

ORLANDO MILTON NORTH BUSINESS  
PARK

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## **TRAFFIC IMPACT STUDY**

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FINAL ▪ OCTOBER 2021

REPORT PREPARED FOR



**ORLANDO CORPORATION**  
6205 AIRPORT ROAD  
MISSISSAUGA, ON L4V 1E3

REPORT PREPARED BY



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## EXECUTIVE SUMMARY

TMIG was retained by Orlando Corporation to prepare a Traffic Impact Study (TIS) for the proposed Orlando Milton North Business Park industrial warehouse development located on 80 hectares of land that consists of two separate parcels of land within the North Milton Business Park Tertiary Plan in Milton, Ontario. The properties are generally located north of James Snow Parkway, west of Esquesing Line, south of 5 Side Road, and east of the CN railway line (located west of Boston Church Road).

The report estimates the site traffic volumes generated by the proposed development during the critical weekday a.m. and p.m. peak hours to assess the impact of site traffic on roadways within the study area and to recommend improvements to accommodate the projected traffic if any are needed. These impacts are based on projected future background traffic and road network conditions derived for 2023, 2028 and 2033 planning horizon years (full build-out, and five and ten years after full build-out in 2023).

As per Orlando's Concept Plan dated August 24, 2021, the proposed development consists of five industrial buildings having a combined gross floor area (G.F.A.) of 3,849,015 ft<sup>2</sup>. The total proposed G.F.A. is divided as follows:

- Three industrial buildings (west of Boston Church Road) with a combined G.F.A. of 1,488,836 ft<sup>2</sup>
- Two industrial buildings (east of Boston Church Road) with a combined G.F.A. of 2,360,179 ft<sup>2</sup>

The site traffic generated by the proposed industrial warehouse development was estimated using ITE Trip Generation Code 150 (Warehousing), and resulted in a total of 746 new two-way vehicle trips during the weekday a.m. peak hour consisting of 548 inbound and 198 outbound trips. During the weekday p.m. peak hour, it is expected to generate a total of 804 new two-way vehicle trips consisting of 232 inbound and 572 outbound trips. 2016 TTS data and the 2009 *Escarpment Business Community* study and expected travel patterns based on site operations provided by the client was used to assign the site trips to the study network. Based on pre-consultation with Town of Milton Staff, an annual growth rate of 2% has been applied to Town Roads (5 Side Road, Boston Church Road and Esquesing Line).

Halton Region Staff provided detailed information regarding annual growth rates and anticipated changes to the annual growth rates based on capital construction projects within the study area and the Region's EMME model forecasts. An annual growth rate of 2% was applied to all Regional roads (James Snow Parkway, Regional Road 25 (RR 25) and Steeles Avenue) prior to planned widening of the roadways. An annual growth rate of 3% was applied to RR 25 from 2023 onwards. Similarly, an annual growth rate was applied to Steeles Avenue from 2023 onwards. After the 2028 study horizon, the annual growth rate applied to James Snow Parkway traffic was increased to 6%.

The annual background growth rates were applied to existing traffic counts, and background development traffic was added to forecast future background traffic for the 2023, 2028 and 2033 horizon years. Two background developments were identified within the study area. The background developments are two parcels of land within the same Tertiary Plan area as the subject site and were assumed to be industrial warehousing sites that would be built-out by the 2028 horizon (after completion of the subject site).

All study intersections (signalized and unsignalized) are expected to have acceptable overall operating characteristics with reserve capacity. The 2023, 2028, and 2033 future total traffic analysis confirms that the incremental impact of the estimated site traffic is minimal and does not contribute to any significant increases in v/c ratios and levels of service. There are no recommended physical improvements to the existing study area intersections due to the impact of introducing site traffic to the study area road network.

Despite not technically warranting traffic signals according to the Ontario Traffic Manual (OTM) Book 12 Justification 7 signal warrant procedure for existing and future traffic volumes, signals are recommended for implementation at the following locations, at the specified study horizon years, due to traffic capacity and safety concerns:

- Esquesing Line and 5 Side Road (2023 onward – triggered by existing over-capacity conditions)
- James Snow Parkway and East Access 3 (2023 onward)
- Boston Church Road and 5 Side Road / Third Line (2028 onward – attributed to background corridor growth)
- James Snow Parkway and East Access 2 (2033 onward)

Left-turn and right-turn lane warrants were conducted at all seven future site access locations, as per MTO and Halton Region guidelines. Left-turn lanes are required at both accesses to the east lands on James Snow Parkway, and right-turn lanes are also recommended to be provided for site operation and safety purposes to facilitate the movement of heavy trucks to/from the site. On Boston Church Road, a left turn and right turn lane are warranted at East Access 1, and a left-turn lane is warranted at West Access 4, however, left-turn lanes are proposed at all accesses along Boston Church Road to better facilitate site traffic operations (such as heavy vehicle turning movements), and overall safety of road users on Boston Church Road. Recommended auxiliary lanes on Boston Church Road can be accommodated within the future 26-metre right-of-way (ROW) cross section with the appropriate pavement making delineation

The 2023, 2028 and 2033 total traffic analysis confirms that all signalized and unsignalized site accesses at full, 5-year & 10-year post build-out are expected to operate with acceptable levels of service during the weekday a.m. and p.m. peak hours and there are no site related queuing issues.



# CONTENTS

<b>1</b>	<b>INTRODUCTION .....</b>	<b>1</b>
1.1	Retainer and Objective.....	1
1.2	Study Background.....	1
<b>2</b>	<b>SITE CHARACTERISTICS .....</b>	<b>2</b>
2.1	Site Location .....	2
2.2	Study Area.....	3
2.3	Site Plan .....	3
2.4	Heritage House located at 8350 Esquising Line .....	5
2.5	Proposed Site Accesses .....	5
2.6	Subdivision Design Review .....	6
2.6.1	Right-of-Way .....	6
2.6.2	Intersection Spacing and Daylighting .....	7
2.6.3	Intersection Angle .....	7
2.6.4	Sight Distance.....	8
<b>3</b>	<b>EXISTING CONDITIONS .....</b>	<b>9</b>
3.1	Road Network .....	9
3.2	Pedestrian Routes .....	9
3.3	Cycling Routes .....	9
3.4	Transit Services.....	10
3.5	Existing Traffic Data.....	10
<b>4</b>	<b>FUTURE BACKGROUND CONDITIONS.....</b>	<b>14</b>
4.1	Study Horizon Years .....	14
4.2	Roadway Improvements .....	14
4.3	Background Growth .....	14
4.4	Background Developments .....	15
4.5	Background Traffic Volumes.....	15
<b>5</b>	<b>SITE TRIP GENERATION .....</b>	<b>19</b>
5.1	Site Trip Generation .....	19
5.2	Site Trip Distribution and Assignment .....	22
<b>6</b>	<b>FUTURE TOTAL TRAFFIC .....</b>	<b>27</b>
<b>7</b>	<b>INTERSECTION CONTROL WARRANT SUMMARY .....</b>	<b>31</b>
7.1	MTO Left Turn Lane Requirement.....	31
7.2	MTO and Halton Region Right Turn Lane Requirement.....	32
7.3	Traffic Signal Warrants .....	33
<b>8</b>	<b>INTERSECTION CAPACITY ANALYSIS .....</b>	<b>34</b>
8.1	Existing Intersections .....	34
8.1.1	Regional Road 25 and 5 Side Road .....	34
8.1.2	Regional Road 25 and James Snow Parkway.....	36
8.1.3	Boston Church Road and James Snow Parkway .....	38
8.1.4	Esquising Line and James Snow Parkway .....	40
8.1.5	James Snow Parkway and Steeles Avenue .....	42

8.1.6	Boston Church Road and 5 Side Road / Third Line .....	44
8.1.7	Esquesing Line and 5 Side Road / Fourth Line.....	46
<b>8.2</b>	<b>Future Intersections .....</b>	<b>47</b>
8.2.1	West Site Access 1 and 5 Side Road .....	47
8.2.2	West Site Access 2 and 5 Side Road .....	48
8.2.3	Boston Church Road and West Site Access 3.....	48
8.2.4	Boston Church Road and West Site Access 4.....	49
8.2.5	Boston Church Road and West Site Access 5.....	49
8.2.6	Boston Church Road and East Site Access 1.....	50
8.2.7	James Snow Parkway and East Site Access 2.....	50
8.2.8	James Snow Parkway and East Site Access 3.....	51
<b>8.3</b>	<b>Building ‘D’ Sensitivity Analysis – 2023 Future Total .....</b>	<b>52</b>
<b>9</b>	<b>QUEUEING ANALYSIS .....</b>	<b>56</b>
<b>10</b>	<b>RECOMMENDATIONS .....</b>	<b>62</b>

## APPENDICES

<b>APPENDIX A</b>	<b>PRE-CONSULTATION CORRESPONDENCE</b>
<b>APPENDIX B</b>	<b>CONCEPT PLAN AND DRAFT PLANS</b>
<b>APPENDIX C</b>	<b>MILTON CROSS SECTIONS</b>
<b>APPENDIX D</b>	<b>EXISTING TRAFFIC DATA</b>
<b>APPENDIX E</b>	<b>HALTON REGION CAPITAL BUDGET MAP</b>
<b>APPENDIX F</b>	<b>BACKGROUND GROWTH TRAFFIC VOLUME FIGURES</b>
<b>APPENDIX G</b>	<b>ESCARPMENT BUSINESS COMMUNITY 2009 STUDY – 2019 TRAFFIC DISTRIBUTION</b>
<b>APPENDIX H</b>	<b>INTERSECTION CONTROL WARRANTS AND CONCEPTUAL DESIGNS</b>
<b>APPENDIX I</b>	<b>SYNCHRO CAPACITY ANALYSIS REPORTS</b>
<b>APPENDIX J</b>	<b>BUILDING D SENSITIVITY SYNCHRO CAPACITY REPORTS</b>
<b>APPENDIX K</b>	<b>SIMTRAFFIC QUEUEING ANALYSIS</b>

## FIGURES

Figure 2-1	Site Location .....	2
Figure 2-2	Orlando Milton North Business Park Concept Plan .....	4
Figure 2-3	Proposed Site Access Locations .....	5
Figure 3-1	Milton Transit OnDemand - 401 Industrial Service Area Map .....	10
Figure 3-2	2019 Baseline Traffic Volumes .....	12
Figure 3-3	2021 Existing Traffic Volumes .....	13
Figure 4-1	2023 Future Background Traffic Volumes .....	16
Figure 4-2	2028 Future Background Traffic Volumes .....	17
Figure 4-3	2033 Future Background Traffic Volumes .....	18
Figure 5-1	Site Traffic Volumes .....	24
Figure 5-2	Automobile Site Traffic Volumes .....	25
Figure 5-3	Heavy Vehicle Site Traffic Volumes .....	26
Figure 6-1	2023 Future Total Traffic Volumes .....	28
Figure 6-2	2028 Future Total Traffic Volume .....	29
Figure 6-3	2033 Future Total Traffic Volumes .....	30

# TABLES

<b>Table 2-1</b>	<b>Intersection Spacing Requirements .....</b>	<b>7</b>
<b>Table 4-1</b>	<b>Annual Growth Rates as per Study Horizon Year.....</b>	<b>15</b>
<b>Table 5-1</b>	<b>Site Trip Generation – West Parcel Buildings.....</b>	<b>20</b>
<b>Table 5-2</b>	<b>Site Trip Generation – East Parcel Buildings.....</b>	<b>21</b>
<b>Table 5-3</b>	<b>Site Trip Generation – East and West Parcels Combined.....</b>	<b>22</b>
<b>Table 5-4</b>	<b>Site Trip Distribution - Automobiles .....</b>	<b>23</b>
<b>Table 5-5</b>	<b>Site Trip Distribution – Heavy Vehicles .....</b>	<b>23</b>
<b>Table 7-1</b>	<b>MTO Left Turn Warrant Summary for James Snow Parkway ..</b>	<b>31</b>
<b>Table 7-2</b>	<b>MTO Left Turn Lane Total Storage Length Summary.....</b>	<b>32</b>
<b>Table 8-1</b>	<b>Regional Road 25 and 5 Side Road Capacity Analysis .....</b>	<b>34</b>
<b>Table 8-2</b>	<b>Regional Road 25 and James Snow Parkway Capacity Analysis.....</b>	<b>36</b>
<b>Table 8-3</b>	<b>Boston Church Road and James Snow Parkway Capacity Analysis.....</b>	<b>38</b>
<b>Table 8-4</b>	<b>Esquesing Line and James Snow Parkway Capacity Analysis.....</b>	<b>40</b>
<b>Table 8-5</b>	<b>James Snow Parkway and Steeles Avenue Capacity Analysis.....</b>	<b>42</b>
<b>Table 8-6</b>	<b>Boston Church Road and 5 Side Road / Third Line Capacity Analysis.....</b>	<b>45</b>
<b>Table 8-7</b>	<b>Esquesing Line and 5 Side Road / Fourth Line Capacity Analysis.....</b>	<b>46</b>
<b>Table 8-8</b>	<b>West Site Access 1 and 5 Side Road Capacity Analysis .....</b>	<b>47</b>
<b>Table 8-9</b>	<b>West Site Access 2 and 5 Side Road Capacity Analysis .....</b>	<b>48</b>
<b>Table 8-10</b>	<b>Boston Church Road and West Site Access 3 Capacity Analysis.....</b>	<b>48</b>
<b>Table 8-11</b>	<b>Boston Church Road and West Site Access 4 Capacity Analysis.....</b>	<b>49</b>
<b>Table 8-12</b>	<b>Boston Church Road and West Site Access 5 Capacity Analysis.....</b>	<b>49</b>
<b>Table 8-13</b>	<b>Boston Church Road and East Site Access 1 Capacity Analysis.....</b>	<b>50</b>
<b>Table 8-14</b>	<b>James Snow Parkway and East Site Access 2 Capacity Analysis.....</b>	<b>50</b>
<b>Table 8-15</b>	<b>James Snow Parkway and East Site Access 3 Capacity Analysis.....</b>	<b>51</b>
<b>Table 8-16</b>	<b>Phase 1 Sensitivity Analysis – Future Total 2023 Capacity Analysis.....</b>	<b>52</b>
<b>Table 9-1</b>	<b>95<sup>th</sup> Percentile Queue Lengths – Existing and Future Background Conditions .....</b>	<b>56</b>
<b>Table 9-2</b>	<b>95<sup>th</sup> Percentile Queue Lengths – Future Total Conditions .....</b>	<b>57</b>

# 1 INTRODUCTION

## 1.1 Retainer and Objective

TMIG was retained by Orlando Corporation to prepare a Traffic Impact Study (TIS) in support of a rezoning application, Regional Official Plan Amendment (ROPA), Local Official Plan Amendment (LOPA), and Draft Plan of Subdivision Applications (West and East) for the proposed industrial warehouse development located on 80 hectares of land that consists of two separate parcels of land north of James Snow Parkway, west of Esquesing Line, south of 5 Side Road, and east of the CN railway line (west of Boston Church Road) in the Town of Milton. The study objectives are as follows:

- Establish existing baseline traffic conditions for the study area and update the baseline conditions to derive the future background volumes at all study intersections for the 2023, 2028 and 2033 planning horizons.
- Analyze future build-out and 5 and 10-year post build-out operating conditions for all study intersections for 2023, 2028 and 2033 planning horizons.
- Based on the composition of the site, apply the estimated site trip generation and distribution to the study area road network and determine the future impacts in the context of all local transportation modes.

## 1.2 Study Background

The proposed development will consist of three industrial buildings on the parcel of land west of Boston Church Road, and two industrial buildings on the parcel of land to the east.

Traffic assessment procedures will comply with the Town of Milton's and Region of Halton's guidelines where applicable, and traffic impacts will be assessed at all identified study intersections for all study horizon years.

A detailed terms of reference was submitted to the Town and Region by TMIG for review. Comments were received from the Town and Region and have informed the general work program for the enclosed study. TMIG's submitted terms of reference and pre-consultation correspondence with the agencies has been included in **Appendix A**.

As agreed upon during pre-consultation, a five-year and ten-year future horizon beyond the anticipated full build-out year (2023) were examined. This study establishes the baseline traffic volumes, estimates the background 2023, 2028 and 2033 traffic growth on the road network in the study area, estimates and assigns new subject site traffic volumes onto the adjacent road network, and documents the expected site (and non-site) related impacts under the 2023, 2028 and 2033 future horizons.

## 2 SITE CHARACTERISTICS

### 2.1 Site Location

The proposed industrial warehouse development is located on 80 hectares of land within the North Milton Business Park Tertiary Plan in Milton, Ontario. The subject lands consist of two parcels of land bisected by Boston Church Road. The combined site is generally bounded by Esquesing Line to the east, the CN Rail corridor to the west, James Snow Parkway to the south, and 5 Side Road to the north. The land adjacent to the subject site consists of agricultural uses and isolated residential use to the north and the east. Predominantly industrial uses are located to the south and the west of the subject lands. The location of the site and the surrounding road network is illustrated in **Figure 2-1**.

**Figure 2-1** Site Location





## 2.2 Study Area

The following study intersections were selected through pre-consultation discussions with the Town and Region:

- Regional Road 25 at James Snow Parkway (Regional Road 4) – Signalized
- Boston Church Road at James Snow Parkway (Regional Road 4) – Signalized
- Esquesing Line at James Snow Parkway (Regional Road 4) – Signalized
- Steeles Avenue (Regional Road 8) at James Snow Parkway (Regional Road 4) – Signalized
- Regional Road 25 at 5 Side Road – Signalized
- Boston Church Road at 5 Side Road
- Esquesing Line at 5 Side Road
- Two Site Accesses at 5 Side Road (Future Condition)
- Three Site Accesses at Boston Church Road (Future Conditions)
- One Site Access at Boston Church Road via a proposed public cul-de-sac (Future Conditions)
- Two Site Accesses via proposed public road intersections at James Snow Parkway (Future Conditions)

## 2.3 Site Plan

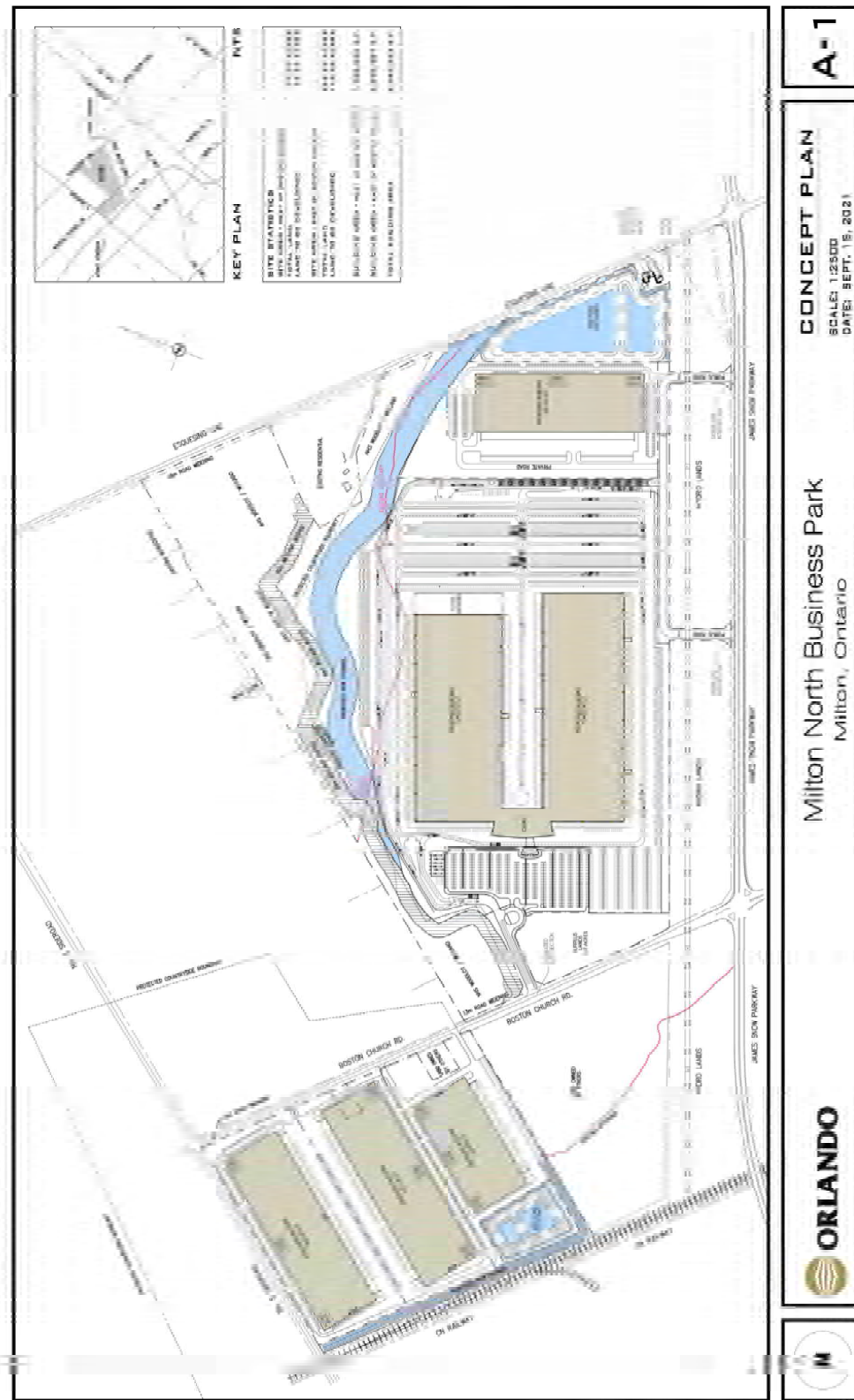
The September 15, 2021 concept plan proposes a total of five buildings with a combined G.F.A. of 2,360,179 ft<sup>2</sup>. Three of the buildings are located on the west parcel, and the remaining two are located on the east parcel. As shown on the concept plan provided as **Figure 2-2** and in **Appendix B**, a total of eight vehicular site accesses to the surrounding road network are proposed.

The proposed development will consist of three industrial buildings on the parcel of land west of Boston Church Road, and two industrial buildings on the parcel of land to the east. The five industrial buildings will have a total combined gross floor area (G.F.A.) of 3,849,015 ft<sup>2</sup>, with 1,488,836 ft<sup>2</sup> G.F.A. located on the west parcel and 2,360,179 ft<sup>2</sup> G.F.A. on the east parcel (*including 63,792 ft<sup>2</sup> G.F.A. assigned to the future expansion of Building 'D', resulting in a total Building 'D' G.F.A. of 1,913,766 ft<sup>2</sup>*).

Phase 1 of the development consists of two buildings on the parcel of land east of Boston Church Road and proposes a total of three full-moves intersections. It is proposed to have one access to Boston Church Road via a public cul-de-sac, and two full-moves intersections to James Snow Parkway via the construction of a new crescent public road that will cross the hydro corridor north of James Snow Parkway, immediately south of the subject site.

Phase 2 of the development consists of three buildings on the parcel of land west of Boston Church Road, and proposes five full-moves access driveways, providing two direct connections to 5 Side Road and three connections to Boston Church Road.

Figure 2-2 Orlando Milton North Business Park Concept Plan





## 2.4 Heritage House located at 8350 Esquising Line

Representatives of the owner of the property municipally described as 8350 Esquising Line (Orlando Corporation lands) approached the Town with a request to facilitate the creation of a block of approximately one acre on the south-east corner of the site, intended to facilitate the relocation of the Aitken-Snow Heritage House approximately 100 metres south from its present location on the west side of Esquising Line north of James Snow Parkway.

As adopted through LOPA 67 (subject to Region approval), it is understood Town staff *‘reviewed the request and considers the “Business Commercial Area” land use designation appropriate for this block. Staff anticipates that the block and building will be occupied by an adaptive re-use, respectful of the heritage and architectural value of the house, consisting of a business and professional office or service commercial use.’*

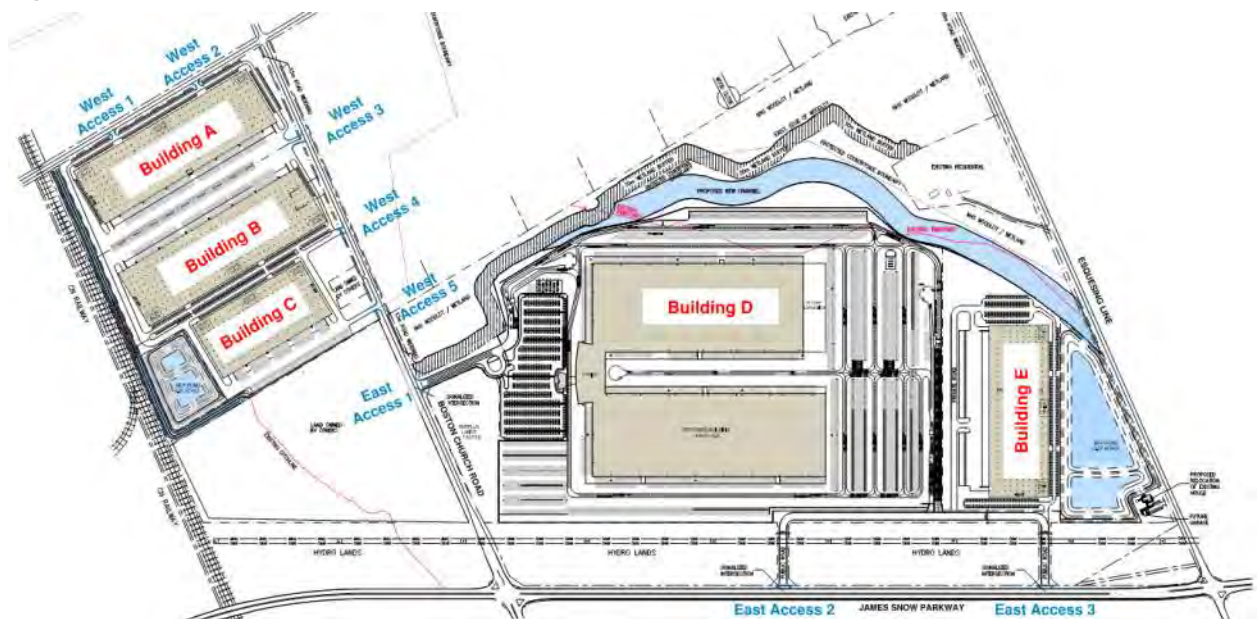
It is TMIG’s opinion the relocation of the Heritage House and changes to the Blocks Land Use designation will have nominal impact to traffic operations in the study area.

## 2.5 Proposed Site Accesses

A total of eight site accesses are proposed to provide access for automobile and heavy vehicle traffic to the east and west parcels of the development. The west parcel proposes five unsignalized accesses; two located on 5 Side Road and three located on Boston Church Road. The east parcel proposes three accesses; one located on Boston Church (unsignalized), and two located on James Snow Parkway (both signalized under 2033 ultimate conditions). The two “accesses” to James Snow Parkway are planned as the two ends of a single crescent public road through the hydro corridor north of James Snow Parkway. The eastern-most access (East Access 3) is proposed to be signalized from 2023 onwards, while the western access to James Snow Parkway (East Access 2) is proposed to be signalized by 2033.

**Figure 2-3** provides the names and locations of all five buildings and the eight proposed accesses to the development. These names were used for analysis and reporting purposes.

**Figure 2-3 Proposed Site Access Locations**



## 2.6 Subdivision Design Review

This section provides a review of design elements for proposed industrial warehouse development. Transportation Association of Canada (TAC) Geometric Design Guidelines and applicable engineering standards for the Town of Milton and Halton Region were referenced where appropriate.

### 2.6.1 Right-of-Way

#### Major Arterial

Through LOPA 67, lands identified a Specific Policy Area No. 42, inclusion of the subject site, shall be subject to additional development application requirements including:

*'James Snow Parkway from Highway 401 to No. 5 Side Road is planned to be widened to six lanes from Highway 401 to Tremaine Road. The proposed start of construction is currently scheduled for 2030, but is subject to change. Should network improvements in the area be required as a result of new development, the applicant will be responsible for the financing and construction of such improvements prior to the scheduled Widening.'*

James Snow Parkway in under Region of Halton jurisdiction and is classified as a C(4) Urban Corridor with an ultimate right-of-way (ROW) with of 47 metres.

As discussed in **Section 4.2** it was assumed for analysis purposes that the widening of James Snow Parkway would be completed by the 2033 planning horizon, and operations were assessed with an additional travel lane in both directions.

#### Collector Roads

Both Boston Church Road and Esquesing Line are identified as Collector roadways in the Town's LOPA Schedule C.2.A). The Town's Official Plan identifies that Collector roads not listed in Table 2A of the Official Plan require a 26 metre ROW. As a result, the Draft Plan of Subdivision (prepared by GSAI) for lands east and west of Boston Church Road identify protection for a 26 metre ROW for both Boston Church Road and Esquesing Line. Due to the forecasted heavy truck volume, upgraded pavement structure is recommended for Boston Church Road, and widened to the ultimate 26 metre ROW as per the Town's LOPA to accommodate the site-related traffic. However, it should be noted a nominal amount of passenger car, and no heavy truck, site-related traffic has been assigned to Esquesing Line, therefore, it is our opinion the need to widen and/or upgrade Esquesing Line is not required at this time. The Draft Plans of Subdivision are located in **Appendix B**.

The roads are to be consistent with Town of Milton engineering design standards for a single or double loaded major collector local road. Town of Milton Standard Drawing E-5 is provided in **Appendix C**.

#### Minor Collector Road

Street 'A', identified within the Draft Plan north of James Snow Parkway on the east side of Boston Church Road, is proposed as 26-metre internal public road terminating at a cul-de-sac providing a connection.

Street 'B', identified within the Draft Plan east of Boston Church Road, is proposed as 24 metre internal public road providing two connections to James Snow Parkway consistent with Town of Milton engineering design standards for a single or double loaded minor collector local road. Town of Milton Standard Drawing E-4 provided in **Appendix C**. The road connections traversing the hydro corridor adjacent to the James Snow Parkway are proposed as part of new development and supported by the Transportation Impact Study herein.

## 2.6.2 Intersection Spacing and Daylighting

### Town of Milton

Town of Milton Engineering and Park Standards Manual states the geometric design of municipal roads shall confirm with the standards set out in the latest edition of the Transportation Association of Canada (TAC) Manual. TAC requires a minimum 400 metre full movement **signalized** access spacing. The proposed Street 'A' on Boston Church Road satisfies the above requirements north of the existing James Snow Parkway intersection.

Additionally, the proposed private driveway accesses proposed to service Phase 1 satisfy TAC minimum access spacing requirements.

Table 1.2 of the Town of Milton Engineering and Park Standards Manual identifies the daylighting requirements at each intersection. The intersection characteristics per the Town's requirements are summarized in **Table 2-1**.

**Table 2-1 Intersection Spacing Requirements**

Intersection	Daylighting (m)	Minimum Intersection Spacing (m)
Local / Laneway	5 – Radius	60
Local / Local	5 – Radius	60
Local / Collector	7.5 - Triangle	60
Collector / Collector	10 - Triangle	60

Note: Three-legged intersections may be spaced a minimum of 40 m (TAC Section 2.3.1.7)

The proposed subdivision road network satisfies the above requirements.

### Halton Region

Table 1 of the Region's Access Management Guideline outlines the minimum spacing requirements for access and road connections to Regional roads. James Snow Parkway is classified as a C (4) Urban Corridor and requires a minimum 300 metre full movement access spacing. The proposed subdivision road network along James Snow Parkway satisfies the above requirements.

The Region's Official Plan requires daylighting triangles measured 15m by 15m at the intersection of a Major Arterial Road with another highway (common and public road). The proposed public road intersections at James Snow Parkway will satisfy this requirement and the Adopted LOPA 67 policy 4.11 (b).

## 2.6.3 Intersection Angle

Intersection angle requirements are provided in Table 1.1 of the Town of Milton Engineering and Park Standards Manual. Intersection angles within the subdivision are provided at 90 degrees which satisfies Town guideline requirements.

It is desirable as per Section 5.4 of the Region's Access Management Guideline that the centerline of the new driveway and the centerline of the Regional Road meet at or nearly at right angles to ensure safe sight visibility when maneuvering to and from the site. The proposed subdivision road network satisfies the above requirements.

#### 2.6.4 Sight Distance

The minimum safe stopping sight distance based on the Town of Milton Engineering and Park Standards Manual for the road network is as follows:

- Laneway (40 km/h design speed): 45 metres
- Local (50 km/h design speed): 65 metres
- Collector (50 or 60 km/h design speed): 65 or 85 metres
- Arterial (60 or 80 km/h design speed): 85 or 140 metres

The smaller numbers are for minor roads and the larger numbers are for major roads.

As per the Region's Access Management Guideline:

*"A safe sight distance is the distance needed by a driver on a Major Arterial, or a driver exiting a driveway of street to verify that the road is clear and to avoid conflicts with other vehicles.*

*Adequate sight distance must be provided for both movements into and out of an access with a minimum of hazard and disruption to traffic. Sight distance requirements must be considered both for vehicles approaching the access and departing from the stopped position at the access."*

Stopping sight distances were reviewed at potential critical locations along the study area road network and based on the intersection angles noted in **Section 2.6.3** and the straight vertical and horizontal alignments of Boston Church Road and James Snow Parkway, none were identified as substandard to the above guidelines.

## 3 EXISTING CONDITIONS

### 3.1 Road Network

The following describes the existing road network within the study area.

**James Snow Parkway (Regional Road 4)** is an urban roadway under the jurisdiction of Halton Region and currently has four travel lanes and runs in a general east-west direction north of Highway 401 in the study area. James Snow Parkway currently extends from Britannia Road in the south to north of Highway 401 through the Milton 401 Business Park area and terminates approximately 900 metres west of Regional Road 25. Within the study area, a posted speed limit of 70 km/h is present along the frontage of the site and transitions to a posted speed limit of 60 km/h at Holgate Crescent, west of the CNR corridor.

**Regional Road 25** is a north-south urban roadway under the jurisdiction of the Region of Halton and has two lanes in each direction of travel with a posted speed limit of 70 km/h within the study area.

**5 Side Road** is an east-west rural roadway under the jurisdiction of the Town of Milton with a paved two-lane cross-section. Within the study area, 5 Side Road has a posted speed limit of 60 km/h.

**Boston Church Road** is a north-south rural roadway under the jurisdiction of the Town of Milton with an existing 20 metre ROW width. Within the study area, Boston Church Road is a paved two-lane roadway with a posted speed limit of 70 km/h south of 5 Side Road that transitions to 60 km/h approximately 130 metres north of James Snow Parkway.

**Esquesing Line** is a north-south rural roadway under the jurisdiction of the Town of Milton with an existing 20 metre ROW width. Within the study area, Esquesing Line is a paved two-lane roadway with a posted speed limit of 60 km/h.

**Steeles Avenue (Regional Road 8)** is an urban roadway under the jurisdiction of Halton Region and currently has four travel lanes and runs in a general east-west direction north of Highway 401. Within Halton Region, Steeles Avenue currently extends from its terminus at Appleby Line in the west to Winston Churchill Boulevard in the east. Within the study area, posted speed limits of 60 and 70 km/h are present west and east of James Snow Parkway, respectively.

### 3.2 Pedestrian Routes

The existing rural cross-sections of 5 Side Road, Boston Church Road, and Esquesing Line within the study area do not provide sidewalks. Sidewalks are not provided along Regional Road 25 between James Snow Parkway and 5 Side Road.

Directly south of the subject site, a multi-use path is provided on the south side of the James Snow Parkway. The multi-use path continues westward to Holgate Crescent (west leg) and then transitions to a standard sidewalk as it approaches Regional Road 25. Boston Church Road has a sidewalk on the west side of the road, south of James Snow Parkway.

Along Steeles Avenue, a multi-use path is present on the south side of the road, while a sidewalk is present on the north side, west of James Snow Parkway.

All signalized intersections within the study area have crosswalks with pedestrian signals.

### 3.3 Cycling Routes

Dedicated bicycle lanes are not currently provided within the study area, however, the mixed-use paths along the south side of James Snow Parkway and Steeles Avenue act as cycling route connections through the area.

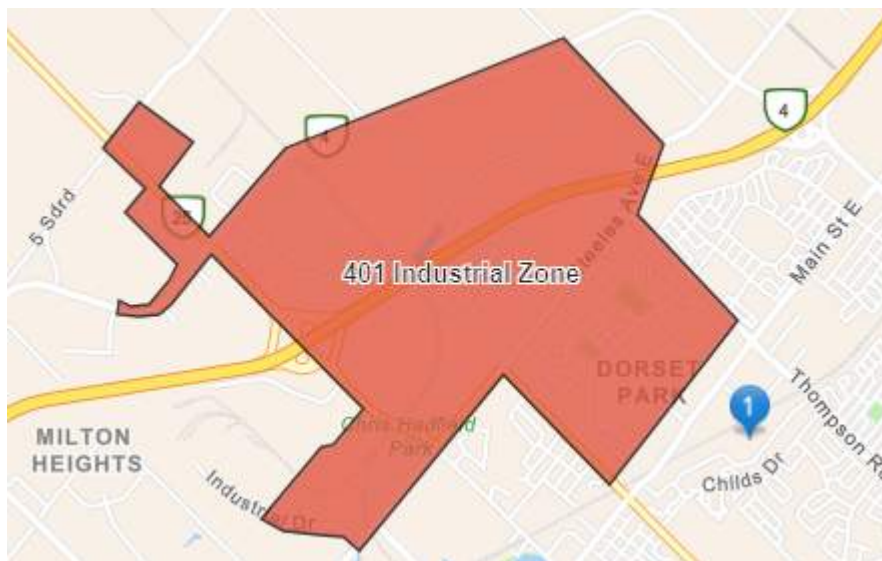


### 3.4 Transit Services

At the time of reporting, Milton Transit operates Routes 1A (Industrial west to east) and 1B (Industrial east to west) within the vicinity of the subject site. The only stop currently serving the site would be at Boston Church Road and James Snow Parkway, located south of the intersection. Bus Routes 1A and 1B provide connections to a GO Transit Bus stop at a carpool lot located at the Highway 401 and Regional Road 25 interchange. The Industrial bus routes also provide a connection to the Milton GO Train Station.

As of September 7, 2021, the industrial routes 1A, B, C, and Trans-Cab will be replaced by the Milton Transit OnDemand service in the 401 Industrial Service Area, which will provide weekday and Saturday transit service without a fixed route or schedule via a mobile app. The transit will connect passengers “to/from available fixed route service at key transfer locations” in the town, via smaller-sized full accessible Milton Transit buses. The service will operate weekdays from 5:15 a.m. to 10:11 p.m., and Saturdays from 7:10 a.m. – 7:40 p.m.. The 401 Industrial Service Area is shown in Figure 3-1, with the Milton Go Station marked as transfer location #1.

**Figure 3-1 Milton Transit OnDemand - 401 Industrial Service Area Map**



It is anticipated that future transit route(s) and/or expanded services will be proposed within the vicinity of the subject site upon full development and occupation of the remaining Milton 401 Industrial/Business Park lands that are adjacent to the subject site to the west and the south.

### 3.5 Existing Traffic Data

Weekday turning movement counts were undertaken by TMIG at existing study intersections (with the exception of James Snow Parkway at Steeles Avenue) on April 16, 2019 during the a.m. and p.m. peak periods. Counts were collected for the a.m. peak period from 7:00 to 10:00 a.m., and the p.m. peak period data was collected from 4:00 to 7:00 p.m.

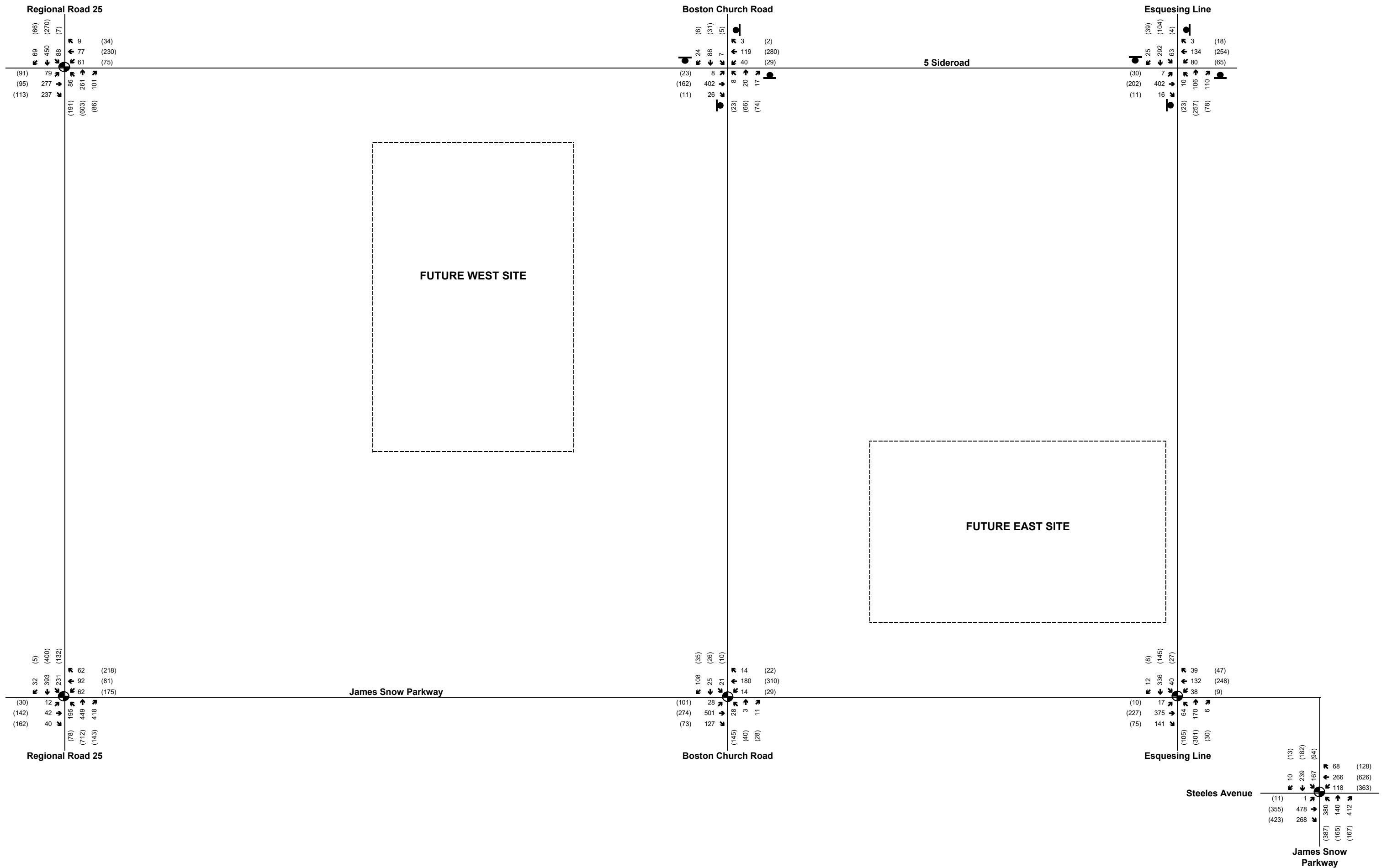
Based on communication with regional Staff in early 2021, it was requested that the intersection of James Snow Parkway and Steeles Avenue be added to the proposed study area. Accordingly, TMIG requested historical counts from the Region’s database, as new turning movement counts collected at the time of the request would be considered atypical due to the ongoing impacts of the COVID-19 Pandemic on traffic volumes and patterns.

Historical turning movement counts for James Snow Parkway at Steeles Avenue East were obtained from the Region, and were counted on April 25, 2018 during the a.m. and p.m. peak periods. Counts were collected for the a.m. peak period from 7:00 to 9:00 a.m., and the p.m. peak hour from 3:00 to 6:00 p.m.. A growth rate of

2% was applied to through movements at the intersection to estimate 2019 baseline traffic volumes in order to bring the volumes in-line with 2019 traffic levels recorded at all other study area intersections.

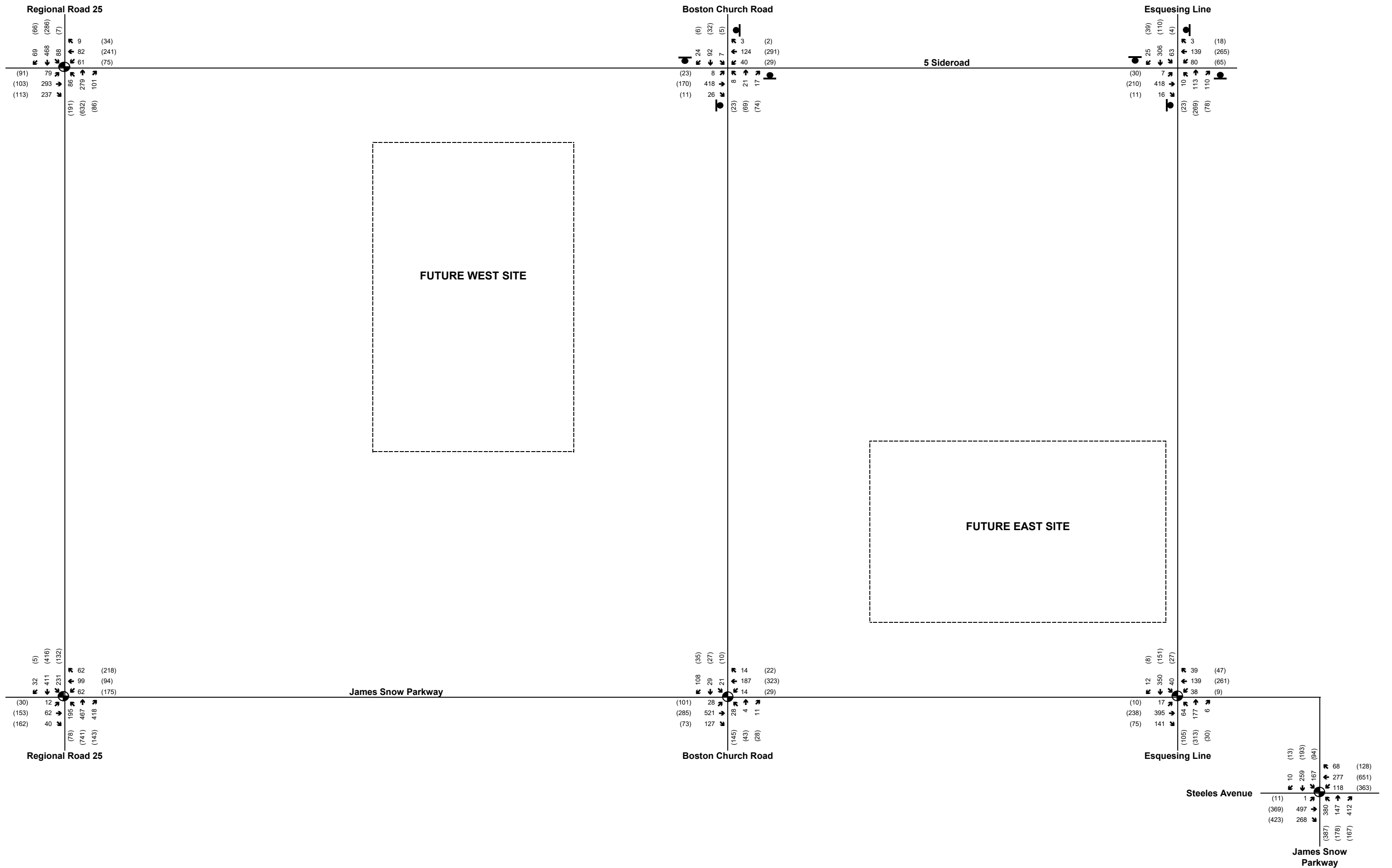
Due to the time that has passed between the collection of the existing traffic counts and the submission of this report, it was determined that counts at all study area intersections would be grown to the 2021 horizon year to estimate existing 2021 volumes. Through volumes at all study area intersections were grown from 2019 to 2021 using an annual growth rate of 2%.

**Figure 3-2** and **Figure 3-3** provide the baseline 2019 and existing 2021 traffic volumes, respectively, at the study intersections for the weekday a.m. and p.m. peak hours. The traffic data is appended in **Appendix D**.



**2019 Baseline Traffic Volumes**  
**Figure 3-2**





**LEGEND**  
 XX AM Peak Hour Volumes  
 (XX) PM Peak Hour Volumes  
 Signalized Intersection  
 Stop Control

**2021 Baseline Traffic Volumes**  
**Figure 3-3**

## 4 FUTURE BACKGROUND CONDITIONS

### 4.1 Study Horizon Years

A planning horizon of 2023 was selected to correspond with the anticipated build-out of the proposed industrial development. The study also includes five (2028) and ten-year (2033) planning horizons beyond full build-out of the proposed development.

### 4.2 Roadway Improvements

As per Halton Region's Budget and Business Plan 2021, Regional Road 25 is scheduled to be widened within the study area. The Region plans to widen Regional Road 25 from four lanes to six lanes between Steeles Avenue to the south, and 5 Side Road to the north with construction scheduled for 2026. The Region also plans to widen Regional Road 25 north of 5 Side Road to 10 Side Road from a 2-lane cross-section to a 4-lane cross-section with construction scheduled for 2024.

Also identified within the Region's 2021 Capital Budget, Steeles Avenue is to be widened from 4 lanes to 6 lanes from Regional Road 25 in the west through the study area to Trafalgar Road in the east, with construction scheduled for 2024.

Given the planned improvements to Regional Road 25 and Steeles Avenue and the anticipated construction start dates, it has been assumed for analysis purposes that the three widening projects will be completed by the 2028 planning horizon. Accordingly, the 2023 analysis will assess operations on Regional Road 25 and Steeles Avenue based on the existing lane configurations, and the 2028 and 2033 analysis will assess operations with an additional travel lane in both directions on Regional Road 25 and Steeles Avenue.

The 2021 Capital Budget also identifies the future widening of James Snow Parkway within the study area. James Snow Parkway is to be widened from 4 lanes to 6 lanes from the Highway 401 interchange to Tremaine Road (west of Regional Road 25), with construction planned to start in 2030. It was assumed for analysis purposes that the widening of James Snow Parkway would be completed by the 2033 planning horizon, and operations were assessed with an additional travel lane in both directions.

No other improvements to Town or Regional roads were identified within the study area for the planning horizons chosen for this study. Excerpts from Halton's 2021 Capital Budget that identify each widening project are provided in **Appendix E**.

### 4.3 Background Growth

Annual traffic growth was applied to all existing roads within the study area by growing the through movements at each study intersection and balancing between intersections as required. Based on consultation with Town of Milton Staff, an annual growth rate of 2% was applied to Town of Milton roads (Boston Church Road, Esquesing Line, and 5 Side Road) within the study area.

Halton Region Staff provided detailed information regarding annual growth rates and anticipated changes to the annual growth rates based on capital construction projects within the study area and the Region's EMME model forecasts. An annual growth rate of 2% was applied to all Halton Region roads (RR 25, James Snow Parkway, and Steeles Avenue) to grow the 2019 baseline traffic data to estimated 2021 existing traffic levels. The 2% annual growth rate was maintained to grow 2021 traffic to the future 2023 full build-out horizon year.

From 2023 onwards, an annual growth rate of 3% was applied to RR 25 to account for widening of the roadway between the 2023 and 2028 horizons. Similarly, to account for future widening of Steeles Avenue, an increased annual growth rate of 4% was applied to Steeles Avenue from 2023 onwards. The Region also plans to widen James Snow Parkway within the study area; however, the widening is not expected to be completed until after the 2028 study horizon. Accordingly, an increased annual growth rate of 6% was applied

to James Snow Parkway traffic from the 2028 horizon year onward to forecast background traffic growth post-widening. A summary of the annual growth rates applied to each road to estimate the background growth for each horizon year within the study area is provided in **Table 4-1**.

**Table 4-1 Annual Growth Rates as per Study Horizon Year**

Road	Annual Growth Rate				
	2018 - 2019	2019 - 2021	2021 - 2023	2023 - 2028	2028 – 2033
Steeles Avenue <sup>1</sup>	2%	2%	2%	4%	4%
RR 25	N/A	2%	2%	3%	3%
James Snow Parkway <sup>1</sup>	2%	2%	2%	2%	6%
5 Side Road	N/A	2%	2%	2%	2%
Boston Church Road	N/A	2%	2%	2%	2%
Esquesing Line	N/A	2%	2%	2%	2%

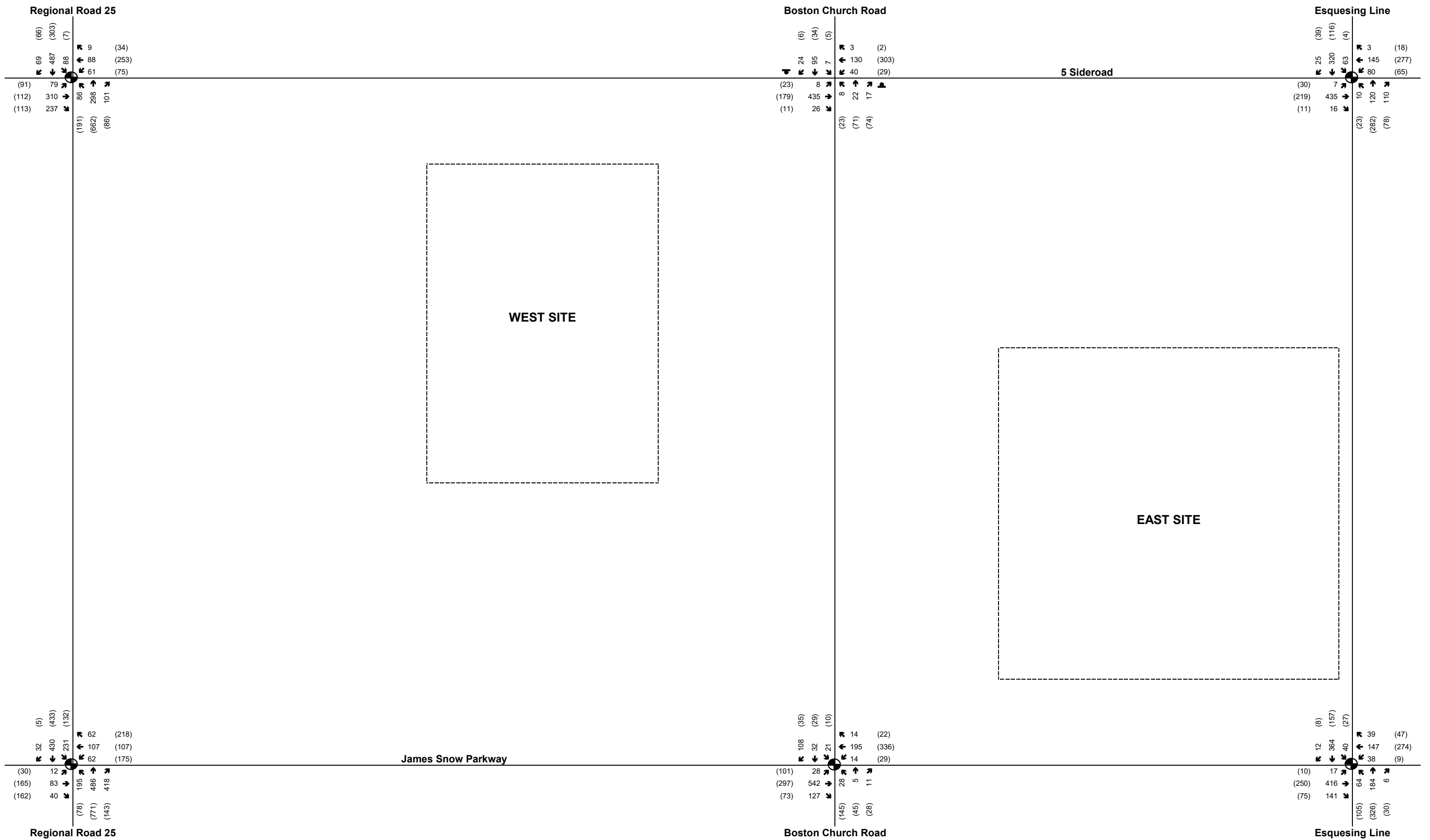
1. As noted in **Section 3.5**, the through movements at the intersection of Steeles Avenue and James Snow Parkway were grown by 2% to bring the historical 2018 Turning Movement Counts provided by the Region in-line with the 2019 counts conducted at all other study area intersections.

#### 4.4 Background Developments

During pre-consultation with the Town of Milton, specific background developments to consider for analysis were not identified within the vicinity of the study area.

#### 4.5 Background Traffic Volumes

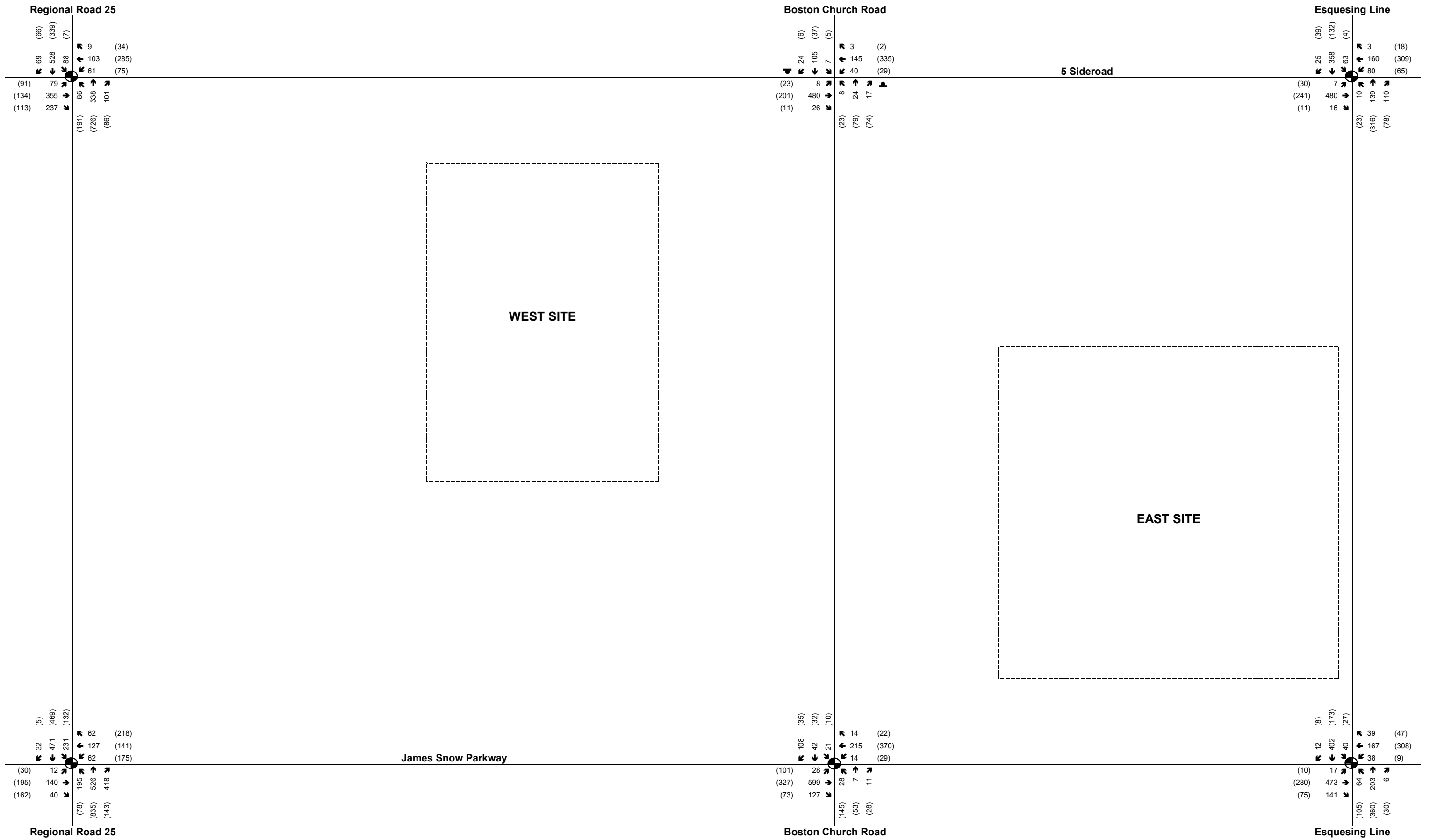
The background traffic volumes were estimated by combining estimated 2021 existing traffic volumes with the total annual traffic growth (2028 and 2033 planning horizons) associated with each of the planning horizon years. The background weekday a.m. and p.m. peak hour volumes for the 2023, 2028, and 2033 planning horizon years are provided in **Figure 4-1**, **Figure 4-2**, and **Figure 4-3**, respectively. Supplemental traffic volume figures for the 2028 horizon year are provided in **Appendix F** that present the number of trips that are attributable to annual background growth.



**LEGEND**

- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes
- ⊕ Signalized Intersection
- ⊙ Stop Control

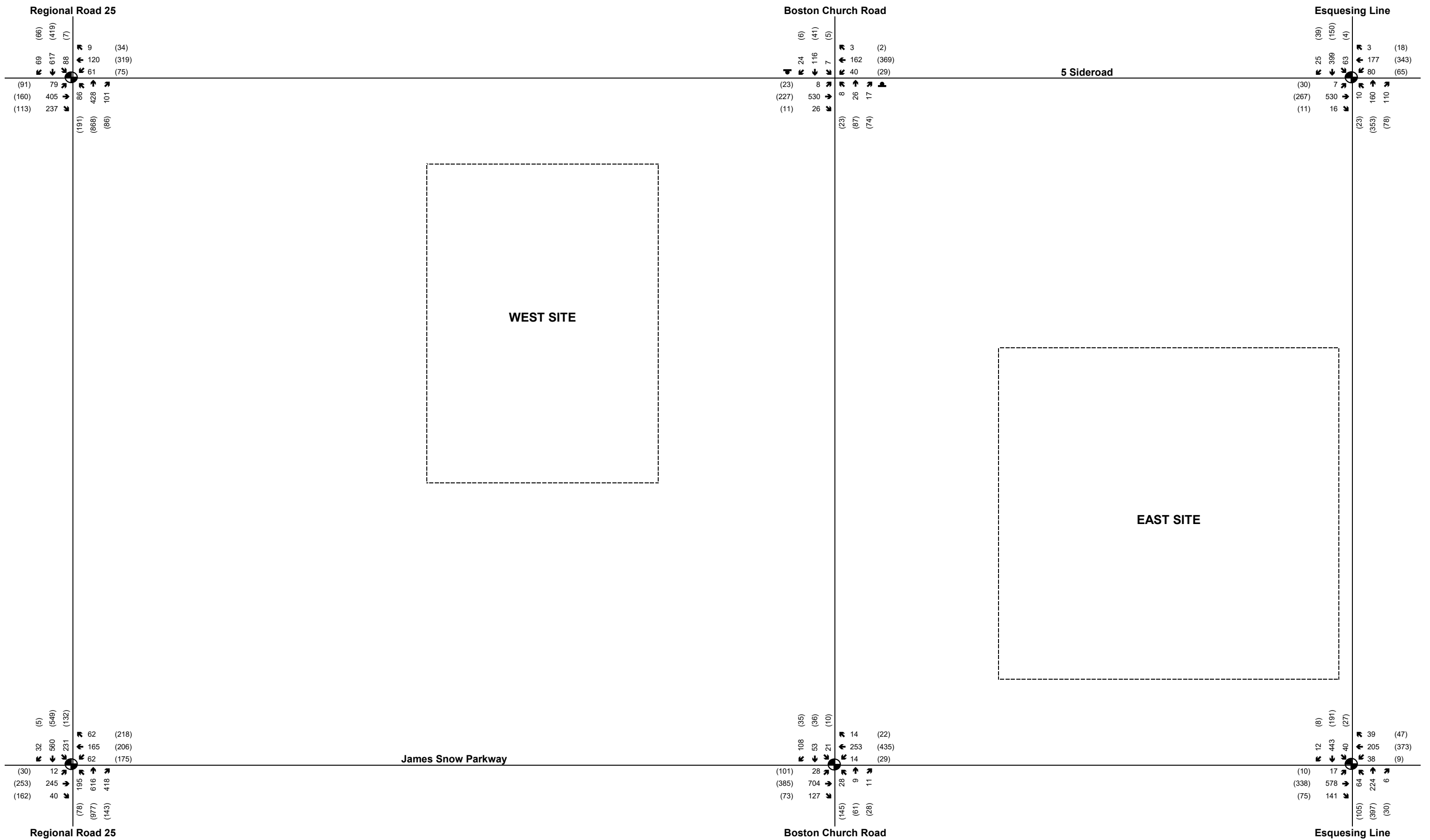
**2023 Future Background Traffic Volumes**  
**Figure 4-1**



**LEGEND**

- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes
- ⊕ Signalized Intersection
- T Stop Control

**2028 Future Background Traffic Volumes**  
**Figure 4-2**



**LEGEND**

- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes
- ⊕ Signalized Intersection
- ⊔ Stop Control

**2033 Future Background Traffic Volumes**  
**Figure 4-3**

## 5 SITE TRIP GENERATION

### 5.1 Site Trip Generation

The proposed concept plan, dated August 24, 2021 consists of five warehouse buildings with a combined total of 3,849,015 ft<sup>2</sup> G.F.A. Three buildings with a combined G.F.A. of 1,488,836 ft<sup>2</sup> are located west of Boston Church Road, and two buildings with a combined G.F.A. of 2,360,179 ft<sup>2</sup> are located to the east. **To protect for any future expansion, an additional 63,792 ft<sup>2</sup> G.F.A. was assigned to accommodate an expansion of Building 'D', resulting in a total Building 'D' G.F.A. of 1,913,766 ft<sup>2</sup>.**

For analysis purposes, the five proposed buildings were labeled as Building 'A' through 'E'. Buildings 'A', 'B', and 'C' are located on the parcel of land west of Boston Church Road. Buildings 'D' and 'E' are located on the parcel of land east of Boston Church Road.

Site traffic generated by the proposed development for the weekday a.m. and p.m. peak hours was estimated by applying the trip rates for Land Use Code (LUC) 150 "Warehousing" in Trip Generation, 10th Edition, published by the Institute of Transportation Engineers (ITE). The greater of the site traffic volumes generated between the fitted curve equation and the average trip generation rates supplied by ITE's Trip Generation manual were chosen to generate site traffic as a conservative measure.

Both the total site trip generation (i.e., all vehicles) and the truck-only trip generation were computed to determine the number of automobile trips for the site. The number of automobile trips was found by subtracting the number of truck trips from the total number of site trips.

For Building D only, located east of Boston Church Road, the heavy vehicle/truck trips generated by the ITE Trip Generation manual were replaced with a prescribed 130 two-way peak hour truck trips. TMIG was instructed to use 130 truck trips during the peak hours for Building D to account for the typical trucking operations of a prospective tenant for Building D. Accordingly, the heavy vehicle site trips generated by Building D are greater than the ITE Trip Generation estimate.

As noted previously, trip generation estimates were adjusted to reflect the proportion of automobiles versus heavy vehicles inherent in an industrial warehouse/distribution centre development. The mix of automobiles and heavy vehicles was based on information provided in ITE's 10<sup>th</sup> edition Trip Generation.

While consideration was given to including a proportion of non-automobile site trips, particularly transit trips, the proposed land use of the subject site is likely to have only a minor component of non-automobile trips. Thus, the site trip estimates conservatively excluded an allowance for non-automobile trips during all peak study hours.

**Table 5-1** summarizes the estimated total trip generation of the west parcel at full build-out of the subject site. Similarly, **Table 5-2** summarizes the estimated total trip generation of the east parcel upon full build-out of the development. The trip generation tables also specify the volume of site trips assigned to heavy vehicles (trucks) and automobiles.

**Table 5-1 Site Trip Generation – West Parcel Buildings**

Building Name and G.F.A. (ft <sup>2</sup> )	Parameters	Peak Hour Trip Generation					
		Weekday AM			Weekday PM		
		In	Out	Total	In	Out	Total
<b>Building 'A'</b> (560,163 ft <sup>2</sup> )	Combined Trip Rate	0.131	0.039	0.170	0.051	0.138	0.189
	Combined Trip Ratio	77%	23%	-	27%	73%	-
	Combined Gross Trips	73	22	95	29	77	106
	Truck Trip Rate	0.010	0.010	0.020	0.016	0.014	0.030
	Truck Trip Ratio	52%	48%	-	52%	48%	-
	Truck Gross Trips	6	5	11	9	8	17
	Automobile Gross Trips	67	17	84	20	69	89
<b>Building 'B'</b> (576,134 ft <sup>2</sup> )	Combined Trip Rate	0.131	0.039	0.170	0.051	0.138	0.189
	Combined Trip Ratio	77%	23%	-	27%	73%	-
	Combined Gross Trips	75	23	98	29	80	109
	Truck Trip Rate	0.011	0.010	0.021	0.015	0.015	0.030
	Truck Trip Ratio	52%	48%	-	52%	48%	-
	Truck Gross Trips	6	6	12	9	8	17
	Automobile Gross Trips	69	17	86	20	72	92
<b>Building 'C'</b> (352,539 ft <sup>2</sup> )	Combined Trip Rate	0.131	0.039	0.170	0.051	0.139	0.190
	Combined Trip Ratio	77%	23%	-	27%	73%	-
	Combined Gross Trips	46	14	60	18	49	67
	Truck Trip Rate	0.010	0.010	0.020	0.016	0.015	0.031
	Truck Trip Ratio	52%	48%	-	52%	48%	-
	Truck Gross Trips	4	3	7	6	5	11
	Automobile Gross Trips	42	11	53	12	44	56
<i>Total New Automobile West Site Trips</i>		<b>178</b>	<b>45</b>	<b>223</b>	<b>52</b>	<b>185</b>	<b>237</b>
<i>Total New Heavy Vehicle West Site Trips</i>		<b>16</b>	<b>14</b>	<b>30</b>	<b>24</b>	<b>21</b>	<b>45</b>
<b>Total New West Site Trips</b>		<b>194</b>	<b>59</b>	<b>253</b>	<b>76</b>	<b>206</b>	<b>282</b>

The three warehouse buildings on the west parcel of the proposed development are expected to generate a total of 253 new two-way vehicle trips during the weekday a.m. peak hour consisting of 194 inbound and 59 outbound trips. During the weekday p.m. peak hour, the west parcel is expected to generate a total of 282 new two-way vehicle trips consisting of 76 inbound and 206 outbound trips.



**Table 5-2 Site Trip Generation – East Parcel Buildings**

Building Name and G.F.A. (ft <sup>2</sup> )	Parameters	Peak Hour Trip Generation					
		Weekday AM			Weekday PM		
		In	Out	Total	In	Out	Total
<b>Building 'D'</b> (1,913,766 ft <sup>2</sup> ) <sup>1</sup>	ITE Combined Trip Rate	0.131	0.039	0.170	0.051	0.139	0.190
	ITE Combined Trip Ratio	77%	23%	-	27%	73%	-
	ITE Combined Gross Trips	250	75	325	98	266	364
	ITE Truck Trip Rate	0.010	0.010	0.020	0.015	0.015	0.030
	ITE Truck Trip Ratio	52%	48%	-	52%	48%	-
	ITE Truck Gross Trips	-20	-18	-38	-30	-27	-57
	Automobile Gross Trips	230	57	287	68	239	307
	Prescribed Truck Trips	65	65	130	65	65	130
	Revised Total Site Trips	295	122	417	133	304	437
<b>Building 'E'</b> (446,413 ft <sup>2</sup> )	Combined Trip Rate	0.131	0.039	0.170	0.051	0.139	0.190
	Combined Trip Ratio	77%	23%	-	27%	73%	-
	Combined Gross Trips	59	17	76	23	62	85
	Truck Trip Rate	0.010	0.010	0.020	0.015	0.014	0.029
	Truck Trip Ratio	52%	48%	-	52%	48%	-
	Truck Gross Trips	5	4	9	7	6	13
	Automobile Gross Trips	54	13	67	16	56	72
<i>Total New Automobile East Site Trips</i>	<i>284</i>	<i>70</i>	<i>354</i>	<i>84</i>	<i>295</i>	<i>379</i>	
<i>Total New Heavy Vehicle East Site Trips</i> <sup>2</sup>	<i>70</i>	<i>69</i>	<i>139</i>	<i>72</i>	<i>71</i>	<i>143</i>	
<b>Total New East Site Trips</b>	<b>354</b>	<b>139</b>	<b>493</b>	<b>156</b>	<b>366</b>	<b>522</b>	

1. Conservative trip generation completed based on a higher Building 'D' G.F.A. provided in August 24, 2021 concept plan (1,849,974 ft<sup>2</sup>), as the 'extra' 63,792 ft<sup>2</sup> G.F.A. used for trip generation purposes and analysis accounts for traffic generated by the Building 'D' future expansion noted on the concept plan.
2. Equal to the sum of the Prescribed Truck Trips for Building 'D' and Truck Gross Trips for Building 'E'.

The two warehouse buildings located on the east parcel of the proposed development are expected to generate a total of 493 new two-way vehicle trips during the weekday a.m. peak hour consisting of 354 inbound and 139 outbound trips. During the weekday p.m. peak hour, the east parcel is expected to generate a total of 522 new two-way vehicle trips consisting of 156 inbound and 366 outbound trips.

**Table 5-3** summarizes the total trips generated by the east and west parcels of land and the overall total trip generation of the proposed industrial warehouse site.

**Table 5-3 Site Trip Generation – East and West Parcels Combined**

Parcel Name and G.F.A. (ft <sup>2</sup> )	Parameters	Peak Hour Trip Generation					
		Weekday AM			Weekday PM		
		In	Out	Total	In	Out	Total
<b>West Parcel</b> (1,488,836 ft <sup>2</sup> )	Automobile Trips	178	45	223	52	185	237
	Truck Trips	16	14	30	24	21	45
	<b>Total Trips</b>	194	59	253	76	206	282
<b>East Parcel</b> (2,360,179 ft <sup>2</sup> )	Automobile Trips	284	70	354	84	295	379
	Truck Trips	70	69	139	72	71	143
	<b>Total Trips</b>	354	139	493	156	366	522
<i>Total New Automobile Site Trips</i>		462	115	577	136	480	616
<i>Total New Heavy Vehicle Site Trips</i>		86	83	169	96	92	188
<b>Total New Site Trips</b>		548	198	746	232	572	804

The proposed development is expected to generate a combined total of 746 new two-way vehicle trips during the weekday a.m. peak hour consisting of 548 inbound and 198 outbound trips. During the weekday p.m. peak hour, it is expected to generate a total of 804 new two-way vehicle trips consisting of 232 inbound and 572 outbound trips.

## 5.2 Site Trip Distribution and Assignment

The new trips generated by the subject site were assigned to the surrounding road network on a building-by-building basis for the purposes of distributing site traffic across the multiple site accesses for each parcel of land. Consideration was also made for assigning heavy vehicle and automobile site traffic differently. For example, no truck traffic was assigned to 5 Side Road, as it was assumed all heavy vehicles would access the site via accesses on James Snow Parkway and Boston Church Road.

Distribution of site traffic was derived from a review of 2016 Transportation Tomorrow Survey (TTS) summary data and existing travel patterns. Automobile site traffic was assigned to the road network based on these distributions and are provided in **Table 5-4**. The distribution of site traffic derived from 2016 TTS data was also used to inform the distribution of heavy vehicle site traffic, however, a review of information from the *Escarpment Business Community 2009 Study* (EBC Study) prepared by Sernas Transtech as it relates to the site was also used. The 2019 Site Traffic distribution figure in the EBC Study (provided in **Appendix G**) summarized the differing distribution of automobiles and heavy vehicles in the vicinity of the Escarpment Business Community. The distributions applied to the heavy vehicle site traffic are provided in **Table 5-5**.

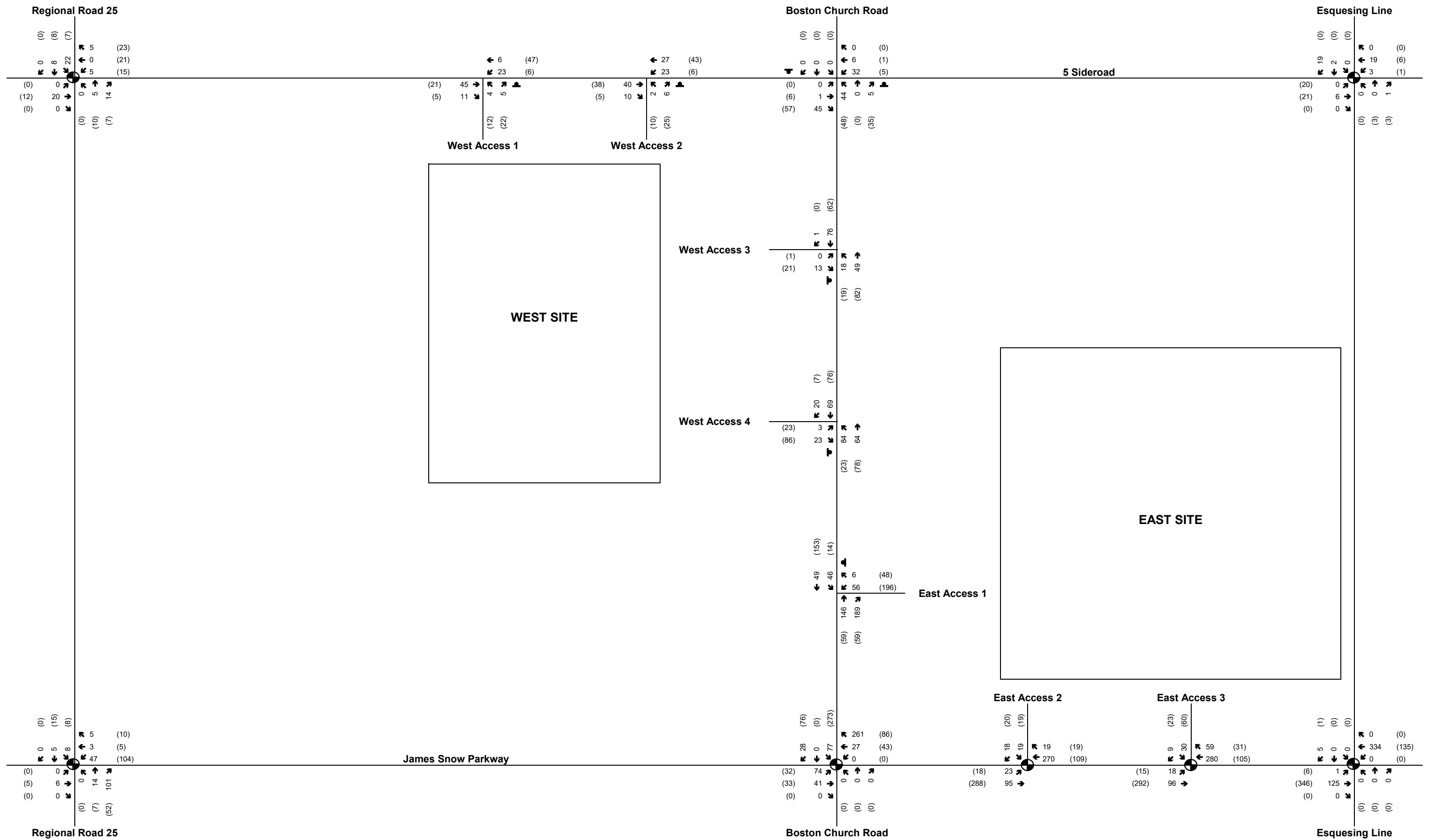
The estimated site trips generated by the proposed development as assigned to the nearby road network for the weekday a.m. and p.m. peak hours are provided in **Figure 5-1**. More detailed trip assignment, divided into auto and truck site traffic, is provided in **Figure 5-2** and **Figure 5-3**, respectively.

**Table 5-4 Site Trip Distribution - Automobiles**

Trip Orientation	AM Peak Hour		PM Peak Hour	
	Inbound	Outbound	Inbound	Outbound
North	10%	5%	5%	10%
South	45%	25%	65%	50%
East	35%	35%	25%	30%
West	10%	35%	5%	10%
Total	100%	100%	100%	100%

**Table 5-5 Site Trip Distribution – Heavy Vehicles**

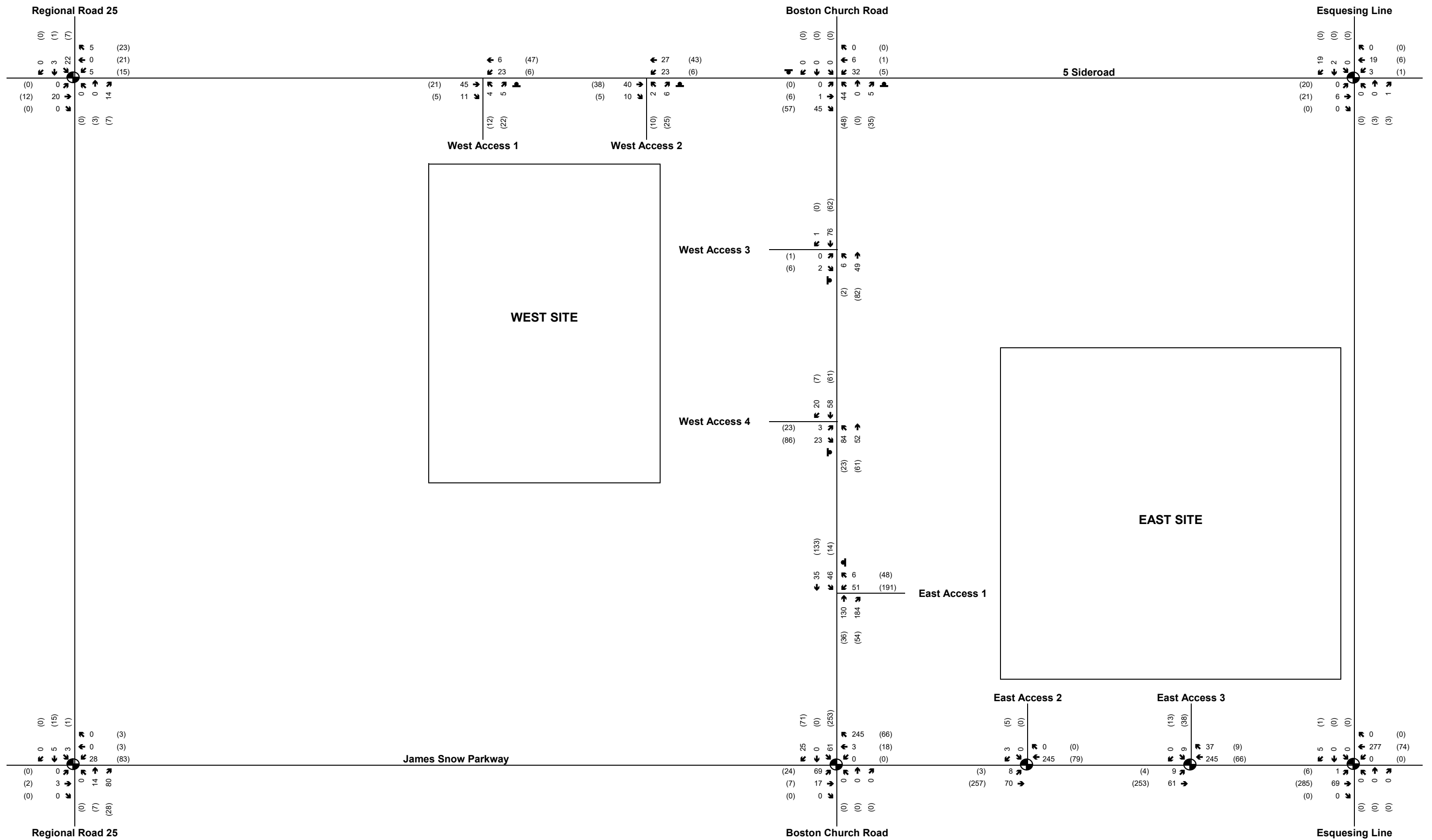
Trip Orientation	AM Peak Hour		PM Peak Hour	
	Inbound	Outbound	Inbound	Outbound
North	7%	7%	7%	7%
South	30%	30%	30%	30%
East	38%	38%	38%	38%
West	25%	25%	25%	25%
Total	100%	100%	100%	100%



**LEGEND**

- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes
- ⊕ Signalized Intersection
- ⊖ Stop Control

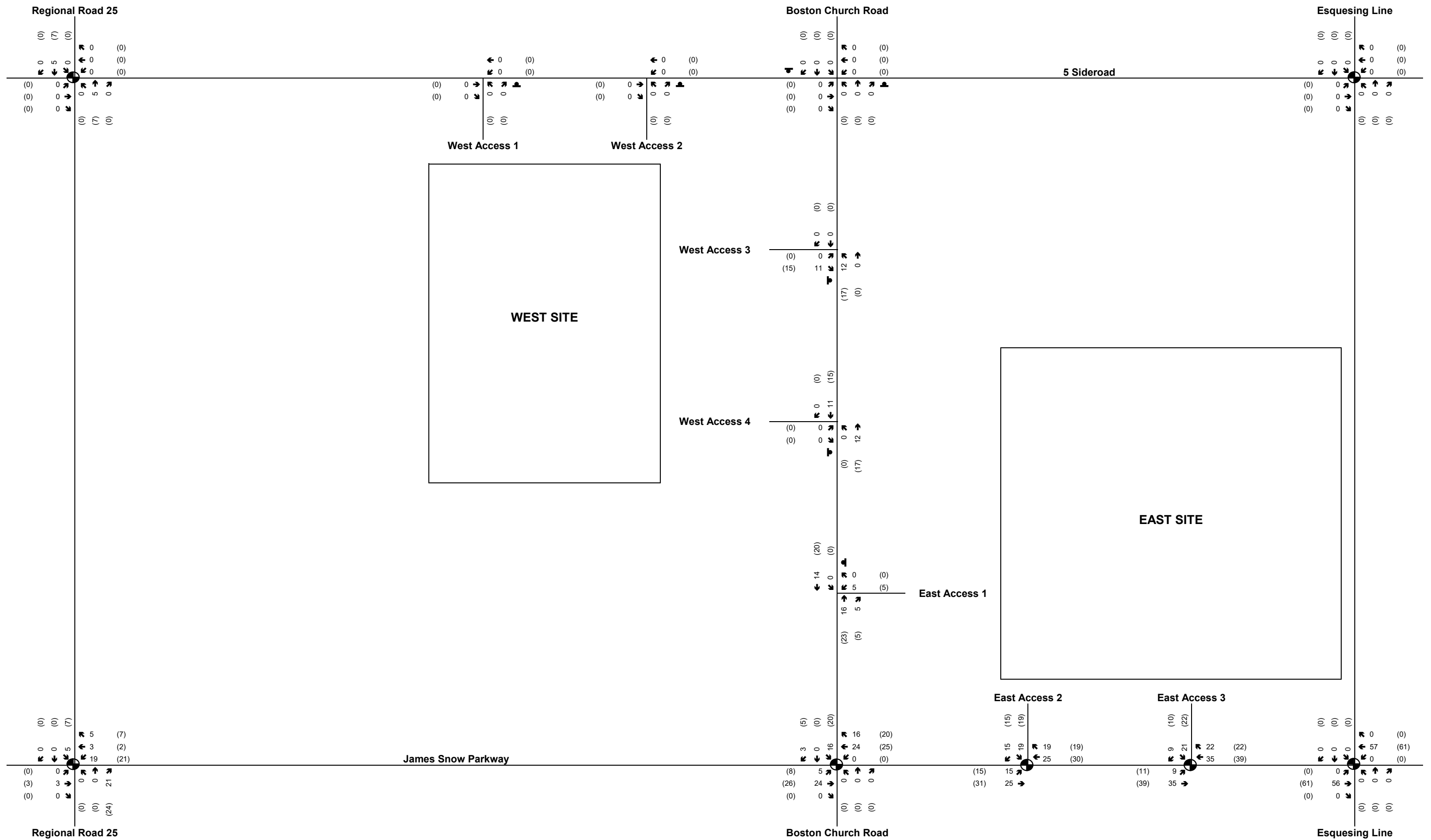
**Site Traffic Volumes**  
**Figure 5-1**



**LEGEND**

- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes
- ⊕ Signalized Intersection
- ⊖ Stop Control

**Automobile Site Traffic Volumes**  
**Figure 5-2**



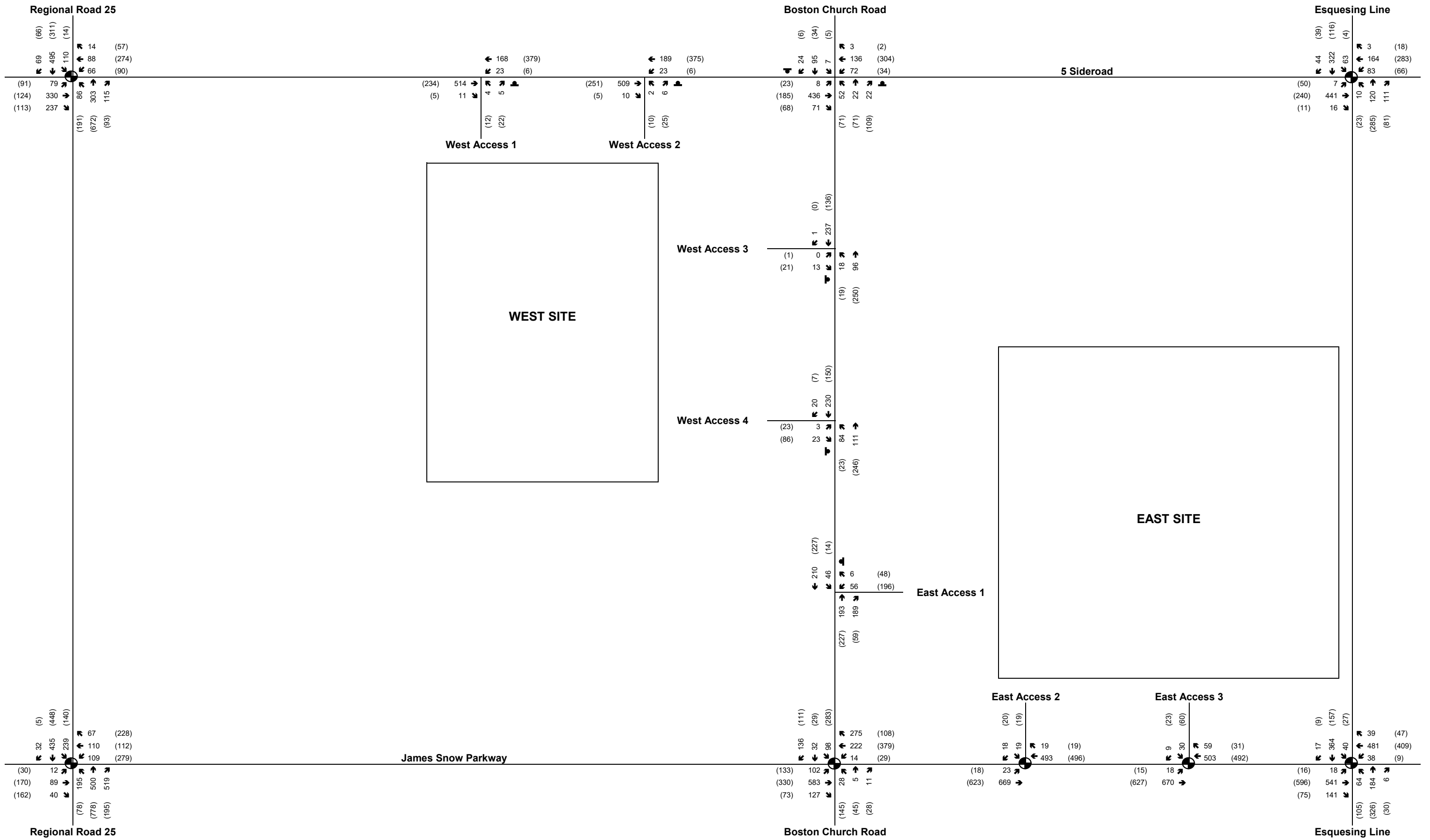
**LEGEND**  
 XX AM Peak Hour Volumes  
 (XX) PM Peak Hour Volumes  
 Signalized Intersection  
 Stop Control

**Heavy Vehicle Site Traffic Volumes  
 Figure 5-3**

## 6 FUTURE TOTAL TRAFFIC

The future total traffic conditions for the peak study hours in the 2023, 2028, and 2033 planning horizons were derived by combining the projected future background traffic for each horizon year with the estimated total subject site traffic.

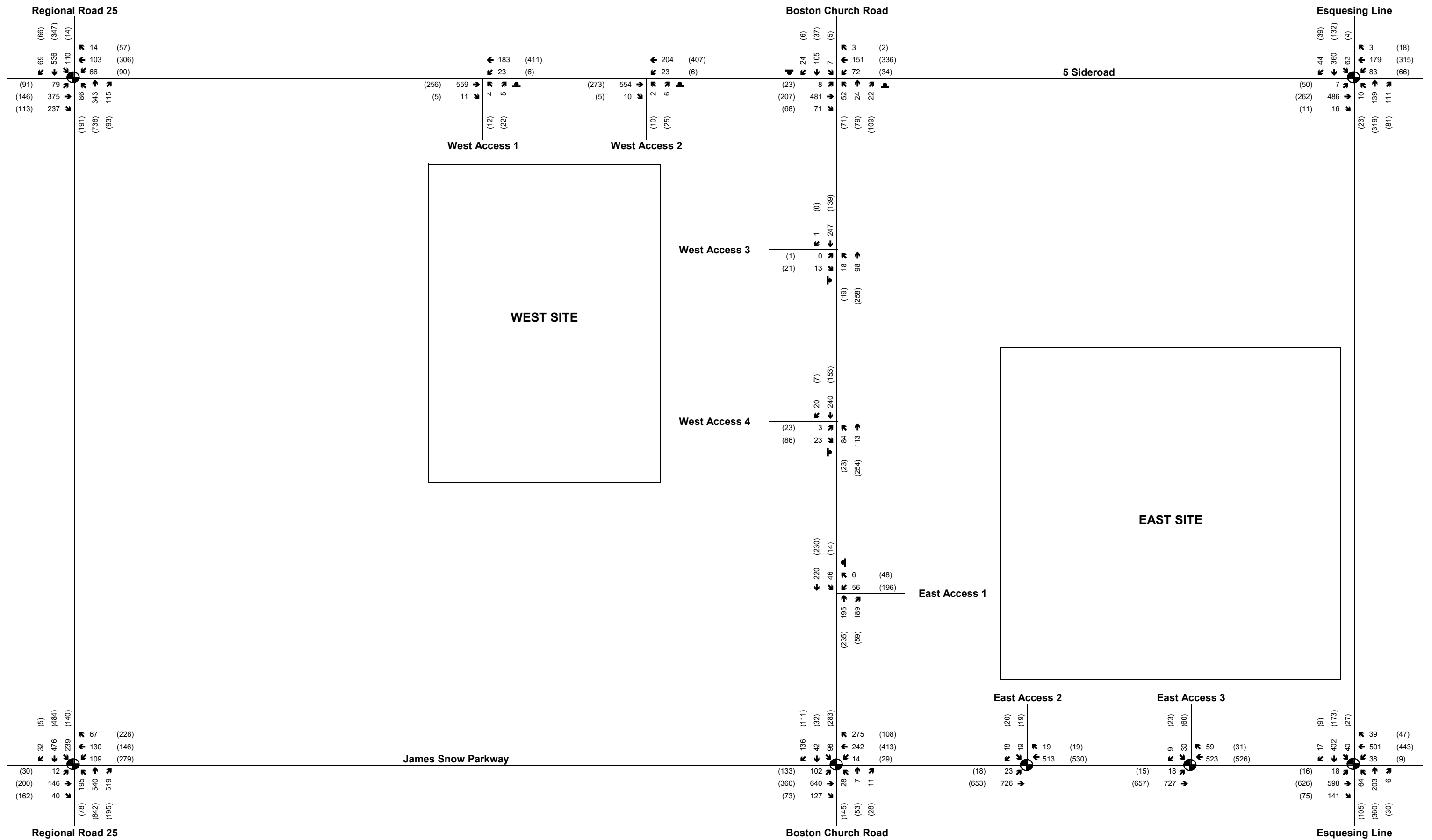
**Figures 6-1, 6-2, and 6-3** summarize the future total traffic volumes for the 2023, 2028, and 2033 planning horizons, respectively, during the weekday a.m. and p.m. peak hours.



- LEGEND**
- XX AM Peak Hour Volumes
  - (XX) PM Peak Hour Volumes
  - ⊕ Signalized Intersection
  - ⊖ Stop Control

**2023 Future Total Traffic Volumes**  
**Figure 6-1**

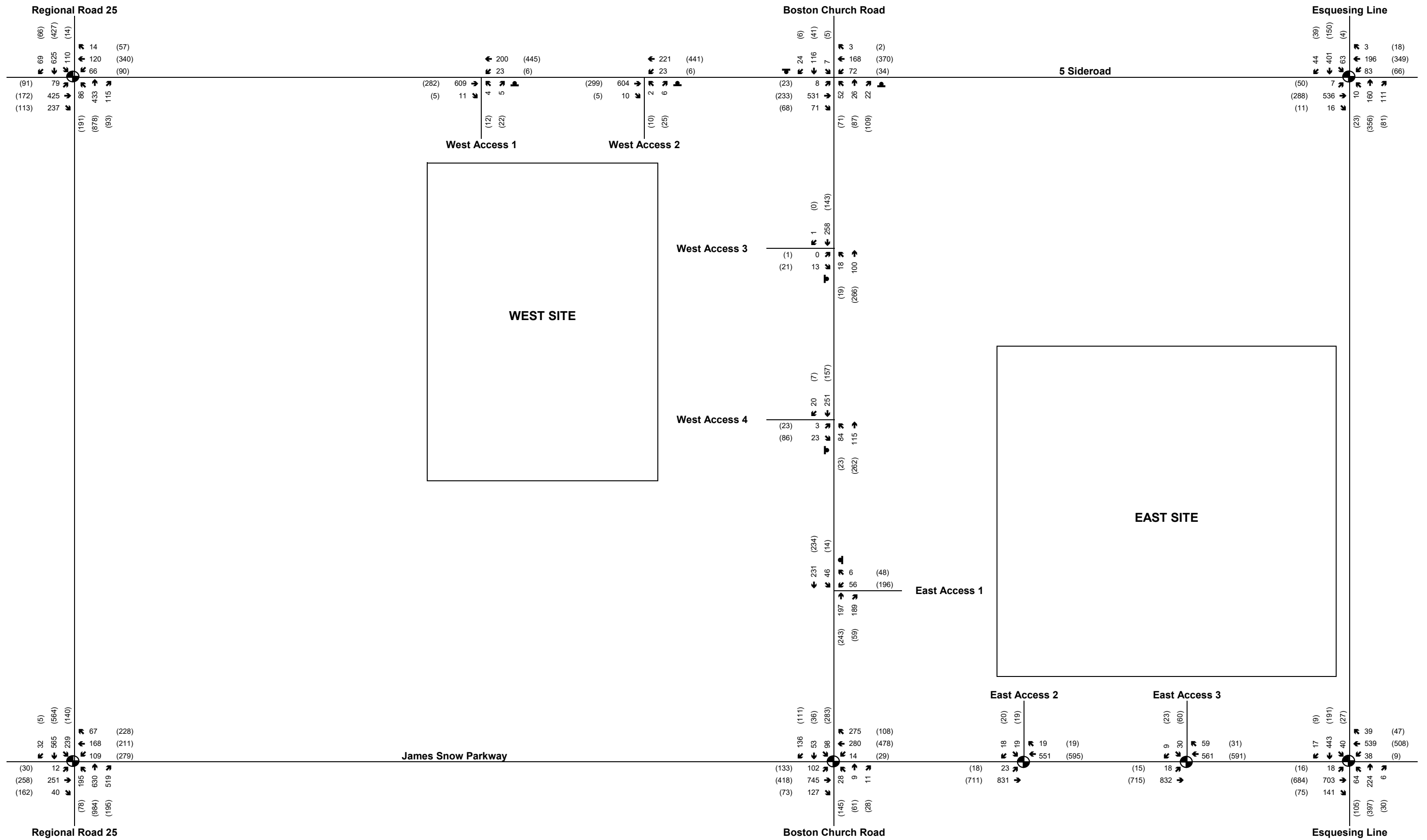




**LEGEND**

- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes
- ⊕ Signalized Intersection
- ⊖ Stop Control

**2028 Future Total Traffic Volumes**  
**Figure 6-2**



**2033 Future Total Traffic Volumes**  
**Figure 6-3**

# 7 INTERSECTION CONTROL WARRANT SUMMARY

## 7.1 MTO Left Turn Lane Requirement

The MTO left turn lane warrants were used to determine if left turn lanes were warranted at the intersections of proposed site accesses and public roads.

The 2033 Future Total turning, advancing, and opposing volumes at the proposed site accesses are provided in **Appendix H**. With the exception of 5 Side Road, a posted speed limit of 70 km/h with a design speed of 90 km/h was assumed for all roads. The posted speed limit on 5 Side Road is 60 km/h and a design speed of 80 km/h was assumed.

Under 2033 traffic conditions, MTO left turn lane warrants were conducted for unsignalized intersections along a two-lane highway. Left-turn lanes were warranted or recommended at the following locations:

- West Access 4 on Boston Church Road (15 m storage, 75 m taper)
- East Access 1 on Boston Church Road (15 m storage, 75 m taper)
- East Access 2 on James Snow Parkway (90 m storage, 145 m taper).
- East Access 3 on James Snow Parkway (90 m storage, 145 m taper)

For the site accesses along James Snow Parkway, MTO left turn warrants were conducted for unsignalized intersections along a divided four-lane highway. **Table 7-1** summarizes the turning, advancing, and opposing volumes at the proposed public road intersections on James Snow Parkway.

**Table 7-1 MTO Left Turn Warrant Summary for James Snow Parkway**

Intersection	V <sub>L</sub> (Left Turn Traffic Volume)	V <sub>A</sub> (Advancing Traffic Volume)	% of Left Turns in VA	V <sub>O</sub> (Opposing Traffic Volume)	Left Turn Lane Warranted?
<b>Future Total 2033 AM Peak Hour</b>					
James Snow Parkway & East Site Access 2	23	854	5%	570	Yes 15 m Storage <sup>1</sup>
James Snow Parkway & East Site Access 3	18	850	5%	620	Yes 15 m Storage
<b>Future Total 2033 PM Peak Hour</b>					
James Snow Parkway & East Site Access 2	18	729	5%	614	Yes 15 m Storage <sup>1</sup>
James Snow Parkway & East Site Access 3	15	730	5%	622	Yes 15 m Storage

1. Minimum storage is the larger value between the a.m. and p.m. peak hour.

As summarized in **Table 7-1**, a left turn warrant is satisfied at East Site Access 2 and East Site Access 3 at James Snow Parkway by the 2033 horizon year with a minimum storage length of 15 metres.

According to Halton Region’s Access Management Guideline:

*Access management provides a systematic means of balancing the access and mobility requirements of roads. Access management is the process that manages access to land development while simultaneously preserving the flow of traffic on the surrounding public road system in terms of safety, capacity and speed.*

Thus, to adhere to the goals of the Region’s access guidelines, TMIG recommends the implementation of both left turn lanes. These auxiliary lanes are essential from both a safety and capacity perspective. Additionally, as heavy vehicles require more time and space to complete a turn or decelerate/accelerate compared to passenger vehicles, it is safer to have a dedicated turning lane for heavy vehicles.

Furthermore, the proposed public road intersections on James Snow Parkway at East Site Access 2 and 3 satisfy the minimum access spacing requirement of 300 metres for a signalized or unsignalized full moves intersection, as per Halton Region’s Access Management Guideline (James Snow Parkway is classified as a C4 Urban Corridor according to Halton Region’s Right-of-Way Classification Code).

As per Table E9-1, Table E9-3, and Figure E9-1 of the *MTO Geometric Design Standards Chapter E: At-Grade Intersections*, additional storage requirements were determined based on the percentage of heavy vehicle volumes making the eastbound left turn movement. **Table 7-2** below shows the total storage requirements required for the eastbound left turn lanes for the 2 site access intersections on James Snow Parkway. As shown in **Table 7-1**, the p.m. peak hour volumes did not warrant a turning lane, thus only the a.m. peak hour volumes were used to determine the total storage length.

**Table 7-2 MTO Left Turn Lane Total Storage Length Summary**

Intersection	AM Peak Hour	
James Snow Parkway North & East Site Access 2	Number of Trucks making Left Turn	15
	Percentage of Trucks making Left Turn	65%
	Additional Storage Length (m) (Table E9-3)	15
	Taper Length (m) (Table E9-1)	145
	Deceleration Lane (m) (Table E9-1)	205
	Parallel Lane (m) (Table E9-1)	60
	<b>Total Storage Length (m) (Minimum Storage + Additional Storage + Parallel Lane)</b>	<b>90</b>
James Snow Parkway North & East Site Access 3	Number of Trucks making Left Turn	9
	Percentage of Trucks making Left Turn	50%
	Additional Storage Length (m) (Table E9-3)	15
	Taper Length (m) (Table E9-1)	145
	Deceleration Lane (m) (Table E9-1)	205
	Parallel Lane (m) (Table E9-1)	60
	<b>Total Storage Length (m) (Minimum Storage + Additional Storage + Parallel Lane)</b>	<b>90</b>

Therefore, as summarized in **Table 7-2**, the eastbound left turn lanes for both East Site Access 2 and 3 on James Snow Parkway are recommended to have a total storage distance of 90 metres.

Although not warranted, left-turn lanes for West Accesses 3 and 5 on Boston Church Road were recommended to accommodate trucks entering the West Site. A 40-metre storage with a 75 metre taper is recommended.

## 7.2 MTO and Halton Region Right Turn Lane Requirement

Per MTO Geometric Design Standards, Chapter E, “*When the volume of right turning vehicles is such that it creates a hazard and reduces capacity at an intersection, or when the volume approaches the channelization criteria, as outlined in Sub-Chapter E.8, consideration should be given to the provision of a deceleration lane in the form of a taper and parallel lane for the right turning traffic.*”

Sub-Chapter E.8 states that right turn lanes may be constructed when right turning traffic volumes for the design hour is 60 vehicles per hour or more. The only proposed site access that satisfies this criterion is the

northbound right movement at Boston Church Road and East Access 1, which has a right turning volume of 189 in the a.m. peak hour.

As per Table E7-1 from the *MTO Geometric Design Standards, Chapter E*, it is determined that the northbound right turn lane for East Site Access 1 on Boston Church Road is recommended to have a storage length of 70 metres and a taper length of 75 metres.

Per Halton Region Access Management Guidelines, auxiliary right-turn lanes are recommended for accesses that:

- Have sufficient volume of decelerating vehicles
- Have right turn volume at signalized intersections of 10% of the through traffic volume
- Have constrained sight distance approaching the access

As all accesses on 5 Side Road and Boston Church Road are proposed as unsignalized accesses, the recommended volume warrant was not applicable. However, given the number of vehicles expected to turn right into East Access 1 on Boston Church Road and the potential for heavy vehicles to also use this movement, a northbound right-turn lane at East Access 1 is recommended.

Given the number of vehicles and the percentage of heavy vehicles expected to turn right at the East Site Accesses on James Snow Parkway (both of which are proposed to be signalized by the 2033 horizon year), TMIG recommends providing westbound right-turn lanes at East Access 2 and East Access 3 with storage length of 80 metres and a taper length of 75 metres per TAC standards. Halton Region right turn lane warrant summaries are provided in **Appendix H**.

Conceptual Design plans have been prepared for James Snow Parkway (CD-00) and Boston Church Road (CD-01) as per TAC, MTO and Halton Region guidelines identified above. The Conceptual Designs are provided in **Appendix H**.

### 7.3 Traffic Signal Warrants

The existing unsignalized intersections of 5 Side Road at Esquesing Line and 5 Side Road at Boston Church Road were evaluated to confirm justification for traffic signal installation. The Ontario Traffic Manual (OTM) Book 12 Justification 7 Signal Warrant Analysis was applied to the unsignalized intersections. Signal warrants are provided in **Appendix H**.

The 5 Side Road and Esquesing Line intersection did not satisfy the OTM signal warrant under Existing 2021 traffic conditions or ultimate 2033 Future Total conditions. The intersection of 5 Side Road and Boston Church Road also did not satisfy the OTM signal warrant under Existing 2021 traffic conditions or ultimate 2033 Future Total conditions.

Traffic signal warrant analysis was also completed for three East Site Accesses under the ultimate 2033 Future Total scenario. Signals were found to not be warranted at any of the East Site Accesses.

Despite not warranting traffic signals according to the OTM warrant, signals are recommended for implementation at the following locations due to traffic capacity and safety concerns:

- Esquesing Line and 5 Side Road (2023 onward – triggered by existing over-capacity conditions)
- James Snow Parkway and East Access 3 (2023 onward)
- Boston Church Road and 5 Side Road / Third Line (2028 onward – attributed to background corridor growth)
- James Snow Parkway and East Access 2 (2033 onward)

## 8 INTERSECTION CAPACITY ANALYSIS

The capacity analysis identifies how well the study area intersections and access driveways are operating and how they are expected to operate in the future. The analysis contained in this report utilized the Highway Capacity Manual (HCM) 2000 techniques within the Synchro Version 10 software package. The reported intersection volume-to-capacity ratios (v/c) are a measure of the saturation volume for each turning movement, while the levels-of-service (LOS) are a measure of the average delay for each turning movement. Queuing characteristics are reported as the predicted 95<sup>th</sup> percentile queue for each turning movement.

The analysis includes identification of all intersections and for all movements; v/c ratios, delay, LOS indicators and 95<sup>th</sup> percentile queue lengths. ‘Critical’ signalized intersections and movements, as per Town of Milton and Halton Region guidelines, are defined as:

- Volume/capacity (v/c) ratios for overall intersection operations, through movements, or shared through/turning movements increased to 0.85 or above;
- v/c ratios for exclusive movements increased to 0.95 or above; and
- Queues for individual movements are projected to exceed available turning lane storage.

The guidelines identify the following ‘critical’ operation levels for unsignalized intersections:

- Level of Service (LOS) based on average delay per vehicle, on individual movements exceeds LOS “D” (i.e., is “E” or “F”); or
- The estimated 95<sup>th</sup> percentile queue length for an individual movement exceeds the available queue storage.

The following tables summarize the Synchro/HCM capacity results for the study intersections during the weekday a.m. and p.m. peak hours under existing (2021), future 2023, 2028, and 2033 traffic conditions. ‘Critical movements’, as listed above, will be **bolded** in the capacity tables. For detailed Synchro reports, see **Appendix I**.

### 8.1 Existing Intersections

#### 8.1.1 Regional Road 25 and 5 Side Road

The capacity analysis results for the existing signalized intersection of Regional Road 25 and 5 Side Road are summarized in **Table 8-1** for both the weekday a.m. and p.m. peak hours under existing and future traffic conditions.

**Table 8-1 Regional Road 25 and 5 Side Road Capacity Analysis**

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Existing 2019	<i>Overall</i>	0.73	28	C	0.62	23	C
	EBL	0.18	18	B	0.36	23	C
	EBTR	<b>0.88</b>	40	D	0.43	25	C
	WBL	0.49	31	C	0.40	33	C
	WBTR	0.19	25	C	0.78	45	D
	NBL	0.37	17	B	0.52	15	B
	NBT	0.22	16	B	0.44	15	B
	NBR	0.08	15	B	0.07	11	B
	SBL	0.29	24	C	0.03	21	C
SBTR	0.54	27	C	0.34	24	C	

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Background 2023	<i>Overall</i>	0.75	28	C	0.63	23	C
	EBL	0.18	18	B	0.37	23	C
	EBTR	<b>0.89</b>	41	D	0.44	24	C
	WBL	0.50	31	C	0.39	33	C
	WBTR	0.20	25	C	0.79	46	D
	NBL	0.38	18	B	0.54	15	B
	NBT	0.24	17	B	0.47	15	B
	NBR	0.08	15	B	0.07	12	B
	SBL	0.30	25	C	0.03	21	C
SBTR	0.57	28	C	0.36	24	C	
Future Total 2023	<i>Overall</i>	0.77	29	C	0.67	25	C
	EBL	0.17	17	B	0.39	23	C
	EBTR	<b>0.90</b>	42	D	0.44	24	C
	WBL	0.56	34	C	0.44	33	C
	WBTR	0.20	25	C	<b>0.85</b>	51	D
	NBL	0.39	19	B	0.56	17	B
	NBT	0.25	17	B	0.49	16	B
	NBR	0.09	16	B	0.07	13	B
	SBL	0.38	27	C	0.07	23	C
SBTR	0.59	29	C	0.39	26	C	
Future Total 2028	<i>Overall</i>	0.75	34	C	0.69	26	C
	EBL	0.15	16	B	0.41	23	C
	EBTR	<b>0.94</b>	50	D	0.46	24	C
	WBL	0.47	23	C	0.43	32	C
	WBTR	0.17	20	B	<b>0.89</b>	56	<b>E</b>
	NBL	0.51	27	C	0.56	18	B
	NBT	0.23	24	C	0.38	16	B
	NBR	0.09	23	C	0.07	13	B
	SBL	0.45	34	C	0.08	24	C
SBTR	0.49	33	C	0.30	26	C	
Future Total 2033	<i>Overall</i>	0.80	33	C	0.75	28	C
	EBL	0.16	16	B	0.44	24	C
	EBTR	<b>0.95</b>	50	D	0.49	24	C
	WBL	0.69	48	D	0.43	32	C
	WBTR	0.24	24	C	<b>0.94</b>	65	<b>E</b>
	NBL	0.45	22	C	0.62	20	B
	NBT	0.26	20	C	0.46	17	B
	NBR	0.09	19	B	0.07	14	B
	SBL	0.48	32	C	0.10	25	C
SBTR	0.54	31	C	0.37	27	C	

The intersection is operating well overall, with acceptable operational characteristics under all study conditions and peak hours. The overall v/c ratio of the intersection during the weekday a.m. and p.m. peak hours does not exceed 0.80 and 0.75, respectively, for any study horizon year. The intersection operates with an overall LOS of 'C' during both peak hours for all planning horizons.

Individual movements at the intersection are operating with reserve capacity under all study conditions and peak hours, operating with v/c ratios of 0.79 or less and LOS 'D' or better, with the exception of the eastbound through/right movement during the weekday a.m. peak hour and the westbound through/right movement during the weekday p.m. peak hours.

Under existing conditions, the eastbound through/right movement operates with a v/c ratio of 0.88 and LOS 'D' during the a.m. peak hour. By 2033, the movement is expected to operate with a v/c ratio of 0.95 and LOS 'D', largely due to background growth and high volumes of eastbound right-turning vehicles. Similarly, the westbound through/right movement operates with LOS 'D' under existing conditions, and by the 2023 Future Total horizon, the v/c ratio increases to 0.85. The movement is expected to operate with a v/c ratio of 0.94 and LOS 'E' under 2033 Future Total conditions.

It is recommended that the Town and Region monitor the intersection and should eastbound traffic experience the predicted delays, investigate the feasibility of constructing a dedicated eastbound right-turn lane in order to ease capacity constraints for the movements and the overall intersection. Further optimization of the signal timings, particularly after the widening of Regional Road 25, could also be investigated as a mitigation measure for any capacity constraints experienced by eastbound and westbound traffic in the future.

### 8.1.2 Regional Road 25 and James Snow Parkway

The capacity analysis results for the existing signalized intersection of Regional Road 25 and James Snow Parkway are summarized in **Table 8-2** for both the weekday a.m. and p.m. peak hours under existing and future traffic conditions.

**Table 8-2 Regional Road 25 and James Snow Parkway Capacity Analysis**

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Existing 2021	<i>Overall</i>	<i>0.44</i>	<i>15</i>	<i>B</i>	<i>0.64</i>	<i>23</i>	<i>C</i>
	EBL	0.07	21	C	0.12	24	C
	EBT	0.12	21	C	0.20	24	C
	EBR	0.04	20	C	0.15	24	C
	WBL	0.34	24	C	0.69	38	D
	WBT	0.16	21	C	0.10	23	C
	WBR	0.05	20	C	0.19	24	C
	NBL	0.38	9	A	0.18	14	B
	NBT	0.46	16	B	0.66	24	C
	NBR	0.30	15	B	0.10	17	B
	SBL	0.48	9	A	0.41	13	B
	SBTR	0.44	16	B	0.34	18	B



Future Background 2023	<i>Overall</i>	<i>0.44</i>	<i>15</i>	<i>B</i>	<i>0.65</i>	<i>23</i>	<i>C</i>
	EBL	0.07	21	C	0.12	24	C
	EBT	0.16	21	C	0.21	25	C
	EBR	0.04	21	C	0.15	25	C
	WBL	0.35	24	C	0.70	39	D
	WBT	0.18	21	C	0.12	24	C
	WBR	0.05	21	C	0.19	25	C
	NBL	0.39	9	A	0.18	14	B
	NBT	0.47	16	B	0.67	25	C
	NBR	0.30	15	B	0.10	17	B
	SBL	0.48	9	A	0.43	13	B
SBTR	0.45	16	B	0.35	18	B	
Future Total 2023	<i>Overall</i>	<i>0.52</i>	<i>17</i>	<i>B</i>	<i>0.78</i>	<i>31</i>	<i>C</i>
	EBL	0.06	21	C	0.09	22	C
	EBT	0.15	22	C	0.16	23	C
	EBR	0.04	21	C	0.15	23	C
	WBL	0.52	28	C	0.83	50	D
	WBT	0.15	22	C	0.09	22	C
	WBR	0.06	21	C	0.20	24	C
	NBL	0.40	10	B	0.22	22	C
	NBT	0.48	18	B	0.76	38	D
	NBR	0.37	17	B	0.14	26	C
	SBL	0.52	11	B	0.58	24	C
SBTR	0.45	17	B	0.41	27	C	
Future Total 2028	<i>Overall</i>	<i>0.54</i>	<i>17</i>	<i>B</i>	<i>0.73</i>	<i>29</i>	<i>C</i>
	EBL	0.06	20	C	0.08	19	B
	EBT	0.23	21	C	0.18	19	B
	EBR	0.04	20	B	0.15	19	B
	WBL	0.54	27	C	0.80	41	D
	WBT	0.18	21	C	0.11	19	B
	WBR	0.06	20	C	0.20	20	B
	NBL	0.42	11	B	0.24	23	C
	NBT	0.38	17	B	0.67	35	D
	NBR	0.37	18	B	0.22	29	C
	SBL	0.54	11	B	0.58	25	C
SBTR	0.36	17	B	0.35	28	C	

Future Total 2033	<i>Overall</i>	0.57	19	B	0.79	30	C
	EBL	0.06	22	C	0.15	32	C
	EBT	0.27	23	C	0.27	33	C
	EBR	0.04	22	C	0.15	32	C
	WBL	0.58	31	C	0.78	34	C
	WBT	0.15	22	C	0.11	19	B
	WBR	0.06	22	C	0.25	21	C
	NBL	0.44	11	B	0.27	23	C
	NBT	0.41	18	B	0.76	36	D
	NBR	0.54	20	C	0.26	28	C
	SBL	0.57	12	B	0.66	28	C
	SBTR	0.39	17	B	0.39	26	C

The intersection is operating well with acceptable operational characteristics under all study conditions and peak hours. The overall v/c ratio of the intersection during the weekday a.m. and p.m. peak hours does not exceed 0.57 or 0.79 for any study horizon, respectively. The intersection is expected to operate with an overall LOS 'B' and 'C' during the weekday a.m. and p.m. peak hours, respectively, for all planning horizons.

Individual movements at the intersection are operating with reserve capacity for all study horizon years and peak hours, operating with v/c ratios of 0.85 or less and LOS 'D' or better.

### 8.1.3 Boston Church Road and James Snow Parkway

The capacity analysis results for the existing signalized intersection of Boston Church Road and James Snow Parkway are summarized in **Table 8-3** for both the weekday a.m. and p.m. peak hours under existing and future traffic conditions.

**Table 8-3 Boston Church Road and James Snow Parkway Capacity Analysis**

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Existing 2021	<i>Overall</i>	0.40	18	B	0.46	21	C
	EBL	0.07	12	B	0.29	14	B
	EBTR	0.58	18	B	0.35	19	B
	WBL	0.08	14	B	0.12	19	B
	WBTR	0.19	15	B	0.44	24	C
	NBL	0.16	23	C	0.47	19	B
	NBT	0.01	24	C	0.04	19	B
	NBR	0.01	24	C	0.03	19	B
	SBL	0.06	17	B	0.08	32	C
	SBT	0.04	21	C	0.10	33	C
	SBR	0.08	22	C	0.03	33	C

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Background 2023	<i>Overall</i>	0.41	17	B	0.47	22	C
	EBL	0.07	11	B	0.31	15	B
	EBTR	0.59	17	B	0.41	22	C
	WBL	0.08	13	B	0.11	19	B
	WBTR	0.20	14	B	0.48	25	C
	NBL	0.13	20	B	0.45	18	B
	NBT	0.01	21	C	0.04	18	B
	NBR	0.01	21	C	0.03	18	B
	SBL	0.07	20	C	0.06	29	C
	SBT	0.05	22	C	0.07	30	C
SBR	0.08	22	C	0.03	30	C	
Future Total 2023	<i>Overall</i>	0.50	20	B	0.62	27	C
	EBL	0.31	12	B	0.44	18	B
	EBTR	0.62	19	B	0.41	23	C
	WBL	0.08	16	B	0.12	22	C
	WBTR	0.41	20	C	0.64	32	C
	NBL	0.23	31	C	0.58	32	C
	NBT	0.01	31	C	0.11	37	D
	NBR	0.01	31	C	0.03	37	D
	SBL	0.28	20	B	0.61	23	C
	SBT	0.05	23	C	0.05	30	C
SBR	0.10	24	C	0.08	30	C	
Future Total 2028	<i>Overall</i>	0.52	20	C	0.64	28	C
	EBL	0.29	11	B	0.45	18	B
	EBTR	0.63	19	B	0.43	23	C
	WBL	0.08	16	B	0.12	22	C
	WBTR	0.43	21	C	0.67	33	C
	NBL	0.25	33	C	0.59	33	C
	NBT	0.02	34	C	0.14	38	D
	NBR	0.01	34	C	0.03	38	D
	SBL	0.29	22	C	0.62	24	C
	SBT	0.06	25	C	0.06	31	C
SBR	0.10	26	C	0.08	31	C	

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Total 2033	<i>Overall</i>	<i>0.45</i>	<i>19</i>	<i>B</i>	<i>0.59</i>	<i>26</i>	<i>C</i>
	EBL	0.31	12	B	0.46	18	B
	EBTR	0.54	18	B	0.36	23	C
	WBL	0.09	16	B	0.14	23	C
	WBTR	0.36	20	B	0.56	30	C
	NBL	0.23	30	C	0.58	31	C
	NBT	0.02	31	C	0.15	36	D
	NBR	0.01	31	C	0.03	36	D
	SBL	0.28	19	B	0.60	22	C
	SBT	0.08	23	C	0.06	29	C
	SBR	0.10	23	C	0.08	29	C

The intersection is operating well with acceptable operational characteristics under all study conditions and peak hours. The overall v/c ratio of the intersection during the weekday a.m. peak hour does not exceed 0.52, and v/c ratio during the p.m. peak hour does not exceed 0.64 for any study horizon year. The intersection operates with an overall LOS of 'C' or better during both peak hours for all horizon years.

Individual movements at the intersection are expected to continue operating with significant reserve capacity under all study conditions and peak hours, operating with v/c ratios of 0.67 or less with LOS 'D' or better.

#### 8.1.4 Esquesing Line and James Snow Parkway

The capacity analysis results for the existing signalized intersection of Esquesing Line and James Snow Parkway are summarized in **Table 8-4** for both the weekday a.m. and p.m. peak hours under existing and future traffic conditions.

**Table 8-4 Esquesing Line and James Snow Parkway Capacity Analysis**

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Existing 2021	<i>Overall</i>	<i>0.58</i>	<i>19</i>	<i>B</i>	<i>0.46</i>	<i>15</i>	<i>B</i>
	EBL	0.05	15	B	0.04	14	B
	EBTR	0.59	22	C	0.39	17	B
	WBL	0.15	14	B	0.03	14	B
	WBTR	0.18	16	B	0.41	17	B
	NBL	0.28	17	B	0.27	12	B
	NBT	0.31	16	B	0.52	15	B
	NBR	0.01	14	B	0.02	11	B
	SBL	0.11	15	B	0.09	11	B
	SBT	0.63	21	C	0.26	12	B
	SBR	0.01	14	B	0.01	11	B

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Background 2023	<i>Overall</i>	<i>0.60</i>	<i>20</i>	<i>B</i>	<i>0.48</i>	<i>15</i>	<i>B</i>
	EBL	0.05	15	B	0.04	14	B
	EBTR	0.62	22	C	0.41	17	B
	WBL	0.15	14	B	0.03	14	B
	WBTR	0.19	17	B	0.42	17	B
	NBL	0.29	17	B	0.27	12	B
	NBT	0.32	17	B	0.54	15	B
	NBR	0.01	14	B	0.02	11	B
	SBL	0.11	15	B	0.10	11	B
	SBT	0.64	22	C	0.27	12	B
SBR	0.01	14	B	0.01	11	B	
Future Total 2023	<i>Overall</i>	<i>0.65</i>	<i>22</i>	<i>C</i>	<i>0.62</i>	<i>19</i>	<i>B</i>
	EBL	0.07	15	B	0.06	13	B
	EBTR	0.70	24	C	0.68	21	C
	WBL	0.18	14	B	0.05	13	B
	WBTR	0.53	19	B	0.48	17	B
	NBL	0.31	20	B	0.29	16	B
	NBT	0.33	19	B	0.58	20	B
	NBR	0.01	16	B	0.02	14	B
	SBL	0.12	17	B	0.11	15	B
	SBT	0.67	25	C	0.29	16	B
SBR	0.01	16	B	0.01	14	B	
Future Total 2028	<i>Overall</i>	<i>0.70</i>	<i>23</i>	<i>C</i>	<i>0.66</i>	<i>20</i>	<i>B</i>
	EBL	0.07	15	B	0.06	13	B
	EBTR	0.74	26	C	0.69	21	C
	WBL	0.19	15	B	0.05	15	B
	WBTR	0.53	20	C	0.52	19	B
	NBL	0.36	22	C	0.29	17	B
	NBT	0.36	20	B	0.64	22	C
	NBR	0.01	17	B	0.02	15	B
	SBL	0.12	18	B	0.13	16	B
	SBT	0.73	28	C	0.32	17	B
SBR	0.01	17	B	0.01	15	B	

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Total 2033	<i>Overall</i>	0.66	22	C	0.61	19	B
	EBL	0.08	16	B	0.07	14	B
	EBTR	0.63	24	C	0.56	19	B
	WBL	0.20	15	B	0.05	15	B
	WBTR	0.43	20	B	0.45	19	B
	NBL	0.37	20	C	0.28	16	B
	NBT	0.37	19	B	0.67	21	C
	NBR	0.01	15	B	0.02	13	B
	SBL	0.12	16	B	0.13	15	B
	SBT	0.75	27	C	0.33	16	B
	SBR	0.01	15	B	0.01	13	B

The intersection is operating well with acceptable operational characteristics under all study conditions and peak hours. The overall v/c ratio of the intersection during the weekday a.m. and p.m. peak hours does not exceed 0.70 and 0.66, respectively, for any study horizon year. The intersection operates with an overall LOS 'C' or better during the a.m. peak hour and LOS 'B' during the p.m. peak hour, for all planning horizons.

Individual movements at the intersection are expected to continue operating with significant reserve capacity for all study horizon years and peak hours, operating with v/c ratios of 0.75 or less and LOS 'C' or better.

### 8.1.5 James Snow Parkway and Steeles Avenue

The capacity analysis results for the existing signalized intersection of James Snow Parkway and Steeles Avenue are summarized in **Table 8-5** for both the weekday a.m. and p.m. peak hours under existing and future traffic conditions.

**Table 8-5 James Snow Parkway and Steeles Avenue Capacity Analysis**

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Existing 2021	<i>Overall</i>	0.52	30	C	0.56	32	C
	EBL	0.00	23	C	0.06	28	C
	EBT	0.53	29	C	0.44	32	C
	EBR	0.18	26	C	0.29	31	C
	WBL	0.38	41	D	0.65	41	D
	WBT	0.22	20	B	0.47	21	C
	WBR	0.05	19	B	0.09	17	B
	NBL	0.65	38	D	0.68	42	D
	NBT	0.19	29	C	0.22	31	C
	NBR	0.38	32	C	0.11	30	C
	SBL	0.40	26	C	0.29	31	C
	SBTR	0.47	36	D	0.41	40	D

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Background 2023	<i>Overall</i>	0.54	31	C	0.57	32	C
	EBL	0.00	24	C	0.06	28	C
	EBT	0.55	30	C	0.46	33	C
	EBR	0.18	26	C	0.29	31	C
	WBL	0.38	41	D	0.65	42	D
	WBT	0.23	20	C	0.48	21	C
	WBR	0.05	19	B	0.09	18	B
	NBL	0.65	39	D	0.68	42	D
	NBT	0.20	29	C	0.24	31	C
	NBR	0.39	32	C	0.11	30	C
	SBL	0.40	26	C	0.29	31	C
	SBTR	0.49	37	D	0.43	40	D
Future Total 2023	<i>Overall</i>	0.58	33	C	0.69	40	D
	EBL	0.00	26	C	0.06	34	C
	EBT	0.57	32	C	0.49	41	D
	EBR	0.18	28	C	0.61	45	D
	WBL	0.39	44	D	0.73	54	D
	WBT	0.24	22	C	0.54	30	C
	WBR	0.05	21	C	0.09	24	C
	NBL	0.67	42	D	0.74	54	D
	NBT	0.55	33	C	0.30	31	C
	NBR	0.41	32	C	0.11	29	C
	SBL	0.45	26	C	0.26	30	C
	SBTR	0.60	39	D	0.71	46	D
Future Total 2028	<i>Overall</i>	0.56	32	C	0.66	39	D
	EBL	0.00	27	C	0.07	35	D
	EBT	0.48	32	C	0.41	41	D
	EBR	0.18	29	C	0.51	43	D
	WBL	0.39	44	D	0.72	54	D
	WBT	0.20	23	C	0.44	29	C
	WBR	0.05	22	C	0.09	25	C
	NBL	0.67	42	D	0.72	53	D
	NBT	0.53	31	C	0.32	30	C
	NBR	0.42	31	C	0.11	28	C
	SBL	0.44	25	C	0.26	30	C
	SBTR	0.64	38	D	0.72	46	D

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Total 2033	<i>Overall</i>	<i>0.56</i>	<i>33</i>	<i>C</i>	<i>0.66</i>	<i>38</i>	<i>D</i>
	EBL	0.00	26	C	0.07	32	C
	EBT	0.56	33	C	0.46	38	D
	EBR	0.18	29	C	0.61	42	D
	WBL	0.39	45	D	0.71	52	D
	WBT	0.23	23	C	0.51	27	C
	WBR	0.05	21	C	0.09	22	C
	NBL	0.67	43	D	0.73	51	D
	NBT	0.42	31	C	0.29	31	C
	NBR	0.46	33	C	0.11	30	C
	SBL	0.46	26	C	0.30	31	C
	SBT	0.55	37	D	0.62	44	D
	SBTR	0.01	32	C	0.01	37	D

The intersection expected to operate with acceptable operational characteristics and reserve capacity for all study horizon years and both peak hours. The overall v/c ratio of the intersection during the weekday a.m. and p.m. peak hours does not exceed 0.58 and 0.69, respectively, for any horizon year. The intersection operates with an overall LOS 'C' during the weekday a.m. peak hour and LOS 'D' or better during the weekday p.m. peak hour for all planning horizons.

Individual movements at the intersection are operating with reserve capacity for all study horizon years and peak hours, operating at LOS 'D' or better and with v/c ratios of 0.67 and 0.74 or less during the weekday a.m. and p.m. peak hours, respectively.

### 8.1.6 Boston Church Road and 5 Side Road / Third Line

The capacity analysis results for the existing unsignalized intersection of Boston Church Road and 5 Side Road / Third Line are summarized in **Table 8-6** for both the weekday a.m. and p.m. peak hours under existing and future traffic conditions. Please note that although an OTM signal warrant is not triggered at this intersection (as discussed in **Section 7.3**), it has been analyzed as a signalized intersection from the 2028 Future Total horizon onwards due to v/c ratios approaching 1.0 and high delays attributed to additional background corridor growth. The unsignalized capacity results for the 2028 Future Total horizon have been included for comparison purposes. A cycle length of 90 seconds was used for analysis purposes, satisfying Milton's minimum cycle length of 75 seconds.



**Table 8-6 Boston Church Road and 5 Side Road / Third Line Capacity Analysis**

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Existing 2019 [unsignalized]	EBLTR	0.72	20	C	0.35	11	B
	WBLTR	0.29	11	B	0.53	14	B
	NBLTR	0.09	10	A	0.30	11	B
	SBLTR	0.23	11	B	0.08	10	A
Future Background 2023 [unsignalized]	EBLTR	0.75	22	C	0.37	12	B
	WBLTR	0.31	11	B	0.56	15	B
	NBLTR	0.09	10	A	0.30	11	B
	SBLTR	0.24	11	B	0.09	10	A
Future Total 2023 [unsignalized]	EBLTR	0.88	36	<b>E</b>	0.52	15	B
	WBLTR	0.40	13	B	0.63	18	C
	NBLTR	0.21	12	B	0.49	15	B
	SBLTR	0.27	12	B	0.10	11	B
Future Total 2028 [unsignalized]	EBLTR	<b>0.99</b>	57	<b>F</b>	0.58	17	C
	WBLTR	0.45	14	B	0.71	23	C
	NBLTR	0.23	12	B	0.53	16	C
	SBLTR	0.30	13	B	0.11	11	B
Future Total 2028 [signalized]	<i>Overall</i>	<b>0.55</b>	<b>14</b>	<b>B</b>	<b>0.50</b>	<b>19</b>	<b>B</b>
	EBLTR	0.52	6	A	0.33	8	A
	WBLTR	0.28	2	A	0.40	10	A
	NBLTR	0.71	53	D	0.77	42	D
	SBLTR	0.60	40	D	0.13	27	C
Future Total 2033 [signalized]	<i>Overall</i>	<b>0.60</b>	<b>15</b>	<b>B</b>	<b>0.54</b>	<b>16</b>	<b>B</b>
	EBLTR	0.57	7	A	0.36	8	A
	WBLTR	0.31	4	A	0.44	4	A
	NBLTR	0.74	55	D	0.78	42	D
	SBLTR	0.63	41	D	0.14	27	C

Under existing, 2023 Future Background, and 2023 Future Total conditions, the unsignalized intersection is generally operating well with acceptable operational characteristics during both peak hours. Under 2023 Future Total conditions, the eastbound shared left/through/right movement is predicted to experience LOS 'E' and a v/c ratio of 0.88 during the weekday a.m. peak hour. During the a.m. peak hour under 2028 Future Total unsignalized conditions, the eastbound movement is predicted to operate with LOS 'F' and a v/c ratio of 0.99. As mentioned earlier in this section, the intersection was analyzed as a signalized intersection from the 2028 Future Total horizon forward to address the near over-capacity movement attributed to additional background corridor growth.

Under signalized 2028 and 2033 Future Total conditions, the intersection operates well during both peak hours with an overall v/c ratio of 0.60 or less and LOS 'B'. During the weekday a.m. peak hour, individual movements operate with v/c ratios of 0.74 or less and LOS 'D' or better. During the p.m. peak hour, individual movements are expected to operate with v/c ratios of 0.78 or less and LOS 'D' or better.

All movements at this intersection were assumed to continue operating with shared left/through/right lanes for all future scenarios, however, the installation of dedicated turn lanes for select movements have the potential to decrease the v/c ratios and delays predicted at the intersection. It is recommended that the intersection be monitored at regular intervals after the installation of signals to determine if the installation of dedicated turn

lanes would be beneficial to the overall flow of traffic (for example, left-turning vehicles waiting for a gap in opposing traffic will cause delays to any through or right-turning traffic behind them).

### 8.1.7 Esquesing Line and 5 Side Road / Fourth Line

The capacity analysis results for the existing unsignalized intersection of Esquesing Line and 5 Side Road / Fourth Line are summarized in **Table 8-7** for both the weekday a.m. and p.m. peak hours under existing and future traffic conditions. Please note that although an OTM signal warrant is not triggered at this intersection (as discussed in **Section 7.3**), it has been analyzed as a signalized intersection from the 2023 horizon onwards due to v/c ratios greater than 1.0 and high delays under existing conditions. The unsignalized capacity results for the 2023 Future Background horizon have been included for comparison purposes. A cycle length of 90 seconds was used for analysis purposes, satisfying Milton’s minimum cycle length of 75 seconds.

**Table 8-7 Esquesing Line and 5 Side Road / Fourth Line Capacity Analysis**

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Existing 2019 [unsignalized]	EBLTR	<b>1.13</b>	112	F	0.60	22	C
	WBLTR	0.62	25	D	0.80	33	D
	NBLTR	0.62	24	C	0.83	26	E
	SBLTR	<b>1.00</b>	71	F	0.38	16	C
Future Background 2023 [unsignalized]	EBLTR	<b>1.17</b>	124	F	0.66	25	C
	WBLTR	0.64	27	D	0.86	42	E
	NBLTR	0.64	26	D	0.89	46	E
	SBLTR	<b>1.05</b>	85	F	0.42	17	C
Future Background 2023 [signalized]	<i>Overall</i>	<b>0.68</b>	<b>24</b>	<b>C</b>	<b>0.59</b>	<b>22</b>	<b>C</b>
	EBLTR	0.57	16	B	0.33	11	B
	WBLTR	0.38	14	B	0.47	13	B
	NBLTR	0.40	22	C	0.81	37	D
	SBLTR	<b>0.85</b>	39	D	0.33	24	C
Future Total 2023 [signalized]	<i>Overall</i>	<b>0.70</b>	<b>24</b>	<b>C</b>	<b>0.60</b>	<b>22</b>	<b>C</b>
	EBLTR	0.59	18	B	0.41	12	B
	WBLTR	0.43	15	B	0.48	13	B
	NBLTR	0.39	21	C	0.81	37	D
	SBLTR	<b>0.85</b>	38	D	0.32	24	C
Future Total 2028 [signalized]	<i>Overall</i>	<b>0.76</b>	<b>25</b>	<b>C</b>	<b>0.65</b>	<b>22</b>	<b>C</b>
	EBLTR	0.67	17	B	0.46	12	B
	WBLTR	0.49	17	B	0.55	15	B
	NBLTR	0.41	20	C	0.83	37	D
	SBLTR	<b>0.89</b>	41	D	0.33	22	C
Future Total 2033 [signalized]	<i>Overall</i>	<b>0.83</b>	<b>27</b>	<b>C</b>	<b>0.71</b>	<b>25</b>	<b>C</b>
	EBLTR	0.77	20	C	0.50	18	B
	WBLTR	0.58	21	C	0.61	18	B
	NBLTR	0.43	19	B	<b>0.86</b>	39	D
	SBLTR	<b>0.91</b>	42	D	0.36	22	C

During the weekday a.m. peak hour under existing conditions, the eastbound and southbound shared left/through/right movements are operating with v/c ratios of 1.13 (higher than theoretical maximum of 1.0)

and 1.0, respectively, and LOS 'F'. During the weekday p.m. peak hour, the northbound shared left/through/right movement operates with LOS 'E' under existing conditions. All other movements during the existing scenario operate with reserve capacity and LOS 'D' or better.

As seen in **Table 8-7**, the movements that operate at, or above, theoretical capacity under existing conditions will continue to operate poorly under 2023 Future Background conditions should unsignalized control remain unchanged at the intersection. As discussed earlier in this section, the intersection was analyzed as a signalized intersection from the 2023 Future Background horizon forward to address existing over-capacity movements.

Under signalized operation, from the 2023 Future Background horizon onward, the intersection is expected to operate at an overall LOS 'C' for all future horizon years. The overall v/c ratio for the intersection is expected to not exceed 0.83 and 0.71 during the a.m. and p.m. peak hours, respectively, for all future horizon years.

All individual movements are predicted to operate at acceptable levels under 2023 and 2028 Future Total conditions, with the exception of the southbound shared left/through/right movement during the a.m. peak hour. The southbound left/through/right movement is expected to operate with a v/c ratio of 0.85 and later increase to 0.91 under 2033 Future Total conditions. During the p.m. peak hour, all individual movements operate well and within the Town's standards under all future total conditions with the exception of the northbound shared left/through/right movement under 2033 Future Total conditions. The northbound left/through/right movement is predicted to operate with a v/c of 0.86 and LOS 'D'.

All movements at this intersection were assumed to continue operating with shared left/through/right lanes for all future scenarios, however, the installation of dedicated turn lanes for select movements have the potential to decrease the v/c ratios and delays predicted at the intersection. It is recommended that the intersection be monitored at regular intervals after the installation of signals to determine if the installation of dedicated turn lanes would be beneficial to the overall flow of traffic (for example, left-turning vehicles waiting for a gap in opposing traffic will cause delays to any through or right-turning traffic behind them).

## 8.2 Future Intersections

### 8.2.1 West Site Access 1 and 5 Side Road

The capacity analysis results for the proposed unsignalized intersection of West Site Access 1 and 5 Side Road are summarized in **Table 8-8** for both the weekday a.m. and p.m. peak hours under future total traffic conditions.

**Table 8-8 West Site Access 1 and 5 Side Road Capacity Analysis**

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Total 2023	EBTR	0.34	0	-	0.15	0	-
	WBLT	0.02	1	A	0.01	0	A
	NBLR	0.02	14	B	0.06	11	B
Future Total 2028	EBTR	0.36	0	-	0.17	0	-
	WBLT	0.03	1	A	0.01	0	A
	NBLR	0.02	14	B	0.07	12	B
Future Total 2033	EBTR	0.40	0	-	0.18	0	-
	WBLT	0.03	1	A	0.01	0	A
	NBLR	0.02	15	C	0.07	12	B

The intersection is expected to operate well with individual movements operating with reserve capacity and minimal delays under all future total study horizon years and peak hours. Individual movements are predicted

to operate with v/c ratios of 0.40 and 0.17 or less during the weekday a.m. and p.m. peak hours, respectively. All movements during both peak hours are expected to operate with LOS 'C' or better.

### 8.2.2 West Site Access 2 and 5 Side Road

The capacity analysis results for the proposed unsignalized intersection of West Site Access 2 and 5 Side Road are summarized in **Table 8-9** for both the weekday a.m. and p.m. peak hours under future total traffic conditions.

**Table 8-9 West Site Access 2 and 5 Side Road Capacity Analysis**

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Total 2023	EBTR	0.33	0	-	0.16	0	-
	WBLT	0.02	1	A	0.01	0	A
	NBLR	0.02	13	B	0.06	11	B
Future Total 2028	EBTR	0.36	0	-	0.18	0	-
	WBLT	0.03	1	A	0.01	0	A
	NBLR	0.02	13	B	0.07	12	B
Future Total 2033	EBTR	0.39	0	-	0.19	0	-
	WBLT	0.03	1	A	0.01	0	A
	NBLR	0.02	14	B	0.07	12	B

The intersection is expected to operate well with individual movements operating with reserve capacity and minimal delays under all future total study horizon years and peak hours. Individual movements are predicted to operate with v/c ratios of 0.39 and 0.19 or less during the weekday a.m. and p.m. peak hours, respectively. All movements during both peak hours are expected to operate with LOS 'B' or better.

### 8.2.3 Boston Church Road and West Site Access 3

The capacity analysis results for the proposed unsignalized intersection of Boston Church Road and West Site Access 3 are summarized in **Table 8-10** for both the weekday a.m. and p.m. peak hours under future total traffic conditions.

**Table 8-10 Boston Church Road and West Site Access 3 Capacity Analysis**

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Total 2023	EBLR	0.02	11	B	0.03	10	B
	NBL	0.02	9	A	0.02	8	A
	SBTR	0.15	0	-	0.09	0	-
Future Total 2028	EBLR	0.02	11	B	0.03	10	B
	NBL	0.02	9	A	0.02	9	A
	SBTR	0.16	0	-	0.09	0	-
Future Total 2033	EBLR	0.02	11	B	0.03	10	B
	NBL	0.02	9	A	0.02	9	A
	SBTR	0.17	0	-	0.09	0	-

The intersection is expected to operate well with individual movements operating with reserve capacity and minimal delays under all future total study horizon years and peak hours. Individual movements are predicted

to operate with v/c ratios of 0.17 and 0.09 or less during the weekday a.m. and p.m. peak hours, respectively. All movements during both peak hours are expected to operate with LOS 'B' or better.

### 8.2.4 Boston Church Road and West Site Access 4

The capacity analysis results for the proposed unsignalized intersection of Boston Church Road and West Site Access 4 are summarized in **Table 8-11** for both the weekday a.m. and p.m. peak hours under future total traffic conditions.

**Table 8-11 Boston Church Road and West Site Access 4 Capacity Analysis**

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Total 2023	EBLR	0.04	10	B	0.15	11	B
	NBL	0.07	8	A	0.02	8	A
	SBTR	0.16	0	-	0.10	0	-
Future Total 2028	EBLR	0.04	10	B	0.15	11	B
	NBL	0.07	8	A	0.02	8	A
	SBTR	0.17	0	-	0.10	-	-
Future Total 2033	EBLR	0.04	10	B	0.15	11	B
	NBL	0.07	8	A	0.02	8	A
	SBTR	0.17	0	-	0.11	0	-

The intersection is expected to operate well with individual movements operating with reserve capacity and minimal delays under all future total study horizon years and peak hours. Individual movements are predicted to operate with v/c ratios of 0.17 and 0.15 or less during the weekday a.m. and p.m. peak hours, respectively. All movements during both peak hours are expected to operate with LOS 'B' or better.

### 8.2.5 Boston Church Road and West Site Access 5

The capacity analysis results for the proposed unsignalized intersection of Boston Church Road and West Site Access 5 are summarized in **Table 8-12** for both the weekday a.m. and p.m. peak hours under future total traffic conditions.

**Table 8-12 Boston Church Road and West Site Access 5 Capacity Analysis**

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Total 2023	EBLR	0.01	11	B	0.01	11	B
	NBL	0.00	9	A	0.01	9	A
	SBTR	0.16	0	-	0.15	0	-
Future Total 2028	EBLR	0.01	11	B	0.01	11	B
	NBL	0.00	9	A	0.01	9	A
	SBTR	0.17	0	-	0.15	0	-
Future Total 2033	EBLR	0.01	12	B	0.01	11	B
	NBL	0.00	9	A	0.01	9	A
	SBTR	0.19	0	-	0.16	0	-

The intersection is expected to operate well with individual movements operating with reserve capacity and minimal delays under all future total study horizon years and peak hours. Individual movements are predicted

to operate with v/c ratios of 0.19 and 0.16 or less during the weekday a.m. and p.m. peak hours, respectively. All movements during both peak hours are expected to operate with LOS 'B' or better.

### 8.2.6 Boston Church Road and East Site Access 1

The capacity analysis results for the proposed unsignalized intersection of Boston Church Road and East Site Access 1 are summarized in **Table 8-13** for both the weekday a.m. and p.m. peak hours under future total traffic conditions.

**Table 8-13 Boston Church Road and East Site Access 1 Capacity Analysis**

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Total 2023	WBL	0.13	14	B	0.42	17	C
	WBR	0.01	9	A	0.07	10	A
	NBR	0.12	0	-	0.04	0	-
	SBL	0.04	8	A	0.01	8	A
Future Total 2028	WBL	0.14	15	B	0.43	18	C
	WBR	0.01	10	A	0.07	10	A
	NBR	0.12	0	-	0.04	0	-
	SBL	0.04	8	A	0.01	8	A
Future Total 2033	WBL	0.13	14	B	0.43	18	C
	WBR	0.01	9	A	0.07	10	A
	NBR	0.12	0	-	0.04	0	-
	SBL	0.04	8	A	0.01	8	A

The intersection is expected to operate well with individual movements operating with reserve capacity and minimal delays under all future total study horizon years and peak hours. Individual movements are predicted to operate with v/c ratios of 0.14 and 0.43 or less during the weekday a.m. and p.m. peak hours, respectively. All movements during both peak hours are expected to operate with LOS 'C' or better.

### 8.2.7 James Snow Parkway and East Site Access 2

The capacity analysis results for the proposed intersection of James Snow Parkway and East Site Access 2 are summarized in **Table 8-14** for both the weekday a.m. and p.m. peak hours under future total traffic conditions. The intersection is proposed to be signalized by the 2033 horizon after widening of James Snow Parkway to three lanes in each direction of travel.

**Table 8-14 James Snow Parkway and East Site Access 2 Capacity Analysis**

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Total 2023 [unsignalized]	EBL	0.04	11	B	0.03	11	B
	WBR	0.01	0	-	0.01	0	-
	SBL	0.16	38	E	0.15	36	E
	SBR	0.04	12	B	0.04	12	B
Future Total 2028 [unsignalized]	EBL	0.04	11	B	0.03	11	B
	WBR	0.01	0	-	0.01	0	-
	SBL	0.18	43	E	0.17	40	E
	SBR	0.04	12	B	0.04	12	B

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Total 2033 [signalized]	<i>Overall</i>	0.28	3	A	0.24	4	A
	EBL	0.07	2	A	0.06	3	A
	EBT	0.26	3	A	0.23	3	A
	WBT	0.18	2	A	0.20	3	A
	WBR	0.03	2	A	0.03	2	A
	SBL	0.51	45	D	0.36	38	D
	SBR	0.02	34	C	0.02	33	C

Under unsignalized operation in 2023 and 2028, the southbound left movement is expected to experience LOS 'E' during both peak hours. Under 2023 and 2028 future total conditions, v/c ratios of remaining individual movements are expected to be 0.18 or less during the a.m. peak hour and less than 0.17 during the p.m. peak hour with LOS 'B' during both peak hours.

Under signalized operation in 2033, the intersection operates with an overall LOS of 'A' during both peak hours, and overall v/c ratios of 0.28 and 0.24 during the a.m. and p.m. peak hours, respectively. All individual movements operate at LOS 'D' or better, and with v/c ratios of 0.51 and 0.36 or less during the weekday a.m. and p.m. peak hours, respectively.

### 8.2.8 James Snow Parkway and East Site Access 3

The capacity analysis results for the proposed signalized intersection of James Snow Parkway and East Site Access 3 are summarized in **Table 8-15** for both the weekday a.m. and p.m. peak hours under future total traffic conditions. The intersection is proposed to be signalized by the 2023 horizon to provide a signalized access to the site at the main heavy vehicle entrance to aid in protecting the safety of all road users, and minimize any delay to westbound through traffic and site related traffic exiting the site.

**Table 8-15 James Snow Parkway and East Site Access 3 Capacity Analysis**

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Total 2023 [signalized]	<i>Overall</i>	0.32	4	A	0.33	6	A
	EBL	0.05	3	A	0.04	3	A
	EBT	0.31	3	A	0.31	4	A
	WBT	0.25	3	A	0.25	4	A
	WBR	0.05	2	A	0.04	3	A
	SBL	0.45	39	D	0.47	34	C
	SBR	0.01	34	C	0.02	30	C
Future Total 2028 [signalized]	<i>Overall</i>	0.35	4	A	0.34	6	A
	EBL	0.05	3	A	0.05	3	A
	EBT	0.34	3	A	0.33	4	A
	WBT	0.25	3	A	0.27	4	A
	WBR	0.05	2	A	0.04	3	A
	SBL	0.45	39	D	0.47	34	C
	SBR	0.01	34	C	0.02	30	C

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Total 2033 [signalized]	Overall	0.29	4	A	0.28	5	A
	EBL	0.05	3	A	0.05	3	A
	EBT	0.27	3	A	0.25	4	A
	WBT	0.19	3	A	0.21	4	A
	WBR	0.05	2	A	0.04	3	A
	SBL	0.45	39	D	0.47	34	C
	SBR	0.01	34	C	0.02	30	C

The intersection is operating well with acceptable operational characteristics under all study conditions and peak hours. The overall v/c ratio of the intersection during the weekday a.m. and p.m. peak hours does not exceed 0.29 and 0.28, respectively, for any future study horizon. The intersection operates with an overall LOS of 'A' during both peak hours under all future total conditions.

Individual movements at the intersection are operating with reserve capacity under all future study conditions and peak hours, operating with v/c ratios of 0.45 or less and LOS 'D' or better during the weekday a.m. peak hour and with v/c ratios of 0.47 or less and LOS 'C' or better during the weekday p.m. peak hour.

### 8.3 Building 'D' Sensitivity Analysis – 2023 Future Total

Recognizing that the entirety of the development may not be leased and in operation by 2023, a sensitivity analysis scenario for the 2023 Future Total horizon was conducted. There is a potential scenario that at a minimum Building D within the east parcel of land would be constructed and fully operational prior to construction of the remaining buildings. The construction of all three accesses to the east lands was assumed, including the construction of the public road crescent that will provide access to James Snow Parkway. Apart from a difference in site trips (Building D only), all other background traffic and analysis assumptions discussed previously for the 2023 Future Total horizon were maintained. The capacity analysis for all intersections under Phase 1 Sensitivity conditions is provided in **Table 8-16**. Synchro capacity reports for the scenario are provided in **Appendix J-1**.

**Table 8-16 Phase 1 Sensitivity Analysis – Future Total 2023 Capacity Analysis**

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Regional Road 25 and 5 Side Road [signalized]	Overall	0.76	29	C	0.65	24	C
	EBL	0.17	18	B	0.38	23	C
	EBTR	<b>0.90</b>	41	D	0.44	24	C
	WBL	0.51	32	C	0.38	32	C
	WBTR	0.20	25	C	0.83	49	D
	NBL	0.39	18	B	0.55	16	B
	NBT	0.25	17	B	0.48	16	B
	NBR	0.08	16	B	0.07	12	B
	SBL	0.34	26	C	0.06	22	C
	SBTR	0.58	29	C	0.38	25	C



Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Regional Road 25 and James Snow Parkway [signalized]	<i>Overall</i>	<i>0.50</i>	<i>17</i>	<i>B</i>	<i>0.73</i>	<i>28</i>	<i>C</i>
	EBL	0.06	21	C	0.10	24	C
	EBT	0.15	21	C	0.18	24	C
	EBR	0.04	21	C	0.15	24	C
	WBL	0.47	26	C	0.80	47	D
	WBT	0.16	21	C	0.10	23	C
	WBR	0.06	21	C	0.19	25	C
	NBL	0.39	10	A	0.20	18	B
	NBT	0.48	17	B	0.71	31	C
	NBR	0.34	16	B	0.13	22	C
	SBL	0.51	10	B	0.50	18	B
	SBTR	0.45	17	B	0.37	23	C
Boston Church Road and James Snow Parkway [signalized]	<i>Overall</i>	<i>0.45</i>	<i>18</i>	<i>B</i>	<i>0.50</i>	<i>23</i>	<i>C</i>
	EBL	0.20	11	B	0.33	13	B
	EBTR	0.59	18	B	0.37	19	B
	WBL	0.08	16	B	0.11	18	B
	WBTR	0.33	19	B	0.52	25	C
	NBL	0.17	25	C	0.53	25	C
	NBT	0.01	26	C	0.09	31	C
	NBR	0.01	26	C	0.03	31	C
	SBL	0.19	18	B	0.43	24	C
	SBT	0.05	22	C	0.08	32	C
SBR	0.09	23	C	0.06	32	C	
Esquesing Line and James Snow Parkway [signalized]	<i>Overall</i>	<i>0.63</i>	<i>21</i>	<i>C</i>	<i>0.56</i>	<i>17</i>	<i>B</i>
	EBL	0.06	15	B	0.04	14	B
	EBTR	0.67	23	C	0.58	19	B
	WBL	0.17	14	B	0.04	14	B
	WBTR	0.38	18	B	0.47	18	B
	NBL	0.30	18	B	0.28	14	B
	NBT	0.32	18	B	0.56	17	B
	NBR	0.01	15	B	0.02	12	B
	SBL	0.11	16	B	0.10	13	B
	SBT	0.66	23	C	0.28	14	B
SBR	0.01	15	B	0.01	12	B	

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
James Snow Parkway and Steeles Avenue [signalized]	<i>Overall</i>	<i>0.56</i>	<i>32</i>	<i>C</i>	<i>0.63</i>	<i>36</i>	<i>D</i>
	EBL	0.00	25	C	0.06	31	C
	EBT	0.56	31	C	0.47	36	D
	EBR	0.18	27	C	0.50	37	D
	WBL	0.38	43	D	0.68	47	D
	WBT	0.23	21	C	0.50	24	C
	WBR	0.05	20	B	0.09	20	B
	NBL	0.66	40	D	0.71	47	D
	NBT	0.40	31	C	0.29	31	C
	NBR	0.40	32	C	0.11	29	C
	SBL	0.42	26	C	0.28	31	C
	SBTR	0.57	38	D	0.63	44	D
Boston Church Road and 5 Side Road / Third Line [unsignalized]	EBLTR	0.80	26	D	0.40	13	B
	WBLTR	0.35	12	B	0.59	16	C
	NBLTR	0.11	10	B	0.40	13	B
	SBLTR	0.25	11	B	0.09	10	B
Esquesing Line and 5 Side Road / Fourth Line [signalized]	<i>Overall</i>	<i>0.69</i>	<i>24</i>	<i>C</i>	<i>0.59</i>	<i>22</i>	<i>C</i>
	EBLTR	0.58	17	B	0.37	11	B
	WBLTR	0.41	15	B	0.47	13	B
	NBLTR	0.39	21	C	0.81	37	D
	SBLTR	<b>0.85</b>	37	D	0.33	24	C
Boston Church Road and East Site Access 1 [unsignalized]	WBL	0.10	11	B	0.31	13	B
	WBR	0.01	9	A	0.06	9	A
	NBR	0.12	0	-	0.04	0	-
	SBL	0.04	8	A	0.01	8	A
James Snow Parkway and East Site Access 2 [unsignalized]	EBL	0.02	10	A	0.02	11	B
	WBR	0.01	0	-	0.01	0	-
	SBL	0.11	27	D	0.11	27	D
	SBR	0.02	11	B	0.03	11	B
James Snow Parkway and East Site Access 3 [signalized]	<i>Overall</i>	<i>0.29</i>	<i>3</i>	<i>A</i>	<i>0.24</i>	<i>3</i>	<i>A</i>
	EBL	0.02	2	A	0.02	2	A
	EBT	0.29	3	A	0.23	2	A
	WBT	0.18	2	A	0.21	2	A
	WBR	0.02	2	A	0.02	2	A
	SBL	0.47	44	D	0.39	40	D
	SBR	0.01	36	D	0.01	35	C

In general, the results of the Building 'D' Sensitivity Analysis are similar or better than those presented for the 2023 Future Total horizon in **Sections 8.1** and **8.2** due to lower site traffic volumes throughout the study area road network and intersections. Overall, signalized and unsignalized intersections are expected to operate well and with reserve capacity. During the weekday a.m. peak hour, two individual movements are expected to operate with v/c ratios of 0.85 or more, whereas all individual movements are predicted to operate with v/cs below 0.85 during the weekday p.m. peak hour.

At the signalized intersection of Regional Road 25 and 5 Side Road, the shared eastbound through/right movement is expected to operate with a v/c ratio of 0.90 during the weekday a.m. peak hour, indicating some reserve capacity remains, however, it is above the Region's threshold of 0.85. Similarly, the southbound left/through/right movement at the signalized intersection of Esquesing Line and 5 Side Road is predicted to operate with a v/c ratio of 0.85 during the a.m. peak hour.

Under the Building 'D' Sensitivity traffic condition, a 26-metre road widening (per the Town's LOPA) on Boston Church Road would only be required between James Snow Parkway and Street 'A' (East Access 1).

## 9 QUEUEING ANALYSIS

**Table 9-1** provides a summary of the 95<sup>th</sup> percentile queues derived from microsimulation of existing and future background 2023 traffic conditions. The queueing report was prepared using SimTraffic Version 10 microsimulation software using the following methodology: 30 minutes seeding time, one-hour recording, and 10 runs. The 95<sup>th</sup> percentile queue lengths that are bolded are predicted to extend beyond available storage of a dedicated turn lane or extend beyond an upstream intersection and/or major access point. Queueing analysis reports are provided in **Appendix K**.

**Table 9-1 95<sup>th</sup> Percentile Queue Lengths – Existing and Future Background Conditions**

Intersection	Movement of Interest	Available Storage (m)	95 <sup>th</sup> Percentile Queue Length (m)			
			Existing 2021		Future Background 2023	
			AM	PM	AM	PM
Regional Road 25 & 5 Side Road	EBL	80	54	36	53	32
	WBL	70	39	39	41	42
	NBL	75	40	71	41	74
	NBR	70	25	17	23	19
	SBL	35	33	7	<b>40</b>	7
Regional Road 25 & James Snow Parkway	EBL	80	14	23	13	24
	EBR	115	21	39	22	41
	WBL	85	41	82	38	<b>93</b>
	WBR	35	23	<b>54</b>	22	<b>59</b>
	NBL	30	10	<b>40</b>	<b>39</b>	<b>46</b>
	NBR	230	10	20	39	20
	SBL	75	49	47	56	47
Boston Church Road & James Snow Parkway	EBL	70	10	29	12	28
	WBL	70	9	16	10	14
	NBL	60	19	54	19	54
	NBR	25	-	-	-	-
	SBL	60	11	7	11	6
	SBR	25	-	-	-	-
Esquesing Line & James Snow Parkway	EBL	85	9	8	10	8
	WBL	70	19	8	19	7
	NBL	40	25	31	24	29
	NBR	25	-	-	-	7
	SBL	25	19	14	21	15
	SBR	25	7	-	13	-
James Snow Parkway and Steeles Avenue	EBL	120	1	8	2	9
	EBR	70	31	61	33	66
	WBL	170	20	56	26	57
	WBR	130	9	14	9	12
	NBL	105	71	71	65	67
	NBR	260	62	24	56	73
	SBL	160	39	28	37	29

Intersection	Movement of Interest	Available Storage (m)	95 <sup>th</sup> Percentile Queue Length (m)			
			Existing 2021		Future Background 2023	
			AM	PM	AM	PM
Boston Church Road / 3 Line & 5 Side Road	EBLTR	-	48	30	49	30
	WBLTR	-	24	31	29	39
	NBLTR	-	16	25	17	24
	SBLTR	-	20	16	20	15
Esquesing Line / Fourth Line & 5 Side Road	EBLTR	-	85	38	89	48
	WBLTR	-	34	47	63	65
	NBLTR	-	41	54	60	102
	SBLTR	-	61	23	115	47

As summarized in **Table 9-1**, the predicted 95<sup>th</sup> percentile queue lengths are able to be accommodated within the existing storage lengths at all intersections during the weekday a.m. and p.m. peak hours under existing and 2023 future background conditions, with the exception of the intersection of Regional Road 25 and James Snow Parkway.

Under existing conditions, at the intersection of Regional Road 25 and James Snow Parkway, the 95<sup>th</sup> percentile queue of the westbound right and northbound left movement exceeds the existing queue storage during the weekday p.m. peak hour by 19 and 10 metres, respectively. Under 2023 background conditions, the northbound left queue is predicted to exceed the available storage by during the weekday a.m. and p.m. peak hours by 9 and 16 metres, respectively, while the westbound left and right movements are predicted to exceed the available storage during the p.m. peak hour only, by 8 and 24 metres respectively.

Under 2023 Future Background conditions, at Regional Road 25 and 5 Side Road, the southbound left movement is expected to exceed the available storage during the a.m. peak hour by 7 metres.

**Table 9-2** provides a summary of the 95<sup>th</sup> percentile queues derived from microsimulation of future total 2023, 2028 and 2033 traffic conditions.

**Table 9-2 95<sup>th</sup> Percentile Queue Lengths – Future Total Conditions**

Intersection	Movement of Interest	Available Storage (m)	95 <sup>th</sup> Percentile Queue Length (m) – Future Total							
			2023		2023 Phase 1		2028		2033	
			AM	PM	AM	PM	AM	PM	AM	PM
Regional Road 25 & 5 Side Road	EBL	80	57	30	39	32	72	33	<b>169</b>	34
	WBL	70	42	47	39	38	37	63	<b>83</b>	<b>94</b>
	NBL	75	44	<b>80</b>	39	72	50	<b>83</b>	51	<b>82</b>
	NBR	70	26	19	23	18	31	20	32	18
	SBL	35	<b>48</b>	11	<b>37</b>	10	<b>45</b>	10	<b>45</b>	11
Regional Road 25 & James Snow Parkway	EBL	80	14	27	15	25	14	27	16	24
	EBR	115	21	39	23	37	21	36	21	42
	WBL	85	65	<b>179</b>	59	<b>125</b>	67	<b>208</b>	73	<b>145</b>
	WBR	35	25	<b>60</b>	23	<b>58</b>	23	<b>49</b>	25	<b>53</b>
	NBL	30	<b>46</b>	<b>50</b>	<b>44</b>	<b>48</b>	<b>47</b>	<b>35</b>	<b>55</b>	<b>54</b>
	NBR	30	<b>54</b>	25	<b>50</b>	23	<b>58</b>	24	<b>49</b>	30
SBL	75	69	52	54	50	70	50	74	55	

Intersection	Movement of Interest	Available Storage (m)	95 <sup>th</sup> Percentile Queue Length (m) – Future Total							
			2023		2023 Phase 1		2028		2033	
			AM	PM	AM	PM	AM	PM	AM	PM
Boston Church Road & James Snow Parkway	EBL	70	26	40	22	33	24	37	25	37
	WBL	70	10	16	10	16	12	15	8	17
	NBL	60	20	<b>65</b>	21	56	24	<b>65</b>	23	<b>61</b>
	NBR	25	-	-	-	-	-	-	-	-
	SBL	60	34	<b>84</b>	21	46	30	<b>84</b>	32	<b>77</b>
	SBR	25	-	4	-	-	-	-	-	-
Esquesing Line & James Snow Parkway	EBL	85	10	11	11	7	11	10	8	9
	WBL	70	18	7	18	7	19	8	17	6
	NBL	40	24	30	28	33	28	31	32	32
	NBR	25	-	-	-	-	-	-	-	7
	SBL	25	17	16	18	15	18	16	24	15
	SBR	25	19	-	17	-	20	-	24	-
James Snow Parkway and Steeles Avenue	EBL	122	1	8	1	8	2	8	1	6
	EBR	72	39	<b>91</b>	36	<b>79</b>	43	<b>93</b>	33	69
	WBL	170	26	64	25	60	26	69	28	60
	WBR	130	11	16	9	14	9	17	8	12
	NBL	105	71	79	71	77	72	77	77	74
	NBR	260	63	24	62	24	48	21	50	22
	SBL	160	41	29	40	28	40	27	47	27
	SBTR	-	52	185	-	-	60	91	-	-
Boston Church Road / 3 Line & 5 Side Road	EBLTR	-	61	36	55	33	70	48	66	51
	WBLTR	-	34	44	31	42	43	75	49	39
	NBLTR	-	20	27	16	26	39	72	40	76
	SBLTR	-	21	15	21	16	47	21	47	25
Esquesing Line / Fourth Line & 5 Side Road	EBLTR	-	80	62	79	57	85	71	99	77
	WBLTR	-	66	68	64	63	77	78	150	94
	NBLTR	-	58	115	58	104	65	115	84	123
	SBLTR	-	114	50	110	48	140	56	183	55
West Site Access 1 & 5 Side Road	EBTR	-	-	-	-	-	-	-	1	-
	WBLT	-	12	2	-	-	13	8	13	5
	NBLR	-	8	14	-	-	8	14	8	14
West Site Access 2 & 5 Side Road	WBLT	-	10	5	-	-	12	5	15	6
	NBLR	-	8	13	-	-	9	13	8	14
Boston Church Road & West Site Access 3	EBLR	-	17	21	-	-	18	20	19	20
	NBL	40	9	5	-	-	8	10	10	8
	SBTR	-	-	-	-	-	1	-	-	-

Intersection	Movement of Interest	Available Storage (m)	95 <sup>th</sup> Percentile Queue Length (m) – Future Total							
			2023		2023 Phase 1		2028		2033	
			AM	PM	AM	PM	AM	PM	AM	PM
Boston Church Road & West Site Access 4	EBLR	-	12	16	-	-	12	15	13	16
	NBL	15	11	6	-	-	11	5	11	4
	SBTR	-	-	-	-	-	-	-	-	-
Boston Church Road & West Site Access 5	EBLR	-	9	14	-	-	9	13	10	11
	NBL	40	5	6	-	-	3	6	6	6
	SBTR	-	-	-	-	-	-	-	-	1
Boston Church Road & East Site Access 1	WBL	-	15	24	16	22	15	26	16	30
	WBR	-	5	8	4	7	5	9	5	9
	SBL	15	8	5	3	4	8	4	8	5
James Snow Parkway & East Site Access 2	EBL	90	14	13	10	10	16	15	17	18
	WBR	80	-	-	-	-	-	-	9	7
	SBL	-	23	23	21	22	22	23	23	24
	SBR	-	19	19	18	16	18	18	18	18
James Snow Parkway & East Site Access 3	EBL	90	14	15	10	11	14	16	14	17
	WBR	80	11	11	5	5	11	14	13	11
	SBL	-	23	33	18	14	24	30	24	32
	SBR	-	15	16	14	12	16	16	14	15

At existing intersections within the study area, the predicted 95<sup>th</sup> percentile queue lengths are generally able to be accommodated within, or only marginally exceed, the existing storage lengths at all intersections during the weekday a.m. and p.m. peak hours under future total conditions, with the exception of select movements.

Regional Road 25 and 5 Side Road

At the intersection of Regional Road 25 and 5 Side Road, the eastbound left, northbound left, westbound left, and southbound left movements are predicted to experience 95<sup>th</sup> percentile queue lengths that will exceed the available storage. During the a.m. peak hour, the eastbound left movement is expected to exceed the available storage by 89 metres under 2033 future total conditions. As noted in **Section 8.1.1** of this report, the eastbound shared through/right movement is expected to experience capacity constraints due to the high volume of right turns, which may be a contributing factor to the queue exceedances of the eastbound left turn movement. It is recommended that the Region and Town review the operations and queueing of this intersection in the future prior to the widening of Regional Road 25 to determine if the construction of a dedicated eastbound right-turn lane will alleviate any existing or future capacity and timing constraints due to predicted background growth.

The westbound left queue is expected to exceed available storage by 13 and 24 metres during both the weekday a.m. and p.m. peak hours under 2033 future total conditions, respectively. The northbound left queue is expected to exceed available storage by 5, 8, and 7 metres during the weekday p.m. peak hours under 2023, 2028, and 2033 future total conditions, respectively. The queue of the southbound left movement is predicted to exceed available storage during the weekday a.m. peak hour by 13, 10, and 10 metres, under 2023, 2028, and 2033 future total conditions, respectively.

### Regional Road 25 and James Snow Parkway

At the intersection of Regional Road 25 and James Snow Parkway, the 95<sup>th</sup> percentile queue of the westbound left movement is expected to exceed available storage during the weekday p.m. peak hour by 94, 123, and 60 metres under 2023, 2028, and 2033 future total conditions, respectively. The westbound right queue is also predicted to exceed its available storage during the weekday p.m. peak hour by 25, 14, and 18 metres under 2023, 2028, and 2033 future total conditions, respectively. The northbound right queue is expected to exceed the available storage during the weekday a.m. peak hour by 24, 28, and 19 metres under 2023, 2028, and 2033 future total conditions, respectively. The 95<sup>th</sup> percentile queues for the northbound left movement are expected to exceed available storage during both weekday peak hours under all future total conditions.

It is recommended that the queue lengths at the intersection be reviewed prior to the widening of Regional Road 25 in 2022 and James Snow Parkway in 2030 to determine if extending turn lane storage can be accommodated as a part of the widening of the roads/intersection.

### Boston Church Road and James Snow Parkway

At the intersection of Boston Church Road and James Snow Parkway, the 95<sup>th</sup> percentile queue of the northbound left movement is expected to marginally exceed available storage by 5, 5, and 1 metres during the weekday p.m. peak hour under 2023, 2028, and 2033 future total conditions respectively. The southbound left movement is expected to exceed available storage by 24, 24, and 17 metres under 2023, 2028, and 2033 future total conditions, respectively, during the p.m. peak hour.

### James Snow Parkway and Steeles Avenue

At the intersection of James Snow Parkway and Steeles Avenue, the eastbound right movement is expected to exceed available storage in the p.m. peak hour by 19 and 21 metres under 2023 and 2028 future total conditions, respectively.

### Boston Church Road and 5 Side Road

While the intersection of Boston Church Road / 3 Line at 5 Side Road does not have dedicated turn lanes on any legs, the 95<sup>th</sup> percentile queue lengths for the shared left/through/right turn movements have been provided in **Table 9-2**. There are no queues of particular concern at the intersection, as the predicted 95<sup>th</sup> percentile queue for all legs of the intersection remain under 100 metres during the a.m. and p.m. peak hour for all future total horizon years.

### Esquesing Line and 5 Side Road

While the intersection of Esquesing Line / Fourth Line at 5 Side Road does not have dedicated turn lanes on any legs, the 95<sup>th</sup> percentile queue lengths for the shared left/through/right turn movements have been provided in **Table 9-2**. The maximum predicted 95<sup>th</sup> percentile queue for eastbound traffic is 99 metres, westbound traffic is expected to experience a queue of up to 150 metres, northbound traffic is expected to experience a queue of up to 115 metres, and southbound traffic is expected to experience a queue of up to 140 metres.

It is recommended that the Town monitor this intersection after signalization to determine if the construction of dedicated turn lanes would be beneficial to reduce overall 95<sup>th</sup> percentile queue lengths at the intersection. The queues are likely due in part to through and right turning vehicles being delayed passage through the intersection by left-turning vehicles waiting for a gap to complete their turning manoeuvre.

### Proposed Site Accesses

All of the proposed unsignalized site accesses are generally expected to operate with minimal 95<sup>th</sup> percentile queues for the shared through/right and left/through movements located along 5 Side Road and Boston Church Road.

The two proposed signalized site accesses on James Snow Parkway are also expected to operate with 95<sup>th</sup> percentile queues that can be accommodated within the provided queue storage lengths. East Site Access 2 (unsignalized in 2023 and signalized by the 2033 horizon year) operates well from a queueing perspective, with minimal changes to the predicted 95<sup>th</sup> percentile queues upon signalization in 2033.



East Site Access 2 and 3 has been analyzed with dedicated westbound right-turn lanes to aid in removing potential conflicts between heavy vehicles turning into the site and general westbound through traffic on James Snow Parkway.

#### Phase 1 Sensitivity Analysis – 2023 Future Total

In general, the estimated 95<sup>th</sup> percentile queues are shorter in the Phase 1 Sensitivity scenario in which only Building D of the East site would be constructed by the 2023 Future Total horizon. There are fewer queues predicted to exceed the storage length in the Phase 1-only scenario than in the entire 2023 Future Total scenario (five movements versus eight). Select movements are predicted to have 95<sup>th</sup> percentile queues exceed available storage, such as the southbound left at Regional Road 25 at 5 Side Road that minimally exceeds storage by 2 metres during a.m. peak hour. and the northbound left At Regional Road 25 at James Snow Parkway, the northbound left exceeds available storage by 14 and 18 metres during the a.m. and p.m. peak hours, respectively. The westbound left and westbound right movements at the same intersection are expected to have 95<sup>th</sup> percentile queues that exceed available storage by 40 and 23 metres, respectively, during the p.m. peak hour.

As queueing issues are also present at Regional Road 25 and James Snow Parkway in the sensitivity scenario, it is again recommended that the queue lengths at the intersection be reviewed in the field prior to the widening of Regional Road 25 and James Snow Parkway to determine if extending turn lane storage can be accommodated as a part of the widening of the roads/intersection.

## 10 RECOMMENDATIONS

The existing unsignalized intersections of 5 Side Road at Esquesing Line and 5 Side Road at Boston Church Road were evaluated to confirm justification for traffic signal installation based on existing and future traffic volumes. The Ontario Traffic Manual (OTM) Book 12 Justification 7 Signal Warrant Analysis was applied to the unsignalized intersections. Although traffic signals are not warranted at the two existing intersections according to the OTM warrant, it is recommended that signals be implemented to alleviate existing and future background traffic capacity constraints (v/c ratio(s) greater than 1.0) under all-way stop control. 90 second cycle lengths were used for analysis purposes, which satisfies the Town of Milton's minimum cycle length of 75 seconds.

It is also recommended that the queues at the intersection of 5 Side Road and Esquesing Line be monitored in the future. Monitoring queues will help determine if the construction of dedicated turn lanes would address potential delay and queue build ups caused by through and right turning vehicles being delayed passage through the intersection by left-turning vehicles waiting for a gap to complete their turning manoeuvre.

Based on microsimulation queueing analysis, there is potential for select movements to experience capacity constraints and 95<sup>th</sup> percentile queues extending beyond existing storage at the intersection of Regional Road 25 and 5 Side Road, and the intersection of Regional Road 25 and James Snow Parkway. It is recommended that these movements be monitored and evaluated by the Region and Town to determine if the extension of existing turn lane storage, or the introduction of dedicated turn lanes can be included in the construction efforts required to widen Regional Road 25 and James Snow Parkway.

Both Boston Church Road and Esquesing Line are identified as Collector roadways in the Town's LOPA Schedule C.2.A). The Draft Plan of Subdivision for lands east and west of Boston Church Road identify protection for a 26 metre ROW for both Boston Church Road and Esquesing Line. Due to the forecasted heavy truck volume, upgraded pavement structure is recommended for Boston Church Road, and widened to the ultimate 26 metre ROW as per the Town's LOPA to accommodate the site-related traffic. However, it should be noted a nominal amount of passenger car, and no heavy truck, site-related traffic has been assigned to Esquesing Line, therefore, it is our opinion the need to widen and/or upgrade Esquesing Line is not required at this time.

Warrants for dedicated left-turn and right-turn lanes were conducted at each of eight proposed site accesses. In addition to turn lanes being warranted at certain accesses, some turn lanes are recommended to safely accommodate site traffic, particularly heavy vehicles. Moreover, adhering to the goals of the Region's access guidelines, TMIG recommends the implementation of left turn lanes on James Snow Parkway at proposed public road intersections. These auxiliary lanes are essential from both a safety and capacity perspective. Additionally, as heavy vehicles require more time and space to complete a turn or decelerate/accelerate compared to passenger vehicles, it is safer to have a dedicated turning lane for heavy vehicles

The following turn lanes are recommended:

- West Access 3 & Boston Church – northbound left turn lane
- West Access 4 & Boston Church – northbound left turn lane
- West Access 5 & Boston Church – northbound left turn lane
- East Access 1 & Boston Church – northbound right turn lane & southbound left-turn lane
- East Access 2 & James Snow Parkway – eastbound left turn lane & westbound right turn lane
- East Access 3 & James Snow Parkway – eastbound left turn lane & westbound right turn lane

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Despite not warranting traffic signals according to the OTM warrant, signals are recommended for implementation at the following locations due to traffic capacity and safety concerns:

- Esquesing Line and 5 Side Road (2023 onward – triggered by existing over-capacity conditions)
- James Snow Parkway and East Access 3 (2023 onward)
- Boston Church Road and 5 Side Road / Third Line (2028 onward – attributed to background corridor growth)
- James Snow Parkway and East Access 2 (2033 onward)

Overall, the off-site improvements (non-access related) to the existing intersections within the study area can be attributed to significant background growth and demand on the network and are not directly attributable to the traffic generated by the subject site.

## **APPENDIX A**

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### **Pre-Consultation Correspondence**

## Kyla Rodgers

---

**From:** Michael.Turco@milton.ca  
**Sent:** Wednesday, May 8, 2019 3:56 PM  
**To:** Michael Dowdall  
**Cc:** 'Monaghan, Patrick'  
**Subject:** FW: JSP Industrial Development - Study Terms of Reference, Town of Milton

Good afternoon Michael,

Please see below Town TOR comments in [green](#):

Please confirm Regional requirements with Halton Region directly.

Should you have any questions, please feel free to contact me.

Thank you,



**Michael Turco**, C.E.T., MITE  
Transportation Planning Technologist  
150 Mary Street, Milton ON,  
905-878-7252 x2363  
[www.milton.ca](http://www.milton.ca)

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---

**From:** Michael Dowdall <[mdowdall@tmig.ca](mailto:mdowdall@tmig.ca)>  
**Sent:** Thursday, April 11, 2019 2:11 PM  
**To:** Michael Turco <[Michael.Turco@milton.ca](mailto:Michael.Turco@milton.ca)>; Monaghan, Patrick <[Patrick.Monaghan@halton.ca](mailto:Patrick.Monaghan@halton.ca)>  
**Subject:** JSP Industrial Development - Study Terms of Reference, Town of Milton

Hi Michael and Patrick,

The Municipal Infrastructure Group Ltd. (TMIG) has been retained to prepare a Transportation Impact Study for a proposed industrial warehouse development consisting of approximately 80 Hectares of land that covers two separate parcels of land north of James Snow Parkway, west of Esquesing Line, south of 5th Sideroad and east of the CN railway line (see attached image). The primary use of the development will be 7 industrial high-cube warehouses (see attached concept plan).

The Phase 1 lands are the lands bound by the CN Railway to the west, Campbellville Road West to the north, Boston Church Road to the east and James Snow Parkway to the south. The Phase 1 lands are 21.7 ha in total.

The Phase 2 lands are bound by Boston Church Road to the west, an unnamed tributary to 16 Mile Creek to the north, Esquesing Line to the east and James Snow Parkway / Hydro Corridor to the south. The Phase 2 lands are 55.0 ha in total.

It is anticipated that both phases will be built concurrently within an estimated 2023 build-out year.

The greenfield property is situated along the north side of James Snow Parkway between the CN Railway and Esquesing Line. Our client intends to develop two parcels of land (Phases 1 and 2) located within the Milton North Business Park with approximately 4,950,000 ft<sup>2</sup> industrial (high-cube warehouse) gross floor area (GFA). Furthermore, our client is also seeking approval for a new public roadway connecting to James Snow Parkway via two new public road connections crossing the abutting hydro corridor, with private site accesses to serve the proposed development parcels. **Please be advised that the Town does not support the roads indicated as “Public Roads” on the Concept Plan being Public Roads. These roads are required to be private roads.**

- Phase 1 of the development consists of three buildings with an approximate total of 1,520,000 ft<sup>2</sup> of industrial GFA. Access to the proposed Phase 1 development includes:
  - Two full moves driveways with direct connection to 5 Sideroad; and
  - Two full moves driveways with direct connections to Boston Church Road.
- Phase 2 of the development consists of four buildings with an approximate total of 3,430,000 ft<sup>2</sup> of industrial GFA. Access to the proposed Phase 2 development includes:
  - One full moves driveway with direct connection to Boston Church Road;
  - Full moves driveways with direct connections to the Proposed ~~Public~~ Private Roadway; and
  - Two full moves intersections with direct connections to James Snow Parkway via the Proposed ~~Public~~ Private Roadway

In order to properly scope this project we ask that the Town & Region provide comments on the following terms of reference and confirm if there are any additional items required as part of the study.

## Terms of Reference

- We will conduct a study area road inventory review to confirm lane assignments, traffic controls, speed limits, and surrounding land uses and general study area characteristics of the study area.

The study area will consist of:

- Boston Church Road at James Snow Parkway (Regional Road 4)
- Boston Church Road at 5 Sideroad
- Esquesing Line at James Snow Parkway (Regional Road 4)
- Esquesing Line at 5 Sideroad
- Regional Road 25 at James Snow Parkway (Regional Road 4)
- Regional Road 25 at 5 Sideroad
- 5 Sideroad at Phase 1 Site Access (Future Condition)
- Boston Church Road at Phase 1 and 2 Site Accesses (Future Condition)
- James Snow Parkway at Proposed ~~Public~~ Private Road Intersections (Future Condition)

Based on the development of these lands as industrial warehouses, we propose counts be completed on a weekday morning between the hours of 7:00 am and 10:00 am and a weekday afternoon between the hours of 4:00 pm and 7:00 pm. This will capture the vehicular activity on the surrounding street system during the typical peak.

- Once existing traffic volumes have been collected, we will prepare a baseline model of traffic operations of the study area intersection using Synchro v.10 for the critical time periods (weekday am and weekday pm) as discussed above.
- The proposed horizon years are as follows (please confirm):
  - Full Build-out (assume 2023) to be confirmed by client
  - 5 Year Post Buildout Horizon (2028)

- 10 Year Post Buildout Horizon (2033)
- Town/Regional staff to provide the background traffic growth rates, and future background development, within the study area to be adopted as part of this study. **Roadways under the Town's jurisdiction should be assumed to have a 2% growth rate compounded per annum.**
- Please provide any potential/committed future road / intersection / other transportation infrastructure improvements within the study area that could affect local traffic distribution or assignments. Their effects on traffic patterns will be accounted for in the appropriate planning horizon as specified by Town/Regional staff.
  - Regarding Boston Church Road, 5 Sideroad and Esquesing Line; are there any plans to widen these streets within the 2033 planning horizon
    - **No plans at this time. Through the TIS, please confirm if and when any widenings will be required.**
  - Further, please confirm the existing and future ROW of these streets
    - **Boston Church Road requires a 26m ROW**
    - **5 Side Road requires a 35m ROW**
    - **Esquesing Line requires a 26m ROW**
- If available, please provide the process required to locate a new public road across a hydro corridor, and the clearance required from a hydro tower to the edge of the proposed ROW. **The Town does not support new public roads at this location. Please confirm any requirements for locating new private roads with the landowner (Hydro One)**
- Trip generation estimates will be prepared for the weekday am and pm peak hours for the proposed development. ITE 10th Edition trip generation data will be reviewed and the appropriate rates used in the analysis.
- Intersection capacity analyses for the resultant post-build out future traffic condition (the combination of future background traffic plus estimated site trip generation) during selected peak hours will then be conducted at all study intersections using Synchro v.10. Input parameters to the Synchro software will be consistent with the recommended practices and guidelines.
- Transit mode split and non-auto trip rates methodologies will be clearly documented in the report. **As modal splits are already implicit in the trip generation rates within the ITE Trip Generation Manual, no further modal split is to be applied.**
- The directional distribution of traffic approaching and departing the site will be determined based upon a review of existing traffic patterns and Toronto Tomorrow Survey 2011 (TTS) data. The site traffic will be assigned to the study area roadway network in accordance with our interpretation of these various patterns. **Please utilize 2016 TTS data for the trip distribution.**
- **Conduct left-turn and right-turn lane warrants at off the site accesses. Determine the required storage lane lengths.**
- **As part of a complete application, it must be ensured that truck traffic can enter and exit the site in a forward motion and access to the waste storage and loading areas are functional. On separate plans, illustrate truck turning movements with one continuous path with AutoTURN and insert the design vehicles on the plan. The site must be able to accommodate the largest design vehicles which will be accessing the property.**
- **Detailed Recommendations regarding on-site/off-site roadway improvements, site access, and site circulation (vehicular & pedestrian) are to be made.**

Thank you in advance for your attention to this matter. We look forward to your comments on the preceding scope of work.

Michael Dowdall, C.E.T., MITE  
Project Manager, Transportation Services

**TMIG | The Municipal Infrastructure Group Ltd.**

8800 Dufferin Street, Suite 200 | Vaughan, Ontario L4K 0C5

p: 905.738.5700 x361 | c: 437.993.2662 | f: 905.738.0065 | [mdowdall@tmig.ca](mailto:mdowdall@tmig.ca) | [tmig.ca](http://tmig.ca)



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## Kyla Rodgers

---

**From:** Monaghan, Patrick <Patrick.Monaghan@halton.ca>  
**Sent:** Wednesday, May 8, 2019 3:40 PM  
**To:** Michael Dowdall  
**Cc:** Michael.Turco@milton.ca; Hudson, Brian; McNeish, Amanda  
**Subject:** RE: JSP Industrial Development - Study Terms of Reference, Town of Milton

Hi Michael D,

Please be advised that we are working on providing some comments on this Terms of Reference, however our process requires that these requests be filtered through our Planning Department to our Public Works Department. I have copied the appropriate Planning contacts on this email. They will provide a response back on our behalf after we fully understand the Planning context and considered the technical implications in detail.

Patrick

### Patrick Monaghan

#### Transportation Planning Coordinator

Infrastructure Planning & Policy

Public Works

**Halton Region**

905-825-6000, ext. 7213 | 1-866-442-5866



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---

**From:** Michael Dowdall [mailto:mdowdall@tmig.ca]  
**Sent:** Thursday, April 11, 2019 2:11 PM  
**To:** Michael.Turco@milton.ca; Monaghan, Patrick  
**Subject:** JSP Industrial Development - Study Terms of Reference, Town of Milton

Hi Michael and Patrick,

The Municipal Infrastructure Group Ltd. (TMIG) has been retained to prepare a Transportation Impact Study for a proposed industrial warehouse development consisting of approximately 80 Hectares of land that covers two separate parcels of land north of James Snow Parkway, west of Esquesing Line, south of 5th Sideroad and east of the CN railway line (see attached image). The primary use of the development will be 7 industrial high-cube warehouses (see attached concept plan).

The Phase 1 lands are the lands bound by the CN Railway to the west, Campbellville Road West to the north, Boston Church Road to the east and James Snow Parkway to the south. The Phase 1 lands are 21.7 ha in total.

The Phase 2 lands are bound by Boston Church Road to the west, an unnamed tributary to 16 Mile Creek to the north, Esquesing Line to the east and James Snow Parkway / Hydro Corridor to the south. The Phase 2 lands are 55.0 ha in total.

It is anticipated that both phases will be built concurrently within an estimated 2023 build-out year.

The greenfield property is situated along the north side of James Snow Parkway between the CN Railway and Esquesing Line. Our client intends to develop two parcels of land (Phases 1 and 2) located within the Milton North Business Park with approximately 4,950,000 ft<sup>2</sup> industrial (high-cube warehouse) gross floor area (GFA). Furthermore, our client is also seeking approval for a new public roadway connecting to James Snow Parkway via two new public road connections crossing the abutting hydro corridor, with private site accesses to serve the proposed development parcels.

- Phase 1 of the development consists of three buildings with an approximate total of 1,520,000 ft<sup>2</sup> of industrial GFA. Access to the proposed Phase 1 development includes:
  - Two full moves driveways with direct connection to 5 Sideroad; and
  - Two full moves driveways with direct connections to Boston Church Road.
- Phase 2 of the development consists of four buildings with an approximate total of 3,430,000 ft<sup>2</sup> of industrial GFA. Access to the proposed Phase 2 development includes:
  - One full moves driveway with direct connection to Boston Church Road;
  - Full moves driveways with direct connections to the Proposed Public Roadway; and
  - Two full moves intersections with direct connections to James Snow Parkway via the Proposed Public Roadway

In order to properly scope this project we ask that the Town & Region provide comments on the following terms of reference and confirm if there are any additional items required as part of the study.

### **Terms of Reference**

- We will conduct a study area road inventory review to confirm lane assignments, traffic controls, speed limits, and surrounding land uses and general study area characteristics of the study area.

The study area will consist of:

- Boston Church Road at James Snow Parkway (Regional Road 4)
- Boston Church Road at 5 Sideroad
- Esquesing Line at James Snow Parkway (Regional Road 4)
- Esquesing Line at 5 Sideroad
- Regional Road 25 at James Snow Parkway (Regional Road 4)
- Regional Road 25 at 5 Sideroad
- 5 Sideroad at Phase 1 Site Access (Future Condition)
- Boston Church Road at Phase 1 and 2 Site Accesses (Future Condition)
- James Snow Parkway at Proposed Public Road Intersections (Future Condition)

Based on the development of these lands as industrial warehouses, we propose counts be completed on a weekday morning between the hours of 7:00 am and 10:00 am and a weekday afternoon between the hours of 4:00 pm and 7:00 pm. This will capture the vehicular activity on the surrounding street system during the typical peak.

- Once existing traffic volumes have been collected, we will prepare a baseline model of traffic operations of the study area intersection using Synchro v.10 for the critical time periods (weekday am and weekday pm) as discussed above.

- The proposed horizon years are as follows (please confirm):
  - Full Build-out (assume 2023) to be confirmed by client
  - 5 Year Post Buildout Horizon (2028)
  - 10 Year Post Buildout Horizon (2033)
- Town/Regional staff to provide the background traffic growth rates, and future background development, within the study area to be adopted as part of this study.
- Please provide any potential/committed future road / intersection / other transportation infrastructure improvements within the study area that could affect local traffic distribution or assignments. Their effects on traffic patterns will be accounted for in the appropriate planning horizon as specified by Town/Regional staff.
  - Regarding Boston Church Road, 5 Sideroad and Esquesing Line; are there any plans to widen these streets within the 2033 planning horizon
  - Further, please confirm the existing and future ROW of these streets
- If available, please provide the process required to locate a new public road across a hydro corridor, and the clearance required from a hydro tower to the edge of the proposed ROW.
- Trip generation estimates will be prepared for the weekday am and pm peak hours for the proposed development. ITE 10th Edition trip generation data will be reviewed and the appropriate rates used in the analysis.
- Intersection capacity analyses for the resultant post-build out future traffic condition (the combination of future background traffic plus estimated site trip generation) during selected peak hours will then be conducted at all study intersections using Synchro v.10. Input parameters to the Synchro software will be consistent with the recommended practices and guidelines.
- Transit mode split and non-auto trip rates methodologies will be clearly documented in the report.
- The directional distribution of traffic approaching and departing the site will be determined based upon a review of existing traffic patterns and Toronto Tomorrow Survey 2011 (TTS) data. The site traffic will be assigned to the study area roadway network in accordance with our interpretation of these various patterns.

Thank you in advance for your attention to this matter. We look forward to your comments on the preceding scope of work.

Michael Dowdall, C.E.T., MITE  
Project Manager, Transportation Services

**TMIG | The Municipal Infrastructure Group Ltd.**

8800 Dufferin Street, Suite 200 | Vaughan, Ontario L4K 0C5  
p: 905.738.5700 x361 | c: 437.993.2662 | f: 905.738.0065 | [mdowdall@tmig.ca](mailto:mdowdall@tmig.ca) | [tmig.ca](http://tmig.ca)



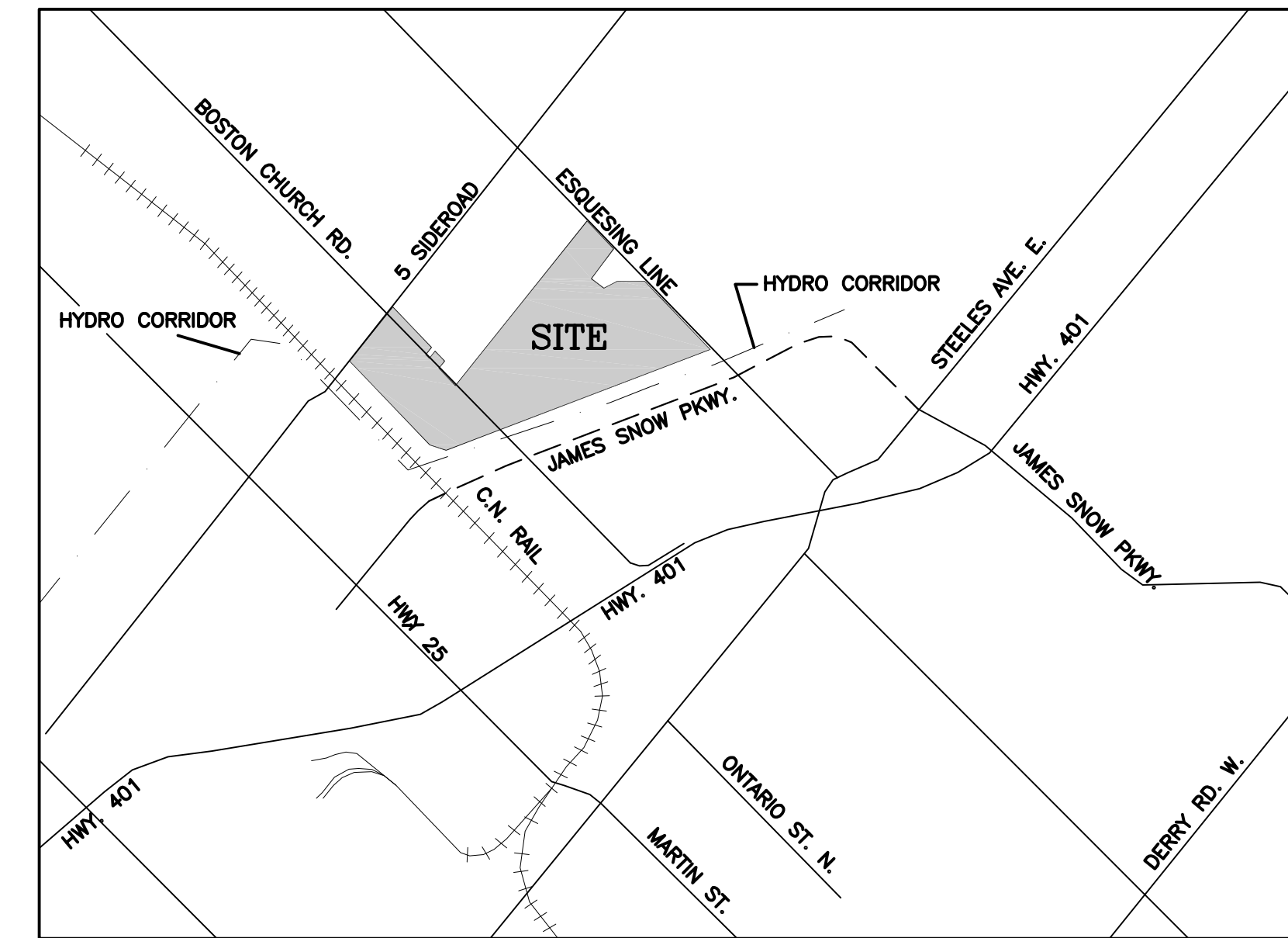
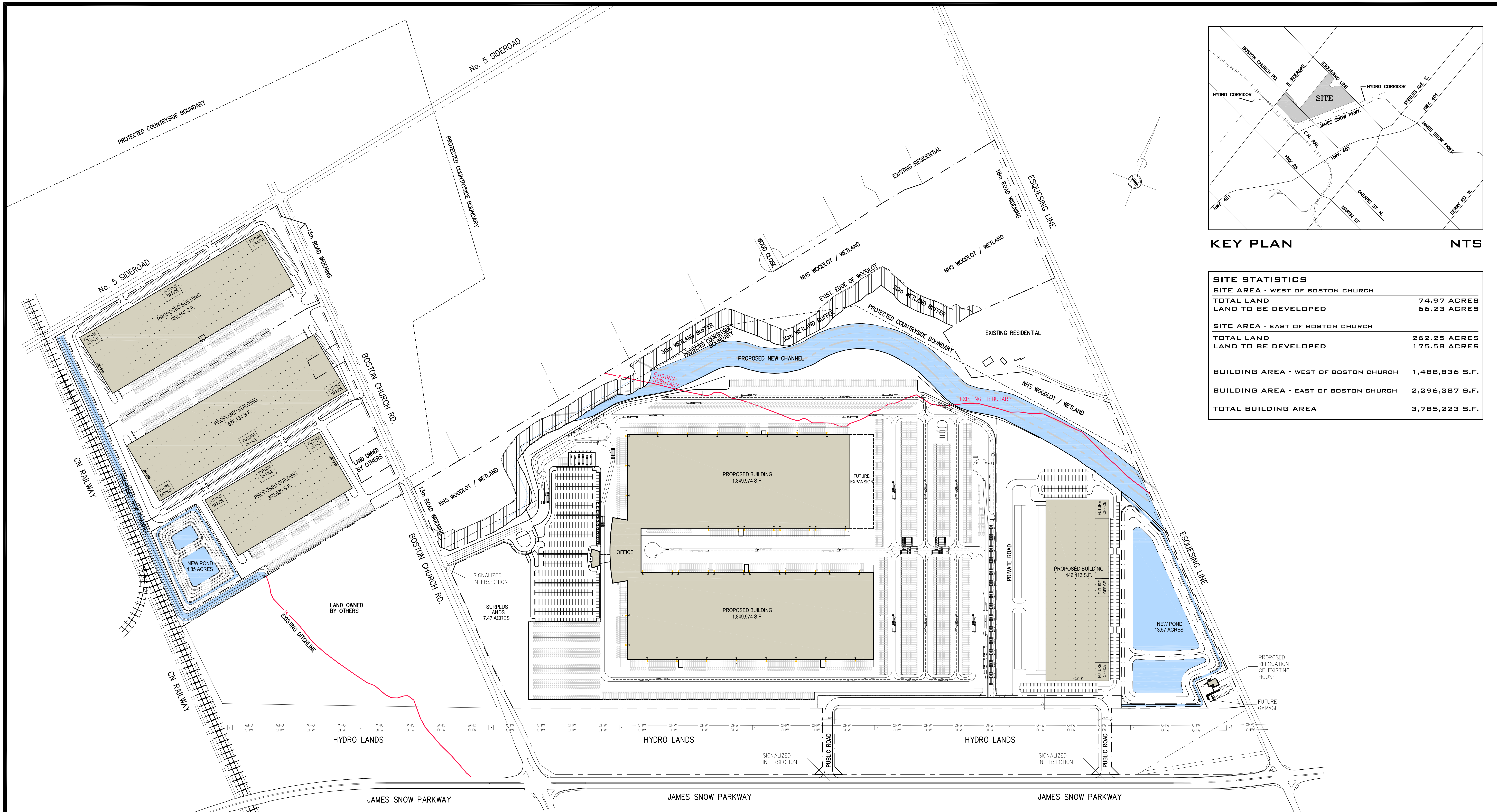
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## **APPENDIX B**

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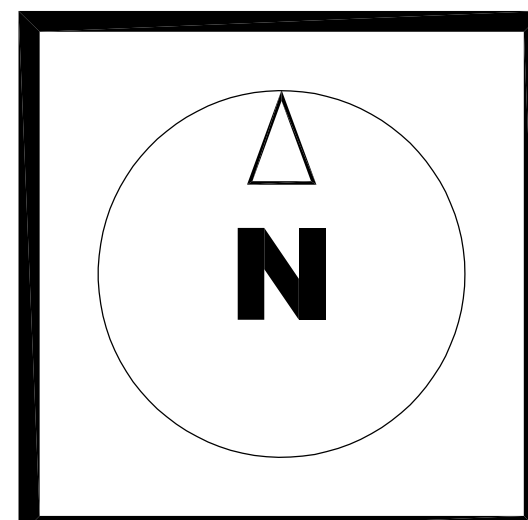
### **Concept Plan and Draft Plans**





**KEY PLAN** NTS

SITE STATISTICS	
SITE AREA - WEST OF BOSTON CHURCH	
TOTAL LAND	74.97 ACRES
LAND TO BE DEVELOPED	66.23 ACRES
SITE AREA - EAST OF BOSTON CHURCH	
TOTAL LAND	262.25 ACRES
LAND TO BE DEVELOPED	175.58 ACRES
BUILDING AREA - WEST OF BOSTON CHURCH	
	1,488,836 S.F.
BUILDING AREA - EAST OF BOSTON CHURCH	
	2,296,387 S.F.
<b>TOTAL BUILDING AREA</b>	<b>3,785,223 S.F.</b>

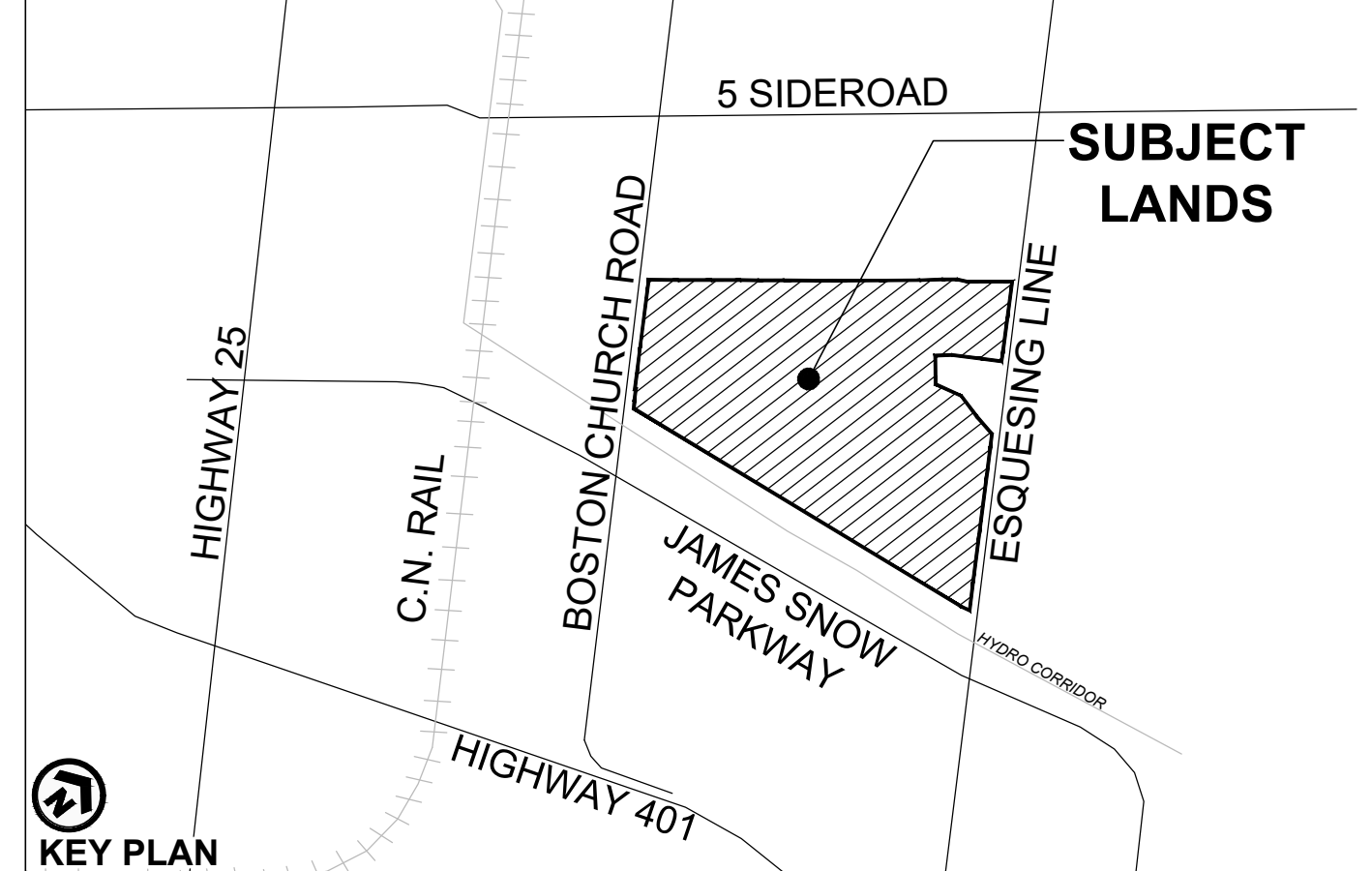
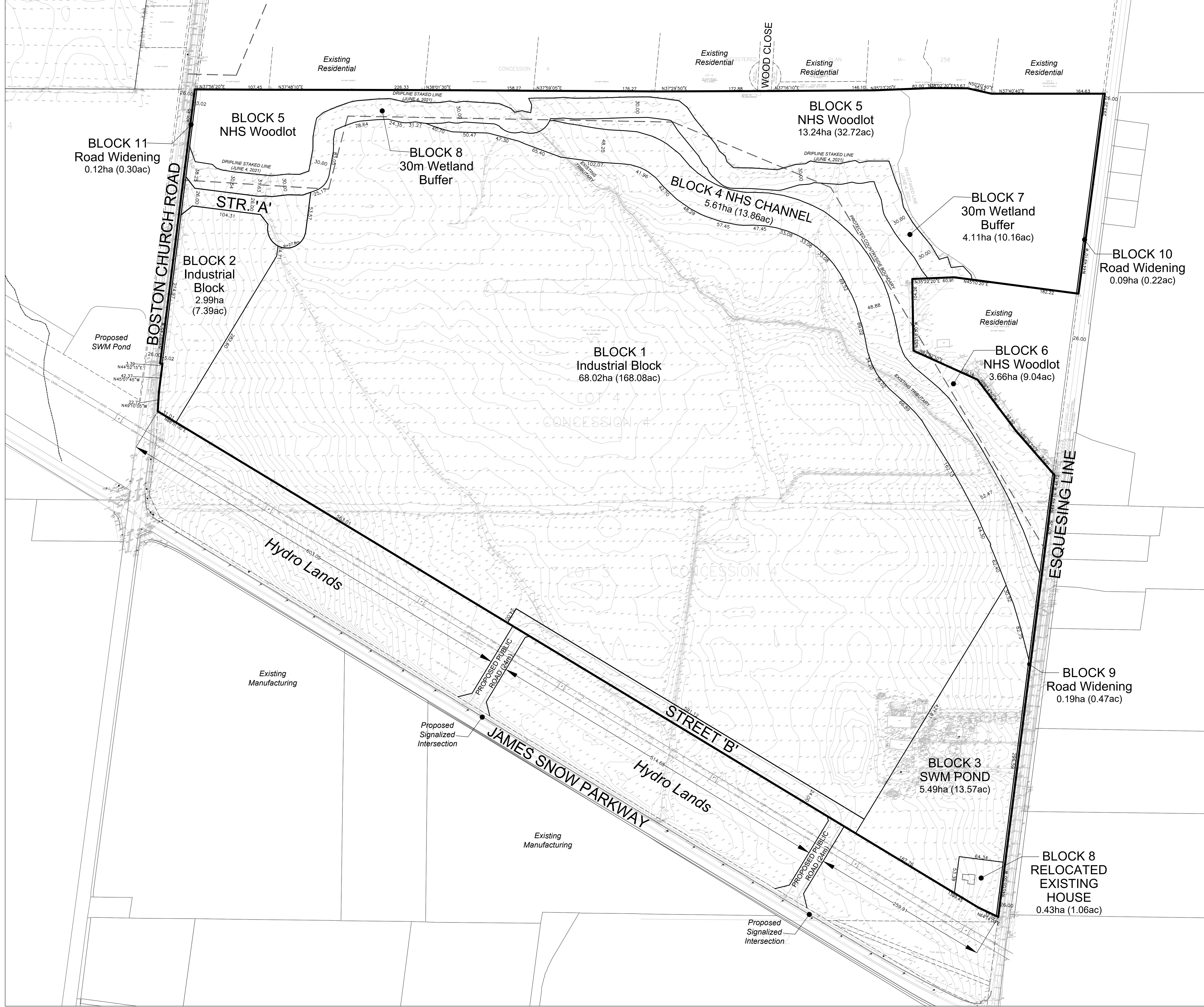


Milton North Business Park  
Milton, Ontario

**CONCEPT PLAN**

SCALE: 1:2500  
DATE: SEPT. 15, 2021





**DRAFT PLAN OF SUBDIVISION  
ORLANDO CORPORATION**  
PART OF LOT 3 AND 4, CONCESSION 4,  
TOWNSHIP OF ESQUESING  
REGIONAL MUNICIPALITY OF HALTON

**OWNERS CERTIFICATE**  
I HEREBY AUTHORIZE GLEN SCHNARR & ASSOCIATES INC. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE TOWN OF MILTON FOR APPROVAL.

SIGNED \_\_\_\_\_ DATE \_\_\_\_\_  
PHIL KING, PRESIDENT  
ORLANDO CORPORATION

**SURVEYORS CERTIFICATE**  
I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO ADJACENT LANDS ARE CORRECTLY AND ACCURATELY SHOWN.

SIGNED \_\_\_\_\_ DATE \_\_\_\_\_  
ALISTER SANKEY, O.L.S.  
David B.Searles Surveying Ltd.  
ONTARIO LAND SURVEYORS  
4284 VILLAGE CENTRE COURT, MISSISSAUGA, ONTARIO L4Z 1S2  
(905) 273-8640 FAX: (905) 896-4410  
E MAIL: DBSOLS@ON.AIBN.COM

**ADDITIONAL INFORMATION**  
(UNDER SECTION 51(17) OF THE PLANNING ACT) INFORMATION REQUIRED BY CLAUSES A,B,C,D,E,F,G, & J ARE SHOWN ON THE DRAFT AND KEY PLANS.

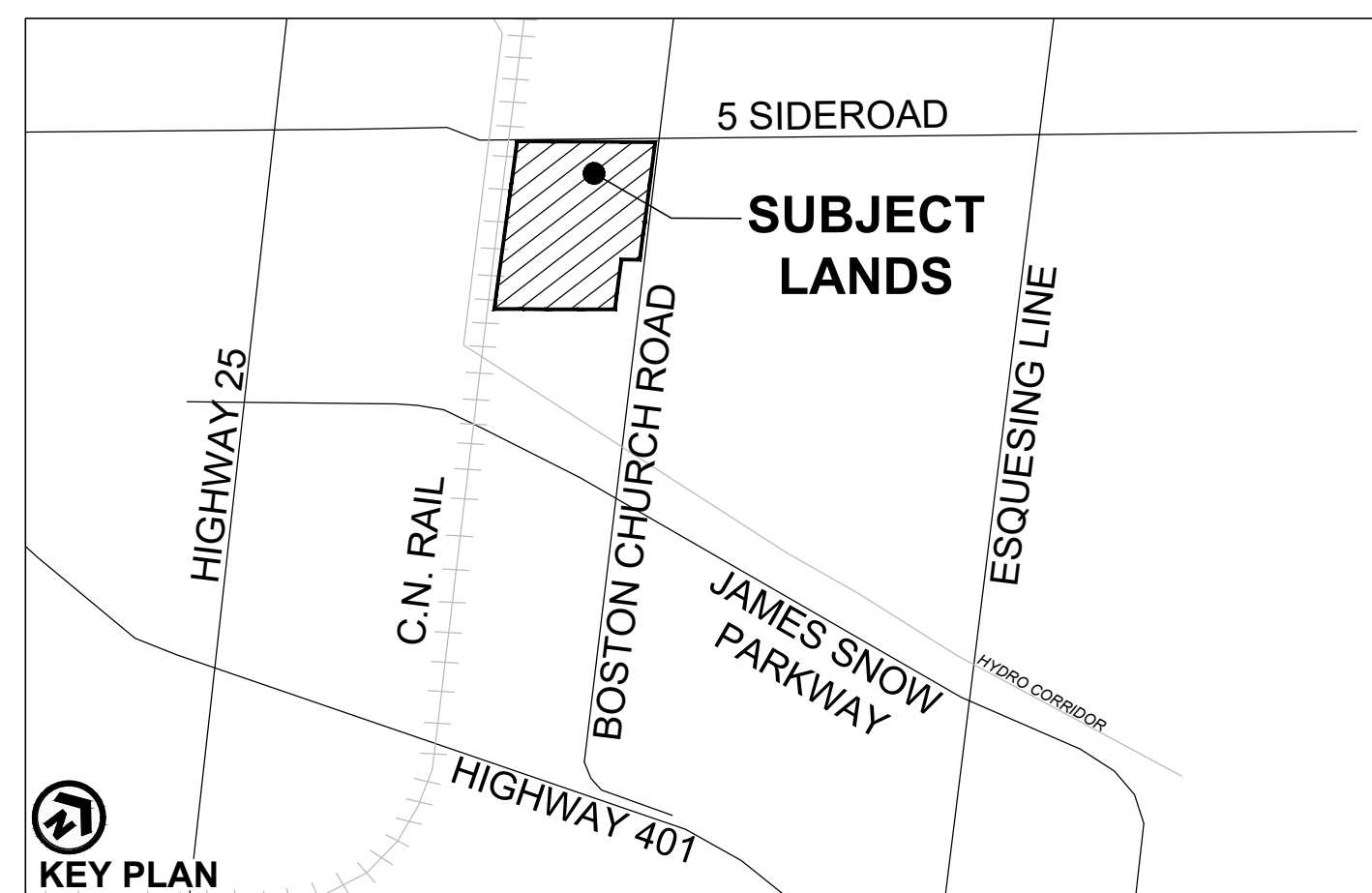
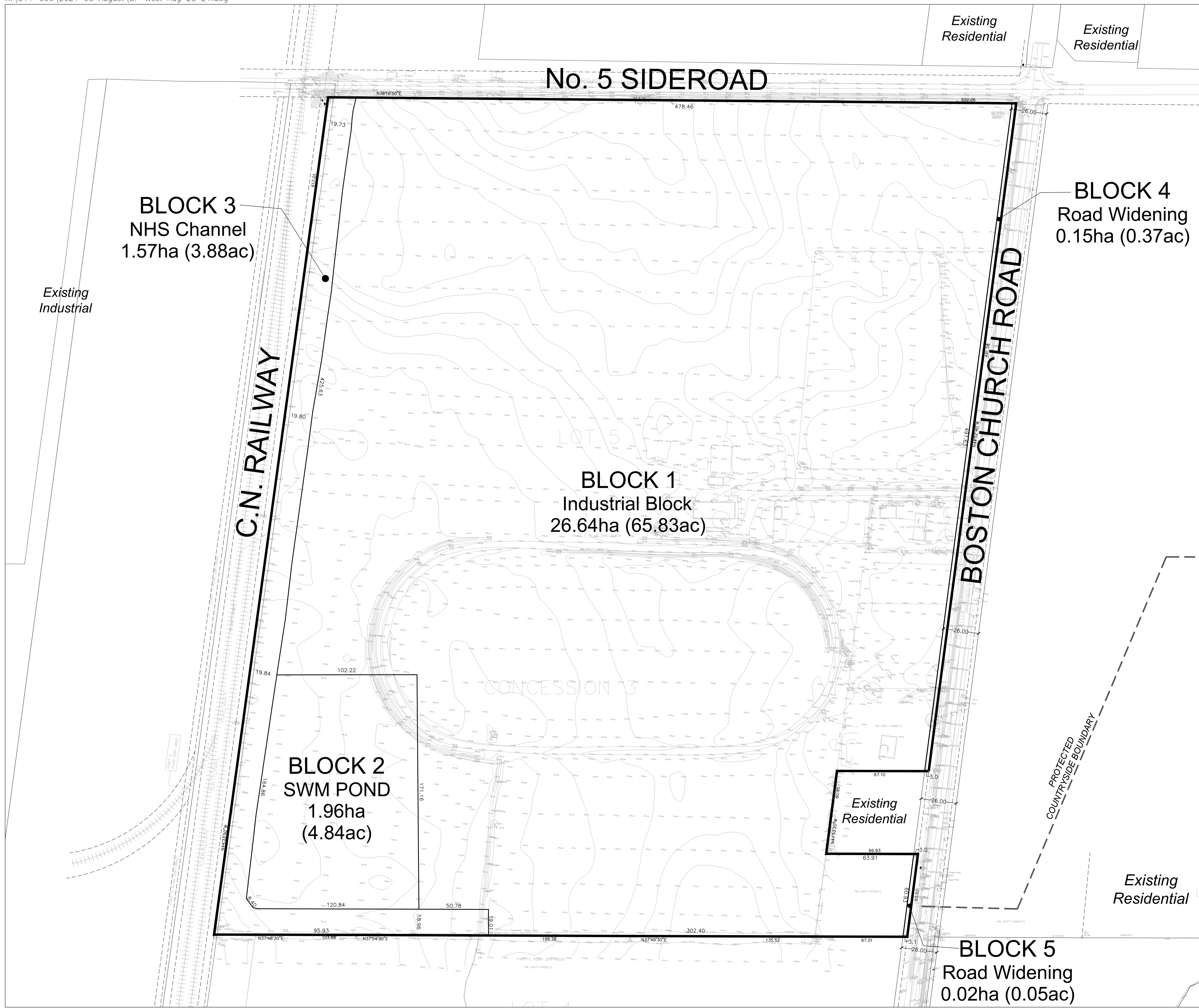
- H) MUNICIPAL AND PIPED WATER TO BE PROVIDED
- I) SANDY LOAM AND CLAY LOAM
- K) SANITARY AND STORM SEWERS TO BE PROVIDED

**LAND USE SCHEDULE**

LAND USE	BLOCKS	AREA (ha)	AREA (ac)
Industrial Block	1,2	71.01	175.47
SWM Pond	3	5.49	13.57
NHS Channel	4	5.61	13.86
NHS Woodlot	5,6	16.90	41.76
30m Wetland Buffer	7	4.11	10.16
Relocated Existing House	8	0.43	1.06
Road Widening	9 - 11	0.40	0.99
24.0m - 26.0m R.O.W. (791m Length)		2.18	5.39
<b>TOTAL</b>	<b>11</b>	<b>106.13</b>	<b>262.25</b>

**NOTES**  
-Base mapping obtained from DB Searles  
-daylight triangle at Street 'A' and Boston Church Road: 15m x 15m





**DRAFT PLAN OF SUBDIVISION  
ORLANDO CORPORATION**

PART OF LOT 5, CONCESSION 3,  
TOWNSHIP OF ESQUESING  
REGIONAL MUNICIPALITY OF HALTON

**OWNERS CERTIFICATE**  
I HEREBY AUTHORIZE GLEN SCHNARR & ASSOCIATES INC. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE TOWN OF MILTON FOR APPROVAL.

SIGNED \_\_\_\_\_ DATE \_\_\_\_\_  
PHIL KING, PRESIDENT  
ORLANDO CORPORATION

**SURVEYORS CERTIFICATE**  
I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO ADJACENT LANDS ARE CORRECTLY AND ACCURATELY SHOWN.

SIGNED \_\_\_\_\_ DATE \_\_\_\_\_  
ALISTER SANKEY, O.L.S.  
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**ADDITIONAL INFORMATION**  
(UNDER SECTION 51(17) OF THE PLANNING ACT) INFORMATION REQUIRED BY CLAUSES A,B,C,D,E,F,G, & J ARE SHOWN ON THE DRAFT AND KEY PLANS.

- H) MUNICIPAL AND PIPED WATER TO BE PROVIDED
- I) SANDY LOAM AND CLAY LOAM
- K) SANITARY AND STORM SEWERS TO BE PROVIDED

**LAND USE SCHEDULE**

LAND USE	BLOCKS	AREA (ha)	AREA (ac)
Industrial Block	1	26.64	65.83
SWM Pond	2	1.96	4.84
NHS Channel	3	1.57	3.88
Road Widening	4,5	0.17	0.42
<b>TOTAL</b>	<b>5</b>	<b>30.34</b>	<b>74.97</b>

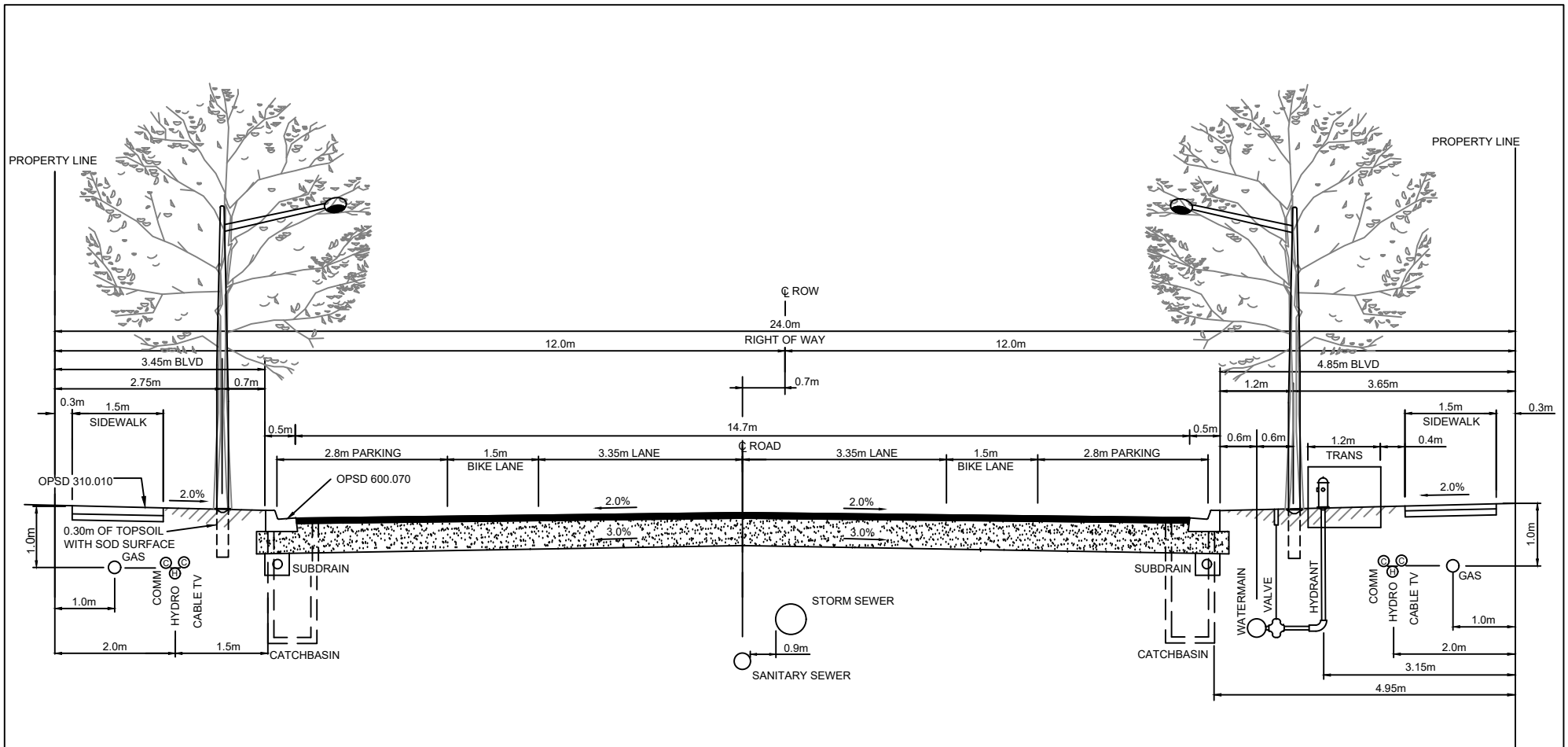
**NOTES**  
- Base mapping obtained from DB Searles



## **APPENDIX C**

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### **Milton Cross Sections**



**NOTE:**

1. SINGLE AND DOUBLE LOADED REFERS TO BUILDINGS FRONTING THE R.O.W ON ONE OR BOTH SIDES, NOT TO SIDEWALK LOCATIONS.

MINIMUM ROAD STRUCTURE	
SURFACE COARSE	40mm HL3 High Stability
BINDER COARSE	100mm HL8
BASE	150mm 19mm LIMESTONE
SUB BASE	375mm GRANULAR 'B', TYPE II

TOWN OF MILTON

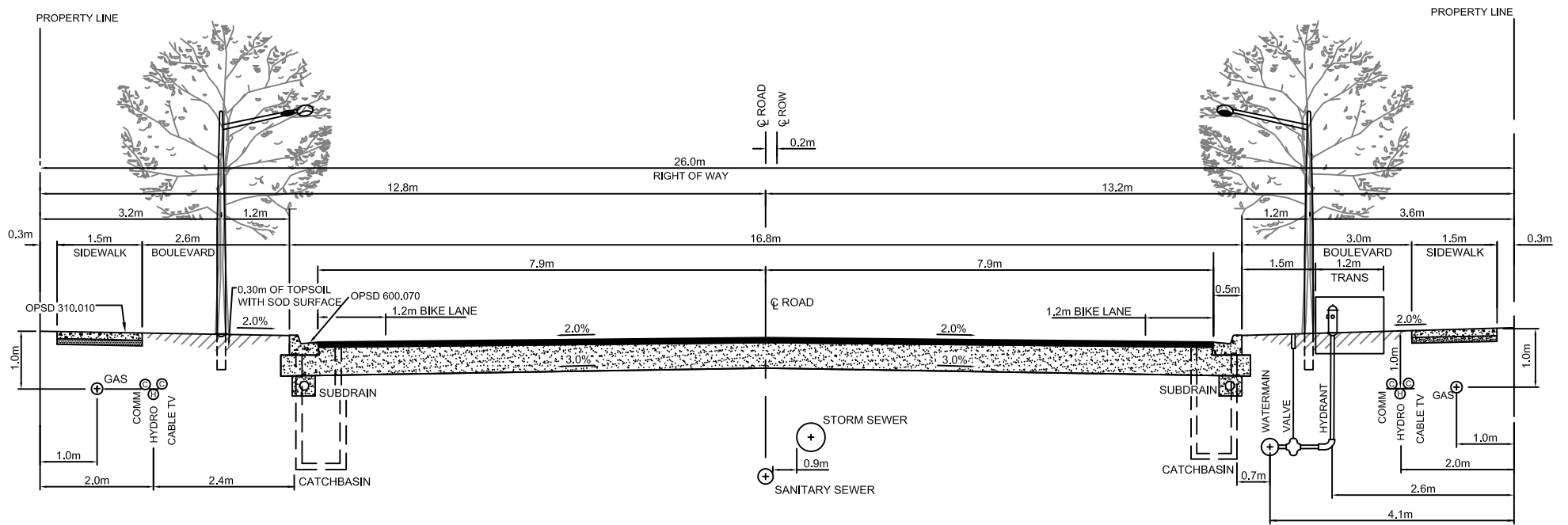
24m ROAD ALLOWANCE - MINOR COLLECTOR - SINGLE OR DOUBLE LOADED

SCALE: N.T.S.

DATE: MARCH 2017

STD. NO. E-4





**NOTE:**

1. CABLE AND BELL PEDESTALS TO BE ALIGNED WITH LIGHT STANDARDS
2. SIDEWALKS ARE TO BE PLACED ON BOTH SIDES OF THE R.O.W., UNLESS JUSTIFIED BY THE PEDESTRIAN ROUTING PLAN
3. CURB AND GUTTER PER OPSD 600.070
4. SINGLE AND DOUBLE LOADED REFERS TO BUILDINGS FRONTING THE R.O.W ON ONE OR BOTH SIDES, NOT TO SIDEWALK LOCATIONS.

MINIMUM ROAD STRUCTURE	
SURFACE COARSE	40mm HL3 HIGH STABILITY
BINDER COARSE	100mm HL8
BASE	150mm 19mm LIMESTONE
SUB BASE	375mm GRANULAR 'B', TYPE II

TOWN OF MILTON

26m ROAD ALLOWANCE - MAJOR COLLECTOR - SINGLE OR DOUBLE LOADED

SCALE: N.T.S.  
 DATE: MARCH 2017  
 STD. NO. E - 5



## APPENDIX D

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### Existing Traffic Data

# Ontario Traffic Inc.

## Morning Peak Diagram

### Specified Period

**From:** 7:00:00  
**To:** 10:00:00

### One Hour Peak

**From:** 7:45:00  
**To:** 8:45:00

**Municipality:** Milton  
**Site #:** 1912000001  
**Intersection:** James Snow Pkwy & Boston Church  
**TFR File #:** 1  
**Count date:** 16-Apr-19

**Weather conditions:**  
**Person(s) who counted:**

**\*\* Signalized Intersection \*\***

**Major Road:** James Snow Pkwy runs W/E

North Leg Total: 199  
North Entering: 154  
North Peds: 0  
Peds Cross:  $\times$

Heavys	0	0	0	0
Trucks	10	4	4	18
Cars	98	21	17	136
<b>Totals</b>	<b>108</b>	<b>25</b>	<b>21</b>	



Heavys	0
Trucks	8
Cars	37
<b>Totals</b>	<b>45</b>

East Leg Total: 731  
East Entering: 198  
East Peds: 0  
Peds Cross:  $\times$

Heavys	0
Trucks	65
Cars	241
<b>Totals</b>	<b>306</b>

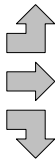


Boston Church Rd

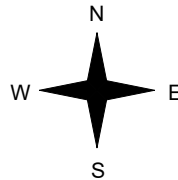
Cars	12	2	0	14
Trucks	133	37	0	170
Heavys	10	4	0	14
<b>Totals</b>	<b>155</b>	<b>43</b>	<b>0</b>	



Heavys	0
Trucks	6
Cars	22
<b>Totals</b>	<b>28</b>
Heavys	0
Trucks	90
Cars	411
<b>Totals</b>	<b>501</b>
Heavys	0
Trucks	23
Cars	104
<b>Totals</b>	<b>127</b>
Heavys	0
Trucks	119
Cars	537
<b>Totals</b>	<b>656</b>



James Snow Pkwy



James Snow Pkwy



Cars	431	102	0	533
Trucks				
Heavys				
<b>Totals</b>	<b>533</b>			

Peds Cross:  $\times$   
West Peds: 0  
West Entering: 656  
West Leg Total: 962

Cars	135	10	3	3	16
Trucks	31	18	0	8	26
Heavys	0	0	0	0	0
<b>Totals</b>	<b>166</b>	<b>28</b>	<b>3</b>	<b>11</b>	



Boston Church Rd



Peds Cross:  $\times$   
South Peds: 0  
South Entering: 42  
South Leg Total: 208

## Comments

# Ontario Traffic Inc.

## Afternoon Peak Diagram

### Specified Period

**From:** 16:00:00  
**To:** 19:00:00

### One Hour Peak

**From:** 16:15:00  
**To:** 17:15:00

**Municipality:** Milton  
**Site #:** 1912000001  
**Intersection:** James Snow Pkwy & Boston Church  
**TFR File #:** 1  
**Count date:** 16-Apr-19

**Weather conditions:**  
**Person(s) who counted:**

**\*\* Signalized Intersection \*\***

**Major Road:** James Snow Pkwy runs W/E

North Leg Total: 233  
North Entering: 71  
North Peds: 0  
Peds Cross:  $\times$

Heavys	0	0	0	0
Trucks	5	2	2	9
Cars	30	24	8	62
<b>Totals</b>	<b>35</b>	<b>26</b>	<b>10</b>	



Heavys	0
Trucks	19
Cars	143
<b>Totals</b>	<b>162</b>

East Leg Total: 606  
East Entering: 317  
East Peds: 0  
Peds Cross:  $\times$

Heavys	0
Trucks	81
Cars	365
<b>Totals</b>	<b>446</b>

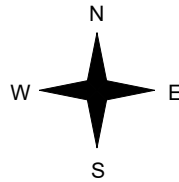


Boston Church Rd

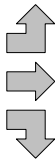
Cars	19	3	0	22
Trucks	210	56	0	266
Heavys	16	13	0	29
<b>Totals</b>	<b>245</b>	<b>72</b>	<b>0</b>	



James Snow Pkwy



Heavys	0
Trucks	8
Cars	93
<b>Totals</b>	<b>101</b>
Heavys	0
Trucks	51
Cars	200
<b>Totals</b>	<b>251</b>
Heavys	0
Trucks	32
Cars	41
<b>Totals</b>	<b>73</b>
Heavys	0
Trucks	91
Cars	334
<b>Totals</b>	<b>425</b>



Boston Church Rd

James Snow Pkwy



Cars	219	70	0	289
Trucks				
Heavys				
<b>Totals</b>	<b>289</b>			

Peds Cross:  $\times$   
West Peds: 0  
West Entering: 425  
West Leg Total: 871

Cars	81	125	31	11	167
Trucks	47	20	8	17	45
Heavys	0	0	0	0	0
<b>Totals</b>	<b>128</b>	<b>145</b>	<b>39</b>	<b>28</b>	



Peds Cross:  $\times$   
South Peds: 0  
South Entering: 212  
South Leg Total: 340

## Comments

# Ontario Traffic Inc.

## Morning Peak Diagram

### Specified Period

**From:** 7:00:00  
**To:** 10:00:00

### One Hour Peak

**From:** 7:15:00  
**To:** 8:15:00

**Municipality:** Milton  
**Site #:** 1912000002  
**Intersection:** 5 Sideroad & Boston Church Rd-3 L  
**TFR File #:** 1  
**Count date:** 16-Apr-19

**Weather conditions:**  
**Person(s) who counted:**

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

**Major Road:** 5 Sideroad runs W/E

North Leg Total: 121  
North Entering: 98  
North Peds: 0  
Peds Cross:  $\bowtie$

Heavys	0	0	0	0
Trucks	3	6	3	12
Cars	21	61	4	86
<b>Totals</b>	<b>24</b>	<b>67</b>	<b>7</b>	



Heavys	0
Trucks	4
Cars	19
<b>Totals</b>	<b>23</b>

East Leg Total: 588  
East Entering: 162  
East Peds: 0  
Peds Cross:  $\bowtie$

Heavys	0
Trucks	19
Cars	132
<b>Totals</b>	<b>151</b>

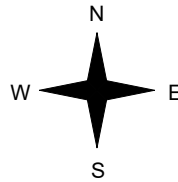


3 Line

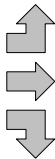
Cars	2	1	0	3
Trucks	104	15	0	119
Heavys	35	5	0	40
<b>Totals</b>	<b>141</b>	<b>21</b>	<b>0</b>	



5 Sideroad



Heavys	0
Trucks	1
Cars	7
<b>Totals</b>	<b>8</b>
Heavys	0
Trucks	53
Cars	349
<b>Totals</b>	<b>402</b>
Heavys	0
Trucks	7
Cars	19
<b>Totals</b>	<b>26</b>



5 Sideroad



Peds Cross:  $\bowtie$   
West Peds: 0  
West Entering: 436  
West Leg Total: 587

Cars	115	7	10	15	32
Trucks	18	1	2	2	5
Heavys	0	0	0	0	0
<b>Totals</b>	<b>133</b>	<b>8</b>	<b>12</b>	<b>17</b>	



Boston Church Rd



Cars	368	58	0	426
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Peds Cross:  $\bowtie$   
South Peds: 0  
South Entering: 37  
South Leg Total: 170

## Comments

# Ontario Traffic Inc.

## Afternoon Peak Diagram

### Specified Period

**From:** 16:00:00

**To:** 19:00:00

### One Hour Peak

**From:** 16:15:00

**To:** 17:15:00

**Municipality:** Milton  
**Site #:** 1912000002  
**Intersection:** 5 Sideroad & Boston Church Rd-3 L  
**TFR File #:** 1  
**Count date:** 16-Apr-19

**Weather conditions:**  
**Person(s) who counted:**

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

**Major Road:** 5 Sideroad runs W/E

North Leg Total: 131  
 North Entering: 40  
 North Peds: 0  
 Peds Cross:  $\times$

Heavys	0	0	0	0
Trucks	1	4	0	5
Cars	5	25	5	35
<b>Totals</b>	<b>6</b>	<b>29</b>	<b>5</b>	



Heavys	0
Trucks	10
Cars	81
<b>Totals</b>	<b>91</b>

East Leg Total: 552  
 East Entering: 311  
 East Peds: 0  
 Peds Cross:  $\times$

Heavys	0
Trucks	57
Cars	252
<b>Totals</b>	<b>309</b>

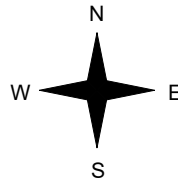


3 Line

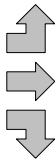
Cars	2	0	0	2
Trucks	230	50	0	280
Heavys	27	2	0	29
<b>Totals</b>	<b>259</b>	<b>52</b>	<b>0</b>	



5 Sideroad



Heavys	0
Trucks	5
Cars	18
<b>Totals</b>	<b>23</b>
Heavys	0
Trucks	25
Cars	137
<b>Totals</b>	<b>162</b>
Heavys	0
Trucks	3
Cars	8
<b>Totals</b>	<b>11</b>
Heavys	0
Trucks	33
Cars	163
<b>Totals</b>	<b>196</b>



5 Sideroad



Cars	207	34	0	241
Trucks				
Heavys				
<b>Totals</b>	<b>207</b>	<b>34</b>	<b>0</b>	<b>241</b>

Peds Cross:  $\times$   
 West Peds: 0  
 West Entering: 196  
 West Leg Total: 505

Cars	60	17	61	65	143
Trucks	9	6	5	9	20
Heavys	0	0	0	0	0
<b>Totals</b>	<b>69</b>	<b>23</b>	<b>66</b>	<b>74</b>	



Boston Church Rd

Peds Cross:  $\times$   
 South Peds: 0  
 South Entering: 163  
 South Leg Total: 232

## Comments



# Ontario Traffic Inc.

## Morning Peak Diagram

### Specified Period

**From:** 7:00:00  
**To:** 10:00:00

### One Hour Peak

**From:** 7:30:00  
**To:** 8:30:00

**Municipality:** Milton  
**Site #:** 1912000003  
**Intersection:** James Snow Pkwy & Esquesing Lir  
**TFR File #:** 1  
**Count date:** 16-Apr-19

**Weather conditions:**  
**Person(s) who counted:**

**\*\* Signalized Intersection \*\***

**Major Road:** James Snow Pkwy runs W/E

North Leg Total: 602  
North Entering: 376  
North Peds: 0  
Peds Cross:  $\bowtie$

Heavys	0	0	0	0
Trucks	2	46	5	53
Cars	10	278	35	323
<b>Totals</b>	<b>12</b>	<b>324</b>	<b>40</b>	



Heavys	0
Trucks	23
Cars	203
<b>Totals</b>	<b>226</b>

East Leg Total: 586  
East Entering: 205  
East Peds: 0  
Peds Cross:  $\bowtie$

Heavys	0	Trucks	45	Cars	159	Totals	204
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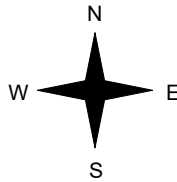


Esquesing Line

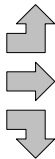
Cars	37	Trucks	2	Heavys	0	Totals	39
Cars	92	Trucks	36	Heavys	0	Totals	128
Cars	34	Trucks	4	Heavys	0	Totals	38
<b>Totals</b>	<b>163</b>	<b>42</b>	<b>0</b>				



James Snow Pkwy



Heavys	0	Trucks	3	Cars	14	Totals	17
Heavys	0	Trucks	72	Cars	263	Totals	335
Heavys	0	Trucks	25	Cars	116	Totals	141
<b>Totals</b>	<b>0</b>	<b>100</b>	<b>393</b>				



James Snow Pkwy



Cars	303	Trucks	78	Heavys	0	Totals	381
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Peds Cross:  $\bowtie$   
West Peds: 0  
West Entering: 493  
West Leg Total: 697

Cars	428	Cars	57	152	5	214
Trucks	75	Trucks	7	18	1	26
Heavys	0	Heavys	0	0	0	0
<b>Totals</b>	<b>503</b>	<b>Totals</b>	<b>64</b>	<b>170</b>	<b>6</b>	



Esquesing Line



Peds Cross:  $\bowtie$   
South Peds: 0  
South Entering: 240  
South Leg Total: 743

## Comments

# Ontario Traffic Inc.

## Afternoon Peak Diagram

### Specified Period

**From:** 16:00:00  
**To:** 19:00:00

### One Hour Peak

**From:** 16:30:00  
**To:** 17:30:00

**Municipality:** Milton  
**Site #:** 1912000003  
**Intersection:** James Snow Pkwy & Esquesing Lir  
**TFR File #:** 1  
**Count date:** 16-Apr-19

**Weather conditions:**  
**Person(s) who counted:**

### \*\* Signalized Intersection \*\*

**Major Road:** James Snow Pkwy runs W/E

North Leg Total: 529  
North Entering: 172  
North Peds: 0  
Peds Cross:  $\times$

Heavys	0	0	0	0
Trucks	1	22	5	28
Cars	7	115	22	144
Totals	8	137	27	



Heavys	0
Trucks	43
Cars	314
Totals	357

East Leg Total: 540  
East Entering: 270  
East Peds: 0  
Peds Cross:  $\times$

Heavys	0	Trucks	76	Cars	251	Totals	327
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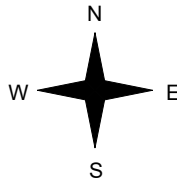


Esquesing Line

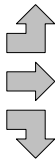
Cars	45	Trucks	2	Heavys	0	Totals	47
Cars	157	Trucks	57	Heavys	0	Totals	214
Cars	9	Trucks	0	Heavys	0	Totals	9
Cars	211	Trucks	59	Heavys	0	Totals	



James Snow Pkwy



Heavys	0	Trucks	3	Cars	7	Totals	10
Heavys	0	Trucks	54	Cars	159	Totals	213
Heavys	0	Trucks	6	Cars	69	Totals	75
Heavys	0	Trucks	63	Cars	235	Totals	



James Snow Pkwy



Cars	209	Trucks	61	Heavys	0	Totals	270
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Peds Cross:  $\times$   
West Peds: 0  
West Entering: 298  
West Leg Total: 625

Cars	193	Cars	87	262	28	377
Trucks	28	Trucks	18	38	2	58
Heavys	0	Heavys	0	0	0	0
Totals	221	Totals	105	300	30	



Esquesing Line



Peds Cross:  $\times$   
South Peds: 0  
South Entering: 435  
South Leg Total: 656

### Comments

# Ontario Traffic Inc.

## Morning Peak Diagram

### Specified Period

**From:** 7:00:00  
**To:** 10:00:00

### One Hour Peak

**From:** 7:30:00  
**To:** 8:30:00

**Municipality:** Milton  
**Site #:** 1912000004  
**Intersection:** 5 Sideroad & Esquesing Line-Fourth  
**TFR File #:** 1  
**Count date:** 16-Apr-19

**Weather conditions:**  
**Person(s) who counted:**

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

**Major Road:** 5 Sideroad runs W/E

North Leg Total: 494  
North Entering: 380  
North Peds: 0  
Peds Cross:  $\times$

Heavys	0	0	0	0
Trucks	3	44	9	56
Cars	22	248	54	324
Totals	25	292	63	



Heavys	0
Trucks	16
Cars	98
Totals	114

East Leg Total: 792  
East Entering: 217  
East Peds: 0  
Peds Cross:  $\times$

Heavys	0	Trucks	21	Cars	148	Totals	169
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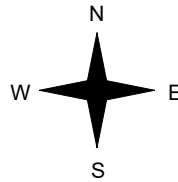


Fourth Line

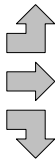
Cars	2	Trucks	1	Heavys	0	Totals	3
Cars	117	Trucks	17	Heavys	0	Totals	134
Cars	72	Trucks	8	Heavys	0	Totals	80
Cars	191	Trucks	26	Heavys	0	Totals	



5 Sideroad



Heavys	0	Trucks	3	Cars	4	Totals	7
Heavys	0	Trucks	48	Cars	354	Totals	402
Heavys	0	Trucks	1	Cars	15	Totals	16
Heavys	0	Trucks	52	Cars	373	Totals	



5 Sideroad



Peds Cross:  $\times$   
West Peds: 0  
West Entering: 425  
West Leg Total: 594

Cars	335	Cars	9	92	103	204
Trucks	53	Trucks	1	12	7	20
Heavys	0	Heavys	0	0	0	0
Totals	388	Totals	10	104	110	



Esquesing Line



Peds Cross:  $\times$   
South Peds: 0  
South Entering: 224  
South Leg Total: 612

## Comments

# Ontario Traffic Inc.

## Afternoon Peak Diagram

### Specified Period

**From:** 16:00:00

**To:** 19:00:00

### One Hour Peak

**From:** 16:15:00

**To:** 17:15:00

**Municipality:** Milton  
**Site #:** 1912000004  
**Intersection:** 5 Sideroad & Esquesing Line-Fourth  
**TFR File #:** 1  
**Count date:** 16-Apr-19

**Weather conditions:**

**Person(s) who counted:**

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

**Major Road:** 5 Sideroad runs W/E

North Leg Total: 452  
 North Entering: 147  
 North Peds: 0  
 Peds Cross:  $\times$

Heavys	0	0	0	0
Trucks	8	19	1	28
Cars	31	85	3	119
<b>Totals</b>	<b>39</b>	<b>104</b>	<b>4</b>	



Heavys 0  
 Trucks 38  
 Cars 267  
 Totals 305

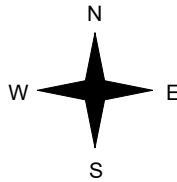
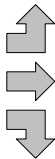
East Leg Total: 621  
 East Entering: 337  
 East Peds: 0  
 Peds Cross:  $\times$

Heavys	0	Trucks	53	Cars	263	Totals	316
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5 Sideroad

Heavys	0	Trucks	9	Cars	21	Totals	30
	0		23		179		202
	0		3		8		11
<b>Totals</b>	<b>0</b>	<b>35</b>	<b>208</b>				



Fourth Line

Cars	16	Trucks	2	Heavys	0	Totals	18
	218		36		0		254
	59		6		0		65
<b>Totals</b>	<b>293</b>	<b>44</b>	<b>0</b>				



5 Sideroad



Cars	253	Trucks	31	Heavys	0	Totals	284
------	-----	--------	----	--------	---	--------	-----

Peds Cross:  $\times$   
 West Peds: 0  
 West Entering: 243  
 West Leg Total: 559

Cars	152	Cars	14	230	71	315
Trucks	28	Trucks	9	27	7	43
Heavys	0	Heavys	0	0	0	0
<b>Totals</b>	<b>180</b>	<b>Totals</b>	<b>23</b>	<b>257</b>	<b>78</b>	



Esquesing Line

Peds Cross:  $\times$   
 South Peds: 0  
 South Entering: 358  
 South Leg Total: 538

## Comments

# Ontario Traffic Inc.

## Morning Peak Diagram

### Specified Period

**From:** 7:00:00  
**To:** 10:00:00

### One Hour Peak

**From:** 7:45:00  
**To:** 8:45:00

**Municipality:** Toronto  
**Site #:** 1912000005  
**Intersection:** RR 25 & James Snow Pkwy  
**TFR File #:** 1  
**Count date:** 16-Apr-19

**Weather conditions:**  
**Person(s) who counted:**

**\*\* Signalized Intersection \*\***

**Major Road:** RR 25 runs N/S

North Leg Total: 1179  
North Entering: 656  
North Peds: 0  
Peds Cross:  $\times$

Heavys	0	0	0	0
Trucks	16	100	55	171
Cars	16	293	176	485
<b>Totals</b>	<b>32</b>	<b>393</b>	<b>231</b>	



Heavys	0
Trucks	146
Cars	377
<b>Totals</b>	<b>523</b>

East Leg Total: 907  
East Entering: 216  
East Peds: 1  
Peds Cross:  $\times$

Heavys	Trucks	Cars	Totals
0	69	250	319

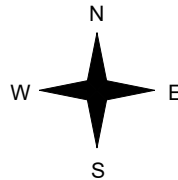


RR 25

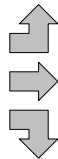
Cars	Trucks	Heavys	Totals
39	23	0	62
77	15	0	92
34	28	0	62
<b>150</b>	<b>66</b>	<b>0</b>	



James Snow Pkwy



Heavys	Trucks	Cars	Totals
0	6	6	12
0	15	27	42
0	19	21	40
<b>0</b>	<b>40</b>	<b>54</b>	



RR 25

James Snow Pkwy



Cars	Trucks	Heavys	Totals
570	121	0	691

Peds Cross:  $\times$   
West Peds: 0  
West Entering: 94  
West Leg Total: 413

Cars	348
Trucks	147
Heavys	0
<b>Totals</b>	<b>495</b>



Cars	157	332	367	856
Trucks	38	117	51	206
Heavys	0	0	0	0
<b>Totals</b>	<b>195</b>	<b>449</b>	<b>418</b>	

Peds Cross:  $\times$   
South Peds: 0  
South Entering: 1062  
South Leg Total: 1557

## Comments

# Ontario Traffic Inc.

## Afternoon Peak Diagram

### Specified Period

**From:** 16:00:00

**To:** 19:00:00

### One Hour Peak

**From:** 16:30:00

**To:** 17:30:00

**Municipality:** Toronto  
**Site #:** 1912000005  
**Intersection:** RR 25 & James Snow Pkwy  
**TFR File #:** 1  
**Count date:** 16-Apr-19

**Weather conditions:**  
**Person(s) who counted:**

**\*\* Signalized Intersection \*\***

**Major Road:** RR 25 runs N/S

North Leg Total: 1497  
 North Entering: 537  
 North Peds: 0  
 Peds Cross:  $\bowtie$

Heavys	0	0	0	0
Trucks	3	82	31	116
Cars	2	318	101	421
<b>Totals</b>	<b>5</b>	<b>400</b>	<b>132</b>	



Heavys 0  
 Trucks 173  
 Cars 787  
 Totals 960

East Leg Total: 891  
 East Entering: 474  
 East Peds: 2  
 Peds Cross:  $\bowtie$

Heavys	Trucks	Cars	Totals
0	63	101	164

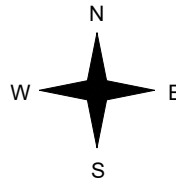


RR 25

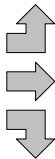
Cars	Trucks	Heavys	Totals
180	38	0	218
57	24	0	81
143	32	0	175
<b>380</b>	<b>94</b>	<b>0</b>	



James Snow Pkwy



Heavys	Trucks	Cars	Totals
0	6	24	30
0	10	132	142
0	28	134	162
0	44	290	



James Snow Pkwy



Peds Cross:  $\bowtie$   
 West Peds: 0  
 West Entering: 334  
 West Leg Total: 498

Cars	595	Cars	42	583	116	741
Trucks	142	Trucks	36	129	27	192
Heavys	0	Heavys	0	0	0	0
<b>Totals</b>	<b>737</b>	<b>Totals</b>	<b>78</b>	<b>712</b>	<b>143</b>	



Peds Cross:  $\bowtie$   
 South Peds: 0  
 South Entering: 933  
 South Leg Total: 1670

### Comments

# Ontario Traffic Inc.

## Morning Peak Diagram

### Specified Period

**From:** 7:00:00  
**To:** 10:00:00

### One Hour Peak

**From:** 7:15:00  
**To:** 8:15:00

**Municipality:** Milton  
**Site #:** 1912000006  
**Intersection:** RR 25 & 5 Sideroad  
**TFR File #:** 1  
**Count date:** 16-Apr-19

**Weather conditions:**  
**Person(s) who counted:**

**\*\* Signalized Intersection \*\***

**Major Road:** RR 25 runs N/S

North Leg Total: 956  
North Entering: 607  
North Peds: 0  
Peds Cross:  $\times$

Heavys	0	0	0	0
Trucks	10	79	12	101
Cars	59	371	76	506
<b>Totals</b>	<b>69</b>	<b>450</b>	<b>88</b>	



Heavys	0
Trucks	77
Cars	272
<b>Totals</b>	<b>349</b>

East Leg Total: 613  
East Entering: 147  
East Peds: 0  
Peds Cross:  $\times$

Heavys	0	Trucks	65	Cars	167	<b>Totals</b>	232
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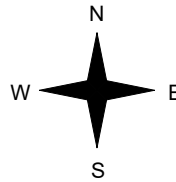


RR 25

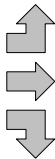
Cars	7	Trucks	2	Heavys	0	<b>Totals</b>	9
Cars	64	Trucks	13	Heavys	0	<b>Totals</b>	77
Cars	39	Trucks	22	Heavys	0	<b>Totals</b>	61
<b>Totals</b>	<b>110</b>	<b>37</b>	<b>0</b>				



5 Sideroad



Heavys	0	Trucks	11	Cars	68	<b>Totals</b>	79
Heavys	0	Trucks	29	Cars	248	<b>Totals</b>	277
Heavys	0	Trucks	56	Cars	181	<b>Totals</b>	237
Heavys	0	Trucks	96	Cars	497	<b>Totals</b>	



5 Sideroad



RR 25



Cars	403	Trucks	63	Heavys	0	<b>Totals</b>	466
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Peds Cross:  $\times$   
West Peds: 0  
West Entering: 593  
West Leg Total: 825

Cars	591	Cars	44	197	79	<b>Totals</b>	320
Trucks	157	Trucks	42	64	22	<b>Totals</b>	128
Heavys	0	Heavys	0	0	0	<b>Totals</b>	0
<b>Totals</b>	<b>748</b>	<b>Totals</b>	<b>86</b>	<b>261</b>	<b>101</b>		



Peds Cross:  $\times$   
South Peds: 0  
South Entering: 448  
South Leg Total: 1196

## Comments

# Ontario Traffic Inc.

## Afternoon Peak Diagram

### Specified Period

**From:** 16:00:00  
**To:** 19:00:00

### One Hour Peak

**From:** 16:15:00  
**To:** 17:15:00

**Municipality:** Milton  
**Site #:** 1912000006  
**Intersection:** RR 25 & 5 Sideroad  
**TFR File #:** 1  
**Count date:** 16-Apr-19

**Weather conditions:**  
**Person(s) who counted:**

**\*\* Signalized Intersection \*\***

**Major Road:** RR 25 runs N/S

North Leg Total: 1071  
North Entering: 343  
North Peds: 0  
Peds Cross:  $\times$

Heavys	0	0	0	0
Trucks	11	40	1	52
Cars	55	230	6	291
Totals	66	270	7	



Heavys	0
Trucks	124
Cars	604
Totals	728

East Leg Total: 527  
East Entering: 339  
East Peds: 0  
Peds Cross:  $\times$

Heavys	0	Trucks	88	Cars	399	Totals	487
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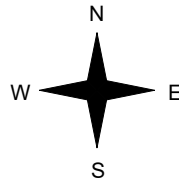


RR 25

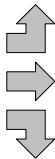
Cars	28	Trucks	6	Heavys	0	Totals	34
Cars	200	Trucks	30	Heavys	0	Totals	230
Cars	55	Trucks	20	Heavys	0	Totals	75
Cars	283	Trucks	56	Heavys	0	Totals	



5 Sideroad



Heavys	0	Trucks	18	Cars	73	Totals	91
Heavys	0	Trucks	13	Cars	82	Totals	95
Heavys	0	Trucks	26	Cars	87	Totals	113
Heavys	0	Trucks	57	Cars	242	Totals	



5 Sideroad



Peds Cross:  $\times$   
West Peds: 1  
West Entering: 299  
West Leg Total: 786

Cars	372	Cars	144	503	63	710
Trucks	86	Trucks	47	100	23	170
Heavys	0	Heavys	0	0	0	0
Totals	458	Totals	191	603	86	



RR 25



Cars	151	Trucks	37	Heavys	0	Totals	188
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Peds Cross:  $\times$   
South Peds: 0  
South Entering: 880  
South Leg Total: 1338

## Comments



# 18. APPENDIX D: PROGRAM REFERENCE CARD

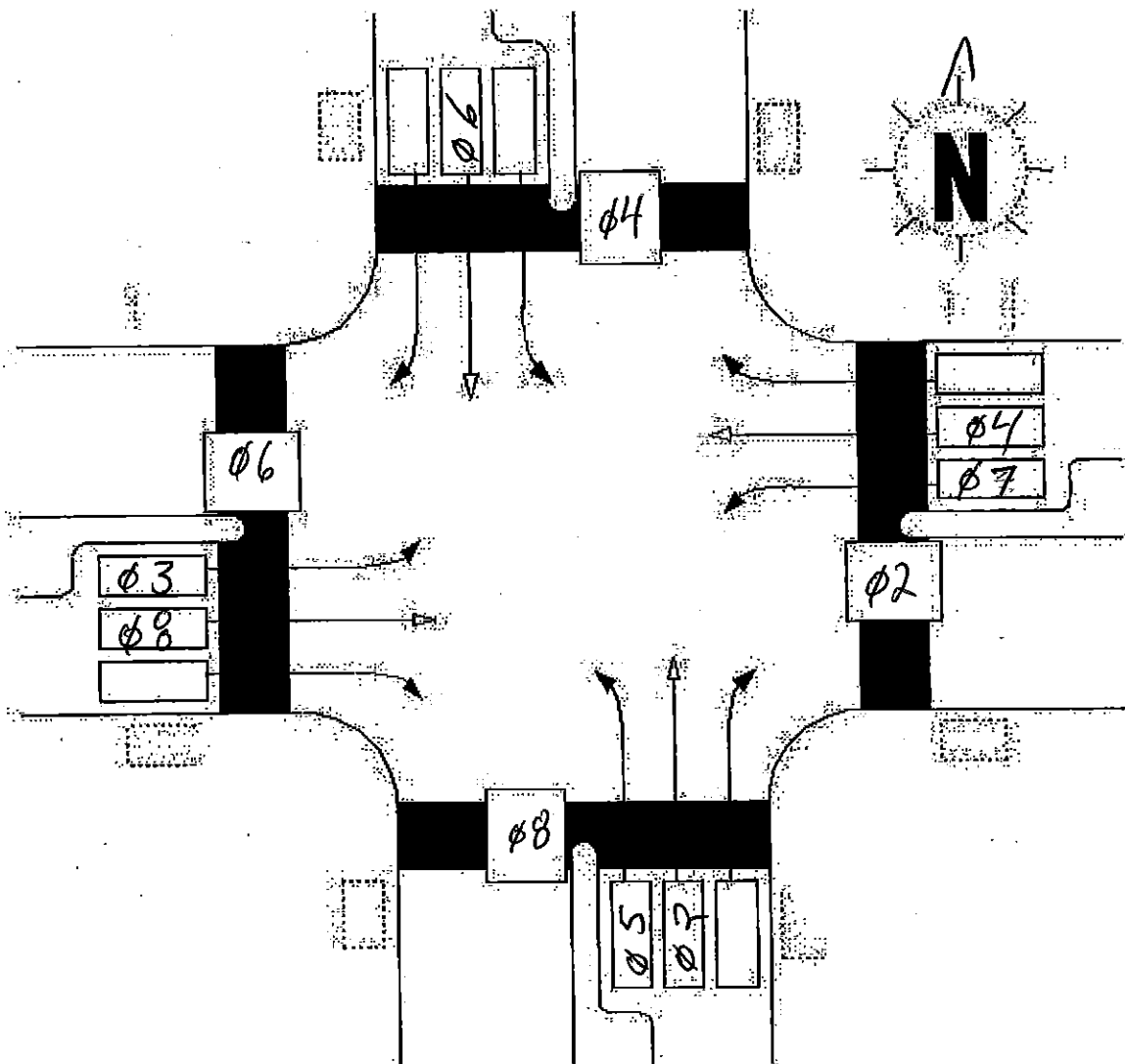
## ASC/3

### PROGRAM REFERENCE CARD

INTERSECTION RR25 + #5 SIDE ROAD

CONTROLLER NUMBER \_\_\_\_\_ ENTERED BY: \_\_\_\_\_ DATE  / /

BOOT: \_\_\_\_\_ MAIN: \_\_\_\_\_ HELP: \_\_\_\_\_ DATA BASE \_\_\_\_\_



*Handwritten signature*

2009

## CONTROLLER SUBMENU

### 2-1. CONTROLLER TIMING DATA

TIMING PLAN 1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE																
MINIMUM GREEN		20	7	10	7	20		10								
BICYCLE MINIMUM GREEN																
CONDITIONAL SERVICE MINIMUM GREEN																
DELAYED GREEN																
WALK		7		7		7		7								
WALK 2																
WALK MAX																
PEDESTRIAN CLEARANCE		25		25		25		25								
PEDESTRIAN CLEARANCE 2																
PEDESTRIAN CLEARANCE MAX																
PEDESTRIAN CARRY OVER																
VEHICLE EXTENSION		3.6	3	3.7	3	4.2		3.7								
VEHICLE EXTENSION 2																
MAX1		4.2	11	3.7	11	3.1		4.8								
MAX2		4.6	16	2.8	14	3.2		4.4								
MAX3		3.5	11	2.4	11	3.5		2.4								
DYNAMIC MAX																
DYNAMIC MAX STEP																
YELLOW CHANGE		4.2	3	3.7	3	4.2		3.7								
RED CLRANCE		1.5	1	1.9	1	1.5		1.9								
RED MAX																
RED REVERT																
ACTUATIONS BEFORE GAP REDUCTION																
SECONDS PER ACTIONS ADDED TO INITIAL																
MAXIMUM ADDED INITIAL GREEN																
TIME BEFORE GAP REDUCTION																
CARS WAITING BEFORE GAP REDUCTION																
STEP TO REDUCE																
TIME TO REDUCE TO MINIMUM																
MINIMUM GAP																

# 18. APPENDIX D: PROGRAM REFERENCE CARD

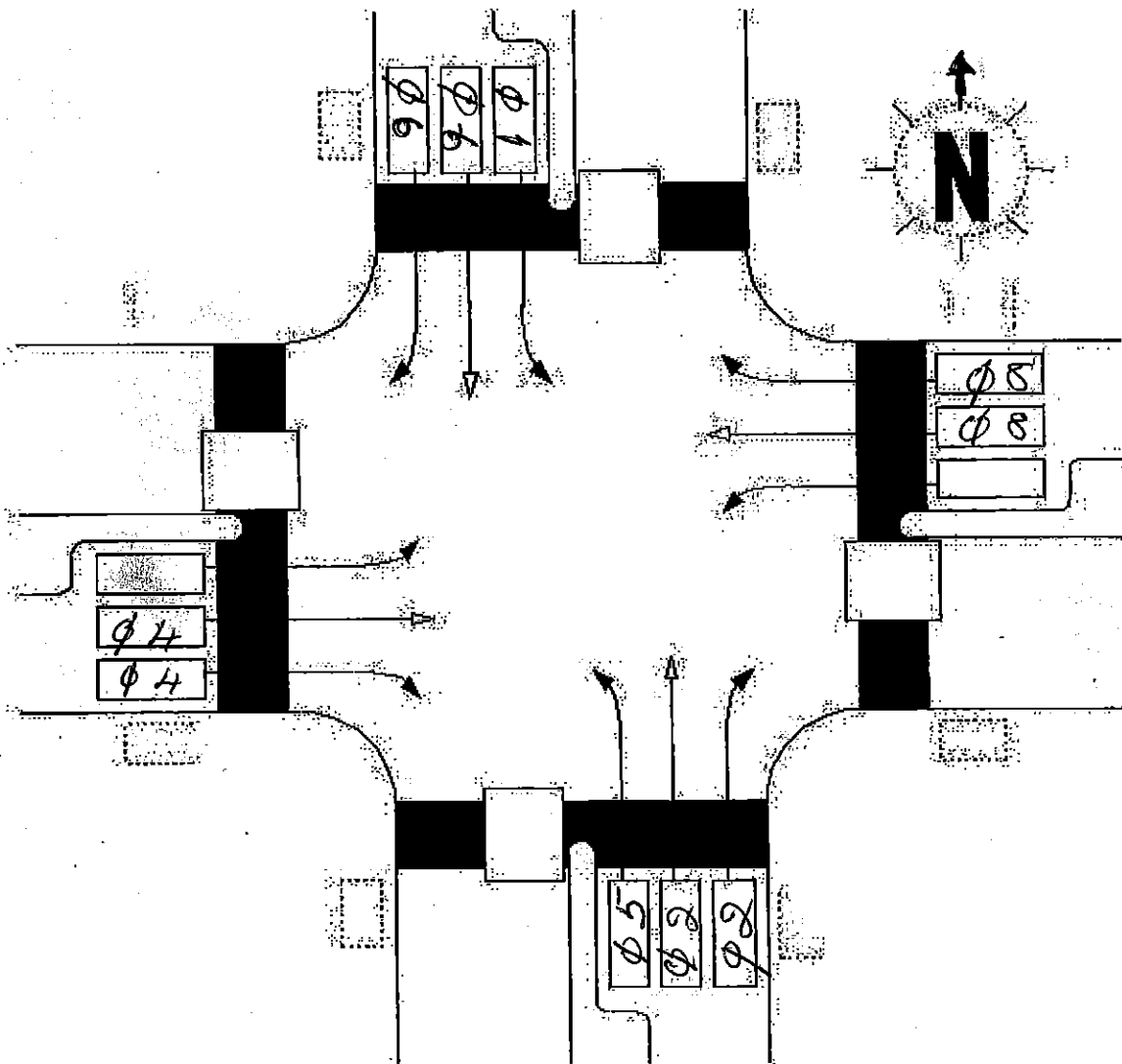
## ASC/3

### PROGRAM REFERENCE CARD

INTERSECTION RR # 25 | JAMES SNOW PKWY.

CONTROLLER NUMBER ASC-3 ENTERED BY: \_\_\_\_\_ DATE  / /

BOOT: \_\_\_\_\_ MAIN: \_\_\_\_\_ HELP: \_\_\_\_\_ DATA BASE \_\_\_\_\_



RR# 25 / J.S.P.  
CONTROLLER SUBMENU

2-1. CONTROLLER TIMING DATA

TIMING PLAN 1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE																
MINIMUM GREEN	7	20	0	10	7	20	0	10								
BICYCLE MINIMUM GREEN																
CONDITIONAL SERVICE MINIMUM GREEN																
DELAYED GREEN																
WALK		7		7		7		7								
WALK 2																
WALK MAX																
PEDESTRIAN CLEARANCE		29		30		29		30								
PEDESTRIAN CLEARANCE 2																
PEDESTRIAN CLEARANCE MAX																
PEDESTRIAN CARRY OVER																
VEHICLE EXTENSION	3.0	5.0		5.0	3.0	5.0		5.0								
VEHICLE EXTENSION 2																
MAX1	12	60		25	12	60		25								
MAX2																
MAX3																
DYNAMIC MAX																
DYNAMIC MAX STEP																
YELLOW CHANGE	3.0	4.2		3.3	3.0	4.2		3.3								
RHD CLRANCE	1.0	2.2		3.0	1.0	2.2		3.0								
RED MAX																
RED REVERT																
ACTUATIONS BEFORE GAP REDUCTION																
SECONDS PER ACTIONS ADDED TO INITIAL																
MAXIMUM ADDED INITIAL GREEN																
TIME BEFORE GAP REDUCTION																
CARS WAITING BEFORE GAP REDUCTION																
STEP TO REDUCE																
TIME TO REDUCE TO MINIMUM																
MINIMUM GAP																

# 18. APPENDIX D: PROGRAM REFERENCE CARD

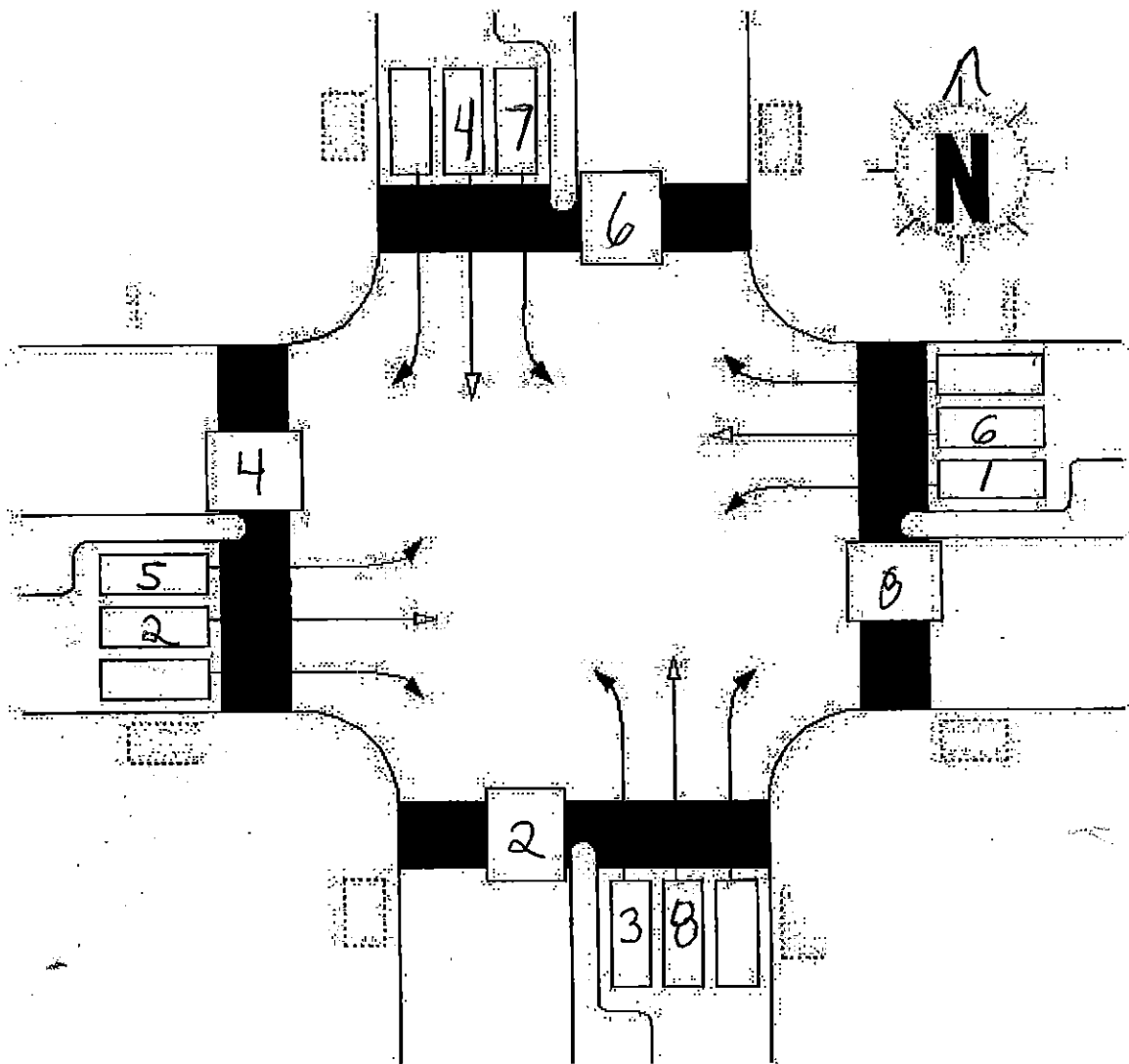
## ASC/3

### PROGRAM REFERENCE CARD

INTERSECTION JAMES SNOW + BOSTON CHURCH

CONTROLLER NUMBER ASC/3 ENTERED BY: \_\_\_\_\_ DATE SEPT. 2014  
SH 38375-1-09-2014

BOOT: \_\_\_\_\_ MAIN: \_\_\_\_\_ HELP: \_\_\_\_\_ DATA BASE \_\_\_\_\_



## CONTROLLER SUBMENU

### 2-1. CONTROLLER TIMING DATA

TIMING PLAN 1																
PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
MINIMUM GREEN		29		8		29										
BICYCLE MINIMUM GREEN																
CONDITIONAL SERVICE MINIMUM GREEN																
DELAYED GREEN																
WALK		7		7		7										
WALK 2		22		15		22										
WALK MAX																
PEDESTRIAN CLEARANCE																
PEDESTRIAN CLEARANCE 2																
PEDESTRIAN CLEARANCE MAX																
PEDESTRIAN CARRY OVER																
VEHICLE EXTENSION		4.0		2.5		4.0										
VEHICLE EXTENSION 2																
MAX1		50		21		50										
MAX2		40		21		40										
MAX3																
DYNAMIC MAX																
DYNAMIC MAX STEP																
YELLOW CHANGE		4.0		4.0		3.0										
RED CLRANCE		2.0		2.0		1.0										
RED MAX																
RED REVERT																
ACTUATIONS BEFORE GAP REDUCTION																
SECONDS PER ACTIONS ADDED TO INITIAL																
MAXIMUM ADDED INITIAL GREEN																
TIME BEFORE GAP REDUCTION																
CARS WAITING BEFORE GAP REDUCTION																
STEP TO REDUCE																
TIME TO REDUCE TO MINIMUM																
MINIMUM GAP																

# 18. APPENDIX D: PROGRAM REFERENCE CARD

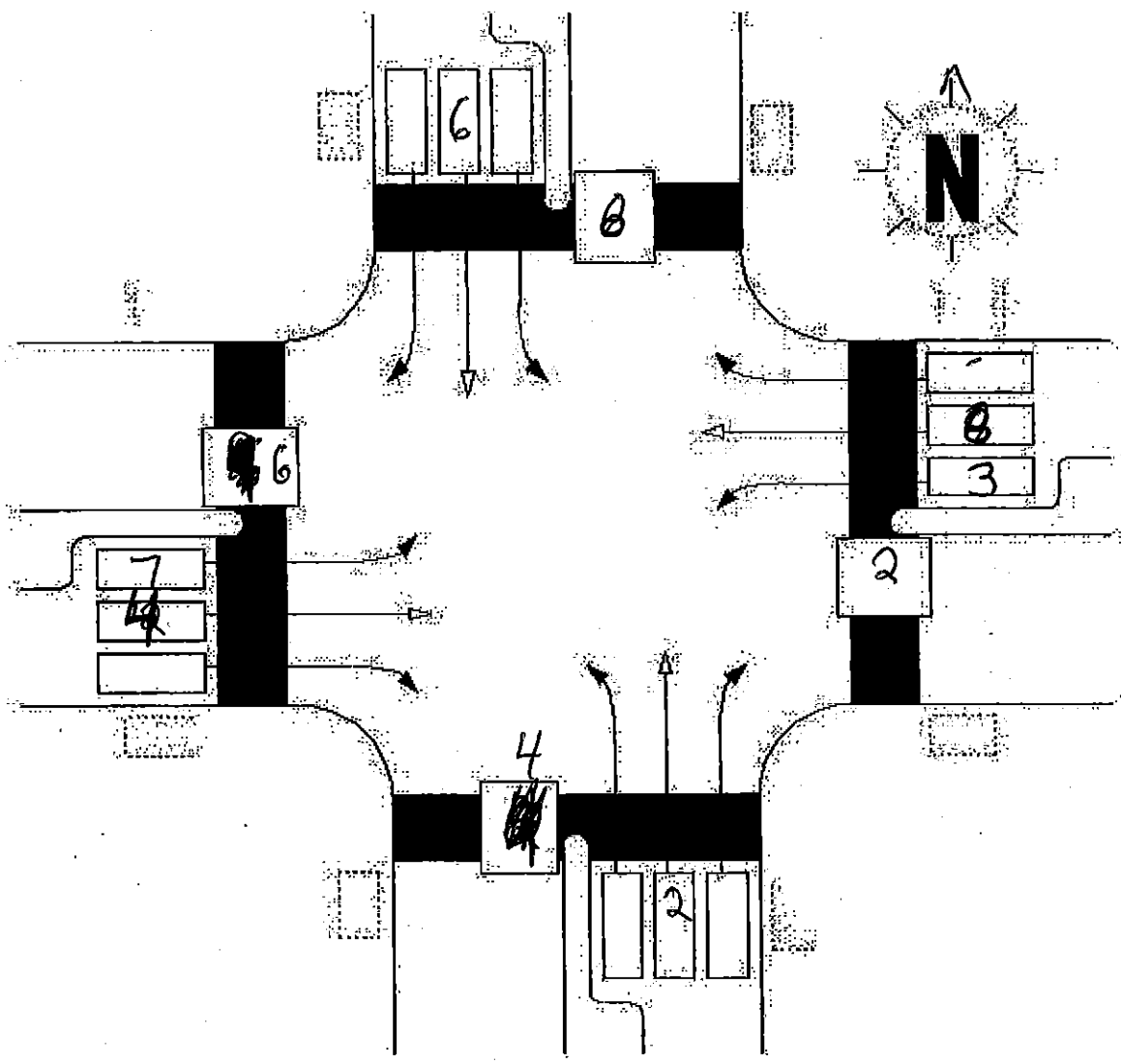
## ASC/3

### PROGRAM REFERENCE CARD

INTERSECTION JAMES SNOW + ESPRESSING

CONTROLLER NUMBER ASC/3 ENTERED BY: \_\_\_\_\_ DATE SEP. 2014  
# 38375-2-09-2014

BOOT: \_\_\_\_\_ MAIN: \_\_\_\_\_ HELP: \_\_\_\_\_ DATA BASE \_\_\_\_\_



## CONTROLLER SUBMENU

### 2-1. CONTROLLER TIMING DATA

TIMING PLAN 1																
PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
MINIMUM GREEN		20	7	15		20	7	15								
BICYCLE MINIMUM GREEN																
CONDITIONAL SERVICE MINIMUM GREEN																
DELAYED GREEN																
WALK		7		7		7		7								
WALK 2		20		17		20		17								
WALK MAX																
PEDESTRIAN CLEARANCE																
PEDESTRIAN CLEARANCE 2																
PEDESTRIAN CLEARANCE MAX																
PEDESTRIAN CARRY OVER																
VEHICLE EXTENSION		5.0	3.0	5.0		5.0	3.0	5.0								
VEHICLE EXTENSION 2																
MAX1		45	15	35		45	15	35								
MAX2																
MAX3																
DYNAMIC MAX																
DYNAMIC MAX STEP																
YELLOW CHANGE		4.2	3.0	3.7		4.2	3.0	3.7								
RED CL RANCE		2.7	1.0	2.6		2.7	1.0	2.6								
RED MAX																
RED REVERT																
ACTUATIONS BEFORE GAP REDUCTION																
SECONDS PER ACTIONS ADDED TO INITIAL																
MAXIMUM ADDED INITIAL GREEN																
TIME BEFORE GAP REDUCTION																
CARS WAITING BEFORE GAP REDUCTION																
STEP TO REDUCE																
TIME TO REDUCE TO MINIMUM																
MINIMUM GAP																



# Ontario Traffic Inc.

## Morning Peak Diagram

### Specified Period

**From:** 6:30:00

**To:** 9:30:00

### One Hour Peak

**From:** 6:30:00

**To:** 7:30:00

**Municipality:** Milton  
**Site #:** 1836800001  
**Intersection:** Mount Pleasant Way & 8500 Mount  
**TFR File #:** 1  
**Count date:** 23-Oct-18

**Weather conditions:**  
**Person(s) who counted:**

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

**Major Road:** Mount Pleasant Way runs N/S

North Leg Total: 16

North Entering: 11

North Peds: 0

Peds Cross:  $\times$

Heavys	0	4	4
Trucks	1	0	1
Cars	1	5	6
<b>Totals</b>	<b>2</b>	<b>9</b>	



Heavys 0

Trucks 2

Cars 3

**Totals 5**

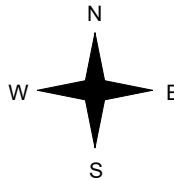
Heavys	Trucks	Cars	Totals
0	1	1	2



Mount Pleasant Way



Mount Pleasant Way



Heavys	Trucks	Cars	Totals
0	1	0	1
0	0	0	0
0	1	0	



8500 Mount Pleasant Way



Peds Cross:  $\times$

West Peds: 0

West Entering: 1

West Leg Total: 3

Cars	5	
Trucks	0	
Heavys	4	
<b>Totals</b>	<b>9</b>	



Cars	0	3	3
Trucks	0	1	1
Heavys	0	0	0
<b>Totals</b>	<b>0</b>	<b>4</b>	

Peds Cross:  $\times$

South Peds: 0

South Entering: 4

South Leg Total: 13

## Comments

# Ontario Traffic Inc.

## Afternoon Peak Diagram

### Specified Period

**From:** 16:00:00

**To:** 19:00:00

### One Hour Peak

**From:** 16:00:00

**To:** 17:00:00

**Municipality:** Milton  
**Site #:** 1836800001  
**Intersection:** Mount Pleasant Way & 8500 Mount  
**TFR File #:** 1  
**Count date:** 23-Oct-18

**Weather conditions:**  
**Person(s) who counted:**

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

**Major Road:** Mount Pleasant Way runs N/S

North Leg Total: 31

North Entering: 13

North Peds: 0

Peds Cross:  $\times$

Heavys	1	5	6
Trucks	1	0	1
Cars	0	6	6
<b>Totals</b>	<b>2</b>	<b>11</b>	



Heavys	4
Trucks	2
Cars	12
<b>Totals</b>	<b>18</b>

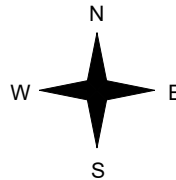
Heavys	Trucks	Cars	Totals
1	1	0	2



Mount Pleasant Way



Mount Pleasant Way



Heavys	Trucks	Cars	Totals
1	2	0	3
0	0	0	0
1	2	0	



8500 Mount Pleasant Way



Peds Cross:  $\times$   
 West Peds: 0  
 West Entering: 3  
 West Leg Total: 5

Cars	6
Trucks	0
Heavys	5
<b>Totals</b>	<b>11</b>



Cars	0	12	12
Trucks	0	0	0
Heavys	0	3	3
<b>Totals</b>	<b>0</b>	<b>15</b>	

Peds Cross:  $\times$   
 South Peds: 0  
 South Entering: 15  
 South Leg Total: 26

## Comments

# Ontario Traffic Inc.

## Total Count Diagram

**Municipality:** Milton  
**Site #:** 1836800001  
**Intersection:** Mount Pleasant Way & 8500 Mount  
**TFR File #:** 1  
**Count date:** 23-Oct-18

**Weather conditions:**  
**Person(s) who counted:**

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

**Major Road:** Mount Pleasant Way runs N/S

North Leg Total: 88  
 North Entering: 47  
 North Peds: 0  
 Peds Cross:  $\nabla$

Heavys	3	17	20
Trucks	6	0	6
Cars	4	17	21
Totals	13	34	



Heavys	12
Trucks	5
Cars	24
Totals	41

Heavys	Trucks	Cars	Totals
3	6	4	13

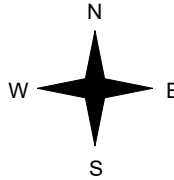


Mount Pleasant Way



Mount Pleasant Way

Heavys	Trucks	Cars	Totals
1	4	1	6
0	0	1	1
1	4	2	



8500 Mount Pleasant Way



Peds Cross:  $\nabla$   
 West Peds: 0  
 West Entering: 7  
 West Leg Total: 20

Cars	18
Trucks	0
Heavys	17
Totals	35



Cars	0	23	23
Trucks	0	1	1
Heavys	0	11	11
Totals	0	35	

Peds Cross:  $\nabla$   
 South Peds: 0  
 South Entering: 35  
 South Leg Total: 70

### Comments

# Ontario Traffic Inc. Traffic Count Summary

Intersection: Mount Pleasant Way & 8500 Moun													Count Date: 23-Oct-18		Municipality: Milton	
North Approach Totals						South Approach Totals										
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	North/South Total Approaches	Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds				
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total					
7:00:00	0	4	1	5	0	6	7:00:00	0	1	0	1	0				
8:00:00	0	7	1	8	0	13	8:00:00	0	5	0	5	0				
9:00:00	0	1	4	5	0	11	9:00:00	0	6	0	6	0				
16:00:00	0	3	1	4	0	4	16:00:00	0	0	0	0	0				
17:00:00	0	11	2	13	0	28	17:00:00	0	15	0	15	0				
18:00:00	0	3	1	4	0	10	18:00:00	0	6	0	6	0				
19:00:00	0	5	3	8	0	10	19:00:00	0	2	0	2	0				
<b>Totals:</b>	0	34	13	47	0	82		0	35	0	35	0				
East Approach Totals						West Approach Totals										
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	East/West Total Approaches	Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds				
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total					
7:00:00	0	0	0	0	0	1	7:00:00	1	0	0	1	0				
8:00:00	0	0	0	0	0	0	8:00:00	0	0	0	0	0				
9:00:00	0	0	0	0	0	0	9:00:00	0	0	0	0	0				
16:00:00	0	0	0	0	0	1	16:00:00	1	0	0	1	0				
17:00:00	0	0	0	0	0	3	17:00:00	3	0	0	3	0				
18:00:00	0	0	0	0	0	1	18:00:00	1	0	0	1	0				
19:00:00	0	0	0	0	0	1	19:00:00	0	0	1	1	0				
<b>Totals:</b>	0	0	0	0	0	7		6	0	1	7	0				
<b>Calculated Values for Traffic Crossing Major Street</b>																
Hours Ending:	7:00	8:00	9:00	16:00		17:00	18:00	19:00	19:00							
Crossing Values:	1	0	0	1		3	1	0	0							

# Steeles Ave E @ James Snow Pkwy

## Morning Peak Diagram

### Specified Period

**From:** 7:00:00

**To:** 9:00:00

### One Hour Peak

**From:** 7:30:00

**To:** 8:30:00

**Municipality:** Halton Region  
**Site #:** 1003490100  
**Intersection:** Steeles Ave E & James Snow Pkwy  
**TFR File #:** 10  
**Count date:** 25-Apr-2018

**Weather conditions:**  
 Rain  
**Person(s) who counted:**  
 Cam

**\*\* Signalized Intersection \*\***

**Major Road:** Steeles Ave E runs W/E

North Leg Total: 489  
 North Entering: 283  
 North Peds: 1  
 Peds Cross:  $\times$

Heavys	2	10	55	67
Trucks	1	3	6	10
Cars	7	113	86	206
<b>Totals</b>	<b>10</b>	<b>126</b>	<b>147</b>	



Heavys	43
Trucks	8
Cars	155
<b>Totals</b>	<b>206</b>

East Leg Total: 1475  
 East Entering: 447  
 East Peds: 0  
 Peds Cross:  $\times$

Heavys	Trucks	Cars	Totals
47	23	581	651

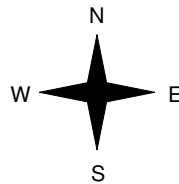


James Snow Pkwy

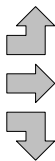
Cars	Trucks	Heavys	Totals
32	4	32	68
218	12	31	261
61	15	42	118
<b>311</b>	<b>31</b>	<b>105</b>	



Steeles Ave E



Heavys	Trucks	Cars	Totals
0	0	1	1
31	12	426	469
19	3	246	268
<b>50</b>	<b>15</b>	<b>673</b>	



James Snow Pkwy



Steeles Ave E



Cars	Trucks	Heavys	Totals
874	31	123	1028

Peds Cross:  $\times$   
 West Peds: 1  
 West Entering: 738  
 West Leg Total: 1389

Cars	420	Cars	356	122	362	840
Trucks	21	Trucks	10	4	13	27
Heavys	71	Heavys	14	11	37	62
<b>Totals</b>	<b>512</b>	<b>Totals</b>	<b>380</b>	<b>137</b>	<b>412</b>	



Peds Cross:  $\times$   
 South Peds: 1  
 South Entering: 929  
 South Leg Total: 1441

## Comments

# Steeles Ave E @ James Snow Pkwy

## Afternoon Peak Diagram

### Specified Period

**From:** 15:00:00

**To:** 18:00:00

### One Hour Peak

**From:** 16:15:00

**To:** 17:15:00

**Municipality:** Halton Region  
**Site #:** 1003490100  
**Intersection:** Steeles Ave E & James Snow Pkwy  
**TFR File #:** 10  
**Count date:** 25-Apr-2018

**Weather conditions:**  
 Rain  
**Person(s) who counted:**  
 Cam

**\*\* Signalized Intersection \*\***

**Major Road:** Steeles Ave E runs W/E

North Leg Total: 586  
 North Entering: 285  
 North Peds: 0  
 Peds Cross:  $\times$

Heavys	0	10	45	55
Trucks	1	3	1	5
Cars	12	165	48	225
<b>Totals</b>	<b>13</b>	<b>178</b>	<b>94</b>	



Heavys	40
Trucks	6
Cars	255
<b>Totals</b>	<b>301</b>

East Leg Total: 1714  
 East Entering: 1105  
 East Peds: 0  
 Peds Cross:  $\times$

Heavys	Trucks	Cars	Totals
56	12	946	1014

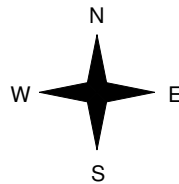


James Snow Pkwy

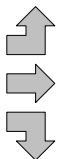
Cars	Trucks	Heavys	Totals
88	4	36	128
566	7	41	614
334	4	25	363
<b>988</b>	<b>15</b>	<b>102</b>	



Steeles Ave E



Heavys	Trucks	Cars	Totals
0	0	11	11
28	7	313	348
21	3	399	423
<b>49</b>	<b>10</b>	<b>723</b>	



James Snow Pkwy

Steeles Ave E



Cars	Trucks	Heavys	Totals
485	17	107	609

Peds Cross:  $\times$   
 West Peds: 0  
 West Entering: 782  
 West Leg Total: 1796

Cars	898	Cars	368	156	124	648
Trucks	10	Trucks	4	2	9	15
Heavys	56	Heavys	15	4	34	53
<b>Totals</b>	<b>964</b>	<b>Totals</b>	<b>387</b>	<b>162</b>	<b>167</b>	



Peds Cross:  $\times$   
 South Peds: 1  
 South Entering: 716  
 South Leg Total: 1680

## Comments

## **APPENDIX E**

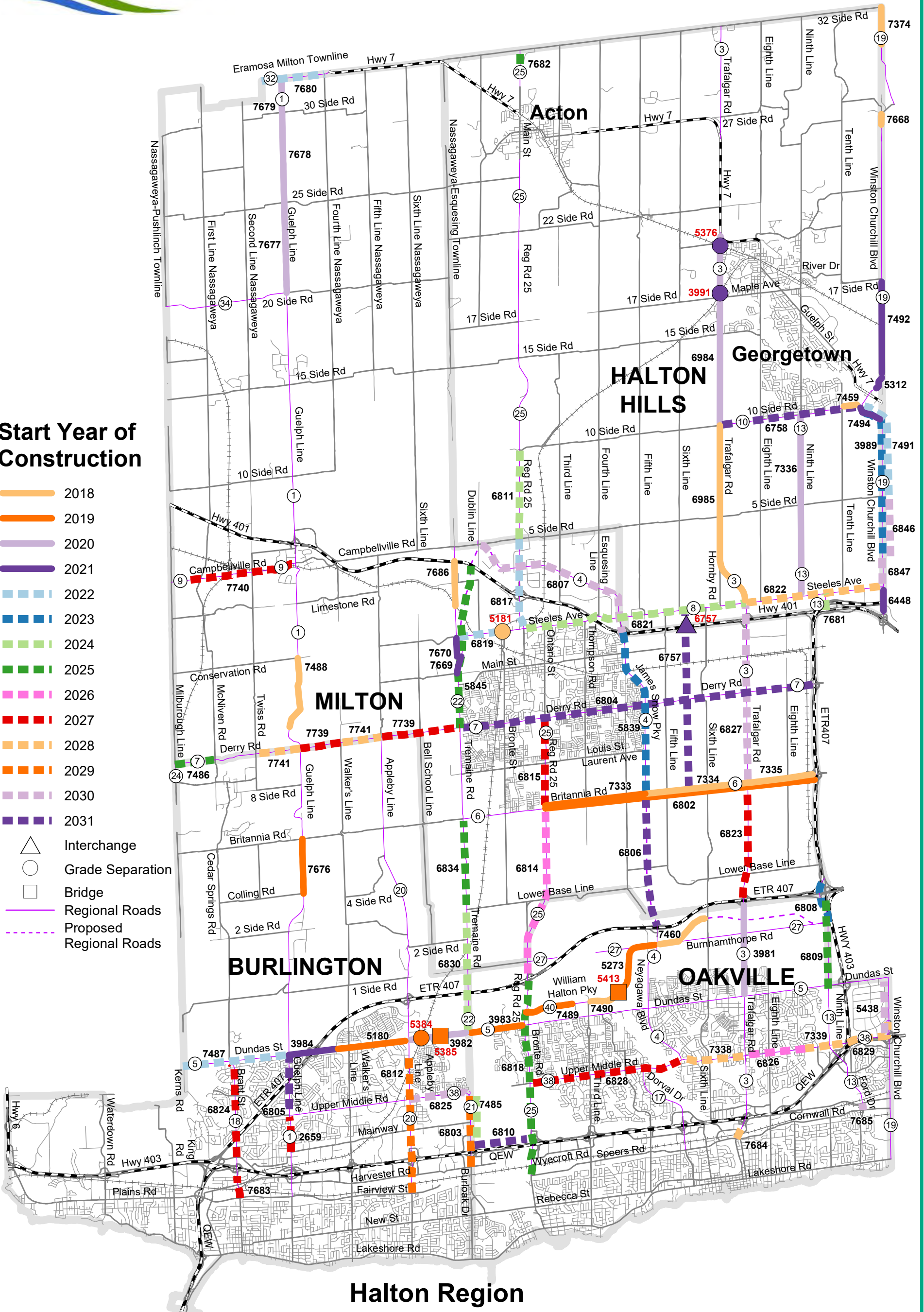
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### **Halton Region Capital Budget Map**

### Start Year of Construction

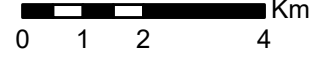
- 2018
- 2019
- 2020
- 2021
- 2022
- 2023
- 2024
- 2025
- 2026
- 2027
- 2028
- 2029
- 2030
- 2031

- Interchange
- Grade Separation
- Bridge
- Regional Roads
- Proposed Regional Roads



## Halton Region Transportation Development and Non-Development Capital Implementation Plan\* (2018-2031)

\*Note this includes Road Widening, Road Reconstructions, New Roads, Interchanges, Bridges and Grade Separations  
Locations shown on this map are approximate and does not attempt to delineate an exact location.



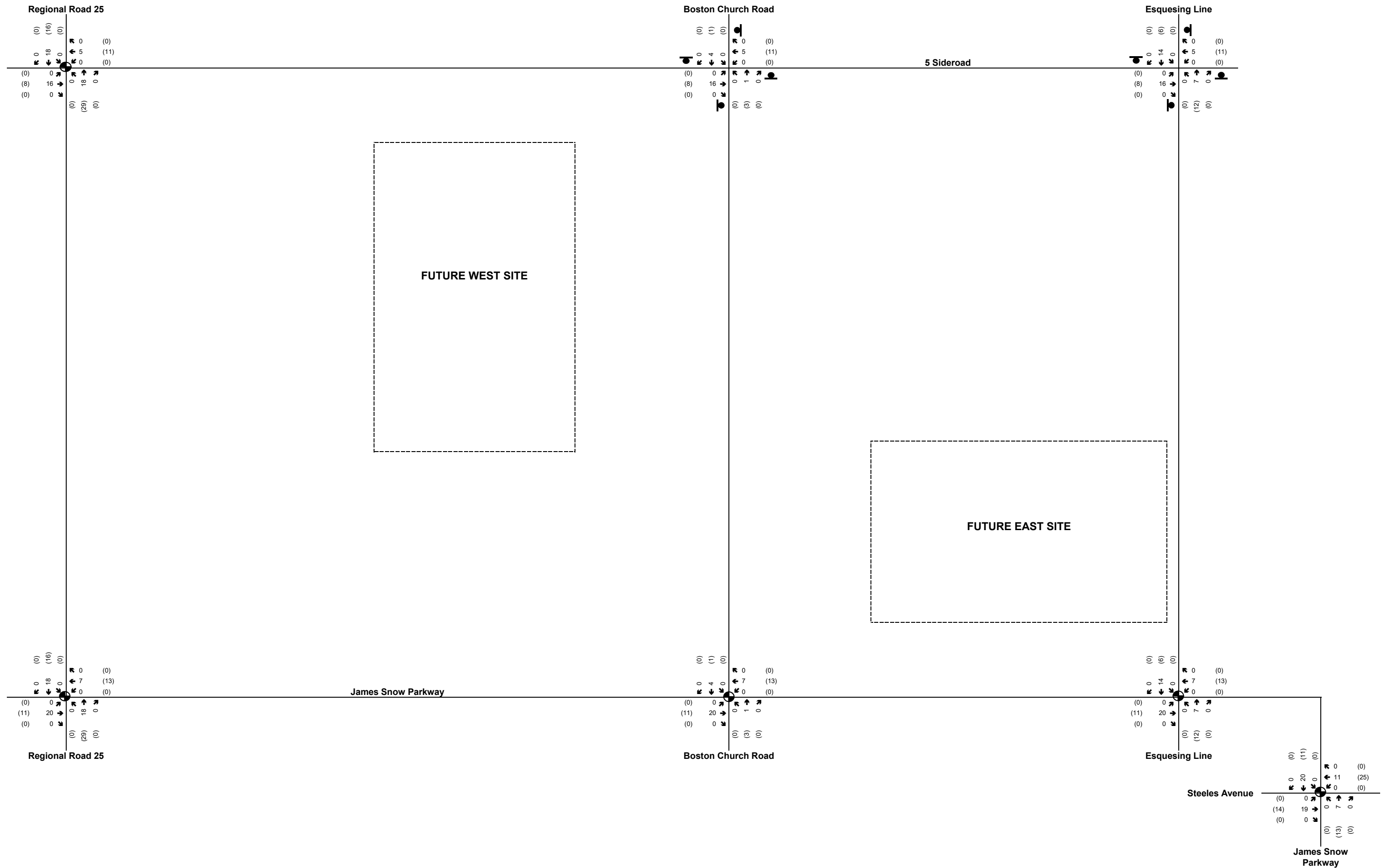


ID	Regional Municipality of Halton Capital Projects (2018-2031) Project Descriptions	Start Year Construction
2659	Guelph Line - Widening - 4 to 6 lanes from Mainway to Upper Middle Road (BUR) (Regional Road 1)	2027
6805	Guelph Line - Widening - 4 to 6 lanes from Upper Middle Road to Dundas Street (BUR) (Regional Road 1)	2031
7676	Guelph Line Reconstruction from Colling Road to Britannia Road (BUR) (Regional Road 1)	2019
7488	Guelph Line Reconstruction, 1km North of Derry Road to Conservation Road (MIL) (Regional Road 1)	2018
7677	Guelph Line Reconstruction from No. 20 Side Road to No. 25 Side Road (MIL) (Regional Road 1)	2020
7678	Guelph Line Reconstruction from No. 25 Side Road to No. 30 Side Road (MIL) (Regional Road 1)	2020
7679	Guelph Line Reconstruction from No. 30 Side Road to No. 32 Side Road (MIL) (Regional Road 1)	2020
7684	Trafalgar Road Reconstruction from Cornwall Road to QEW (OAK) (Regional Road 3)	2028
3981	Trafalgar Road - Widening - 4 to 6 lanes from Dundas Street to Highway 407 (OAK) (Regional Road 3)	2020
6823	Trafalgar Road - Widening - 4 to 6 lanes from Highway 407 to Britannia Road (MIL) (Regional Road 3)	2027
6827	Trafalgar Road - Widening - 4 to 6 lanes from Britannia Road to Steeles Avenue (MIL/HHS) (Regional Road 3)	2030
6985	Trafalgar Road - Widening - 2 to 4 lanes from Steeles Avenue to 10 Side Road (HHS) (Regional Road 3)	2018
6984	Trafalgar Road - Widening - 2 to 4 lanes from 10 Side Road to Highway 7 (HHS) (Regional Road 3)	2020
3991	Trafalgar Road - Grade Separation at CN Crossing North of Maple Avenue (HHS) (Regional Road 3)	2021
5376	Trafalgar Road - Grade Separation at Metrolinx Crossing South of Highway 7 (HHS) (Regional Road 3)	2021
6806	James Snow Parkway - New 6 lane road from Highway 407 to Britannia Road (MIL) (Regional Road 4)	2031
5839	James Snow Parkway - Widening - 4 to 6 lanes from Britannia Road to Highway 401 (MIL) (Regional Road 4)	2023
6807	James Snow Parkway - Widening - 4 to 6 lanes from Highway 401 to 5 Side Road (MIL) (Regional Road 4)	2030
7487	Dundas Street - Widening - 4 to 6 lanes from Kerns Road to Guelph Line, including improvements at Brant Street (BUR) (Regional Road 5)	2022
3984	Dundas Street - Widening - 4 to 6 lanes from Guelph Line to North Hampton Boulevard (BUR) (Regional Road 5)	2021
5180	Dundas Street - Widening - 4 to 6 lanes from Northampton Boulevard to Appleby Line (BUR) (Regional Road 5)	2019
3982	Dundas Street - Widening - 4 to 6 lanes (excluding CNR & Bronte Crk Bridges) from Appleby Line to Tremaine Road (BUR) (Regional Road 5)	2020
5384	Dundas Street - Grade Separation at CN Crossing between Appleby Line and Tremaine Road (BUR) (Regional Road 5)	2019
5385	Dundas Street - Bronte Creek Bridge between Appleby Line and Tremaine Road (BUR) (Regional Road 5)	2019
3983	Dundas Street Widening - 4 to 6 lanes from Tremaine Road to Bronte Road (OAK) (Regional Road 5)	2019
7333	Britannia Road - Widening 2 to 4 lanes from Regional Road 25 to James Snow Parkway (MIL) (Regional Road 6)	2019
7334	Britannia Road - Widening - 2 to 4 lanes from James Snow Parkway to Trafalgar Road (MIL) (Regional Road 6)	2018
7335	Britannia Road - Widening - 2 to 4 lanes from Trafalgar Road to Highway 407 (MIL) (Regional Road 6)	2018
6802	Britannia Road - Widening - 4 to 6 lanes from Regional Road 25 to Highway 407 (MIL) (Regional Road 6)	2019
7486	Derry Road - Reconstruction from Milborough Line to McNiven Road (MIL) (Regional Road 7)	2025
7741	Derry Road Reconstruction from Twiss to Guelph Line, and Derry Road Reconstruction from Walkers Line to Appleby Line (BUR) (Regional Road 7)	2028
7739	Derry Road Reconstruction from Guelph Line to Walkers Line, and Derry Road Reconstruction from Appleby Line to Tremaine Road (MIL)	2027
6804	Derry Road - Widening - 4 to 6 lanes from Tremaine Road to Highway 407 (MIL) (Regional Road 7)	2031
6819	Steeles Avenue - Widening - 2 to 4 lanes from Tremaine Road to Industrial Drive (MIL) (Regional Road 8)	2022
5181	Steeles Avenue - Grade Separation at CN crossing west of Bronte Street (MIL) (Regional Road 8)	2018
6821	Steeles Avenue - Widening - 4 to 6 lanes from Regional Road 25 to Trafalgar (MIL/HHS) (Regional Road 8)	2024
6822	Steeles Avenue - Widening - 4 to 6 lanes (with RBL) from Trafalgar Road to Winston Churchill Boulevard (HHS) (Regional Road 8)	2028
7740	Campbellville Road Reconstruction from Milborough Line to Campbell Avenue (MIL) (Regional Road 9)	2027
6758	10 Side Road - Widening - 2 to 4 lanes from Trafalgar Road to Winston Churchill Boulevard (HHS) (Regional Road 10)	2031
7459	10 Side Road - 2 Lane Reconstruction/Realignment to intersection at Winston Churchill Boulevard (HHS) (Regional Road 10)	2018
7685	Ford Drive Reconstruction from Cornwall Road to Royal Windsor Drive (OAK) (Regional Road 13)	2030
6809	Ninth Line - Widening - 2 to 4 lanes from Dundas Street to Burnhamthorpe Road (OAK) (Regional Road 13)	2025
6808	Ninth Line - Widening - 2 to 4 lanes from Burnhamthorpe Road to Highway 407 (OAK) (Regional Road 13)	2023
7681	Ninth Line (South Leg) Reconstruction from Halton Region Boundary to Steeles Avenue (HHS) (Regional Road 13)	2024
7336	Ninth Line - Widening - 2 to 4 lanes from Steeles Avenue to 10 Side Road (HHS) (Regional Road 13)	2020
7683	Brant Street - Reconstruction from Fairview Street to QEW (BUR) (Regional Road 18)	2027
6824	Brant Street - Widening - 4 to 6 lanes from North Service Road to Dundas Street (BUR) (Regional Road 18)	2027
5438	Winston Churchill Boulevard - Widening - 4 to 6 lanes from Upper Middle Road / QEW to Dundas Street - (OAK) (Regional Road 19)	2030
6448	Winston Churchill Boulevard - Widening - 4 to 6 lanes from Highway 401 to Steeles Avenue (HHS) (Regional Road 19)	2021
6847	Winston Churchill Boulevard - Widening - 5 to 7 lanes from Steeles Avenue to 2 km south of 5 Side Road (HHS) (Regional Road 19)	2030
6846	Winston Churchill Boulevard - Widening - 4 to 6 lanes from 2km south of 5 Side Road to 5 Side Road (HHS) (Regional Road 19)	2030
3989	Winston Churchill Boulevard - Widening - 2 to 4 Lanes from 2km south of 5 Side Road to potential by-pass (HHS) (Regional Road 19)	2023
7491	Winston Churchill Boulevard - Reconstruction from 5 Side Road to 10 Side Road (HHS) (Regional Road 19)	2022
5312	Winston Churchill Boulevard - 2 lane Reconstruction from Credit River Bridge to Old Pine Road (HHS) (Regional Road 19)	2021
7492	Winston Churchill Boulevard - 2 lane Reconstruction from Old Pine Road to 17 Side Road (HHS) (Regional Road 19)	2021
7668	Winston Churchill Boulevard Re-alignment and Reconstruction from About 500m South of King St. to King St. (HHS) (Regional Road 19)	2018
7374	Winston Churchill Boulevard - Reconstruction from Terra Cotta to Ballinafad Rd/32 Side Road (HHS) (Regional Road 19)	2018
6812	Appleby Line - Widening - 4 to 6 lanes from Fairview Street to Taywood Drive (BUR) (Regional Road 20)	2029
6803	Burloak Drive - Widening - 4 to 6 lanes from Harvester Road to Upper Middle Road (BUR/OAK) (Regional Road 21)	2029
7485	Burloak Drive - 4 lane urbanization from north of North Service Road to Upper Middle Road (BUR/OAK) (Regional Road 21)	2024
6830	Tremaine Road - Widening - 2 to 4 lanes from Dundas Street to Lower Base Line (BUR/OAK) (Regional Road 22)	2024
6834	Tremaine Road - Widening - 2 to 4 lanes from Lower Base Line to Britannia Road (BUR/OAK) (Regional Road 22)	2025
5845	Tremaine Road - Widening - 4 to 6 lanes from Derry Road to Highway 401 (MIL) (Regional Road 22)	2025
7669	Old Tremaine Road Reconstruction from No. 14 Side Road to Old Tremaine Road (MIL) (Regional Road 22)	2021
7670	Old Tremaine Road Reconstruction from Old Tremaine Road to Tremaine Road (MIL) (Regional Road 22)	2021
7686	Tremaine Road Reconstruction from Railway Crossing to South of Highway 401 Bridge (MIL) (Regional Road 22)	2018
6818	Bronte Road - Widening - 4 to 6 lanes from Speers Road to Highway 407 (OAK) (Regional Road 25)	2025
6814	Regional Road 25 - Widening - 4 to 6 lanes from Highway 407 to Britannia Road (MIL) (Regional Road 25)	2026
6815	Regional Road 25 - Widening - 4 to 6 lanes from Britannia Road to Derry Road (MIL) (Regional Road 25)	2027
6817	Regional Road 25 - Widening - 4 to 6 lanes from Steeles Avenue to 5 Side Road (MIL) (Regional Road 25)	2022
6811	Regional Road 25 - Widening - 2 to 4 lanes from 5 Side Road to 10 Side Road (HHS) (Regional Road 25)	2024
7682	Regional Road 25 Reconstruction from North of Main Street to No. 32 Side Road (HHS) (Regional Road 25)	2025
7680	No. 32 Side Road Reconstruction from Halton Region Boundary to Highway 7 (MIL) (Regional Road 32)	2022
6825	Upper Middle Road - Widening - 4 to 6 lanes from Appleby Line to Burloak Drive (BUR) (Regional Road 38)	2030
6828	Upper Middle Road - Widening - 4 to 6 lanes from Bronte Road to Neyagawa Boulevard (OAK) (Regional Road 38)	2027
7338	Upper Middle Road - Widening - 4 to 6 lanes from Neyagawa Boulevard to Trafalgar Road (OAK) (Regional Road 38)	2028
6826	Upper Middle Road - Widening - 4 to 6 lanes from Trafalgar Road to Grand Boulevard (OAK) (Regional Road 38)	2026
7339	Upper Middle Road - Widening - 4 to 6 lanes from Grand Boulevard to Ninth Line/Ford Drive(OAK) (Regional Road 38)	2028
6829	Upper Middle Road - Widening - 4 to 6 lanes from Ninth Line to Winston Churchill Boulevard (OAK) (Regional Road 38)	2028
7489	William Halton Parkway - Widening - 2 to 4 lanes from Old Bronte Road to Hospital Gate (OAK) (Regional Road 40)	2019
7490	William Halton Parkway - New 4 lane road from Third Line to Sixteen Mile Creek (OAK) (Regional Road 40)	2018
5413	William Halton Parkway - New 4 lane Bridge over Sixteen Mile Creek (OAK) (Regional Road 40)	2019
5273	William Halton Parkway - New 4 lane road from Sixteen Mile Creek to Neyagawa Boulevard (OAK) (Regional Road 40)	2019
7460	William Halton Parkway - New 4 lane road from Neyagawa Boulevard to Sixth Line (OAK) (Regional Road 40)	2018
6757	"5 1/2 Line" - New 6 lane road from Britannia Road to Steeles Avenue and Interchange at Highway 401 (MIL)	2031
6810	North Service Road - New 4 lane road from Burloak Drive to Bronte Road (OAK)	2031
7494	Norval Bypass (HHS)	2021

## **APPENDIX F**

---

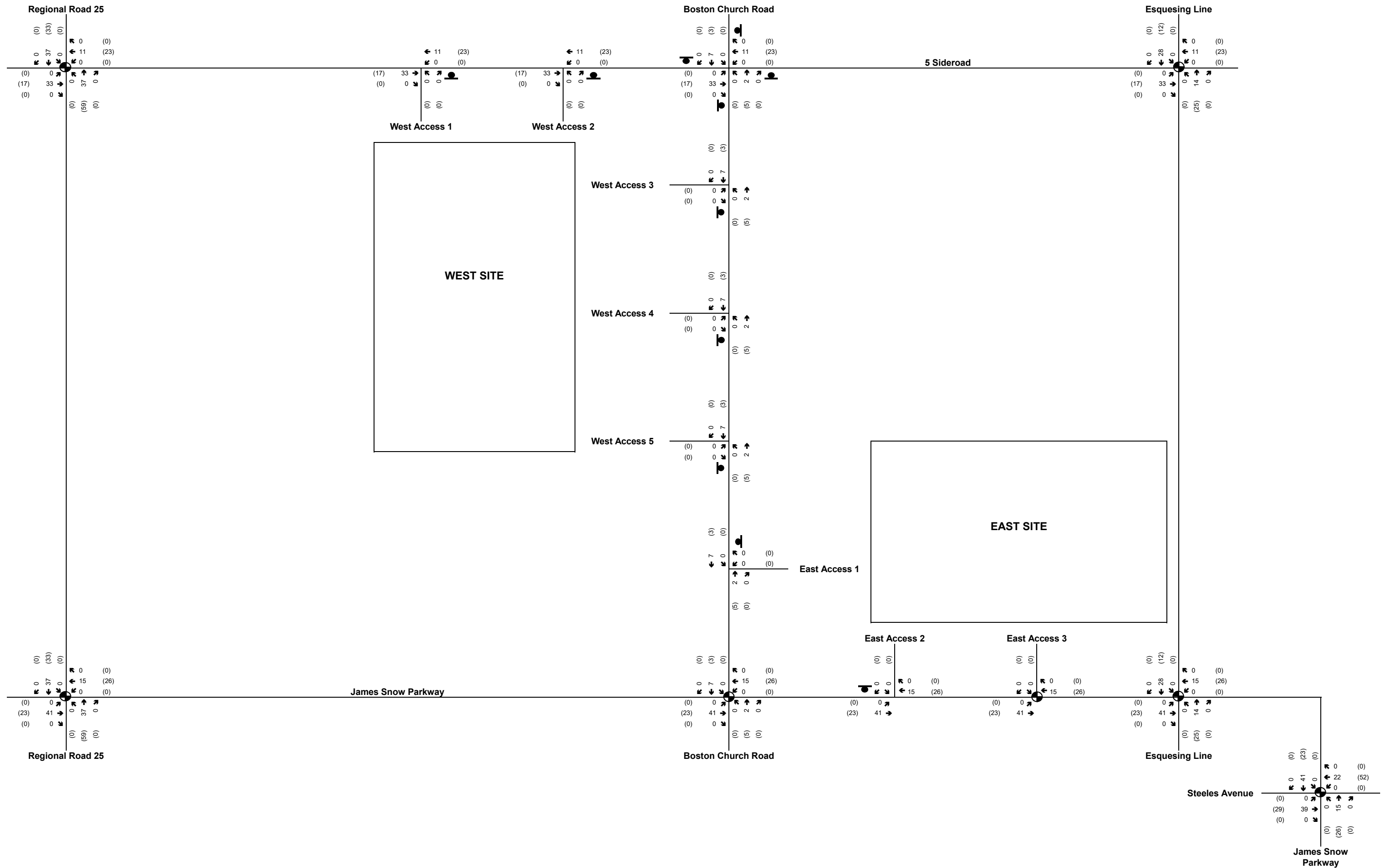
### **Background Growth Traffic Volume Figures**



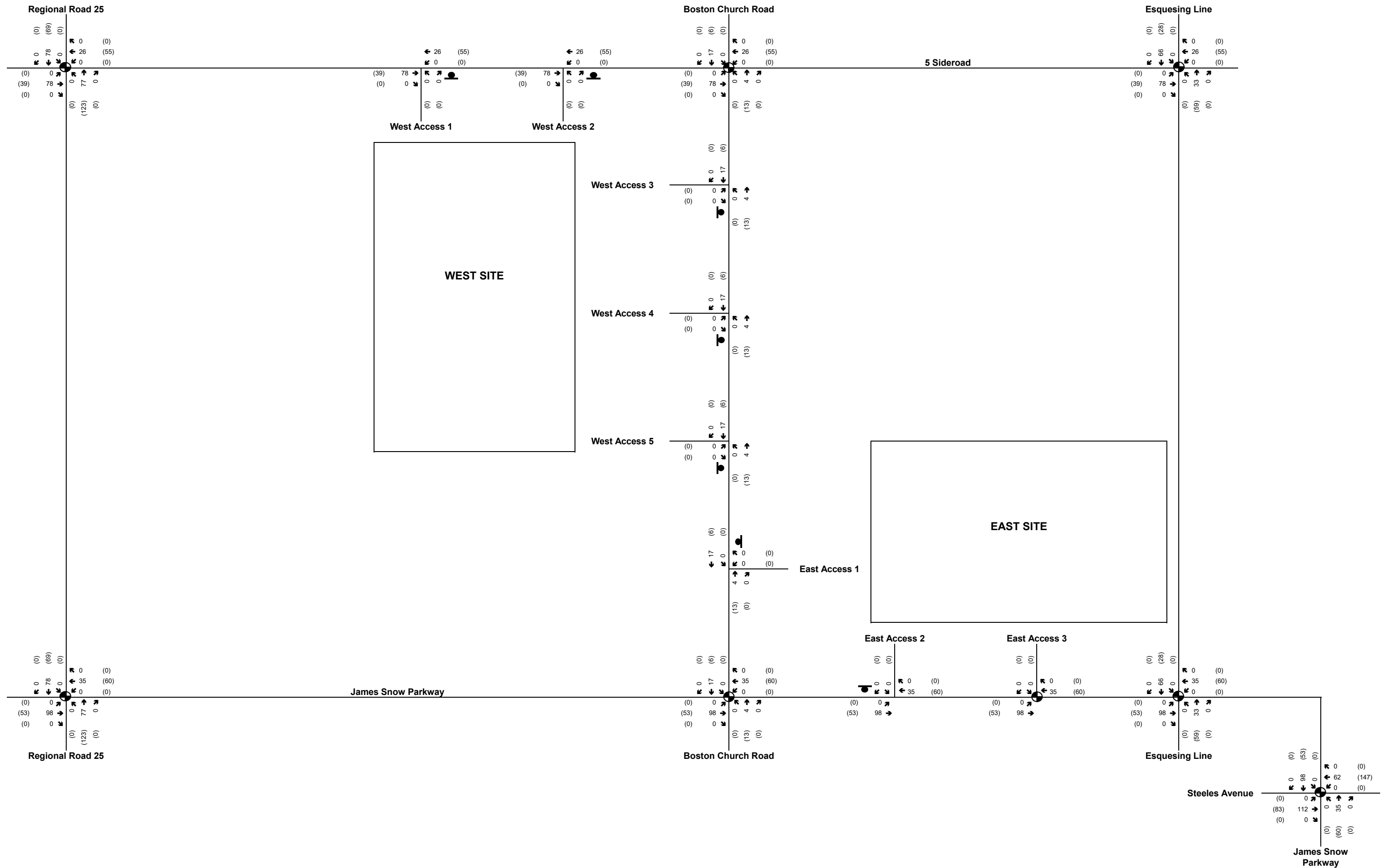
**LEGEND**

- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes
- Signalized Intersection
- ⊥ Stop Control

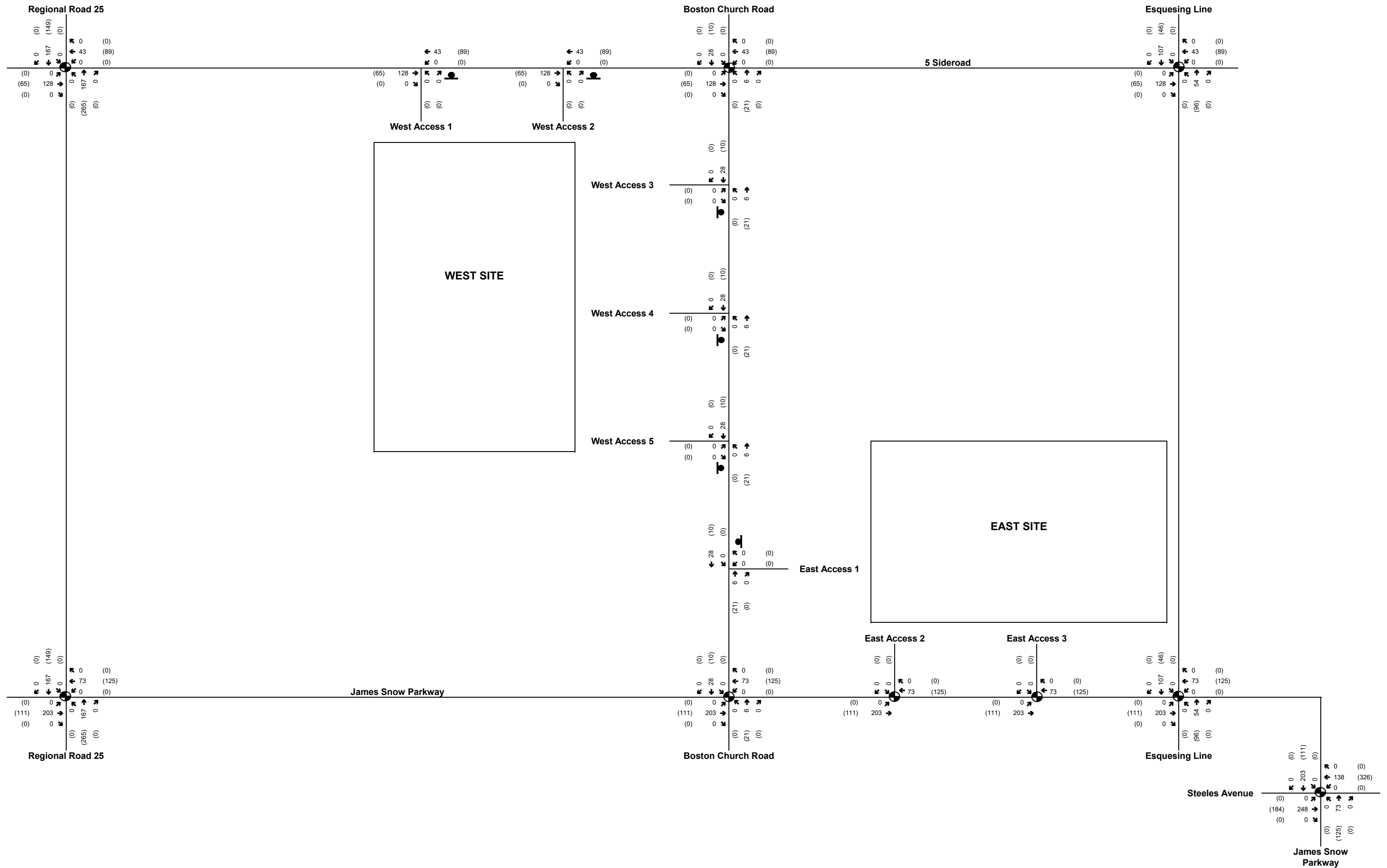
**2021 Background Traffic Growth Volumes**  
**Figure G-1**



**2023 Background Traffic Growth Volumes  
Figure G-2**



2028 Background Traffic Growth Volumes  
Figure G-3



**LEGEND**

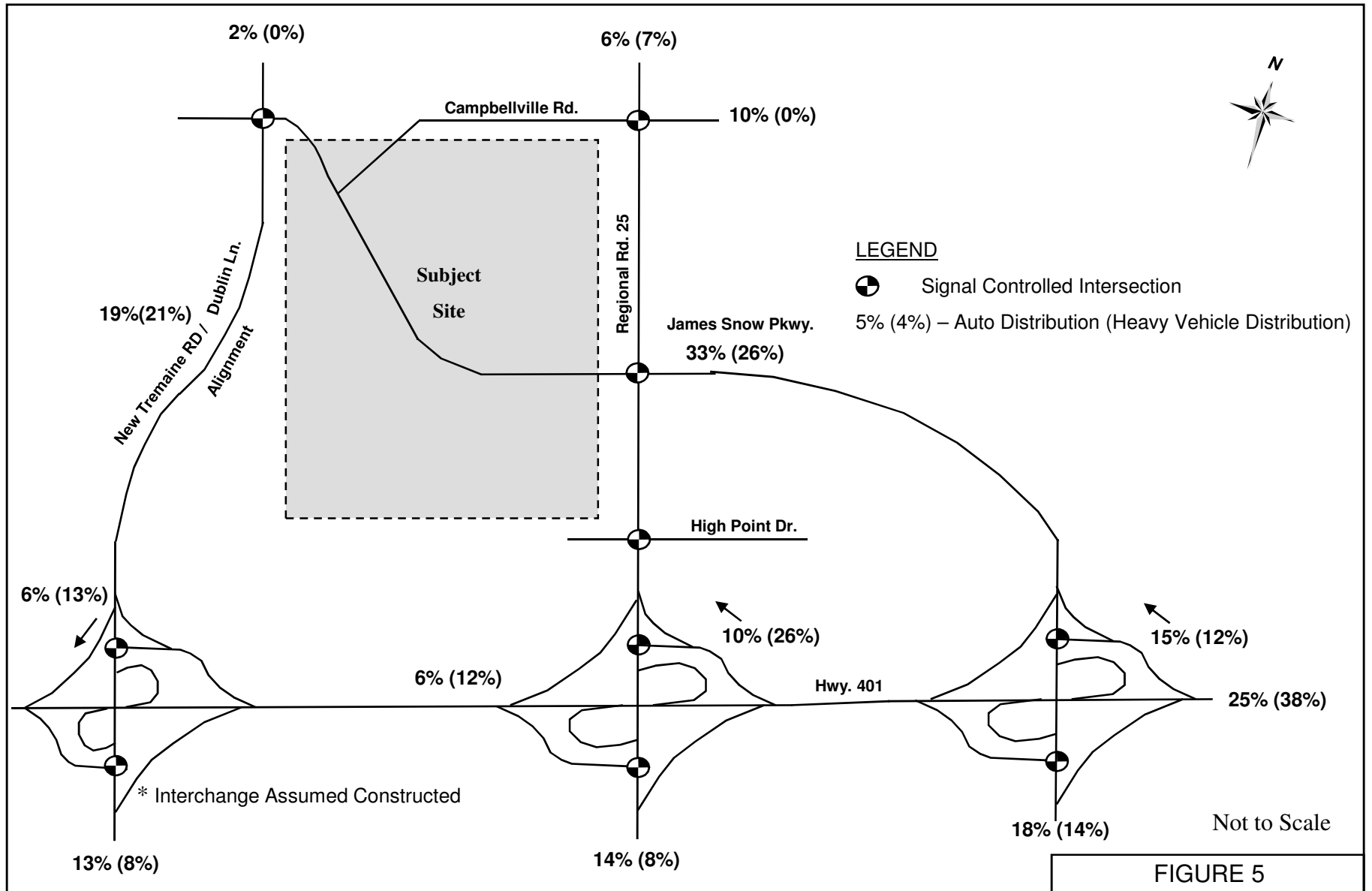
- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes
- ⊙ Signalized Intersection
- Stop Control

**2033 Background Traffic Growth Volumes**  
**Figure G-4**

## **APPENDIX G**

---

### **Escarpment Business Community 2009 Study – 2019 Traffic Distribution**



ESCARPMENT BUSINESS COMMUNITY TRAFFIC IMPACT ASSESSMENT-UPDATE

## 2019 SITE TRAFFIC DISTRIBUTION

(MARCH 2009)

FIGURE 5

**SERNAS TRANSTECH**  
 45 Vogell Rd  
 Richmond Hill, Ontario  
 L4B 3P6  
 T: 905 508-3371  
 F: 905 508-2599  
 sernastranstech.com



## **APPENDIX H**

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### **Intersection Control Warrants and Conceptual Designs**

**MTO LEFT TURN WARRANT**

**2033 AM PEAK HOUR**

**Intersection 201**

Posted Speed 60 km/h  
Design Speed 80 km/h

**West Access 1 at 5 Sideroad - Westbound**

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	23	15%	Fig. EA-15	No	-
VA	223				
%LT in VA	10.3%				
VO	620				

**Intersection 202**

Posted Speed 60 km/h  
Design Speed 80 km/h

**West Access 2 at 5 Sideroad - Westbound**

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	23	10%	Fig. EA-14	No	-
VA	244				
%LT in VA	9.4%				
VO	614				

**Intersection 203**

Posted Speed 70 km/h  
Design Speed 90 km/h

**West Access 3 at Boston Church Road - Northbound**

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	18	20%	Fig. EA-19	No	-
VA	118				
%LT in VA	15.3%				
VO	259				

**Intersection 204**

Posted Speed 70 km/h  
Design Speed 90 km/h

**West Access 4 at Boston Church Road - Northbound**

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	84	45%	Fig. EA-21	Yes	15
VA	199				
%LT in VA	42.2%				
VO	271				

**Intersection 205**

Posted Speed 70 km/h  
Design Speed 90 km/h

**West Access 5 at Boston Church Road - Northbound**

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	4	5%	Fig. EA-18	No	-
VA	203				
%LT in VA	2.0%				
VO	274				

**Intersection 101**

Posted Speed 70 km/h  
Design Speed 90 km/h

**East Access 1 at Boston Church Road - Southbound**

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	4	20%	Fig. EA-19	No	-
VA	277				
%LT in VA	16.6%				
VO	386				

**Intersection 102**

Posted Speed 70 km/h  
Design Speed 90 km/h

**East Access 2 at James Snow Parkway - Eastbound**

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	4	5%	Fig. EC-1	Yes	15
VA	854				
%LT in VA	2.7%				
VO	570				

MTO					
No. of Trucks in LT	15			Total Distance (Storage + Deceleration Lane) (m)	
% Trucks in LT	69%	70%	235		
Additional Storage Length (m)	15		Total Storage	90	
Total Storage Length (m)	30				
Taper Length (m)	145				
Deceleration Lane (m)	205				

**Intersection 103**

Posted Speed 70 km/h  
Design Speed 90 km/h

**East Access 3 at James Snow Parkway - Eastbound**

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	18	5%	Fig. EC-1	Yes	15
VA	850				
%LT in VA	2.1%				
VO	620				

MTO					
No. of Trucks in LT	9			Total Distance (Storage + Deceleration Lane) (m)	
% Trucks in LT	50%	50%	235		
Additional Storage Length (m)	15		Total Storage	90	
Total Storage Length (m)	30				
Taper Length (m)	145				
Deceleration Lane (m)	205				

**2033 PM PEAK HOUR**

**Intersection 201**

Posted Speed 60 km/h  
Design Speed 80 km/h

**West Access 1 at 5 Sideroad - Westbound**

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	6	5%	Fig. EA-14	No	-
VA	451				
%LT in VA	1.3%				
VO	287				

**Intersection 202**

Posted Speed 60 km/h  
Design Speed 80 km/h

**West Access 2 at 5 Sideroad - Westbound**

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	6	5%	Fig. EA-14	No	-
VA	447				
%LT in VA	1.3%				
VO	304				

**Intersection 203**

Posted Speed 70 km/h  
Design Speed 90 km/h

**West Access 3 at Boston Church Road - Northbound**

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	19	10%	Fig. EA-18	No	-
VA	285				
%LT in VA	6.7%				
VO	143				

**Intersection 204**

Posted Speed 70 km/h  
Design Speed 90 km/h

**West Access 4 at Boston Church Road - Northbound**

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	23	10%	Fig. EA-18	No	-
VA	285				
%LT in VA	8.1%				
VO	164				

**Intersection 205**

Posted Speed 70 km/h  
Design Speed 90 km/h

**West Access 4 at Boston Church Road - Northbound**

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	6	5%	Fig. EA-18	No	-
VA	291				
%LT in VA	2.1%				
VO	243				

**Intersection 101**

Posted Speed 70 km/h  
Design Speed 90 km/h

**East Access 1 at Boston Church Road - Southbound**

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	6	10%	Fig. EA-18	No	-
VA	248				
%LT in VA	5.6%				
VO	302				

**Intersection 102**

Posted Speed 70 km/h  
Design Speed 90 km/h

**East Access 2 at James Snow Parkway - Eastbound**

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	15	5%	Fig. EC-1	Yes	15
VA	729				
%LT in VA	2.5%				
VO	614				

MTO					
No. of Trucks in LT	15			Total Distance (Storage + Deceleration Lane) (m)	
% Trucks in LT	83%	90%	235		
Additional Storage Length (m)	15		Total Storage	90	
Total Storage Length (m)	30				
Taper Length (m)	145				
Deceleration Lane (m)	205				

**Intersection 103**

Posted Speed 70 km/h  
Design Speed 90 km/h

**East Access 3 at James Snow Parkway - Eastbound**

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	18	5%	Fig. EC-1	Yes	15
VA	730				
%LT in VA	2.1%				
VO	622				

MTO					
No. of Trucks in LT	11			Total Distance (Storage + Deceleration Lane) (m)	
% Trucks in LT	73%	80%	235		
Additional Storage Length (m)	15		Total Storage	90	
Total Storage Length (m)	30				
Taper Length (m)	145				
Deceleration Lane (m)	205				

**HALTON REGION AG RIGHT- TURN WARRANT - 10%**

**2033 AM PEAK HOUR**

**Intersection 201**

Posted Speed 60 km/h  
Design Speed 80 km/h

**West Access 1 at 5 Sideroad - Westbound**

	Total Traffic (vph)	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VR	11	Fig. EA-14	No	-
VT	609			
%RT in VT	1.8%			

**Intersection 202**

Posted Speed 60 km/h  
Design Speed 80 km/h

**West Access 2 at 5 Sideroad - Westbound**

	Total Traffic (vph)	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VR	10	Fig. EA-14	No	-
VT	604			
%RT in VT	1.7%			

**Intersection 203**

Posted Speed 70 km/h  
Design Speed 90 km/h

**West Access 3 at Boston Church Road - Northbound**

	Total Traffic (vph)	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VR	1	Fig. EA-20	No	-
VT	258			
%RT in VT	0.4%			

**Intersection 204**

Posted Speed 70 km/h  
Design Speed 90 km/h

**West Access 4 at Boston Church Road - Northbound**

	Total Traffic (vph)	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VR	20	Fig. EA-20	No	-
VT	251			
%RT in VT	8.0%			

**Intersection 205**

Posted Speed 70 km/h  
Design Speed 90 km/h

**West Access 5 at Boston Church Road - Northbound**

	Total Traffic (vph)	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VR	0	Fig. EA-20	No	-
VT	274			
%RT in VT	0.0%			

**Intersection 101**

Posted Speed 70 km/h  
Design Speed 90 km/h

**East Access 1 at Boston Church Road - Southbound**

	Total Traffic (vph)	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VR	189	Fig. EA-18	Yes	-
VT	197			
%RT in VT	95.9%			

**Intersection 102**

Posted Speed 70 km/h  
Design Speed 90 km/h

**East Access 2 at James Snow Parkway - Eastbound**

	Total Traffic (vph)	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VR	19	Fig. EC-1	No	-
VT	551			
%RT in VT	3.4%			

**Intersection 103**

Posted Speed 70 km/h  
Design Speed 90 km/h

**East Access 3 at James Snow Parkway - Eastbound**

	Total Traffic (vph)	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VR	59	Fig. EC-1	Yes	-
VT	561			
%RT in VT	10.5%			

**2033 PM PEAK HOUR**

**Intersection 201**

Posted Speed 60 km/h  
Design Speed 80 km/h

**West Access 1 at 5 Sideroad - Westbound**

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VR	5	-	Fig. EA-14	No	-
VT	282				
%RT in VT	1.8%				

**Intersection 202**

Posted Speed 60 km/h  
Design Speed 80 km/h

**West Access 2 at 5 Sideroad - Westbound**

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VR	5	-	Fig. EA-14	No	-
VT	299				
%RT in VT	1.7%				

**Intersection 203**

Posted Speed 70 km/h  
Design Speed 90 km/h

**West Access 3 at Boston Church Road - Northbound**

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VR	0	-	Fig. EA-18	No	-
VT	143				
%RT in VT	0.0%				

**Intersection 204**

Posted Speed 70 km/h  
Design Speed 90 km/h

**West Access 4 at Boston Church Road - Northbound**

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VR	7	-	Fig. EA-18	No	-
VT	157				
%RT in VT	4.5%				

**Intersection 205**

Posted Speed 70 km/h  
Design Speed 90 km/h

**West Access 4 at Boston Church Road - Northbound**

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VR	0	-	Fig. EA-18	No	-
VT	243				
%RT in VT	0.0%				

**Intersection 101**

Posted Speed 70 km/h  
Design Speed 90 km/h

**East Access 1 at Boston Church Road - Southbound**

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VR	59	-	Fig. EA-18	Yes	-
VT	243				
%RT in VT	24.3%				

**Intersection 102**

Posted Speed 70 km/h  
Design Speed 90 km/h

**East Access 2 at James Snow Parkway - Eastbound**

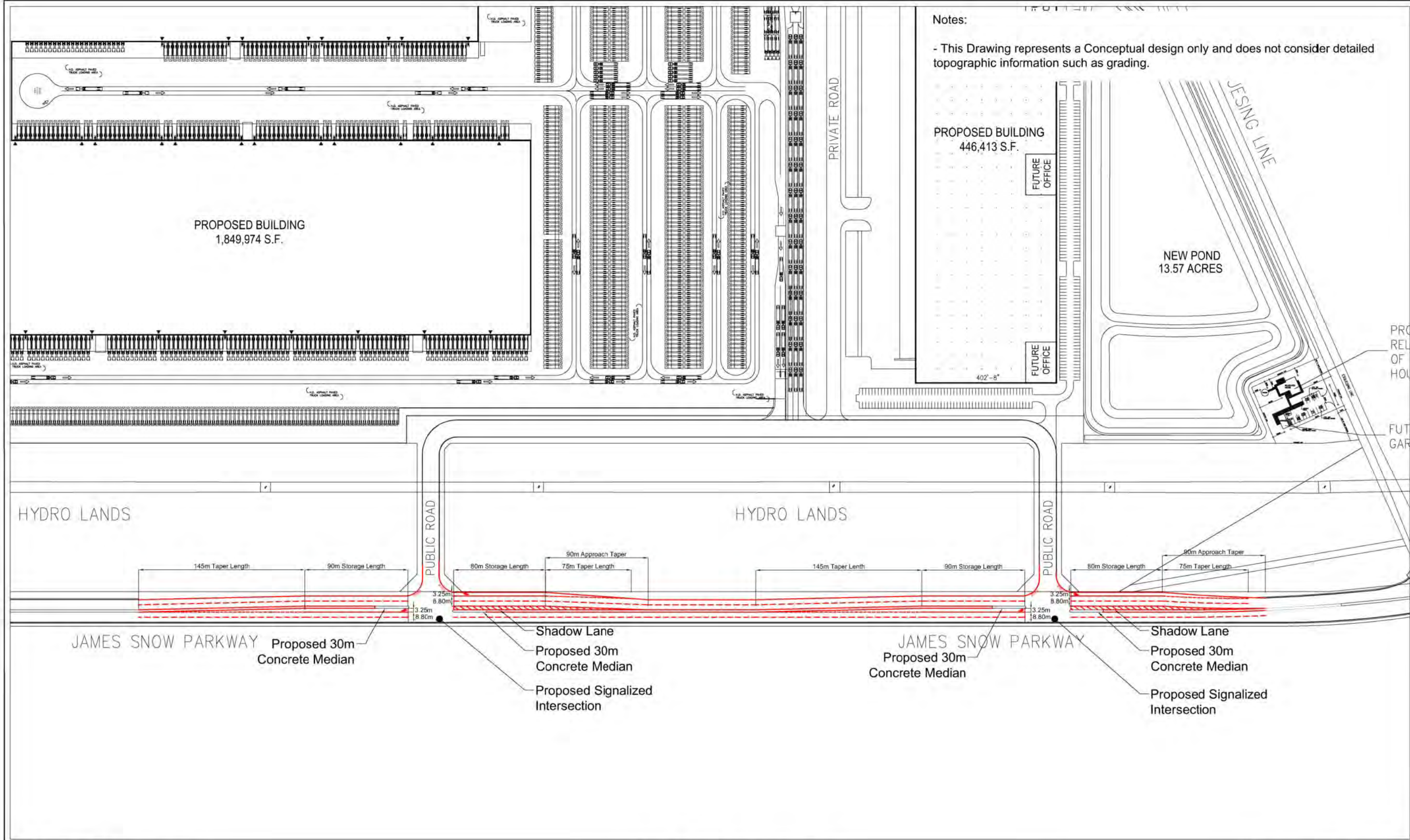
	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VR	19	-	Fig. EC-1	No	-
VT	595				
%RT in VT	3.2%				

**Intersection 103**

Posted Speed 70 km/h  
Design Speed 90 km/h

**East Access 3 at James Snow Parkway - Eastbound**

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VR	31	-	Fig. EC-1	No	-
VT	591				
%RT in VT	5.2%				

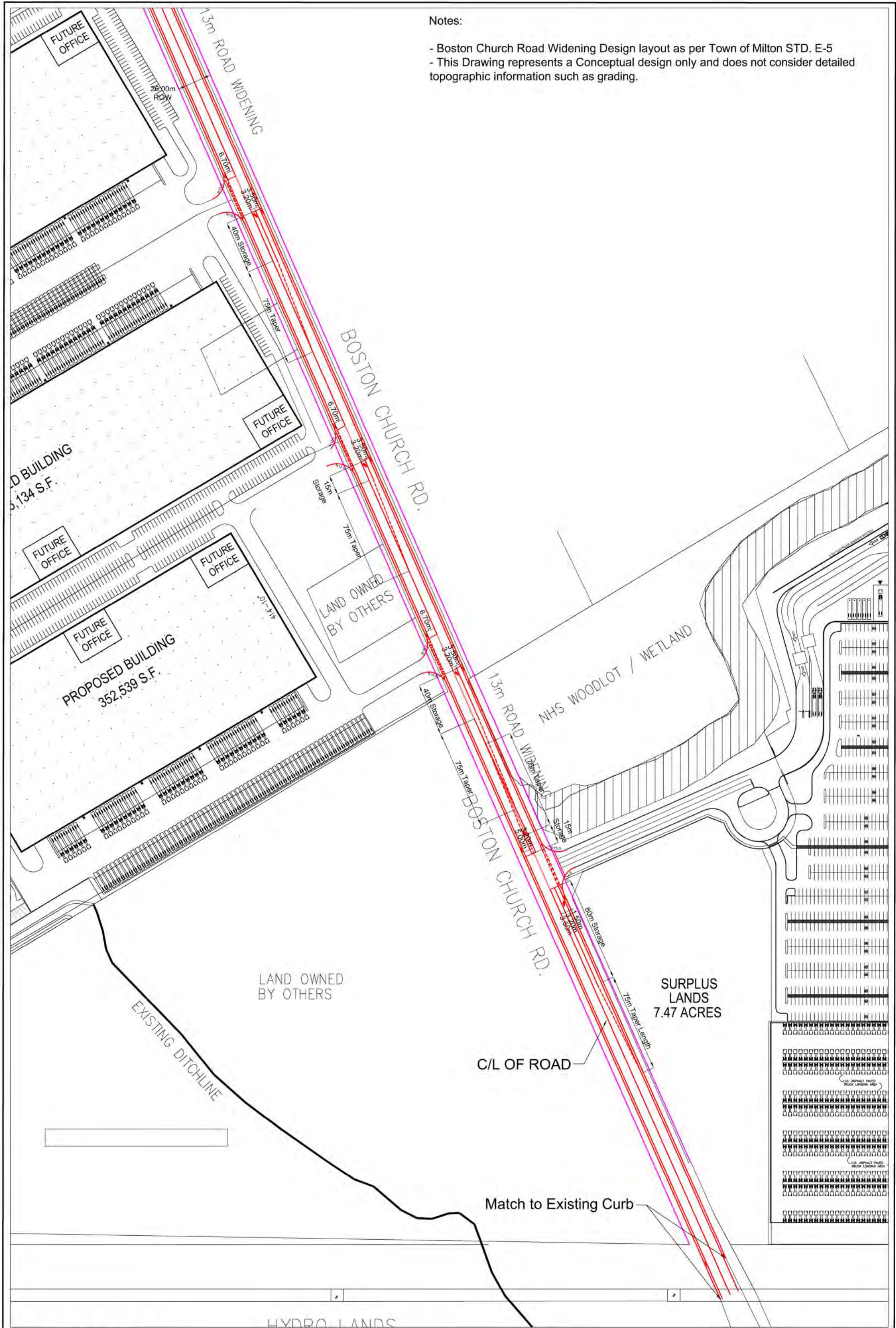


Notes:  
 - This Drawing represents a Conceptual design only and does not consider detailed topographic information such as grading.



Notes:

- Boston Church Road Widening Design layout as per Town of Milton STD. E-5
- This Drawing represents a Conceptual design only and does not consider detailed topographic information such as grading.





# Traffic Signal Warrant - Input Sheet Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

## Project and Scenario Summary

<b>Project:</b>	Orlando - North Porta Lands			<b>Project No.:</b>	17197
				<b>Date:</b>	2021-08-06
<b>Horizon:</b>	Future Total	<b>Horizon Year:</b>	2021	<b>Analyst:</b>	AX

## Study Intersection Summary

<b>Major Street:</b>	5 Sideroad	<b>Direction:</b>	East/West
<b>Minor Street:</b>	Boston Church Road	<b>Direction:</b>	North/South

## Intersection Details for Warrant Parameters

<b>Flow Conditions:</b>	Free Flow (Rural)	<b>Number of Lanes:</b>	1
<b>Number of Legs:</b>	Four	<b>Intersection Type:</b>	Existing

Notes: "Free Flow" is used when the operating speed is greater than or equal to 70km/h, "Restricted Flow" otherwise. The Number of Lanes greater than 1 only needs to be for one direction along the major road. An intersection is considered "New" if at least 1-leg is added to an existing intersection.

## Input Volumes and Average Hourly Volume Determination

Peak Hour	Major: 5 Sideroad						Minor: Boston Church Road						Pedestrians Crossing Major
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
AM	8	418	26	40	124	3	8	21	17	7	92	24	0
PM	23	180	11	29	291	2	23	69	74	5	32	6	0
AHV <sup>1</sup>	8	150	9	17	104	1	8	23	23	3	31	8	0

1. The AHV is determined by the availability of the peak hour estimates. If both the AM and PM Peak Hour Volume estimate is available then  $AHV = (AM_{PHV} + PM_{PHV}) / 4$ . In the case that only one estimate is available then  $AHV = AM_{PHV} / 2$  or  $AHV = PM_{PHV} / 2$ .

## Determination of Justification Volumes (Based on AHV)

Justification 1A: All Approach Lanes	385	Justification 2A: Major Street Both Approaches	289
Justification 1B: Minor Street Both Approaches	96	Justification 2B: Traffic Crossing Major Street	42

Note: The <u>crossing</u> volume is defined as the sum of:		
(1) Left turns from both minor street approaches:		11
(2) The heaviest through volume from the minor street:		31
(3) 50% of the heavier left turn movement from major street when both of the following criteria are met:		0
(a) The left turn volume > 120 vph	17	FALSE
(b) The left turn volume plus the opposing volume > 720 vph	167	FALSE
(4) Pedestrians crossing the major street:		0
	<b>Total</b>	<b>42</b>

# Traffic Signal Warrant - Output Sheet Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

### Project and Scenario Summary

<b>Project:</b>	Orlando - North Porta Lands			<b>Project No.:</b>	17197
				<b>Date:</b>	2021-08-06
<b>Horizon:</b>	Future Total	<b>Horizon Year:</b>	2021	<b>Analyst:</b>	AX

### Study Intersection Summary

<b>Major Street:</b>	5 Sideroad	<b>Direction:</b>	East/West
<b>Minor Street:</b>	Boston Church Road	<b>Direction:</b>	North/South

### Summary of Base Justification Thresholds

Justification	1 Approach Lane		2 or More Approach Lanes	
	Free Flow	Restricted Flow	Free Flow	Restricted Flow
1A: All Approach Lanes	<b>480</b>	720	600	900
1B: Minor Street Both Approaches	<b>120</b>	170	120	170
2A: Major Street Both Approaches	<b>480</b>	720	600	900
2B: Traffic Crossing Major Street	<b>50</b>	75	50	75

The above values are taken from Table 12 and Table 13 from OTM Book 12 (March 2012).

The grey shaded values are provided for reference only, and are not applicable to the study intersection.

### Adjusted Justification Thresholds for Study Intersection Conditions

Justification	Base Threshold	Existing Intersection	"T" Intersection	Final Threshold
1A: All Approach Lanes	480	120%	-	<b>576</b>
1B: Minor Street Both Approaches	120	120%	100%	<b>144</b>
2A: Major Street Both Approaches	480	120%	-	<b>576</b>
2B: Traffic Crossing Major Street	50	120%	-	<b>60</b>

The above adjustments are taken from OTM Book 12 (March 2012) the "T" Intersection adjustment only applies to Justification 1B, and is a 50% increase on the threshold when the study intersection is a "T" intersection. Otherwise a value of 100% is used.

### Warrant Calculation

Justification	Study Intersection Justification Volume	Justification Threshold	Percentage Warrant	Warrant Met?
1A: All Approach Lanes	385	<b>576</b>	67%	<b>No</b>
1B: Minor Street Both Approaches	96	<b>144</b>	67%	
2A: Major Street Both Approaches	289	<b>576</b>	50%	<b>No</b>
2B: Traffic Crossing Major Street	42	<b>60</b>	70%	

Notes: In the case of Justification 7 based on AHV both Warrant 1 and 2 must be met 100%, which requires both the A and B part of each warrant being equal to 100%.

When calculating the percentage, any value greater than 100% is expressed as 100%.

**Based on OTM Book 12's Signal Warrant Justification 7 and the estimated AHV for the subject study intersection a signal is:**

**Not Warranted**

# Traffic Signal Warrant - Input Sheet Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

## Project and Scenario Summary

<b>Project:</b>	Orlando - North Porta Lands			<b>Project No.:</b>	17197
				<b>Date:</b>	2021-08-03
<b>Horizon:</b>	Existing	<b>Horizon Year:</b>	2021	<b>Analyst:</b>	AX

## Study Intersection Summary

<b>Major Street:</b>	5 Sideroad	<b>Direction:</b>	East/West
<b>Minor Street:</b>	Esquesing Line	<b>Direction:</b>	North/South

## Intersection Details for Warrant Parameters

<b>Flow Conditions:</b>	Free Flow (Rural)	<b>Number of Lanes:</b>	1
<b>Number of Legs:</b>	Four	<b>Intersection Type:</b>	Existing

Notes: "Free Flow" is used when the operating speed is greater than or equal to 70km/h, "Restricted Flow" otherwise. The Number of Lanes greater than 1 only needs to be for one direction along the major road. An intersection is considered "New" if at least 1-leg is added to an existing intersection.

## Input Volumes and Average Hourly Volume Determination

Peak Hour	Major: 5 Sideroad						Minor: Esquesing Line						Pedestrians Crossing Major
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
AM	7	418	16	80	139	3	10	113	110	63	306	25	0
PM	30	210	11	65	265	18	23	269	78	4	110	39	0
AHV <sup>1</sup>	9	157	7	36	101	5	8	96	47	17	104	16	0

1. The AHV is determined by the availability of the peak hour estimates. If both the AM and PM Peak Hour Volume estimate is available then  $AHV = (AM_{PHV} + PM_{PHV}) / 4$ . In the case that only one estimate is available then  $AHV = AM_{PHV} / 2$  or  $AHV = PM_{PHV} / 2$ .

## Determination of Justification Volumes (Based on AHV)

Justification 1A: All Approach Lanes	603	Justification 2A: Major Street Both Approaches	315
Justification 1B: Minor Street Both Approaches	288	Justification 2B: Traffic Crossing Major Street	129

Note: The <u>crossing</u> volume is defined as the sum of:		
(1) Left turns from both minor street approaches:		25
(2) The heaviest through volume from the minor street:		104
(3) 50% of the heavier left turn movement from major street when both of the following criteria are met:		0
(a) The left turn volume > 120 vph	36	FALSE
(b) The left turn volume plus the opposing volume > 720 vph	193	FALSE
(4) Pedestrians crossing the major street:		0
	<b>Total</b>	<b>129</b>



# Traffic Signal Warrant - Output Sheet Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

## Project and Scenario Summary

<b>Project:</b>	Orlando - North Porta Lands			<b>Project No.:</b>	17197
				<b>Date:</b>	2021-08-03
<b>Horizon:</b>	Existing	<b>Horizon Year:</b>	2021	<b>Analyst:</b>	AX

## Study Intersection Summary

<b>Major Street:</b>	5 Sideroad	<b>Direction:</b>	East/West
<b>Minor Street:</b>	Esquesing Line	<b>Direction:</b>	North/South

## Summary of Base Justification Thresholds

Justification	1 Approach Lane		2 or More Approach Lanes	
	Free Flow	Restricted Flow	Free Flow	Restricted Flow
1A: All Approach Lanes	480	720	600	900
1B: Minor Street Both Approaches	120	170	120	170
2A: Major Street Both Approaches	480	720	600	900
2B: Traffic Crossing Major Street	50	75	50	75

The above values are taken from Table 12 and Table 13 from OTM Book 12 (March 2012).

The grey shaded values are provided for reference only, and are not applicable to the study intersection.

## Adjusted Justification Thresholds for Study Intersection Conditions

Justification	Base Threshold	Existing Intersection	"T" Intersection	Final Threshold
1A: All Approach Lanes	480	120%	-	576
1B: Minor Street Both Approaches	120	120%	100%	144
2A: Major Street Both Approaches	480	120%	-	576
2B: Traffic Crossing Major Street	50	120%	-	60

The above adjustments are taken from OTM Book 12 (March 2012) the "T" Intersection adjustment only applies to Justification 1B, and is a 50% increase on the threshold when the study intersection is a "T" intersection. Otherwise a value of 100% is used.

## Warrant Calculation

Justification	Study Intersection Justification Volume	Justification Threshold	Percentage Warrant	Warrant Met?
1A: All Approach Lanes	603	576	100%	Yes
1B: Minor Street Both Approaches	288	144	100%	
2A: Major Street Both Approaches	315	576	55%	No
2B: Traffic Crossing Major Street	129	60	100%	

Notes: In the case of Justification 7 based on AHV both Warrant 1 and 2 must be met 100%, which requires both the A and B part of each warrant being equal to 100%.

When calculating the percentage, any value greater than 100% is expressed as 100%.

**Based on OTM Book 12's Signal Warrant Justification 7 and the estimated AHV for the subject study intersection a signal is:**

**Not Warranted**

## Traffic Signal Warrant - Input Sheet Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

### Project and Scenario Summary

<b>Project:</b>	Orlando - North Porta Lands			<b>Project No.:</b>	17197
				<b>Date:</b>	2021-08-06
<b>Horizon:</b>	Future Total	<b>Horizon Year:</b>	2033	<b>Analyst:</b>	AX

### Study Intersection Summary

<b>Major Street:</b>	5 Sideroad	<b>Direction:</b>	East/West
<b>Minor Street:</b>	Boston Church Road	<b>Direction:</b>	North/South

### Intersection Details for Warrant Parameters

<b>Flow Conditions:</b>	Free Flow (Rural)	<b>Number of Lanes:</b>	1
<b>Number of Legs:</b>	Four	<b>Intersection Type:</b>	Existing

Notes: "Free Flow" is used when the operating speed is greater than or equal to 70km/h, "Restricted Flow" otherwise.

The Number of Lanes greater than 1 only needs to be for one direction along the major road.

An intersection is considered "New" if at least 1-leg is added to an existing intersection.

### Input Volumes and Average Hourly Volume Determination

Peak Hour	Major: 5 Sideroad						Minor: Boston Church Road						Pedestrians Crossing Major
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
AM	8	531	71	72	168	3	52	26	22	7	116	24	0
PM	23	233	68	34	370	2	71	87	109	5	41	6	0
AHV <sup>1</sup>	8	191	35	27	135	1	31	28	33	3	39	8	0

1. The AHV is determined by the availability of the peak hour estimates. If both the AM and PM Peak Hour Volume estimate is available then  $AHV = (AM_{PHV} + PM_{PHV}) / 4$ . In the case that only one estimate is available then  $AHV = AM_{PHV} / 2$  or  $AHV = PM_{PHV} / 2$ .

### Determination of Justification Volumes (Based on AHV)

Justification 1A: All Approach Lanes	539	Justification 2A: Major Street Both Approaches	397
Justification 1B: Minor Street Both Approaches	142	Justification 2B: Traffic Crossing Major Street	73

Note: The <u>crossing</u> volume is defined as the sum of:	
(1) Left turns from both minor street approaches:	34
(2) The heaviest through volume from the minor street:	39
(3) 50% of the heavier left turn movement from major street when both of the following criteria are met:	0
(a) The left turn volume > 120 vph    27    FALSE	
(b) The left turn volume plus the opposing volume > 720 vph    218    FALSE	
(4) Pedestrians crossing the major street:	0
<b>Total</b>	<b>73</b>

## Traffic Signal Warrant - Output Sheet Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

### Project and Scenario Summary

<b>Project:</b>	Orlando - North Porta Lands			<b>Project No.:</b>	17197
				<b>Date:</b>	2021-08-06
<b>Horizon:</b>	Future Total	<b>Horizon Year:</b>	2033	<b>Analyst:</b>	AX

### Study Intersection Summary

<b>Major Street:</b>	5 Sideroad	<b>Direction:</b>	East/West
<b>Minor Street:</b>	Boston Church Road	<b>Direction:</b>	North/South

### Summary of Base Justification Thresholds

Justification	1 Approach Lane		2 or More Approach Lanes	
	Free Flow	Restricted Flow	Free Flow	Restricted Flow
1A: All Approach Lanes	<b>480</b>	720	600	900
1B: Minor Street Both Approaches	<b>120</b>	170	120	170
2A: Major Street Both Approaches	<b>480</b>	720	600	900
2B: Traffic Crossing Major Street	<b>50</b>	75	50	75

The above values are taken from Table 12 and Table 13 from OTM Book 12 (March 2012).

The grey shaded values are provided for reference only, and are not applicable to the study intersection.

### Adjusted Justification Thresholds for Study Intersection Conditions

Justification	Base Threshold	Existing Intersection	"T" Intersection	Final Threshold
1A: All Approach Lanes	480	120%	-	<b>576</b>
1B: Minor Street Both Approaches	120	120%	100%	<b>144</b>
2A: Major Street Both Approaches	480	120%	-	<b>576</b>
2B: Traffic Crossing Major Street	50	120%	-	<b>60</b>

The above adjustments are taken from OTM Book 12 (March 2012) the "T" Intersection adjustment only applies to Justification 1B, and is a 50% increase on the threshold when the study intersection is a "T" intersection. Otherwise a value of 100% is used.

### Warrant Calculation

Justification	Study Intersection Justification Volume	Justification Threshold	Percentage Warrant	Warrant Met?
1A: All Approach Lanes	539	<b>576</b>	94%	<b>No</b>
1B: Minor Street Both Approaches	142	<b>144</b>	99%	
2A: Major Street Both Approaches	397	<b>576</b>	69%	<b>No</b>
2B: Traffic Crossing Major Street	73	<b>60</b>	100%	

Notes: In the case of Justification 7 based on AHV both Warrant 1 and 2 must be met 100%, which requires both the A and B part of each warrant being equal to 100%.

When calculating the percentage, any value greater than 100% is expressed as 100%.

**Based on OTM Book 12's Signal Warrant Justification 7 and the estimated AHV for the subject study intersection a signal is:**

**Not Warranted**

## Traffic Signal Warrant - Input Sheet Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

### Project and Scenario Summary

<b>Project:</b>	Orlando - North Porta Lands	<b>Project No.:</b>	17197
		<b>Date:</b>	2021-08-05
<b>Horizon:</b>	Future Total	<b>Horizon Year:</b>	2033
		<b>Analyst:</b>	AX

### Study Intersection Summary

<b>Major Street:</b>	5 Sideroad	<b>Direction:</b>	East/West
<b>Minor Street:</b>	Esquesing Line	<b>Direction:</b>	North/South

### Intersection Details for Warrant Parameters

<b>Flow Conditions:</b>	Free Flow (Rural)	<b>Number of Lanes:</b>	1
<b>Number of Legs:</b>	Four	<b>Intersection Type:</b>	Existing

Notes: "Free Flow" is used when the operating speed is greater than or equal to 70km/h, "Restricted Flow" otherwise. The Number of Lanes greater than 1 only needs to be for one direction along the major road. An intersection is considered "New" if at least 1-leg is added to an existing intersection.

### Input Volumes and Average Hourly Volume Determination

Peak Hour	Major: 5 Sideroad						Minor: Esquesing Line						Pedestrians Crossing Major
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
AM	7	536	16	83	196	3	10	160	111	63	401	44	0
PM	50	288	11	66	349	18	23	356	81	4	150	39	0
AHV <sup>1</sup>	14	206	7	37	136	5	8	129	48	17	138	21	0

1. The AHV is determined by the availability of the peak hour estimates. If both the AM and PM Peak Hour Volume estimate is available then  $AHV = (AM_{PHV} + PM_{PHV}) / 4$ . In the case that only one estimate is available then  $AHV = AM_{PHV} / 2$  or  $AHV = PM_{PHV} / 2$ .

### Determination of Justification Volumes (Based on AHV)

Justification 1A: All Approach Lanes	766	Justification 2A: Major Street Both Approaches	405
Justification 1B: Minor Street Both Approaches	361	Justification 2B: Traffic Crossing Major Street	163

Note: The <u>crossing volume</u> is defined as the sum of:		
(1) Left turns from both minor street approaches:		25
(2) The heaviest through volume from the minor street:		138
(3) 50% of the heavier left turn movement from major street when both of the following criteria are met:		0
(a) The left turn volume > 120 vph	37	FALSE
(b) The left turn volume plus the opposing volume > 720 vph	243	FALSE
(4) Pedestrians crossing the major street:		0
	<b>Total</b>	<b>163</b>

## Traffic Signal Warrant - Output Sheet Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

### Project and Scenario Summary

<b>Project:</b>	Orlando - North Porta Lands			<b>Project No.:</b>	17197
				<b>Date:</b>	2021-08-05
<b>Horizon:</b>	Future Total	<b>Horizon Year:</b>	2033	<b>Analyst:</b>	AX

### Study Intersection Summary

<b>Major Street:</b>	5 Sideroad	<b>Direction:</b>	East/West
<b>Minor Street:</b>	Esquesing Line	<b>Direction:</b>	North/South

### Summary of Base Justification Thresholds

Justification	1 Approach Lane		2 or More Approach Lanes	
	Free Flow	Restricted Flow	Free Flow	Restricted Flow
1A: All Approach Lanes	<b>480</b>	720	600	900
1B: Minor Street Both Approaches	<b>120</b>	170	120	170
2A: Major Street Both Approaches	<b>480</b>	720	600	900
2B: Traffic Crossing Major Street	<b>50</b>	75	50	75

The above values are taken from Table 12 and Table 13 from OTM Book 12 (March 2012).  
The grey shaded values are provided for reference only, and are not applicable to the study intersection.

### Adjusted Justification Thresholds for Study Intersection Conditions

Justification	Base Threshold	Existing Intersection	"T" Intersection	Final Threshold
1A: All Approach Lanes	480	120%	-	<b>576</b>
1B: Minor Street Both Approaches	120	120%	100%	<b>144</b>
2A: Major Street Both Approaches	480	120%	-	<b>576</b>
2B: Traffic Crossing Major Street	50	120%	-	<b>60</b>

The above adjustments are taken from OTM Book 12 (March 2012) the "T" Intersection adjustment only applies to Justification 1B, and is a 50% increase on the threshold when the study intersection is a "T" intersection. Otherwise a value of 100% is used.

### Warrant Calculation

Justification	Study Intersection Justification Volume	Justification Threshold	Percentage Warrant	Warrant Met?
1A: All Approach Lanes	766	<b>576</b>	100%	<b>Yes</b>
1B: Minor Street Both Approaches	361	<b>144</b>	100%	
2A: Major Street Both Approaches	405	<b>576</b>	70%	<b>No</b>
2B: Traffic Crossing Major Street	163	<b>60</b>	100%	

Notes: In the case of Justification 7 based on AHV both Warrant 1 and 2 must be met 100%, which requires both the A and B part of each warrant being equal to 100%.

When calculating the percentage, any value greater than 100% is expressed as 100%.

**Based on OTM Book 12's Signal Warrant Justification 7 and the estimated AHV for the subject study intersection a signal is:**

Not Warranted

## Traffic Signal Warrant - Input Sheet Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

### Project and Scenario Summary

<b>Project:</b>	Orlando - North Porta Lands	<b>Project No.:</b>	17197
		<b>Date:</b>	2021-07-21
<b>Horizon:</b>	Future Total	<b>Horizon Year:</b>	2033
		<b>Analyst:</b>	AX

### Study Intersection Summary

<b>Major Street:</b>	Boston Church Road	<b>Direction:</b>	North/South
<b>Minor Street:</b>	East Access 1	<b>Direction:</b>	East/West

### Intersection Details for Warrant Parameters

<b>Flow Conditions:</b>	Free Flow (Rural)	<b>Number of Lanes:</b>	1
<b>Number of Legs:</b>	Three ("T" Intersection)	<b>Intersection Type:</b>	New

Notes: "Free Flow" is used when the operating speed is greater than or equal to 70km/h, "Restricted Flow" otherwise. The Number of Lanes greater than 1 only needs to be for one direction along the major road. An intersection is considered "New" if at least 1-leg is added to an existing intersection.

### Input Volumes and Average Hourly Volume Determination

Peak Hour	Major: Boston Church Road						Minor: East Access 1						Pedestrians Crossing Major
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
AM	0	197	189	46	231	0	0	0	0	56	0	6	0
PM	0	243	59	14	234	0	0	0	0	196	0	48	0
AHV <sup>1</sup>	0	110	62	15	116	0	0	0	0	63	0	14	0

1. The AHV is determined by the availability of the peak hour estimates. If both the AM and PM Peak Hour Volume estimate is available then  $AHV = (AM_{PHV} + PM_{PHV}) / 4$ . In the case that only one estimate is available then  $AHV = AM_{PHV} / 2$  or  $AHV = PM_{PHV} / 2$ .

### Determination of Justification Volumes (Based on AHV)

Justification 1A: All Approach Lanes	380	Justification 2A: Major Street Both Approaches	303
Justification 1B: Minor Street Both Approaches	77	Justification 2B: Traffic Crossing Major Street	63

Note: The <u>crossing</u> volume is defined as the sum of:		
(1) Left turns from both minor street approaches:		63
(2) The heaviest through volume from the minor street:		0
(3) 50% of the heavier left turn movement from major street when both of the following criteria are met:		0
(a) The left turn volume > 120 vph	15	FALSE
(b) The left turn volume plus the opposing volume > 720 vph	125	FALSE
(4) Pedestrians crossing the major street:		0
	<b>Total</b>	<b>63</b>

## Traffic Signal Warrant - Output Sheet Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

### Project and Scenario Summary

<b>Project:</b>	Orlando - North Porta Lands	<b>Project No.:</b>	17197
		<b>Date:</b>	2021-07-21
<b>Horizon:</b>	Future Total	<b>Horizon Year:</b>	2033
		<b>Analyst:</b>	AX

### Study Intersection Summary

<b>Major Street:</b>	Boston Church Road	<b>Direction:</b>	North/South
<b>Minor Street:</b>	East Access 1	<b>Direction:</b>	East/West

### Summary of Base Justification Thresholds

Justification	1 Approach Lane		2 or More Approach Lanes	
	Free Flow	Restricted Flow	Free Flow	Restricted Flow
1A: All Approach Lanes	<b>480</b>	720	600	900
1B: Minor Street Both Approaches	<b>120</b>	170	120	170
2A: Major Street Both Approaches	<b>480</b>	720	600	900
2B: Traffic Crossing Major Street	<b>50</b>	75	50	75

The above values are taken from Table 12 and Table 13 from OTM Book 12 (March 2012).  
The grey shaded values are provided for reference only, and are not applicable to the study intersection.

### Adjusted Justification Thresholds for Study Intersection Conditions

Justification	Base Threshold	New Intersection	"T" Intersection	Final Threshold
1A: All Approach Lanes	480	150%	-	<b>720</b>
1B: Minor Street Both Approaches	120	150%	150%	<b>270</b>
2A: Major Street Both Approaches	480	150%	-	<b>720</b>
2B: Traffic Crossing Major Street	50	150%	-	<b>75</b>

The above adjustments are taken from OTM Book 12 (March 2012) the "T" Intersection adjustment only applies to Justification 1B, and is a 50% increase on the threshold when the study intersection is a "T" intersection. Otherwise a value of 100% is used.

### Warrant Calculation

Justification	Study Intersection Justification Volume	Justification Threshold	Percentage Warrant	Warrant Met?
1A: All Approach Lanes	380	<b>720</b>	53%	<b>No</b>
1B: Minor Street Both Approaches	77	<b>270</b>	29%	
2A: Major Street Both Approaches	303	<b>720</b>	42%	<b>No</b>
2B: Traffic Crossing Major Street	63	<b>75</b>	84%	

Notes: In the case of Justification 7 based on AHV both Warrant 1 and 2 must be met 100%, which requires both the A and B part of each warrant being equal to 100%.

When calculating the percentage, any value greater than 100% is expressed as 100%.

**Based on OTM Book 12's Signal Warrant Justification 7 and the estimated AHV for the subject study intersection a signal is:**

**Not Warranted**



## Traffic Signal Warrant - Input Sheet Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

### Project and Scenario Summary

<b>Project:</b>	Orlando - North Porta Lands	<b>Project No.:</b>	17197
		<b>Date:</b>	2021-07-21
<b>Horizon:</b>	Future Total	<b>Horizon Year:</b>	2033
		<b>Analyst:</b>	AX

### Study Intersection Summary

<b>Major Street:</b>	James Snow Parkway	<b>Direction:</b>	East/West
<b>Minor Street:</b>	East Access 2	<b>Direction:</b>	North/South

### Intersection Details for Warrant Parameters

<b>Flow Conditions:</b>	Free Flow (Rural)	<b>Number of Lanes:</b>	2 or more
<b>Number of Legs:</b>	Three ("T" Intersection)	<b>Intersection Type:</b>	New

Notes: "Free Flow" is used when the operating speed is greater than or equal to 70km/h, "Restricted Flow" otherwise. The Number of Lanes greater than 1 only needs to be for one direction along the major road. An intersection is considered "New" if at least 1-leg is added to an existing intersection.

### Input Volumes and Average Hourly Volume Determination

Peak Hour	Major: James Snow Parkway						Minor: East Access 2						Pedestrians Crossing Major
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
AM	23	831	0	0	551	19	0	0	0	19	0	20	0
PM	18	711	0	0	595	19	0	0	0	19	0	18	0
AHV <sup>1</sup>	10	386	0	0	287	10	0	0	0	10	0	10	0

1. The AHV is determined by the availability of the peak hour estimates. If both the AM and PM Peak Hour Volume estimate is available then  $AHV = (AM_{PHV} + PM_{PHV}) / 4$ . In the case that only one estimate is available then  $AHV = AM_{PHV} / 2$  or  $AHV = PM_{PHV} / 2$ .

### Determination of Justification Volumes (Based on AHV)

Justification 1A: All Approach Lanes	713	Justification 2A: Major Street Both Approaches	693
Justification 1B: Minor Street Both Approaches	20	Justification 2B: Traffic Crossing Major Street	10

Note: The <u>crossing</u> volume is defined as the sum of:		
(1) Left turns from both minor street approaches:	10	
(2) The heaviest through volume from the minor street:	0	
(3) 50% of the heavier left turn movement from major street when both of the following criteria are met:	0	
(a) The left turn volume > 120 vph	10	FALSE
(b) The left turn volume plus the opposing volume > 720 vph	297	FALSE
(4) Pedestrians crossing the major street:	0	
<b>Total</b>		<b>10</b>



## Traffic Signal Warrant - Output Sheet Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

### Project and Scenario Summary

<b>Project:</b>	Orlando - North Porta Lands	<b>Project No.:</b>	17197
		<b>Date:</b>	2021-07-21
<b>Horizon:</b>	Future Total	<b>Horizon Year:</b>	2033
		<b>Analyst:</b>	AX

### Study Intersection Summary

<b>Major Street:</b>	James Snow Parkway	<b>Direction:</b>	East/West
<b>Minor Street:</b>	East Access 2	<b>Direction:</b>	North/South

### Summary of Base Justification Thresholds

Justification	1 Approach Lane		2 or More Approach Lanes	
	Free Flow	Restricted Flow	Free Flow	Restricted Flow
1A: All Approach Lanes	480	720	<b>600</b>	900
1B: Minor Street Both Approaches	120	170	<b>120</b>	170
2A: Major Street Both Approaches	480	720	<b>600</b>	900
2B: Traffic Crossing Major Street	50	75	<b>50</b>	75

The above values are taken from Table 12 and Table 13 from OTM Book 12 (March 2012).

The grey shaded values are provided for reference only, and are not applicable to the study intersection.

### Adjusted Justification Thresholds for Study Intersection Conditions

Justification	Base Threshold	New Intersection	"T" Intersection	Final Threshold
1A: All Approach Lanes	600	150%	-	<b>900</b>
1B: Minor Street Both Approaches	120	150%	150%	<b>270</b>
2A: Major Street Both Approaches	600	150%	-	<b>900</b>
2B: Traffic Crossing Major Street	50	150%	-	<b>75</b>

The above adjustments are taken from OTM Book 12 (March 2012) the "T" Intersection adjustment only applies to Justification 1B, and is a 50% increase on the threshold when the study intersection is a "T" intersection. Otherwise a value of 100% is used.

### Warrant Calculation

Justification	Study Intersection Justification Volume	Justification Threshold	Percentage Warrant	Warrant Met?
1A: All Approach Lanes	713	<b>900</b>	79%	<b>No</b>
1B: Minor Street Both Approaches	20	<b>270</b>	7%	
2A: Major Street Both Approaches	693	<b>900</b>	77%	<b>No</b>
2B: Traffic Crossing Major Street	10	<b>75</b>	13%	

Notes: In the case of Justification 7 based on AHV both Warrant 1 and 2 must be met 100%, which requires both the A and B part of each warrant being equal to 100%.

When calculating the percentage, any value greater than 100% is expressed as 100%.

**Based on OTM Book 12's Signal Warrant Justification 7 and the estimated AHV for the subject study intersection a signal is:**

**Not Warranted**

## Traffic Signal Warrant - Input Sheet Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

### Project and Scenario Summary

<b>Project:</b>	Orlando - North Porta Lands	<b>Project No.:</b>	17197
		<b>Date:</b>	2021-07-21
<b>Horizon:</b>	Future Total	<b>Horizon Year:</b>	2033
		<b>Analyst:</b>	AX

### Study Intersection Summary

<b>Major Street:</b>	James Snow Parkway	<b>Direction:</b>	East/West
<b>Minor Street:</b>	East Access 3	<b>Direction:</b>	North/South

### Intersection Details for Warrant Parameters

<b>Flow Conditions:</b>	Free Flow (Rural)	<b>Number of Lanes:</b>	2 or more
<b>Number of Legs:</b>	Three ("T" Intersection)	<b>Intersection Type:</b>	New

Notes: "Free Flow" is used when the operating speed is greater than or equal to 70km/h, "Restricted Flow" otherwise. The Number of Lanes greater than 1 only needs to be for one direction along the major road. An intersection is considered "New" if at least 1-leg is added to an existing intersection.

### Input Volumes and Average Hourly Volume Determination

Peak Hour	Major: James Snow Parkway						Minor: East Access 3						Pedestrians Crossing Major
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
AM	18	832	0	0	561	59	0	0	0	30	0	9	0
PM	15	715	0	0	591	31	0	0	0	60	0	23	0
AHV <sup>1</sup>	8	387	0	0	288	23	0	0	0	23	0	8	0

1. The AHV is determined by the availability of the peak hour estimates. If both the AM and PM Peak Hour Volume estimate is available then  $AHV = (AM_{PHV} + PM_{PHV}) / 4$ . In the case that only one estimate is available then  $AHV = AM_{PHV} / 2$  or  $AHV = PM_{PHV} / 2$ .

### Determination of Justification Volumes (Based on AHV)

Justification 1A: All Approach Lanes	737	Justification 2A: Major Street Both Approaches	706
Justification 1B: Minor Street Both Approaches	31	Justification 2B: Traffic Crossing Major Street	23

Note: The <u>crossing</u> volume is defined as the sum of:		
(1) Left turns from both minor street approaches:	23	
(2) The heaviest through volume from the minor street:	0	
(3) 50% of the heavier left turn movement from major street when both of the following criteria are met:	0	
(a) The left turn volume > 120 vph	8	FALSE
(b) The left turn volume plus the opposing volume > 720 vph	296	FALSE
(4) Pedestrians crossing the major street:	0	
<b>Total</b>		<b>23</b>

## Traffic Signal Warrant - Output Sheet Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

### Project and Scenario Summary

<b>Project:</b>	Orlando - North Porta Lands	<b>Project No.:</b>	17197
		<b>Date:</b>	2021-07-21
<b>Horizon:</b>	Future Total	<b>Horizon Year:</b>	2033
		<b>Analyst:</b>	AX

### Study Intersection Summary

<b>Major Street:</b>	James Snow Parkway	<b>Direction:</b>	East/West
<b>Minor Street:</b>	East Access 3	<b>Direction:</b>	North/South

### Summary of Base Justification Thresholds

Justification	1 Approach Lane		2 or More Approach Lanes	
	Free Flow	Restricted Flow	Free Flow	Restricted Flow
1A: All Approach Lanes	480	720	<b>600</b>	900
1B: Minor Street Both Approaches	120	170	<b>120</b>	170
2A: Major Street Both Approaches	480	720	<b>600</b>	900
2B: Traffic Crossing Major Street	50	75	<b>50</b>	75

The above values are taken from Table 12 and Table 13 from OTM Book 12 (March 2012).

The grey shaded values are provided for reference only, and are not applicable to the study intersection.

### Adjusted Justification Thresholds for Study Intersection Conditions

Justification	Base Threshold	New Intersection	"T" Intersection	Final Threshold
1A: All Approach Lanes	600	150%	-	<b>900</b>
1B: Minor Street Both Approaches	120	150%	150%	<b>270</b>
2A: Major Street Both Approaches	600	150%	-	<b>900</b>
2B: Traffic Crossing Major Street	50	150%	-	<b>75</b>

The above adjustments are taken from OTM Book 12 (March 2012) the "T" Intersection adjustment only applies to Justification 1B, and is a 50% increase on the threshold when the study intersection is a "T" intersection. Otherwise a value of 100% is used.

### Warrant Calculation

Justification	Study Intersection Justification Volume	Justification Threshold	Percentage Warrant	Warrant Met?
1A: All Approach Lanes	737	<b>900</b>	82%	<b>No</b>
1B: Minor Street Both Approaches	31	<b>270</b>	11%	
2A: Major Street Both Approaches	706	<b>900</b>	78%	<b>No</b>
2B: Traffic Crossing Major Street	23	<b>75</b>	31%	

Notes: In the case of Justification 7 based on AHV both Warrant 1 and 2 must be met 100%, which requires both the A and B part of each warrant being equal to 100%.

When calculating the percentage, any value greater than 100% is expressed as 100%.

**Based on OTM Book 12's Signal Warrant Justification 7 and the estimated AHV for the subject study intersection a signal is:**

**Not Warranted**

## **APPENDIX I**

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### **Synchro Capacity Analysis Reports**

Lanes, Volumes, Timings

<2021 Existing> AM Peak Hour

1: Regional Road 25 & 5 Sideroad

08-14-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	293	237	61	82	9	86	279	101	88	468	69
Future Volume (vph)	79	293	237	61	82	9	86	279	101	88	468	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	70.0		0.0	75.0		70.0	35.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	100.0			100.0			75.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.933			0.985			0.850			0.981	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1601	1542	0	1342	1610	0	1225	2920	1338	1601	3048	0
Fit Permitted	0.612			0.312			0.311			0.570		
Satd. Flow (perm)	1031	1542	0	441	1610	0	401	2920	1338	961	3048	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					6				107			15
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		573.6			536.0			986.0			203.5	
Travel Time (s)		34.4			32.2			50.7			10.5	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Adj. Flow (vph)	84	312	252	65	87	10	91	297	107	94	498	73
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	564	0	65	97	0	91	297	107	94	571	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99		0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1		1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0		8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0		-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0		-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0		9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA	Perm	Perm		NA
Protected Phases	3	8		4	4		5	2	2	6		6
Permitted Phases	8			4			2		2	6		
Detector Phase	3	8		4	4		5	2	2	6		6
Switch Phase												
Minimum Initial (s)	7.0	10.0		10.0	10.0		7.0	20.0	20.0	20.0		20.0
Minimum Split (s)	11.0	38.0		38.0	38.0		11.0	38.2	38.2	38.2		38.2

Lanes, Volumes, Timings

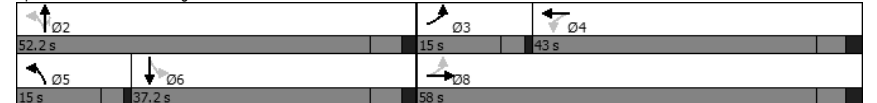
<2021 Existing> AM Peak Hour

1: Regional Road 25 & 5 Sideroad

08-14-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	15.0	58.0		43.0	43.0		15.0	52.2	52.2	37.2	37.2	
Total Split (%)	13.6%	52.6%		39.0%	39.0%		13.6%	47.4%	47.4%	33.8%	33.8%	
Maximum Green (s)	11.0	52.0		37.0	37.0		11.0	46.0	46.0	31.0	31.0	
Yellow Time (s)	3.0	3.7		3.7	3.7		3.0	4.2	4.2	4.2	4.2	
All-Red Time (s)	1.0	2.3		2.3	2.3		1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0		6.0	6.0		4.0	6.2	6.2	6.2	6.2	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.7		3.7	3.7		3.0	3.6	3.6	4.2	4.2	
Recall Mode	None	None		None	None		None	Ped	Ped	Ped	Ped	
Walk Time (s)		7.0			7.0			7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		25.0			25.0			25.0	25.0	25.0	25.0	
Pedestrian Calls (#/hr)		0			0			0	0	0	0	
Act Effect Green (s)	41.5	39.4		29.7	29.7		46.1	43.8	43.8	33.2	33.2	
Actuated g/C Ratio	0.43	0.41		0.31	0.31		0.48	0.46	0.46	0.35	0.35	
v/c Ratio	0.17	0.89		0.48	0.19		0.33	0.22	0.16	0.28	0.54	
Control Delay	17.2	43.9		43.1	26.1		20.3	18.0	4.5	31.8	30.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	17.2	43.9		43.1	26.1		20.3	18.0	4.5	31.8	30.2	
LOS	B	D		D	C		C	B	A	C	C	
Approach Delay		40.4			32.9			15.5			30.5	
Approach LOS		D			C			B			C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	110.2											
Actuated Cycle Length:	95.9											
Natural Cycle:	100											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.89											
Intersection Signal Delay:	30.2						Intersection LOS: C					
Intersection Capacity Utilization:	91.9%											
ICU Level of Service:	F											
Analysis Period (min):	15											

Splits and Phases: 1: Regional Road 25 & 5 Sideroad



HCM Signalized Intersection Capacity Analysis  
1: Regional Road 25 & 5 Sideroad

<2021 Existing> AM Peak Hour  
08-14-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	79	293	237	61	82	9	86	279	101	88	468	69
Future Volume (vph)	79	293	237	61	82	9	86	279	101	88	468	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		6.0	6.0		4.0	6.2	6.2	6.2	6.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.93		1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1601	1542		1342	1609		1225	2920	1338	1601	3047	
Fit Permitted	0.61	1.00		0.31	1.00		0.31	1.00	1.00	0.57	1.00	
Satd. Flow (perm)	1031	1542		440	1609		402	2920	1338	961	3047	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	84	312	252	65	87	10	91	297	107	94	498	73
RTOR Reduction (vph)	0	0	0	0	4	0	0	0	58	0	10	0
Lane Group Flow (vph)	84	564	0	65	93	0	91	297	49	94	561	0
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases	3	8		4			5	2			6	
Permitted Phases	8			4			2		2	6		
Actuated Green, G (s)	40.5	40.5		29.7	29.7		44.9	44.9	44.9	33.2	33.2	
Effective Green, g (s)	40.5	40.5		29.7	29.7		44.9	44.9	44.9	33.2	33.2	
Actuated g/C Ratio	0.41	0.41		0.30	0.30		0.46	0.46	0.46	0.34	0.34	
Clearance Time (s)	4.0	6.0		6.0	6.0		4.0	6.2	6.2	6.2	6.2	
Vehicle Extension (s)	3.0	3.7		3.7	3.7		3.0	3.6	3.6	4.2	4.2	
Lane Grp Cap (vph)	467	639		133	489		249	1343	615	326	1036	
v/s Ratio Prot	0.01	c0.37		0.06			c0.03	0.10			c0.18	
v/s Ratio Perm	0.06			0.15			0.14		0.04	0.10		
v/c Ratio	0.18	0.88		0.49	0.19		0.37	0.22	0.08	0.29	0.54	
Uniform Delay, d1	17.7	26.4		27.7	25.1		16.1	15.8	14.8	23.6	26.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	13.9		3.5	0.2		0.9	0.1	0.1	0.7	0.8	
Delay (s)	17.9	40.3		31.3	25.3		17.0	15.9	14.8	24.3	26.8	
Level of Service	B	D		C	C		B	B	B	C	C	
Approach Delay (s)		37.4			27.7			15.9			26.5	
Approach LOS		D			C			B			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		27.5		HCM 2000 Level of Service					C			
HCM 2000 Volume to Capacity ratio		0.73										
Actuated Cycle Length (s)		97.6		Sum of lost time (s)					20.2			
Intersection Capacity Utilization		91.9%		ICU Level of Service					F			
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings

2: Regional Road 25 & James Snow Parkway N

<2021 Existing> AM Peak Hour

08-14-2021

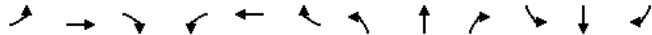
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	12	62	40	62	99	62	195	467	418	231	411	32
Future Volume (vph)	12	62	40	62	99	62	195	467	418	231	411	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		115.0	85.0		35.0	30.0		0.0	75.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	40.0			90.0			70.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor									0.99	1.00		
Frt			0.850			0.850			0.850		0.989	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1217	2684	1103	1259	3147	1192	1534	2897	1458	1472	2847	0
Fit Permitted	0.688			0.713			0.489			0.477		
Satd. Flow (perm)	881	2684	1103	945	3147	1192	789	2897	1439	739	2847	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			58			64			431		7	
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		452.4			1065.5			592.1			986.0	
Travel Time (s)		27.1			63.9			30.5			50.7	
Confl. Peds. (#/hr)									1		1	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Adj. Flow (vph)	12	64	41	64	102	64	201	481	431	238	424	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	64	41	64	102	64	201	481	431	238	457	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.2	9.0	9.0	9.0	9.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	
Switch Phase												

Lanes, Volumes, Timings

<2021 Existing> AM Peak Hour

2: Regional Road 25 & James Snow Parkway N

08-14-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	43.6	43.6	43.6	43.6	43.6	43.6	11.0	42.9	42.9	11.0	35.9	
Total Split (s)	55.6	55.6	55.6	55.6	55.6	55.6	15.0	76.9	76.9	15.0	76.9	
Total Split (%)	37.7%	37.7%	37.7%	37.7%	37.7%	37.7%	10.2%	52.1%	52.1%	10.2%	52.1%	
Maximum Green (s)	49.0	49.0	49.0	49.0	49.0	49.0	11.0	70.0	70.0	11.0	70.0	
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	4.2	4.2	3.0	4.2	
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	1.0	2.7	2.7	1.0	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	30.0	30.0	30.0	30.0	30.0	30.0		29.0	29.0		22.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0	0		0	
Act Effect Green (s)	12.3	12.3	12.3	12.3	12.3	12.3	35.2	22.5	22.5	35.4	22.6	
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.56	0.36	0.36	0.57	0.36	
v/c Ratio	0.07	0.12	0.16	0.34	0.16	0.22	0.36	0.46	0.54	0.45	0.44	
Control Delay	22.9	22.2	6.2	28.4	22.4	9.0	7.3	17.4	4.7	8.4	16.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	22.9	22.2	6.2	28.4	22.4	9.0	7.3	17.4	4.7	8.4	16.9	
LOS	C	C	A	C	C	A	A	B	A	A	B	
Approach Delay	16.7			20.3			10.6			14.0		
Approach LOS	B			C			B			B		

Intersection Summary

Area Type:	Other
Cycle Length:	147.5
Actuated Cycle Length:	62.4
Natural Cycle:	100
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.54
Intersection Signal Delay:	13.1
Intersection LOS:	B
Intersection Capacity Utilization:	61.8%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 2: Regional Road 25 & James Snow Parkway N

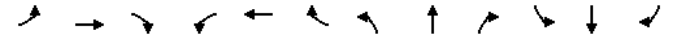
Ø1	Ø2	Ø4
15 s	76.9 s	55.6 s
Ø5	Ø6	Ø8
15 s	76.9 s	55.6 s

HCM Signalized Intersection Capacity Analysis

<2021 Existing> AM Peak Hour

2: Regional Road 25 & James Snow Parkway N

08-14-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	12	62	40	62	99	62	195	467	418	231	411	32
Future Volume (vph)	12	62	40	62	99	62	195	467	418	231	411	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1217	2684	1103	1259	3147	1192	1534	2897	1440	1472	2847	
Fit Permitted	0.69	1.00	1.00	0.71	1.00	1.00	0.49	1.00	1.00	0.48	1.00	
Satd. Flow (perm)	881	2684	1103	945	3147	1192	789	2897	1440	740	2847	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	12	64	41	64	102	64	201	481	431	238	424	33
RTOR Reduction (vph)	0	0	33	0	0	51	0	0	274	0	4	0
Lane Group Flow (vph)	12	64	8	64	102	13	201	481	157	238	453	0
Confl. Peds. (#/hr)							1		1			
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	12.3	12.3	12.3	12.3	12.3	12.3	32.4	22.6	22.6	32.4	22.6	
Effective Green, g (s)	12.3	12.3	12.3	12.3	12.3	12.3	32.4	22.6	22.6	32.4	22.6	
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.52	0.36	0.36	0.52	0.36	
Clearance Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	174	530	218	186	622	235	528	1052	523	500	1034	
v/s Ratio Prot		0.02			0.03		0.06	0.17		c0.07	0.16	
v/s Ratio Perm	0.01		0.01	c0.07		0.01	0.14		0.11	c0.17		
v/c Ratio	0.07	0.12	0.04	0.34	0.16	0.05	0.38	0.46	0.30	0.48	0.44	
Uniform Delay, d1	20.3	20.5	20.2	21.5	20.7	20.2	8.2	15.1	14.1	8.5	15.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	0.2	0.1	2.3	0.3	0.2	0.5	0.7	0.7	0.7	0.6	
Delay (s)	20.6	20.7	20.3	23.8	20.9	20.4	8.7	15.8	14.8	9.2	15.6	
Level of Service	C	C	C	C	C	C	A	B	B	A	B	
Approach Delay (s)	20.6			21.6			14.1			13.4		
Approach LOS	C			C			B			B		

Intersection Summary

HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	62.2	Sum of lost time (s)	17.5
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

<2021 Existing> AM Peak Hour

3: Boston Church Road & James Snow Parkway N

08-14-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	521	127	14	187	14	28	4	11	21	29	108
Future Volume (vph)	28	521	127	14	187	14	28	4	11	21	29	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		0.0	70.0		0.0	60.0		25.0	60.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			70.0			90.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.971			0.989				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1508	3004	0	1415	2973	0	1113	3650	944	1534	3147	1498
Fit Permitted	0.580			0.331			0.735			0.583		
Satd. Flow (perm)	921	3004	0	493	2973	0	861	3650	944	941	3147	1498
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		22			6			90			120	
Link Speed (k/h)		70			70			60			60	
Link Distance (m)		358.9			1451.5			792.9			198.3	
Travel Time (s)		18.5			74.6			47.6			11.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%
Adj. Flow (vph)	31	579	141	16	208	16	31	4	12	23	32	120
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	720	0	16	224	0	31	4	12	23	32	120
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8	7	4	4	
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0		7.0	20.0		7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	11.0	33.5		11.0	33.5		11.0	31.6	31.6	11.0	31.6	31.6

Lanes, Volumes, Timings

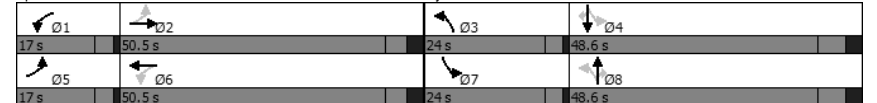
<2021 Existing> AM Peak Hour

3: Boston Church Road & James Snow Parkway N

08-14-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	17.0	50.5		17.0	50.5		24.0	48.6	48.6	24.0	48.6	48.6
Total Split (%)	12.1%	36.0%		12.1%	36.0%		17.1%	34.7%	34.7%	17.1%	34.7%	34.7%
Maximum Green (s)	13.0	44.0		13.0	44.0		20.0	41.0	41.0	20.0	41.0	41.0
Yellow Time (s)	3.0	3.7		3.0	3.7		3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	1.0	2.8		1.0	2.8		1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		7.0			7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		20.0			20.0			17.0	17.0		17.0	17.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effect Green (s)	32.8	29.0		31.7	26.8		19.0	15.9	15.9	22.7	15.7	15.7
Actuated g/C Ratio	0.50	0.45		0.49	0.41		0.29	0.24	0.24	0.35	0.24	0.24
v/c Ratio	0.06	0.53		0.05	0.18		0.11	0.00	0.04	0.05	0.04	0.27
Control Delay	9.4	15.8		9.6	14.9		21.8	25.5	0.3	15.6	24.5	8.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.4	15.8		9.6	14.9		21.8	25.5	0.3	15.6	24.5	8.2
LOS	A	B		A	B		C	C	A	B	C	A
Approach Delay		15.5			14.5			16.6			12.1	
Approach LOS		B			B			B			B	
Intersection Summary												
Area Type:	Other											
Cycle Length:	140.1											
Actuated Cycle Length:	65.1											
Natural Cycle:	90											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.53											
Intersection Signal Delay:	14.9						Intersection LOS: B					
Intersection Capacity Utilization:	51.9%						ICU Level of Service A					
Analysis Period (min):	15											

Splits and Phases: 3: Boston Church Road & James Snow Parkway N





HCM Signalized Intersection Capacity Analysis  
3: Boston Church Road & James Snow Parkway N

<2021 Existing> AM Peak Hour  
08-14-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	28	521	127	14	187	14	28	4	11	21	29	108
Future Volume (vph)	28	521	127	14	187	14	28	4	11	21	29	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.5	4.0	6.5	4.0	7.6	7.6	4.0	7.6	4.0	7.6	7.6
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Frt	1.00	0.97	1.00	0.99	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1508	3002	1415	2974	1113	3650	944	1534	3147	1498		
Fit Permitted	0.58	1.00	0.33	1.00	0.74	1.00	1.00	0.58	1.00	1.00	1.00	1.00
Satd. Flow (perm)	921	3002	492	2974	861	3650	944	3147	1498			
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	31	579	141	16	208	16	31	4	12	23	32	120
RTOR Reduction (vph)	0	13	0	0	4	0	0	0	10	0	0	91
Lane Group Flow (vph)	31	707	0	16	220	0	31	4	2	23	32	29
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	NA	Perm	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		4			4
Actuated Green, G (s)	31.5	29.0		28.5	27.5		15.9	13.2	13.2	23.7	17.1	17.1
Effective Green, g (s)	31.5	29.0		28.5	27.5		15.9	13.2	13.2	23.7	17.1	17.1
Actuated g/C Ratio	0.44	0.40		0.40	0.38		0.22	0.18	0.18	0.33	0.24	0.24
Clearance Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	423	1210		207	1137		199	670	173	364	748	356
v/s Ratio Prot	c0.00	c0.24		0.00	0.07		c0.01	0.00		c0.01	0.01	
v/s Ratio Perm	0.03			0.03			c0.03	0.00	0.02			0.02
v/c Ratio	0.07	0.58		0.08	0.19		0.16	0.01	0.01	0.06	0.04	0.08
Uniform Delay, d1	11.6	16.7		13.3	14.8		22.4	24.0	24.0	16.5	21.1	21.3
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	1.1		0.2	0.2		0.4	0.0	0.1	0.1	0.0	0.2
Delay (s)	11.7	17.9		13.5	15.0		22.8	24.0	24.1	16.6	21.1	21.5
Level of Service	B	B		B	B		C	C	C	B	C	C
Approach Delay (s)		17.6			14.9			23.2			20.8	
Approach LOS		B			B			C			C	

Intersection Summary		
HCM 2000 Control Delay	17.7	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.40	
Actuated Cycle Length (s)	71.9	Sum of lost time (s)
Intersection Capacity Utilization	51.9%	ICU Level of Service
Analysis Period (min)	15	
c Critical Lane Group		

Lanes, Volumes, Timings  
4: Esquesing Line & James Snow Parkway N

<2021 Existing> AM Peak Hour  
08-14-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	17	395	141	38	139	39	64	177	6	40	350	12
Future Volume (vph)	17	395	141	38	139	39	64	177	6	40	350	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		0.0	70.0		0.0	40.0		25.0	25.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			80.0			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.961			0.967				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1547	2918	0	1644	2870	0	1644	1731	1396	1615	1685	1396
Fit Permitted	0.625			0.333			0.406			0.632		
Satd. Flow (perm)	1018	2918	0	576	2870	0	703	1731	1396	1074	1685	1396
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		46			33				74			74
Link Speed (k/h)		70			70			60				60
Link Distance (m)		1451.5			1421.7			292.4				1994.7
Travel Time (s)		74.6			73.1			17.5				119.7
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	17%	13%	14%	17%	17%
Adj. Flow (vph)	19	449	160	43	158	44	73	201	7	45	398	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	19	609	0	43	202	0	73	201	7	45	398	14
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8		2	2	2	6		6
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6		6
Switch Phase												
Minimum Initial (s)	7.0	15.0		7.0	15.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	11.0	30.6		11.0	30.6		33.5	33.5	33.5	33.5	33.5	33.5

Lanes, Volumes, Timings

<2021 Existing> AM Peak Hour

4: Esquesing Line & James Snow Parkway N

08-14-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	19.0	41.6		19.0	41.6		51.5	51.5	51.5	51.5	51.5	51.5
Total Split (%)	16.9%	37.1%		16.9%	37.1%		45.9%	45.9%	45.9%	45.9%	45.9%	45.9%
Maximum Green (s)	15.0	35.0		15.0	35.0		45.0	45.0	45.0	45.0	45.0	45.0
Yellow Time (s)	3.0	4.2		3.0	4.2		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	2.4		1.0	2.4		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		17.0			17.0		20.0	20.0	20.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	29.7	23.3		30.9	25.6		27.3	27.3	27.3	27.3	27.3	27.3
Actuated g/C Ratio	0.42	0.33		0.44	0.36		0.39	0.39	0.39	0.39	0.39	0.39
v/c Ratio	0.04	0.61		0.12	0.19		0.27	0.30	0.01	0.11	0.61	0.02
Control Delay	11.7	22.7		12.1	14.9		21.6	19.0	0.0	18.2	24.5	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	22.7		12.1	14.9		21.6	19.0	0.0	18.2	24.5	0.1
LOS	B	C		B	B		C	B	A	B	C	A
Approach Delay		22.3			14.4			19.2			23.1	
Approach LOS		C			B			B			C	

Intersection Summary

Area Type:	Other
Cycle Length:	112.1
Actuated Cycle Length:	70.6
Natural Cycle:	80
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.61
Intersection Signal Delay:	20.8
Intersection Capacity Utilization:	76.0%
Analysis Period (min):	15
Intersection LOS:	C
ICU Level of Service:	D

Splits and Phases: 4: Esquesing Line & James Snow Parkway N

Phase 1: EBL, EBT, EBR	Phase 2: WBL, WBT, WBR	Phase 3: NBL, NBT, NBR	Phase 4: SBL, SBT, SBR
51.5 s	19 s	41.6 s	
Phase 5: EBL, EBT, EBR	Phase 6: WBL, WBT, WBR	Phase 7: NBL, NBT, NBR	Phase 8: SBL, SBT, SBR
51.5 s	19 s	41.6 s	

HCM Signalized Intersection Capacity Analysis

<2021 Existing> AM Peak Hour

4: Esquesing Line & James Snow Parkway N

08-14-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	17	395	141	38	139	39	64	177	6	40	350	12
Future Volume (vph)	17	395	141	38	139	39	64	177	6	40	350	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1547	2917		1644	2871		1644	1731	1396	1615	1685	1396
Flt Permitted	0.62	1.00		0.33	1.00		0.41	1.00	1.00	0.63	1.00	1.00
Satd. Flow (perm)	1017	2917		577	2871		703	1731	1396	1074	1685	1396
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	19	449	160	43	158	44	73	201	7	45	398	14
RTOR Reduction (vph)	0	31	0	0	21	0	0	0	4	0	0	9
Lane Group Flow (vph)	19	578	0	43	181	0	73	201	3	45	398	5
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	11%	17%	13%	14%	17%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	26.4	24.1		29.4	25.6		27.3	27.3	27.3	27.3	27.3	27.3
Effective Green, g (s)	26.4	24.1		29.4	25.6		27.3	27.3	27.3	27.3	27.3	27.3
Actuated g/C Ratio	0.37	0.33		0.41	0.35		0.38	0.38	0.38	0.38	0.38	0.38
Clearance Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	388	972		290	1016		265	653	527	405	636	527
v/s Ratio Prot	0.00	c0.20		c0.01	0.06			0.12			c0.24	
v/s Ratio Perm	0.02			0.05			0.10		0.00	0.04		0.00
v/c Ratio	0.05	0.59		0.15	0.18		0.28	0.31	0.01	0.11	0.63	0.01
Uniform Delay, d1	14.8	20.0		13.3	16.1		15.6	15.8	14.0	14.6	18.3	14.1
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	1.5		0.2	0.2		1.2	0.6	0.0	0.3	2.7	0.0
Delay (s)	14.8	21.5		13.5	16.3		16.8	16.4	14.0	14.9	21.1	14.1
Level of Service	B	C		B	B		B	B	B	B	C	B
Approach Delay (s)		21.3			15.8			16.5			20.2	
Approach LOS		C			B			B			C	

Intersection Summary

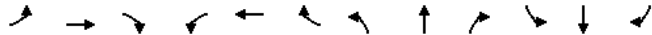
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	72.3	Sum of lost time (s)	17.1
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings

<2021 Existing> AM Peak Hour

5: James Snow Parkway N & Steeles Avenue East

08-14-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	1	497	268	118	277	68	380	147	412	167	259	10
Future Volume (vph)	1	497	268	118	277	68	380	147	412	167	259	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	122.0		72.0	170.0		130.0	105.0		260.0	160.0		0.0
Storage Lanes	1		1	2		1	2		1	1		0
Taper Length (m)	60.0			70.0			80.0			80.0		
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	0.95
Fit			0.850			0.850			0.850		0.994	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3579	1601	3471	3579	1601	3471	3579	1601	1789	3557	0
Fit Permitted	0.568			0.950			0.950			0.651		
Satd. Flow (perm)	1070	3579	1601	3471	3579	1601	3471	3579	1601	1226	3557	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			291			82			398			2
Link Speed (k/h)		60			70			60			70	
Link Distance (m)		729.0			881.4			342.7			1421.7	
Travel Time (s)		43.7			45.3			20.6			73.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	540	291	128	301	74	413	160	448	182	282	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	540	291	128	301	74	413	160	448	182	293	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.0			4.0			4.0			4.0	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	NA
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2		6		6		8	4		
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	7.0	22.0	22.0	7.0	22.0	22.0	7.0	15.0	15.0	7.0	15.0	
Minimum Split (s)	11.0	47.2	47.2	12.0	47.2	47.2	12.0	46.3	46.3	11.0	46.3	
Total Split (s)	15.0	55.2	55.2	26.0	66.2	66.2	29.0	59.0	59.0	24.0	54.0	

Lanes, Volumes, Timings

<2021 Existing> AM Peak Hour

5: James Snow Parkway N & Steeles Avenue East

08-14-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	9.1%	33.6%	33.6%	15.8%	40.3%	40.3%	17.7%	35.9%	35.9%	14.6%	32.9%	
Maximum Green (s)	11.0	48.0	48.0	21.0	59.0	59.0	24.0	51.7	51.7	20.0	46.7	
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	4.2	4.2	3.0	4.2	
All-Red Time (s)	1.0	3.5	3.5	2.0	3.5	3.5	2.0	3.1	3.1	1.0	3.1	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	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	5.0	5.0	3.0	5.0	
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		33.0	33.0		33.0	33.0		32.0	32.0		32.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effect Green (s)	33.8	23.5	23.5	9.3	36.0	36.0	17.3	22.1	22.1	32.6	16.5	
Actuated g/C Ratio	0.37	0.26	0.26	0.10	0.39	0.39	0.19	0.24	0.24	0.36	0.18	
v/c Ratio	0.00	0.59	0.46	0.36	0.21	0.11	0.63	0.18	0.65	0.35	0.45	
Control Delay	16.0	33.8	6.4	42.9	20.5	5.4	39.2	29.2	10.4	17.7	36.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	16.0	33.8	6.4	42.9	20.5	5.4	39.2	29.2	10.4	17.7	36.9	
LOS	B	C	A	D	C	A	D	C	B	B	D	
Approach Delay		24.2			24.0			25.0			29.5	
Approach LOS		C			C			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 164.2

Actuated Cycle Length: 91.4

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 25.3

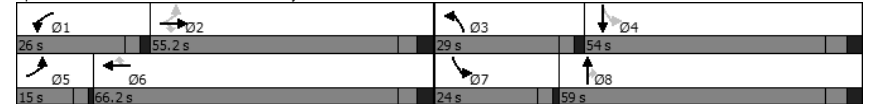
Intersection LOS: C

Intersection Capacity Utilization 68.5%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: James Snow Parkway N & Steeles Avenue East



HCM Signalized Intersection Capacity Analysis  
5: James Snow Parkway N & Steeles Avenue East

<2021 Existing> AM Peak Hour  
08-14-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	1	497	268	118	277	68	380	147	412	167	259	10
Future Volume (vph)	1	497	268	118	277	68	380	147	412	167	259	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	
Fit	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	3579	1601	3471	3579	1601	3471	3579	1601	1789	3558	
Fit Permitted	0.57	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.65	1.00	
Satd. Flow (perm)	1070	3579	1601	3471	3579	1601	3471	3579	1601	1225	3558	
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)	1	540	291	128	301	74	413	160	448	182	282	11
RTOR Reduction (vph)	0	0	208	0	0	46	0	0	305	0	2	0
Lane Group Flow (vph)	1	540	83	128	301	28	413	160	143	182	291	0
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	NA
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2			6			8		4	
Actuated Green, G (s)	28.1	26.9	26.9	9.3	36.0	36.0	17.3	22.1	22.1	29.2	16.5	
Effective Green, g (s)	28.1	26.9	26.9	9.3	36.0	36.0	17.3	22.1	22.1	29.2	16.5	
Actuated g/C Ratio	0.30	0.28	0.28	0.10	0.38	0.38	0.18	0.23	0.23	0.31	0.17	
Clearance Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	327	1018	455	341	1363	609	635	836	374	454	621	
v/s Ratio Prot	0.00	c0.15		c0.04	0.08		c0.12	0.04		0.05	c0.08	
v/s Ratio Perm	0.00		0.05			0.02			0.09		0.07	
v/c Ratio	0.00	0.53	0.18	0.38	0.22	0.05	0.65	0.19	0.38	0.40	0.47	
Uniform Delay, d1	23.3	28.5	25.5	39.9	19.8	18.4	35.8	29.0	30.5	25.1	35.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.5	0.2	0.7	0.1	0.0	2.4	0.2	1.4	0.6	1.2	
Delay (s)	23.3	29.0	25.7	40.6	19.9	18.5	38.2	29.3	31.8	25.7	36.2	
Level of Service	C	C	C	D	B	B	D	C	C	C	D	
Approach Delay (s)		27.8			24.9			34.0			32.2	
Approach LOS		C			C			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay	30.3			HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio	0.52											
Actuated Cycle Length (s)	94.5			Sum of lost time (s)				24.5				
Intersection Capacity Utilization	68.5%			ICU Level of Service				C				
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings  
6: Boston Church Road/3 Line & 5 Sideroad

<2021 Existing> AM Peak Hour  
08-14-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	8	418	26	40	124	3	8	21	17	7	92	24
Future Volume (vph)	8	418	26	40	124	3	8	21	17	7	92	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit		0.992			0.998			0.949			0.973	
Fit Protected		0.999			0.988			0.992			0.997	
Satd. Flow (prot)	0	1673	0	0	1672	0	0	1580	0	0	1668	0
Fit Permitted		0.999			0.988			0.992			0.997	
Satd. Flow (perm)	0	1673	0	0	1672	0	0	1580	0	0	1668	0
Link Speed (k/h)		60			60			70			60	
Link Distance (m)		541.0			1343.2			1050.6			496.0	
Travel Time (s)		32.5			80.6			54.0			29.8	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	13%	13%	27%	13%	13%	33%	13%	17%	12%	43%	9%	13%
Adj. Flow (vph)	9	480	30	46	143	3	9	24	20	8	106	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	519	0	0	192	0	0	53	0	0	142	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
<b>Two way Left Turn Lane</b>												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	
<b>Intersection Summary</b>												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	45.2%			ICU Level of Service A								
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis  
6: Boston Church Road/3 Line & 5 Sideroad

<2021 Existing> AM Peak Hour  
08-14-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	8	418	26	40	124	3	8	21	17	7	92	24
Future Volume (vph)	8	418	26	40	124	3	8	21	17	7	92	24
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	9	480	30	46	143	3	9	24	20	8	106	28
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	519	192	53	142								
Volume Left (vph)	9	46	9	8								
Volume Right (vph)	30	3	20	28								
Hadj (s)	0.20	0.26	0.05	0.09								
Departure Headway (s)	5.0	5.5	6.1	5.9								
Degree Utilization, x	0.72	0.29	0.09	0.23								
Capacity (veh/h)	519	613	515	540								
Control Delay (s)	19.9	10.8	9.7	10.8								
Approach Delay (s)	19.9	10.8	9.7	10.8								
Approach LOS	C	B	A	B								
<b>Intersection Summary</b>												
Delay	15.9											
Level of Service	C											
Intersection Capacity Utilization	45.2%			ICU Level of Service			A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

7: Esquesing Line/Fourth Line & 5 Sideroad

<2021 Existing> AM Peak Hour  
08-14-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	7	418	16	80	139	3	10	113	110	63	306	25
Future Volume (vph)	7	418	16	80	139	3	10	113	110	63	306	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.995			0.998			0.936			0.992		
Fit Protected	0.999			0.982			0.998			0.992		
Satd. Flow (prot)	0	1701	0	0	1679	0	0	1645	0	0	1649	0
Fit Permitted	0.999			0.982			0.998			0.992		
Satd. Flow (perm)	0	1701	0	0	1679	0	0	1645	0	0	1649	0
Link Speed (k/h)	60			60			60			70		
Link Distance (m)	1343.2			646.3			1994.7			464.9		
Travel Time (s)	80.6			38.8			119.7			23.9		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Adj. Flow (vph)	8	475	18	91	158	3	11	128	125	72	348	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	501	0	0	252	0	0	264	0	0	448	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0			3.7			3.7		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	1.6			1.6			1.6			1.6		
<b>Two way Left Turn Lane</b>												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14			24			14		
Sign Control	Stop			Stop			Stop			Stop		
<b>Intersection Summary</b>												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	82.9%			ICU Level of Service			E					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

<2021 Existing> AM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

08-14-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔				↔			↔			↔	
Sign Control	Stop				Stop			Stop			Stop	
Traffic Volume (vph)	7	418	16	80	139	3	10	113	110	63	306	25
Future Volume (vph)	7	418	16	80	139	3	10	113	110	63	306	25
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	8	475	18	91	158	3	11	128	125	72	348	28

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	501	252	264	448
Volume Left (vph)	8	91	11	72
Volume Right (vph)	18	3	125	28
Hadj (s)	0.19	0.27	-0.12	0.24
Departure Headway (s)	8.1	8.9	8.5	8.0
Degree Utilization, x	1.13	0.62	0.62	1.00
Capacity (veh/h)	459	392	410	442
Control Delay (s)	112.3	25.4	24.3	71.3
Approach Delay (s)	112.3	25.4	24.3	71.3
Approach LOS	F	D	C	F

Intersection Summary	
Delay	68.9
Level of Service	F
Intersection Capacity Utilization	82.9%
ICU Level of Service	E
Analysis Period (min)	15

Lanes, Volumes, Timings

<2021 Existing> PM Peak Hour

1: Regional Road 25 & 5 Sideroad

08-14-2021

	↖	→	↘	↙	←	↖	↗	↘	↙	↕	↖	↗	↘	↙	↕
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations	↖	↗	↘	↙	↖	↗	↘	↙	↖	↗	↘	↙	↖	↗	↘
Traffic Volume (vph)	91	103	113	75	241	34	191	632	86	7	286	66			
Future Volume (vph)	91	103	113	75	241	34	191	632	86	7	286	66			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Storage Length (m)	80.0		0.0	70.0		0.0	75.0		70.0	35.0		0.0			
Storage Lanes	1		0	1		0	1		1	1		0			
Taper Length (m)	100.0			100.0			75.0			100.0					
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95			
Frt		0.922				0.982			0.850		0.972				
Fit Protected	0.950			0.950			0.950			0.950					
Satd. Flow (prot)	1601	1510	0	1342	1604	0	1225	2920	1338	1601	3026	0			
Fit Permitted	0.306			0.615			0.450			0.396					
Satd. Flow (perm)	516	1510	0	869	1604	0	580	2920	1338	667	3026	0			
Right Turn on Red			No			Yes			Yes			Yes			
Satd. Flow (RTOR)					6				91			25			
Link Speed (k/h)		60			60				70			70			
Link Distance (m)		573.6			536.0				986.0			203.5			
Travel Time (s)		34.4			32.2				50.7			10.5			
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94			
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%			
Adj. Flow (vph)	97	110	120	80	256	36	203	672	91	7	304	70			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	97	230	0	80	292	0	203	672	91	7	374	0			
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No			
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right			
Median Width(m)		3.7			3.7				3.7			3.7			
Link Offset(m)		0.0			0.0				0.0			0.0			
Crosswalk Width(m)		1.6			1.6				1.6			1.6			
Two way Left Turn Lane															
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99			
Turning Speed (k/h)	24		14	24		14	24		14	24		14			
Number of Detectors	1	1		1	1		1	1	1	1	1	1			
Detector Template															
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0			
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0			
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0			
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0			
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel															
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0			
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0			
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0			
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	NA			
Protected Phases	3	8		4	4		5	2	2	6	6	6			
Permitted Phases	8			4			2		2	6					
Detector Phase	3	8		4	4		5	2	2	6	6	6			
Switch Phase															
Minimum Initial (s)	7.0	10.0		10.0	10.0		7.0	20.0	20.0	20.0	20.0	20.0			
Minimum Split (s)	11.0	38.0		38.0	38.0		11.0	38.2	38.2	38.2	38.2	38.2			

Lanes, Volumes, Timings

<2021 Existing> PM Peak Hour

1: Regional Road 25 & 5 Sideroad

08-14-2021

	↖	→	↘	↙	←	↖	↗	↘	↙	↕	↖	↗	↘	↙	↕
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Total Split (s)	20.0	54.0		34.0	34.0		18.0	56.2	56.2	38.2	38.2				
Total Split (%)	18.1%	49.0%		30.9%	30.9%		16.3%	51.0%	51.0%	34.7%	34.7%				
Maximum Green (s)	16.0	48.0		28.0	28.0		14.0	50.0	50.0	32.0	32.0				
Yellow Time (s)	3.0	3.7		3.7	3.7		3.0	4.2	4.2	4.2	4.2				
All-Red Time (s)	1.0	2.3		2.3	2.3		1.0	2.0	2.0	2.0	2.0				
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0				
Total Lost Time (s)	4.0	6.0		6.0	6.0		4.0	6.2	6.2	6.2	6.2				
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag				
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes				
Vehicle Extension (s)	3.0	3.7		3.7	3.7		3.0	3.6	3.6	4.2	4.2				
Recall Mode	None	None		None	None		None	Ped	Ped	Ped	Ped				
Walk Time (s)		7.0			7.0			7.0	7.0	7.0	7.0				
Flash Dont Walk (s)		25.0			25.0			25.0	25.0	25.0	25.0				
Pedestrian Calls (#/hr)		0			0			0	0	0	0				
Act Effect Green (s)	34.6	32.5		21.9	21.9		52.1	49.8	49.8	32.7	32.7				
Actuated g/C Ratio	0.36	0.34		0.23	0.23		0.55	0.53	0.53	0.34	0.34				
v/c Ratio	0.33	0.44		0.40	0.78		0.50	0.44	0.12	0.03	0.35				
Control Delay	22.2	26.0		38.9	49.5		19.1	17.0	3.9	26.4	25.2				
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0				
Total Delay	22.2	26.0		38.9	49.5		19.1	17.0	3.9	26.4	25.2				
LOS	C	C		D	D		B	B	A	C	C				
Approach Delay		24.9			47.2			16.2			25.2				
Approach LOS		C			D			B			C				
Intersection Summary															
Area Type:	Other														
Cycle Length:	110.2														
Actuated Cycle Length:	94.8														
Natural Cycle:	100														
Control Type:	Actuated-Uncoordinated														
Maximum v/c Ratio:	0.78														
Intersection Signal Delay:	24.9														
Intersection Capacity Utilization:	75.1%														
ICU Level of Service:	D														
Analysis Period (min):	15														
Splits and Phases:	1: Regional Road 25 & 5 Sideroad														
	↖	↗	↘	↙	↖	↗	↘	↙	↖	↗	↘	↙	↖	↗	↘
	56.2 s	20 s	34 s	38.2 s	18 s	38.2 s	54 s								

HCM Signalized Intersection Capacity Analysis

<2021 Existing> PM Peak Hour

1: Regional Road 25 & 5 Sideroad

08-14-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	91	103	113	75	241	34	191	632	86	7	286	66
Future Volume (vph)	91	103	113	75	241	34	191	632	86	7	286	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	6.0	6.0	4.0	6.2	6.2	6.2	6.2	6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95
Frt	1.00	0.92	1.00	0.98	1.00	1.00	0.85	1.00	0.97	1.00	0.97	1.00
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1601	1510	1342	1603	1225	2920	1338	1601	3026	1601	3026	1601
Fit Permitted	0.31	1.00	0.62	1.00	0.45	1.00	1.00	0.40	1.00	0.40	1.00	1.00
Satd. Flow (perm)	516	1510	869	1603	581	2920	1338	668	3026	516	1510	869
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	97	110	120	80	256	36	203	672	91	7	304	70
RTOR Reduction (vph)	0	0	0	0	5	0	0	4	0	16	0	0
Lane Group Flow (vph)	97	230	0	80	287	0	203	672	47	7	358	0
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	Perm	Perm	NA	NA	NA	6
Protected Phases	3	8		4		5	2					
Permitted Phases	8		4		2		2	6				
Actuated Green, G (s)	33.5	33.5	21.9	21.9	49.8	49.8	49.8	32.8	32.8			
Effective Green, g (s)	33.5	33.5	21.9	21.9	49.8	49.8	49.8	32.8	32.8			
Actuated g/C Ratio	0.35	0.35	0.23	0.23	0.52	0.52	0.52	0.34	0.34			
Clearance Time (s)	4.0	6.0	6.0	6.0	4.0	6.2	6.2	6.2	6.2			
Vehicle Extension (s)	3.0	3.7	3.7	3.7	3.0	3.6	3.6	4.2	4.2			
Lane Grp Cap (vph)	267	529	199	367	390	1522	697	229	1039			
v/s Ratio Prot	0.03	c0.15		c0.18		c0.07	0.23		0.12			
v/s Ratio Perm	0.10		0.09		c0.20		0.04	0.01				
v/c Ratio	0.36	0.43	0.40	0.78	0.52	0.44	0.07	0.03	0.34			
Uniform Delay, d1	22.3	23.7	31.2	34.6	13.3	14.2	11.3	20.8	23.3			
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	0.8	0.7	1.7	10.8	1.3	0.3	0.1	0.1	0.3			
Delay (s)	23.1	24.5	32.9	45.4	14.6	14.5	11.4	20.9	23.6			
Level of Service	C	C	C	D	B	B	B	C	C			
Approach Delay (s)		24.1		42.7		14.2		23.6				
Approach LOS		C		D		B		C				
<b>Intersection Summary</b>												
HCM 2000 Control Delay	22.7		HCM 2000 Level of Service				C					
HCM 2000 Volume to Capacity ratio	0.62											
Actuated Cycle Length (s)	95.5		Sum of lost time (s)				20.2					
Intersection Capacity Utilization	75.1%		ICU Level of Service				D					
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings

<2021 Existing> PM Peak Hour

2: Regional Road 25 & James Snow Parkway N

08-14-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	30	153	162	175	94	218	78	741	143	132	416	5
Future Volume (vph)	30	153	162	175	94	218	78	741	143	132	416	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		115.0	85.0		35.0	30.0		0.0	75.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	40.0			90.0			70.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor									0.99	1.00		
Frt			0.850			0.850			0.850		0.998	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1217	2684	1103	1259	3147	1192	1534	2897	1458	1472	2908	0
Fit Permitted	0.691			0.652			0.500			0.254		
Satd. Flow (perm)	885	2684	1103	864	3147	1192	807	2897	1439	393	2908	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			167			225			147			1
Link Speed (k/h)		60			60		70					70
Link Distance (m)		452.4			1065.5		592.1					986.0
Travel Time (s)		27.1			63.9		30.5					50.7
Confl. Peds. (#/hr)								1		1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Adj. Flow (vph)	31	158	167	180	97	225	80	764	147	136	429	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	158	167	180	97	225	80	764	147	136	434	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7				3.7
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		1.6			1.6			1.6				1.6
<b>Two way Left Turn Lane</b>												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
<b>Detector Template</b>												
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.2	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
<b>Detector 1 Channel</b>												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	NA
Protected Phases		4			8		5	2		1		6
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	
<b>Switch Phase</b>												



Lanes, Volumes, Timings

<2021 Existing> PM Peak Hour

2: Regional Road 25 & James Snow Parkway N

08-14-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	43.6	43.6	43.6	43.6	43.6	43.6	11.0	42.9	42.9	11.0	35.9	
Total Split (s)	55.6	55.6	55.6	55.6	55.6	55.6	15.0	76.9	76.9	15.0	76.9	
Total Split (%)	37.7%	37.7%	37.7%	37.7%	37.7%	37.7%	10.2%	52.1%	52.1%	10.2%	52.1%	
Maximum Green (s)	49.0	49.0	49.0	49.0	49.0	49.0	11.0	70.0	70.0	11.0	70.0	
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	4.2	4.2	3.0	4.2	
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	1.0	2.7	2.7	1.0	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	30.0	30.0	30.0	30.0	30.0	30.0		29.0	29.0		22.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0	0		0	
Act Effect Green (s)	27.7	27.7	27.7	27.7	27.7	27.7	47.7	35.7	35.7	50.7	40.0	
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30	0.30	0.52	0.39	0.39	0.55	0.44	
v/c Ratio	0.12	0.20	0.37	0.69	0.10	0.44	0.16	0.68	0.23	0.41	0.34	
Control Delay	26.4	25.5	6.8	44.9	24.8	6.5	11.8	27.8	4.7	14.9	20.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.4	25.5	6.8	44.9	24.8	6.5	11.8	27.8	4.7	14.9	20.7	
LOS	C	C	A	D	C	A	B	C	A	B	C	
Approach Delay		16.8			23.8			23.1			19.3	
Approach LOS		B			C			C			B	

Intersection Summary

Area Type:	Other
Cycle Length:	147.5
Actuated Cycle Length:	91.9
Natural Cycle:	100
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.69
Intersection Signal Delay:	21.4
Intersection LOS:	C
Intersection Capacity Utilization:	66.2%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 2: Regional Road 25 & James Snow Parkway N

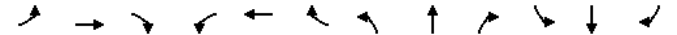
Ø1	Ø2	Ø4
15 s	76.9 s	55.6 s
Ø5	Ø6	Ø8
15 s	76.9 s	55.6 s

HCM Signalized Intersection Capacity Analysis

<2021 Existing> PM Peak Hour

2: Regional Road 25 & James Snow Parkway N

08-14-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	30	153	162	175	94	218	78	741	143	132	416	5
Future Volume (vph)	30	153	162	175	94	218	78	741	143	132	416	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1217	2684	1103	1259	3147	1192	1534	2897	1439	1472	2908	
Fit Permitted	0.69	1.00	1.00	0.65	1.00	1.00	0.50	1.00	1.00	0.25	1.00	
Satd. Flow (perm)	885	2684	1103	864	3147	1192	807	2897	1439	394	2908	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	31	158	167	180	97	225	80	764	147	136	429	5
RTOR Reduction (vph)	0	0	117	0	0	157	0	0	88	0	1	0
Lane Group Flow (vph)	31	158	50	180	97	68	80	764	59	136	433	0
Conf. Peds. (#/hr)							1		1			
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	27.7	27.7	27.7	27.7	27.7	27.7	43.8	37.0	37.0	49.8	40.0	
Effective Green, g (s)	27.7	27.7	27.7	27.7	27.7	27.7	43.8	37.0	37.0	49.8	40.0	
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30	0.30	0.48	0.40	0.40	0.54	0.43	
Clearance Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	266	808	332	260	947	358	437	1165	578	328	1264	
v/s Ratio Prot		0.06			0.03		0.01	c0.26		c0.04	0.15	
v/s Ratio Perm	0.04		0.05	c0.21		0.06	0.07		0.04	0.18		
v/c Ratio	0.12	0.20	0.15	0.69	0.10	0.19	0.18	0.66	0.10	0.41	0.34	
Uniform Delay, d1	23.3	23.9	23.5	28.4	23.2	23.8	13.3	22.3	17.1	11.7	17.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	0.2	0.4	9.7	0.1	0.5	0.2	1.8	0.2	0.9	0.3	
Delay (s)	23.7	24.1	24.0	38.1	23.3	24.4	13.5	24.1	17.3	12.5	17.6	
Level of Service	C	C	C	D	C	C	B	C	B	B	B	
Approach Delay (s)		24.0			29.1			22.3			16.4	
Approach LOS		C			C			C			B	

Intersection Summary

HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	92.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

<2021 Existing> PM Peak Hour

3: Boston Church Road & James Snow Parkway N

08-14-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↘	↔	↕	↘	↔	↕	↘	↔	↕	↘
Traffic Volume (vph)	101	285	73	29	323	22	145	43	28	10	27	35
Future Volume (vph)	101	285	73	29	323	22	145	43	28	10	27	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		0.0	70.0		0.0	60.0		25.0	60.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			70.0			90.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.969			0.991				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1508	2997	0	1415	2977	0	1113	3650	944	1534	3147	1498
Fit Permitted	0.437			0.517			0.487			0.724		
Satd. Flow (perm)	694	2997	0	770	2977	0	570	3650	944	1169	3147	1498
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			5				90			90
Link Speed (k/h)		70			70				60			60
Link Distance (m)		358.9			1451.5				792.9			198.3
Travel Time (s)		18.5			74.6				47.6			11.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%
Adj. Flow (vph)	112	317	81	32	359	24	161	48	31	11	30	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	112	398	0	32	383	0	161	48	31	11	30	39
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7				3.7			3.7
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		1.6			1.6				1.6			1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8	7	4		4
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0		7.0	20.0		7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	11.0	33.5		11.0	33.5		11.0	31.6	31.6	11.0	31.6	31.6

Lanes, Volumes, Timings

<2021 Existing> PM Peak Hour

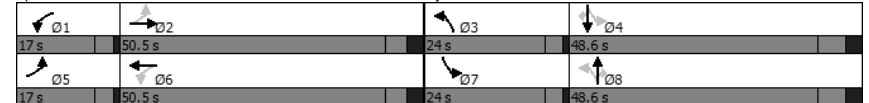
3: Boston Church Road & James Snow Parkway N

08-14-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	17.0	50.5		17.0	50.5		24.0	48.6	48.6	24.0	48.6	48.6
Total Split (%)	12.1%	36.0%		12.1%	36.0%		17.1%	34.7%	34.7%	17.1%	34.7%	34.7%
Maximum Green (s)	13.0	44.0		13.0	44.0		20.0	41.0	41.0	20.0	41.0	41.0
Yellow Time (s)	3.0	3.7		3.0	3.7		3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	1.0	2.8		1.0	2.8		1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		7.0			7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		20.0			20.0			17.0	17.0		17.0	17.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effect Green (s)	35.4	28.9		29.8	21.6		29.9	24.3	24.3	17.0	15.8	15.8
Actuated g/C Ratio	0.48	0.39		0.40	0.29		0.41	0.33	0.33	0.23	0.21	0.21
v/c Ratio	0.25	0.34		0.08	0.44		0.44	0.04	0.08	0.04	0.04	0.10
Control Delay	14.6	19.0		13.9	26.4		20.1	18.9	0.4	14.9	30.2	0.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.6	19.0		13.9	26.4		20.1	18.9	0.4	14.9	30.2	0.5
LOS	B	B		B	C		C	B	A	B	C	A
Approach Delay		18.0			25.4			17.3			13.6	
Approach LOS		B			C			B			B	
Intersection Summary												
Area Type:	Other											
Cycle Length:	140.1											
Actuated Cycle Length:	73.7											
Natural Cycle:	90											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.44											
Intersection Signal Delay:	20.1						Intersection LOS: C					
Intersection Capacity Utilization:	52.3%						ICU Level of Service A					
Analysis Period (min):	15											

Splits and Phases: 3: Boston Church Road & James Snow Parkway N



HCM Signalized Intersection Capacity Analysis  
3: Boston Church Road & James Snow Parkway N

<2021 Existing> PM Peak Hour  
08-14-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	101	285	73	29	323	22	145	43	28	10	27	35
Future Volume (vph)	101	285	73	29	323	22	145	43	28	10	27	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1508	2999		1415	2976		1113	3650	944	1534	3147	1498
Fit Permitted	0.44	1.00		0.52	1.00		0.49	1.00	1.00	0.72	1.00	1.00
Satd. Flow (perm)	693	2999		771	2976		570	3650	944	1169	3147	1498
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	112	317	81	32	359	24	161	48	31	11	30	39
RTOR Reduction (vph)	0	15	0	0	4	0	0	0	21	0	0	35
Lane Group Flow (vph)	112	383	0	32	379	0	161	48	10	11	30	4
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		4
Actuated Green, G (s)	35.4	28.9		25.8	23.3		30.0	24.9	24.9	8.9	7.8	7.8
Effective Green, g (s)	35.4	28.9		25.8	23.3		30.0	24.9	24.9	8.9	7.8	7.8
Actuated g/C Ratio	0.45	0.36		0.32	0.29		0.38	0.31	0.31	0.11	0.10	0.10
Clearance Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	391	1090		270	872		339	1143	295	135	308	146
v/s Ratio Prot	c0.03	0.13		0.00	c0.13		c0.11	0.01		0.00	0.01	
v/s Ratio Perm	0.10			0.03			c0.07		0.01	0.01		0.00
v/c Ratio	0.29	0.35		0.12	0.44		0.47	0.04	0.03	0.08	0.10	0.03
Uniform Delay, d1	13.4	18.5		18.6	22.8		18.1	19.0	18.9	31.6	32.6	32.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.4		0.2	0.7		1.1	0.0	0.1	0.3	0.3	0.2
Delay (s)	13.8	18.9		18.8	23.5		19.2	19.0	19.0	31.8	32.9	32.6
Level of Service	B	B		B	C		B	B	B	C	C	C
Approach Delay (s)		17.7			23.1			19.1			32.6	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	20.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	79.5	Sum of lost time (s)	22.1
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings  
4: Esquesing Line & James Snow Parkway N

<2021 Existing> PM Peak Hour  
08-14-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	10	238	75	9	261	47	105	313	30	27	151	8
Future Volume (vph)	10	238	75	9	261	47	105	313	30	27	151	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		0.0	70.0		0.0	40.0		25.0	25.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			80.0			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.964			0.977				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1547	2925	0	1644	2864	0	1644	1731	1396	1615	1685	1396
Fit Permitted	0.542			0.539			0.649			0.499		
Satd. Flow (perm)	882	2925	0	933	2864	0	1123	1731	1396	848	1685	1396
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		39			19					74		74
Link Speed (k/h)		70			70				60			60
Link Distance (m)		1451.5			1421.7				292.4			1994.7
Travel Time (s)		74.6			73.1				17.5			119.7
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	11%	17%	13%	14%	17%
Adj. Flow (vph)	11	270	85	10	297	53	119	356	34	31	172	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	355	0	10	350	0	119	356	34	31	172	9
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7				3.7			3.7
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		1.6			1.6				1.6			1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8		2	2	2	6		6
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6		6
Switch Phase												
Minimum Initial (s)	7.0	15.0		7.0	15.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	11.0	30.6		11.0	30.6		33.5	33.5	33.5	33.5	33.5	33.5

Lanes, Volumes, Timings

<2021 Existing> PM Peak Hour

4: Esquesing Line & James Snow Parkway N

08-14-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	19.0	41.6		19.0	41.6		51.5	51.5	51.5	51.5	51.5	51.5
Total Split (%)	16.9%	37.1%		16.9%	37.1%		45.9%	45.9%	45.9%	45.9%	45.9%	45.9%
Maximum Green (s)	15.0	35.0		15.0	35.0		45.0	45.0	45.0	45.0	45.0	45.0
Yellow Time (s)	3.0	4.2		3.0	4.2		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	2.4		1.0	2.4		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		17.0			17.0		20.0	20.0	20.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	20.1	16.4		20.1	16.4		22.3	22.3	22.3	22.3	22.3	22.3
Actuated g/C Ratio	0.37	0.30		0.37	0.30		0.41	0.41	0.41	0.41	0.41	0.41
v/c Ratio	0.03	0.39		0.02	0.40		0.26	0.50	0.05	0.09	0.25	0.01
Control Delay	10.9	15.7		10.9	16.7		13.4	15.4	1.0	12.0	12.5	0.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.9	15.7		10.9	16.7		13.4	15.4	1.0	12.0	12.5	0.0
LOS	B	B		B	B		B	B	A	B	B	A
Approach Delay		15.5			16.6			14.0			11.9	
Approach LOS		B			B			B			B	

Intersection Summary

Area Type:	Other
Cycle Length:	112.1
Actuated Cycle Length:	53.8
Natural Cycle:	80
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.50
Intersection Signal Delay:	14.7
Intersection Capacity Utilization:	62.2%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	B

Splits and Phases: 4: Esquesing Line & James Snow Parkway N

Phase 1: 02	Phase 2: 03	Phase 3: 04
51.5 s	19 s	41.6 s
Phase 4: 06	Phase 5: 07	Phase 6: 08
51.5 s	19 s	41.6 s

HCM Signalized Intersection Capacity Analysis

<2021 Existing> PM Peak Hour

4: Esquesing Line & James Snow Parkway N

08-14-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	10	238	75	9	261	47	105	313	30	27	151	8
Future Volume (vph)	10	238	75	9	261	47	105	313	30	27	151	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1547	2926		1644	2865		1644	1731	1396	1615	1685	1396
Flt Permitted	0.54	1.00		0.54	1.00		0.65	1.00	1.00	0.50	1.00	1.00
Satd. Flow (perm)	882	2926		933	2865		1122	1731	1396	848	1685	1396
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	270	85	10	297	53	119	356	34	31	172	9
RTOR Reduction (vph)	0	28	0	0	14	0	0	0	21	0	0	5
Lane Group Flow (vph)	11	327	0	10	336	0	119	356	13	31	172	4
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	11%	17%	13%	14%	17%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	17.4	16.4		17.4	16.4		22.3	22.3	22.3	22.3	22.3	22.3
Effective Green, g (s)	17.4	16.4		17.4	16.4		22.3	22.3	22.3	22.3	22.3	22.3
Actuated g/C Ratio	0.31	0.29		0.31	0.29		0.39	0.39	0.39	0.39	0.39	0.39
Clearance Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	281	844		298	827		440	679	548	332	661	548
v/s Ratio Prot	c0.00	0.11		0.00	c0.12			c0.21			0.10	
v/s Ratio Perm	0.01			0.01			0.11		0.01	0.04		0.00
v/c Ratio	0.04	0.39		0.03	0.41		0.27	0.52	0.02	0.09	0.26	0.01
Uniform Delay, d1	13.8	16.2		13.7	16.3		11.7	13.2	10.6	10.9	11.7	10.5
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	0.6		0.0	0.7		0.7	1.4	0.0	0.3	0.4	0.0
Delay (s)	13.8	16.8		13.8	17.0		12.4	14.6	10.6	11.1	12.1	10.5
Level of Service	B	B		B	B		B	B	B	B	B	B
Approach Delay (s)		16.7			16.9			13.8			11.9	
Approach LOS		B			B			B			B	

Intersection Summary

HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	56.8	Sum of lost time (s)	17.1
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings

<2021 Existing> PM Peak Hour

5: James Snow Parkway N & Steeles Avenue East

08-14-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔↔	↔↔	↔	↔↔	↔↔	↔	↔	↔↔	↔
Traffic Volume (vph)	11	369	423	363	651	128	387	178	167	94	193	13
Future Volume (vph)	11	369	423	363	651	128	387	178	167	94	193	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	122.0		72.0	170.0		130.0	105.0		260.0	160.0		0.0
Storage Lanes	1		1	2		1	2		1	1		0
Taper Length (m)	60.0			70.0			80.0			80.0		
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	0.95
Fit			0.850			0.850			0.850		0.991	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3579	1601	3471	3579	1601	3471	3579	1601	1789	3546	0
Fit Permitted	0.382			0.950			0.950			0.630		
Satd. Flow (perm)	719	3579	1601	3471	3579	1601	3471	3579	1601	1187	3546	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			460			139			182			4
Link Speed (k/h)		60			70			60			70	
Link Distance (m)		729.0			881.4			342.7			1421.7	
Travel Time (s)		43.7			45.3			20.6			73.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	401	460	395	708	139	421	193	182	102	210	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	401	460	395	708	139	421	193	182	102	224	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.0			4.0			4.0			4.0	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2		6		6		8	4		
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	7.0	22.0	22.0	7.0	22.0	22.0	7.0	15.0	15.0	7.0	15.0	
Minimum Split (s)	11.0	47.2	47.2	12.0	47.2	47.2	12.0	46.3	46.3	11.0	46.3	
Total Split (s)	15.0	55.2	55.2	26.0	66.2	66.2	29.0	59.0	59.0	24.0	54.0	

Lanes, Volumes, Timings

<2021 Existing> PM Peak Hour

5: James Snow Parkway N & Steeles Avenue East

08-14-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	9.1%	33.6%	33.6%	15.8%	40.3%	40.3%	17.7%	35.9%	35.9%	14.6%	32.9%	
Maximum Green (s)	11.0	48.0	48.0	21.0	59.0	59.0	24.0	51.7	51.7	20.0	46.7	
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	4.2	4.2	3.0	4.2	
All-Red Time (s)	1.0	3.5	3.5	2.0	3.5	3.5	2.0	3.1	3.1	1.0	3.1	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	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	5.0	5.0	3.0	5.0	
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		33.0	33.0		33.0	33.0		32.0	32.0		32.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effect Green (s)	32.5	22.3	22.3	17.8	43.1	43.1	18.0	24.9	24.9	28.3	15.4	
Actuated g/C Ratio	0.33	0.23	0.23	0.18	0.44	0.44	0.18	0.25	0.25	0.29	0.16	
v/c Ratio	0.04	0.49	0.64	0.63	0.45	0.18	0.66	0.21	0.34	0.26	0.40	
Control Delay	15.8	36.5	8.0	42.4	21.6	4.4	43.1	30.3	6.6	20.4	40.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	15.8	36.5	8.0	42.4	21.6	4.4	43.1	30.3	6.6	20.4	40.0	
LOS	B	D	A	D	C	A	D	C	A	C	D	
Approach Delay		21.2			26.3			31.6			33.9	
Approach LOS		C			C			C			C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	164.2											
Actuated Cycle Length:	98.1											
Natural Cycle:	130											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.66											
Intersection Signal Delay:	27.0						Intersection LOS: C					
Intersection Capacity Utilization:	72.6%						ICU Level of Service C					
Analysis Period (min):	15											
Splits and Phases:	5: James Snow Parkway N & Steeles Avenue East											

HCM Signalized Intersection Capacity Analysis  
5: James Snow Parkway N & Steeles Avenue East

<2021 Existing> PM Peak Hour  
08-14-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	11	369	423	363	651	128	387	178	167	94	193	13
Future Volume (vph)	11	369	423	363	651	128	387	178	167	94	193	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	
Fit	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	3579	1601	3471	3579	1601	3471	3579	1601	1789	3545	
Fit Permitted	0.38	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.63	1.00	
Satd. Flow (perm)	720	3579	1601	3471	3579	1601	3471	3579	1601	1187	3545	
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)	12	401	460	395	708	139	421	193	182	102	210	14
RTOR Reduction (vph)	0	0	344	0	0	80	0	0	137	0	3	0
Lane Group Flow (vph)	12	401	116	395	708	59	421	193	45	102	221	0
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	NA
Protected Phases	5	2		1	6		3	8		7		4
Permitted Phases	2		2			6			8		4	
Actuated Green, G (s)	26.9	25.6	25.6	17.8	43.1	43.1	18.0	24.9	24.9	24.9	15.4	
Effective Green, g (s)	26.9	25.6	25.6	17.8	43.1	43.1	18.0	24.9	24.9	24.9	15.4	
Actuated g/C Ratio	0.27	0.25	0.25	0.18	0.43	0.43	0.18	0.25	0.25	0.25	0.15	
Clearance Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	204	904	404	609	1522	681	616	879	393	348	538	
v/s Ratio Prot	0.00	0.11		c0.11	c0.20		c0.12	0.05		0.03	c0.06	
v/s Ratio Perm	0.01		0.07			0.04			0.03	0.04		
v/c Ratio	0.06	0.44	0.29	0.65	0.47	0.09	0.68	0.22	0.11	0.29	0.41	
Uniform Delay, d1	27.5	31.9	30.5	38.8	20.8	17.4	39.0	30.5	29.6	30.6	38.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.3	0.4	2.4	0.2	0.1	3.1	0.3	0.3	0.5	1.1	
Delay (s)	27.6	32.2	30.9	41.2	21.1	17.4	42.1	30.7	29.9	31.0	39.9	
Level of Service	C	C	C	D	C	B	D	C	C	C	D	
Approach Delay (s)		31.5			27.1			36.6			37.1	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	31.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	101.3	Sum of lost time (s)	24.5
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		

Lanes, Volumes, Timings  
6: Boston Church Road/3 Line & 5 Sideroad

<2021 Existing> PM Peak Hour  
08-14-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	23	170	11	29	291	2	23	69	74	5	32	6
Future Volume (vph)	23	170	11	29	291	2	23	69	74	5	32	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit		0.992			0.999			0.940			0.981	
Fit Protected		0.994			0.996			0.993			0.994	
Satd. Flow (prot)	0	1665	0	0	1690	0	0	1570	0	0	1648	0
Fit Permitted		0.994			0.996			0.993			0.994	
Satd. Flow (perm)	0	1665	0	0	1690	0	0	1570	0	0	1648	0
Link Speed (k/h)		60			60			70			60	
Link Distance (m)		541.0			1343.2			1050.6			496.0	
Travel Time (s)		32.5			80.6			54.0			29.8	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	13%	13%	27%	13%	13%	33%	13%	17%	12%	43%	9%	13%
Adj. Flow (vph)	26	195	13	33	334	2	26	79	85	6	37	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	234	0	0	369	0	0	190	0	0	50	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	41.3%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
6: Boston Church Road/3 Line & 5 Sideroad

<2021 Existing> PM Peak Hour  
08-14-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	23	170	11	29	291	2	23	69	74	5	32	6
Future Volume (vph)	23	170	11	29	291	2	23	69	74	5	32	6
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	26	195	13	33	334	2	26	79	85	6	37	7
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	234	369	190	50								
Volume Left (vph)	26	33	26	6								
Volume Right (vph)	13	2	85	7								
Hadj (s)	0.22	0.24	0.00	0.17								
Departure Headway (s)	5.4	5.2	5.6	6.1								
Degree Utilization, x	0.35	0.53	0.30	0.08								
Capacity (veh/h)	627	665	580	510								
Control Delay (s)	11.3	14.0	10.9	9.6								
Approach Delay (s)	11.3	14.0	10.9	9.6								
Approach LOS	B	B	B	A								
<b>Intersection Summary</b>												
Delay	12.3											
Level of Service	B											
Intersection Capacity Utilization	41.3%			ICU Level of Service			A					
Analysis Period (min)	15											

Lanes, Volumes, Timings  
7: Esquesing Line/Fourth Line & 5 Sideroad

<2021 Existing> PM Peak Hour  
08-14-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Volume (vph)	30	210	11	65	265	18	23	269	78	4	110	39
Future Volume (vph)	30	210	11	65	265	18	23	269	78	4	110	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.994			0.993			0.971			0.966		
Fit Protected	0.994			0.991			0.997			0.999		
Satd. Flow (prot)	0	1645	0	0	1666	0	0	1681	0	0	1623	0
Fit Permitted	0.994			0.991			0.997			0.999		
Satd. Flow (perm)	0	1645	0	0	1666	0	0	1681	0	0	1623	0
Link Speed (k/h)	60			60			60			70		
Link Distance (m)	1343.2			646.3			1994.7			464.9		
Travel Time (s)	80.6			38.8			119.7			23.9		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Adj. Flow (vph)	34	239	13	74	301	20	26	306	89	5	125	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	286	0	0	395	0	0	421	0	0	174	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0			3.7			3.7		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	1.6			1.6			1.6			1.6		
<b>Two way Left Turn Lane</b>												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control	Stop			Stop			Stop			Stop		
<b>Intersection Summary</b>												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	65.9%			ICU Level of Service			C					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

<2021 Existing> PM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

08-14-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔				↔			↔			↔	
Sign Control	Stop				Stop			Stop			Stop	
Traffic Volume (vph)	30	210	11	65	265	18	23	269	78	4	110	39
Future Volume (vph)	30	210	11	65	265	18	23	269	78	4	110	39
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	34	239	13	74	301	20	26	306	89	5	125	44

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	286	395	421	174
Volume Left (vph)	34	74	26	5
Volume Right (vph)	13	20	89	44
Hadj (s)	0.26	0.24	0.07	0.10
Departure Headway (s)	7.6	7.3	7.1	7.9
Degree Utilization, x	0.60	0.80	0.83	0.38
Capacity (veh/h)	429	473	487	388
Control Delay (s)	21.6	33.1	35.6	15.8
Approach Delay (s)	21.6	33.1	35.6	15.8
Approach LOS	C	D	E	C

Intersection Summary	
Delay	29.0
Level of Service	D
Intersection Capacity Utilization	65.9% ICU Level of Service C
Analysis Period (min)	15



Lanes, Volumes, Timings

1: Regional Road 25 & 5 Sideroad

08-15-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	310	237	61	88	9	86	298	101	88	487	69
Future Volume (vph)	79	310	237	61	88	9	86	298	101	88	487	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	70.0		0.0	75.0		70.0	35.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	100.0			100.0			75.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.935				0.986			0.850		0.981	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1601	1548	0	1342	1612	0	1225	2920	1338	1601	3047	0
Fit Permitted	0.611			0.294			0.296			0.560		
Satd. Flow (perm)	1030	1548	0	415	1612	0	382	2920	1338	944	3047	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					5				107			14
Link Speed (k/h)		60			60				70			70
Link Distance (m)		573.6			536.0				986.0			203.5
Travel Time (s)		34.4			32.2				50.7			10.5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Adj. Flow (vph)	84	330	252	65	94	10	91	317	107	94	518	73
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	582	0	65	104	0	91	317	107	94	591	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7				3.7			3.7
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		1.6			1.6				1.6			1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99		0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1		1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0		8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0		-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0		-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0		9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA	Perm	Perm		NA
Protected Phases	3	8		4	4		5	2	2	6		6
Permitted Phases	8			4			2		2	6		
Detector Phase	3	8		4	4		5	2	2	6		6
Switch Phase												
Minimum Initial (s)	7.0	10.0		10.0	10.0		7.0	20.0	20.0	20.0		20.0
Minimum Split (s)	11.0	38.0		38.0	38.0		11.0	38.2	38.2	38.2		38.2

Lanes, Volumes, Timings

1: Regional Road 25 & 5 Sideroad

08-15-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	15.0	58.0		43.0	43.0		15.0	52.2	52.2	37.2	37.2	
Total Split (%)	13.6%	52.6%		39.0%	39.0%		13.6%	47.4%	47.4%	33.8%	33.8%	
Maximum Green (s)	11.0	52.0		37.0	37.0		11.0	46.0	46.0	31.0	31.0	
Yellow Time (s)	3.0	3.7		3.7	3.7		3.0	4.2	4.2	4.2	4.2	
All-Red Time (s)	1.0	2.3		2.3	2.3		1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0		6.0	6.0		4.0	6.2	6.2	6.2	6.2	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.7		3.7	3.7		3.0	3.6	3.6	4.2	4.2	
Recall Mode	None	None		None	None		None	Ped	Ped	Ped	Ped	
Walk Time (s)		7.0			7.0			7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		25.0			25.0			25.0	25.0	25.0	25.0	
Pedestrian Calls (#/hr)		0			0			0	0	0	0	
Act Effect Green (s)	42.8	40.7		31.0	31.0		46.1	43.8	43.8	33.1	33.1	
Actuated g/C Ratio	0.44	0.42		0.32	0.32		0.47	0.45	0.45	0.34	0.34	
v/c Ratio	0.17	0.90		0.49	0.20		0.34	0.24	0.16	0.29	0.56	
Control Delay	17.0	44.6		44.4	26.2		21.0	18.6	4.6	32.6	31.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	17.0	44.6		44.4	26.2		21.0	18.6	4.6	32.6	31.4	
LOS	B	D		D	C		C	B	A	C	C	
Approach Delay		41.1			33.2			16.1			31.6	
Approach LOS		D			C			B			C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	110.2											
Actuated Cycle Length:	97.2											
Natural Cycle:	100											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.90											
Intersection Signal Delay:	30.9						Intersection LOS: C					
Intersection Capacity Utilization:	92.8%						ICU Level of Service F					
Analysis Period (min):	15											
Splits and Phases:	1: Regional Road 25 & 5 Sideroad											

HCM Signalized Intersection Capacity Analysis

1: Regional Road 25 & 5 Sideroad

08-15-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Traffic Volume (vph)	79	310	237	61	88	9	86	298	101	88	487	69	
Future Volume (vph)	79	310	237	61	88	9	86	298	101	88	487	69	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	6.0	6.0	6.0	6.0	4.0	6.2	6.2	6.2	6.2	6.2	6.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	
Frt	1.00	0.94	1.00	0.99	1.00	1.00	0.85	1.00	0.95	1.00	0.98	1.00	
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1601	1548	1342	1612	1225	2920	1338	1601	3049	1601	3049	1601	
Fit Permitted	0.61	1.00	0.29	1.00	0.30	1.00	1.00	0.56	1.00	0.61	1.00	0.61	
Satd. Flow (perm)	1030	1548	415	1612	381	2920	1338	943	3049	1030	1548	415	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	84	330	252	65	94	10	91	317	107	94	518	73	
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	58	0	9	0	
Lane Group Flow (vph)	84	582	0	65	101	0	91	317	49	94	582	0	
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%	
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	Perm	Perm	NA	pm+pt	NA	Perm	
Protected Phases	3	8		4		5	2		6		6		
Permitted Phases	8		4		2		2	6					
Actuated Green, G (s)	41.7	41.7	31.0	31.0	44.8	44.8	44.8	33.1	33.1	41.7	41.7	31.0	
Effective Green, g (s)	41.7	41.7	31.0	31.0	44.8	44.8	44.8	33.1	33.1	41.7	41.7	31.0	
Actuated g/C Ratio	0.42	0.42	0.31	0.31	0.45	0.45	0.45	0.34	0.34	0.42	0.42	0.31	
Clearance Time (s)	4.0	6.0	6.0	6.0	4.0	6.2	6.2	6.2	6.2	4.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.7	3.7	3.7	3.0	3.6	3.6	4.2	4.2	3.0	3.7	3.7	
Lane Grp Cap (vph)	473	654	130	506	238	1325	607	316	1022	473	654	130	
v/s Ratio Prot	0.01	c0.38		0.06	c0.03	0.11		c0.19		0.01	c0.38		
v/s Ratio Perm	0.06		0.16		0.14		0.04	0.10		0.06		0.16	
v/c Ratio	0.18	0.89	0.50	0.20	0.38	0.24	0.08	0.30	0.57	0.18	0.89	0.50	
Uniform Delay, d1	17.5	26.4	27.5	24.8	16.7	16.5	15.3	24.2	26.9	17.5	26.4	27.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	14.3	3.8	0.2	1.0	0.1	0.1	0.8	1.0	0.2	14.3	3.8	
Delay (s)	17.6	40.7	31.3	25.0	17.7	16.6	15.3	25.0	27.9	17.6	40.7	31.3	
Level of Service	B	D	C	C	B	B	B	C	C	B	D	C	
Approach Delay (s)		37.8		27.4		16.6		27.5			37.8		
Approach LOS		D		C		B		C			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay	28.1		HCM 2000 Level of Service					C					
HCM 2000 Volume to Capacity ratio	0.75												
Actuated Cycle Length (s)	98.7			Sum of lost time (s)					20.2				
Intersection Capacity Utilization	92.8%		ICU Level of Service					F					
Analysis Period (min)	15												
c Critical Lane Group													

Lanes, Volumes, Timings

2: Regional Road 25 & James Snow Parkway N

08-15-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	12	83	40	62	107	62	195	486	418	231	430	32
Future Volume (vph)	12	83	40	62	107	62	195	486	418	231	430	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		115.0	85.0		35.0	30.0		0.0	75.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	40.0			90.0			70.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor									0.99	1.00		
Frt			0.850			0.850			0.850		0.990	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1217	2684	1103	1259	3147	1192	1534	2897	1458	1472	2851	0
Fit Permitted	0.682			0.698			0.480			0.466		
Satd. Flow (perm)	873	2684	1103	925	3147	1192	775	2897	1439	722	2851	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			58			64			431			7
Link Speed (k/h)		60			60			70				70
Link Distance (m)		452.4			1065.5			592.1				986.0
Travel Time (s)		27.1			63.9			30.5				50.7
Confl. Peds. (#/hr)									1		1	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Adj. Flow (vph)	12	86	41	64	110	64	201	501	431	238	443	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	86	41	64	110	64	201	501	431	238	476	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7				3.7
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		1.6			1.6			1.6				1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.2	9.0	9.0	9.0	9.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	
Switch Phase												

Lanes, Volumes, Timings

2: Regional Road 25 & James Snow Parkway N

08-15-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	43.6	43.6	43.6	43.6	43.6	43.6	11.0	42.9	42.9	11.0	35.9	
Total Split (s)	55.6	55.6	55.6	55.6	55.6	55.6	15.0	76.9	76.9	15.0	76.9	
Total Split (%)	37.7%	37.7%	37.7%	37.7%	37.7%	37.7%	10.2%	52.1%	52.1%	10.2%	52.1%	
Maximum Green (s)	49.0	49.0	49.0	49.0	49.0	49.0	11.0	70.0	70.0	11.0	70.0	
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	4.2	4.2	3.0	4.2	
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	1.0	2.7	2.7	1.0	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	30.0	30.0	30.0	30.0	30.0	30.0		29.0	29.0		22.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0	0		0	
Act Effect Green (s)	12.5	12.5	12.5	12.5	12.5	12.5	35.9	23.1	23.1	35.9	23.1	
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.57	0.37	0.37	0.57	0.37	
v/c Ratio	0.07	0.16	0.16	0.35	0.18	0.22	0.36	0.47	0.54	0.45	0.46	
Control Delay	23.3	23.0	6.2	29.2	22.9	9.1	7.3	17.5	4.6	8.5	17.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	23.3	23.0	6.2	29.2	22.9	9.1	7.3	17.5	4.6	8.5	17.0	
LOS	C	C	A	C	C	A	A	B	A	A	B	
Approach Delay	18.1			20.9			10.8			14.2		
Approach LOS	B			C			B			B		

Intersection Summary

Area Type:	Other
Cycle Length:	147.5
Actuated Cycle Length:	63.2
Natural Cycle:	100
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.54
Intersection Signal Delay:	13.4
Intersection LOS:	B
Intersection Capacity Utilization:	61.8%
ICU Level of Service:	B
Analysis Period (min):	15

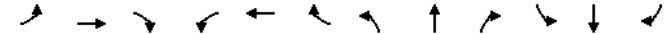
Splits and Phases: 2: Regional Road 25 & James Snow Parkway N

Ø1	Ø2	Ø4
15 s	76.9 s	55.6 s
Ø5	Ø6	Ø8
15 s	76.9 s	55.6 s

HCM Signalized Intersection Capacity Analysis

2: Regional Road 25 & James Snow Parkway N

08-15-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	12	83	40	62	107	62	195	486	418	231	430	32
Future Volume (vph)	12	83	40	62	107	62	195	486	418	231	430	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1217	2684	1103	1259	3147	1192	1534	2897	1440	1472	2850	
Fit Permitted	0.68	1.00	1.00	0.70	1.00	1.00	0.48	1.00	1.00	0.47	1.00	
Satd. Flow (perm)	874	2684	1103	925	3147	1192	774	2897	1440	722	2850	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	12	86	41	64	110	64	201	501	431	238	443	33
RTOR Reduction (vph)	0	0	33	0	0	51	0	0	273	0	4	0
Lane Group Flow (vph)	12	86	8	64	110	13	201	501	158	238	472	0
Conf. Peds. (#/hr)							1	1				
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	12.5	12.5	12.5	12.5	12.5	12.5	32.9	23.1	23.1	33.1	23.2	
Effective Green, g (s)	12.5	12.5	12.5	12.5	12.5	12.5	32.9	23.1	23.1	33.1	23.2	
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.52	0.37	0.37	0.53	0.37	
Clearance Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	173	532	218	183	624	236	522	1062	528	497	1049	
v/s Ratio Prot		0.03			0.03		0.06	0.17		c0.08	0.17	
v/s Ratio Perm	0.01		0.01	c0.07		0.01	0.14		0.11	c0.18		
v/c Ratio	0.07	0.16	0.04	0.35	0.18	0.05	0.39	0.47	0.30	0.48	0.45	
Uniform Delay, d1	20.5	20.9	20.4	21.7	21.0	20.5	8.3	15.3	14.2	8.5	15.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	0.3	0.1	2.4	0.3	0.2	0.5	0.7	0.7	0.7	0.6	
Delay (s)	20.9	21.2	20.5	24.2	21.3	20.7	8.7	16.0	14.9	9.2	15.7	
Level of Service	C	C	C	C	C	C	A	B	B	A	B	
Approach Delay (s)	21.0			21.9			14.3			13.5		
Approach LOS	C			C			B			B		

Intersection Summary

HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	63.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

3: Boston Church Road & James Snow Parkway N

08-15-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	28	542	127	14	195	14	28	5	11	21	32	108
Future Volume (vph)	28	542	127	14	195	14	28	5	11	21	32	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		0.0	70.0		0.0	60.0		25.0	60.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			70.0			90.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.972			0.990				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1508	3007	0	1415	2975	0	1113	3650	944	1534	3147	1498
Fit Permitted	0.576			0.323			0.719			0.754		
Satd. Flow (perm)	915	3007	0	481	2975	0	842	3650	944	1217	3147	1498
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		21			6			90				120
Link Speed (k/h)		70			70			60				60
Link Distance (m)		358.9			566.0			792.9				198.3
Travel Time (s)		18.5			29.1			47.6				11.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%
Adj. Flow (vph)	31	602	141	16	217	16	31	6	12	23	36	120
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	743	0	16	233	0	31	6	12	23	36	120
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7				3.7
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		1.6			1.6			1.6				1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8	8	7	4	4
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0		7.0	20.0		7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	11.0	33.5		11.0	33.5		11.0	31.6	31.6	11.0	31.6	31.6

Lanes, Volumes, Timings

3: Boston Church Road & James Snow Parkway N

08-15-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	17.0	50.5		17.0	50.5		24.0	48.6	48.6	24.0	48.6	48.6
Total Split (%)	12.1%	36.0%		12.1%	36.0%		17.1%	34.7%	34.7%	17.1%	34.7%	34.7%
Maximum Green (s)	13.0	44.0		13.0	44.0		20.0	41.0	41.0	20.0	41.0	41.0
Yellow Time (s)	3.0	3.7		3.0	3.7		3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	1.0	2.8		1.0	2.8		1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		20.0			20.0			17.0			17.0	17.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effect Green (s)	33.0	29.2		31.9	27.0		22.4	15.9	15.9	21.9	15.7	15.7
Actuated g/C Ratio	0.51	0.45		0.49	0.41		0.34	0.24	0.24	0.34	0.24	0.24
v/c Ratio	0.06	0.55		0.05	0.19		0.10	0.01	0.04	0.05	0.05	0.27
Control Delay	9.3	15.9		9.5	14.8		16.3	25.6	0.3	16.0	24.7	8.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.3	15.9		9.5	14.8		16.3	25.6	0.3	16.0	24.7	8.2
LOS	A	B		A	B		B	C	A	B	C	A
Approach Delay		15.7			14.5			13.5			12.5	
Approach LOS		B			B			B			B	
Intersection Summary												
Area Type:	Other											
Cycle Length:	140.1											
Actuated Cycle Length:	65.3											
Natural Cycle:	90											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.55											
Intersection Signal Delay:	14.9						Intersection LOS: B					
Intersection Capacity Utilization:	52.5%						ICU Level of Service A					
Analysis Period (min):	15											
Splits and Phases:	3: Boston Church Road & James Snow Parkway N											
	17 s			50.5 s			24 s			48.6 s		
	17 s			50.5 s			24 s			48.6 s		

HCM Signalized Intersection Capacity Analysis  
3: Boston Church Road & James Snow Parkway N

08-15-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	28	542	127	14	195	14	28	5	11	21	32	108
Future Volume (vph)	28	542	127	14	195	14	28	5	11	21	32	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1508	3005		1415	2974		1113	3650	944	1534	3147	1498
Fit Permitted	0.58	1.00		0.32	1.00		0.72	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	914	3005		481	2974		842	3650	944	1217	3147	1498
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	31	602	141	16	217	16	31	6	12	23	36	120
RTOR Reduction (vph)	0	12	0	0	4	0	0	0	9	0	0	93
Lane Group Flow (vph)	31	731	0	16	229	0	31	6	3	23	36	27
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		4			4
Actuated Green, G (s)	31.8	29.3		28.8	27.8		18.7	16.0	16.0	18.1	15.7	15.7
Effective Green, g (s)	31.8	29.3		28.8	27.8		18.7	16.0	16.0	18.1	15.7	15.7
Actuated g/C Ratio	0.45	0.41		0.41	0.39		0.26	0.23	0.23	0.26	0.22	0.22
Clearance Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	431	1243		208	1167		232	824	213	321	697	332
v/s Ratio Prot	c0.00	c0.24		0.00	0.08		c0.01	0.00		0.00	0.01	
v/s Ratio Perm	0.03			0.03			c0.03	0.00	0.02			0.02
v/c Ratio	0.07	0.59		0.08	0.20		0.13	0.01	0.01	0.07	0.05	0.08
Uniform Delay, d1	11.0	16.1		12.7	14.1		19.7	21.2	21.3	19.9	21.7	21.8
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	1.1		0.2	0.2		0.3	0.0	0.1	0.1	0.1	0.2
Delay (s)	11.1	17.2		12.8	14.3		20.0	21.3	21.3	20.0	21.8	22.0
Level of Service	B	B		B	B		B	C	C	C	C	C
Approach Delay (s)		16.9			14.2			20.5			21.7	
Approach LOS		B			B			C			C	

Intersection Summary		
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.41	
Actuated Cycle Length (s)	70.8	Sum of lost time (s) 22.1
Intersection Capacity Utilization	52.5%	ICU Level of Service A
Analysis Period (min)	15	
c Critical Lane Group		

Lanes, Volumes, Timings  
4: Esquesing Line & James Snow Parkway N

08-15-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	17	416	141	38	147	39	64	184	6	40	364	12
Future Volume (vph)	17	416	141	38	147	39	64	184	6	40	364	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		0.0	70.0		0.0	40.0		25.0	25.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			80.0			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.962			0.969			0.850				0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1547	2920	0	1644	2871	0	1644	1731	1396	1615	1685	1396
Fit Permitted	0.620			0.315			0.389			0.627		
Satd. Flow (perm)	1009	2920	0	545	2871	0	673	1731	1396	1066	1685	1396
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		43			31				74			74
Link Speed (k/h)		70			70			60				60
Link Distance (m)		346.4			1421.7			292.4				1994.7
Travel Time (s)		17.8			73.1			17.5				119.7
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	17%	13%	14%	17%	17%
Adj. Flow (vph)	19	473	160	43	167	44	73	209	7	45	414	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	19	633	0	43	211	0	73	209	7	45	414	14
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7				3.7
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		1.6			1.6			1.6				1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8		2	2	2	6		6
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6		6
Switch Phase												
Minimum Initial (s)	7.0	15.0		7.0	15.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	11.0	30.6		11.0	30.6		33.5	33.5	33.5	33.5	33.5	33.5

Lanes, Volumes, Timings

4: Esquesing Line & James Snow Parkway N

08-15-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	19.0	41.6		19.0	41.6		51.5	51.5	51.5	51.5	51.5	51.5
Total Split (%)	16.9%	37.1%		16.9%	37.1%		45.9%	45.9%	45.9%	45.9%	45.9%	45.9%
Maximum Green (s)	15.0	35.0		15.0	35.0		45.0	45.0	45.0	45.0	45.0	45.0
Yellow Time (s)	3.0	4.2		3.0	4.2		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	2.4		1.0	2.4		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		17.0			17.0		20.0	20.0	20.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	30.4	24.0		31.6	26.3		28.2	28.2	28.2	28.2	28.2	28.2
Actuated g/C Ratio	0.42	0.33		0.44	0.36		0.39	0.39	0.39	0.39	0.39	0.39
v/c Ratio	0.04	0.63		0.12	0.20		0.28	0.31	0.01	0.11	0.63	0.02
Control Delay	12.2	23.8		12.6	15.6		22.0	19.2	0.0	18.2	25.1	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.2	23.8		12.6	15.6		22.0	19.2	0.0	18.2	25.1	0.1
LOS	B	C		B	B		C	B	A	B	C	A
Approach Delay		23.4			15.1			19.4			23.7	
Approach LOS		C			B			B			C	

Intersection Summary

Area Type:	Other
Cycle Length:	112.1
Actuated Cycle Length:	72.2
Natural Cycle:	80
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.63
Intersection Signal Delay:	21.5
Intersection Capacity Utilization:	77.3%
Analysis Period (min):	15
Intersection LOS:	C
ICU Level of Service:	D

Splits and Phases: 4: Esquesing Line & James Snow Parkway N

Phase 1: EBL, EBT, EBR	Phase 2: WBL, WBT, WBR	Phase 3: NBL, NBT, NBR	Phase 4: SBL, SBT, SBR
51.5 s	19 s	41.6 s	
Phase 5: EBL, EBT, EBR	Phase 6: WBL, WBT, WBR	Phase 7: NBL, NBT, NBR	Phase 8: SBL, SBT, SBR
51.5 s	19 s	41.6 s	

HCM Signalized Intersection Capacity Analysis

4: Esquesing Line & James Snow Parkway N

08-15-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	17	416	141	38	147	39	64	184	6	40	364	12
Future Volume (vph)	17	416	141	38	147	39	64	184	6	40	364	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1547	2921		1644	2870		1644	2870	1396	1615	1685	1396
Flt Permitted	0.62	1.00		0.32	1.00		0.39	1.00	1.00	0.63	1.00	1.00
Satd. Flow (perm)	1009	2921		546	2870		672	1731	1396	1066	1685	1396
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	19	473	160	43	167	44	73	209	7	45	414	14
RTOR Reduction (vph)	0	29	0	0	20	0	0	4	0	0	0	9
Lane Group Flow (vph)	19	604	0	43	191	0	73	209	3	45	414	5
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	11%	17%	13%	14%	17%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	26.9	24.7		30.1	26.3		28.2	28.2	28.2	28.2	28.2	28.2
Effective Green, g (s)	26.9	24.7		30.1	26.3		28.2	28.2	28.2	28.2	28.2	28.2
Actuated g/C Ratio	0.36	0.33		0.41	0.36		0.38	0.38	0.38	0.38	0.38	0.38
Clearance Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	383	977		279	1022		256	661	533	407	643	533
v/s Ratio Prot	0.00	c0.21		c0.01	0.07			0.12			c0.25	
v/s Ratio Perm	0.02			0.05			0.11		0.00	0.04		0.00
v/c Ratio	0.05	0.62		0.15	0.19		0.29	0.32	0.01	0.11	0.64	0.01
Uniform Delay, d1	15.1	20.6		13.6	16.4		15.8	16.0	14.1	14.7	18.7	14.1
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	1.7		0.3	0.2		1.3	0.6	0.0	0.3	3.0	0.0
Delay (s)	15.1	22.3		13.8	16.6		17.1	16.6	14.1	15.0	21.7	14.2
Level of Service	B	C		B	B		B	B	B	B	C	B
Approach Delay (s)		22.1			16.1			16.7			20.8	
Approach LOS		C			B			B			C	

Intersection Summary

HCM 2000 Control Delay	19.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	73.8	Sum of lost time (s)	17.1
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings

5: James Snow Parkway N & Steeles Avenue East

08-15-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔↔	↔↔	↔	↔↔	↔↔	↔	↔↔	↔	↔
Traffic Volume (vph)	1	517	268	118	288	68	380	155	412	167	280	10
Future Volume (vph)	1	517	268	118	288	68	380	155	412	167	280	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	122.0		72.0	170.0		130.0	105.0		260.0	160.0		0.0
Storage Lanes	1		1	2		1	2		1	1		0
Taper Length (m)	60.0			70.0			80.0			80.0		
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	0.95
Fit			0.850			0.850			0.850		0.995	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3579	1601	3471	3579	1601	3471	3579	1601	1789	3561	0
Fit Permitted	0.562			0.950			0.950			0.646		
Satd. Flow (perm)	1058	3579	1601	3471	3579	1601	3471	3579	1601	1217	3561	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			291			82			392			2
Link Speed (k/h)		60			70			60			70	
Link Distance (m)		729.0			881.4			342.7			1421.7	
Travel Time (s)		43.7			45.3			20.6			73.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	562	291	128	313	74	413	168	448	182	304	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	562	291	128	313	74	413	168	448	182	315	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.0			4.0			4.0			4.0	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2		6		6		8	4		
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	7.0	22.0	22.0	7.0	22.0	22.0	7.0	15.0	15.0	7.0	15.0	
Minimum Split (s)	11.0	47.2	47.2	12.0	47.2	47.2	12.0	46.3	46.3	11.0	46.3	
Total Split (s)	15.0	55.2	55.2	26.0	66.2	66.2	29.0	59.0	59.0	24.0	54.0	

Lanes, Volumes, Timings

5: James Snow Parkway N & Steeles Avenue East

08-15-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	9.1%	33.6%	33.6%	15.8%	40.3%	40.3%	17.7%	35.9%	35.9%	14.6%	32.9%	
Maximum Green (s)	11.0	48.0	48.0	21.0	59.0	59.0	24.0	51.7	51.7	20.0	46.7	
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	4.2	4.2	3.0	4.2	
All-Red Time (s)	1.0	3.5	3.5	2.0	3.5	3.5	2.0	3.1	3.1	1.0	3.1	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	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	5.0	5.0	3.0	5.0	
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		33.0	33.0		33.0	33.0		32.0	32.0		32.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effect Green (s)	34.2	23.9	23.9	9.4	36.5	36.5	17.6	22.8	22.8	33.3	17.1	
Actuated g/C Ratio	0.37	0.26	0.26	0.10	0.39	0.39	0.19	0.25	0.25	0.36	0.18	
v/c Ratio	0.00	0.61	0.46	0.37	0.22	0.11	0.63	0.19	0.65	0.35	0.48	
Control Delay	17.0	34.6	6.5	43.9	20.9	5.4	39.8	29.4	10.6	17.9	37.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	17.0	34.6	6.5	43.9	20.9	5.4	39.8	29.4	10.6	17.9	37.5	
LOS	B	C	A	D	C	A	D	C	B	B	D	
Approach Delay		25.0			24.4			25.4			30.3	
Approach LOS		C			C			C			C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	164.2											
Actuated Cycle Length:	92.7											
Natural Cycle:	120											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.65											
Intersection Signal Delay:	25.9						Intersection LOS: C					
Intersection Capacity Utilization:	68.5%						ICU Level of Service C					
Analysis Period (min)	15											
Splits and Phases:	5: James Snow Parkway N & Steeles Avenue East											

HCM Signalized Intersection Capacity Analysis  
5: James Snow Parkway N & Steeles Avenue East

08-15-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	1	517	268	118	288	68	380	155	412	167	280	10
Future Volume (vph)	1	517	268	118	288	68	380	155	412	167	280	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	
Fit	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	3579	1601	3471	3579	1601	3471	3579	1601	1789	3560	
Fit Permitted	0.56	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.65	1.00	
Satd. Flow (perm)	1058	3579	1601	3471	3579	1601	3471	3579	1601	1216	3560	
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)	1	562	291	128	313	74	413	168	448	182	304	11
RTOR Reduction (vph)	0	0	208	0	0	46	0	0	298	0	2	0
Lane Group Flow (vph)	1	562	83	128	313	28	413	168	150	182	313	0
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2			6			8		4	
Actuated Green, G (s)	28.5	27.3	27.3	9.4	36.5	36.5	17.6	22.9	22.9	29.9	17.1	
Effective Green, g (s)	28.5	27.3	27.3	9.4	36.5	36.5	17.6	22.9	22.9	29.9	17.1	
Actuated g/C Ratio	0.30	0.28	0.28	0.10	0.38	0.38	0.18	0.24	0.24	0.31	0.18	
Clearance Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	323	1018	455	340	1362	609	637	854	382	455	634	
v/s Ratio Prot	0.00	c0.16		c0.04	0.09		c0.12	0.05		0.05	c0.09	
v/s Ratio Perm	0.00		0.05			0.02			0.09		0.07	
v/c Ratio	0.00	0.55	0.18	0.38	0.23	0.05	0.65	0.20	0.39	0.40	0.49	
Uniform Delay, d1	23.7	29.1	25.9	40.5	20.2	18.7	36.3	29.2	30.7	25.3	35.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.7	0.2	0.7	0.1	0.0	2.3	0.2	1.4	0.6	1.3	
Delay (s)	23.7	29.8	26.1	41.2	20.2	18.8	38.6	29.4	32.0	25.9	36.8	
Level of Service	C	C	C	D	C	B	D	C	C	C	D	
Approach Delay (s)		28.5			25.2			34.2			32.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	95.9	Sum of lost time (s)	24.5
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

Lanes, Volumes, Timings  
6: Boston Church Road/3 Line & 5 Sideroad

08-15-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	8	435	26	40	130	3	8	22	17	7	95	24
Future Volume (vph)	8	435	26	40	130	3	8	22	17	7	95	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit		0.992			0.998			0.950			0.974	
Fit Protected		0.999			0.989			0.992			0.997	
Satd. Flow (prot)	0	1673	0	0	1674	0	0	1581	0	0	1671	0
Fit Permitted		0.999			0.989			0.992			0.997	
Satd. Flow (perm)	0	1673	0	0	1674	0	0	1581	0	0	1671	0
Link Speed (k/h)		60			60			70			60	
Link Distance (m)		166.9			1343.2			219.2			496.0	
Travel Time (s)		10.0			80.6			11.3			29.8	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	13%	13%	27%	13%	13%	33%	13%	17%	12%	43%	9%	13%
Adj. Flow (vph)	9	500	30	46	149	3	9	25	20	8	109	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	539	0	0	198	0	0	54	0	0	145	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type:	Unsignalized		
Intersection Capacity Utilization	45.8%	ICU Level of Service A	
Analysis Period (min)	15		



HCM Unsignalized Intersection Capacity Analysis

6: Boston Church Road/3 Line & 5 Sideroad

08-15-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	8	435	26	40	130	3	8	22	17	7	95	24
Future Volume (vph)	8	435	26	40	130	3	8	22	17	7	95	24
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	9	500	30	46	149	3	9	25	20	8	109	28
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	539	198	54	145								
Volume Left (vph)	9	46	9	8								
Volume Right (vph)	30	3	20	28								
Hadj (s)	0.20	0.26	0.06	0.09								
Departure Headway (s)	5.0	5.5	6.2	6.0								
Degree Utilization, x	0.75	0.31	0.09	0.24								
Capacity (veh/h)	539	607	514	543								
Control Delay (s)	21.8	11.0	9.9	11.0								
Approach Delay (s)	21.8	11.0	9.9	11.0								
Approach LOS	C	B	A	B								
<b>Intersection Summary</b>												
Delay	17.2											
Level of Service	C											
Intersection Capacity Utilization	45.8%		ICU Level of Service		A							
Analysis Period (min)	15											

Lanes, Volumes, Timings

7: Esquesing Line/Fourth Line & 5 Sideroad

08-15-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Volume (vph)	7	435	16	80	145	3	10	120	110	63	320	25
Future Volume (vph)	7	435	16	80	145	3	10	120	110	63	320	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.995		0.998		0.998		0.998		0.992		0.992	
Fit Protected	0.999		0.983		0.998		0.998		0.992		0.992	
Satd. Flow (prot)	0	1701	0	0	1680	0	0	1647	0	0	1649	0
Fit Permitted	0.996		0.731		0.979		0.979		0.902		0.902	
Satd. Flow (perm)	0	1696	0	0	1249	0	0	1616	0	0	1499	0
Right Turn on Red			Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)	3		1		61		5		5		5	
Link Speed (k/h)	60		60		60		70		70		70	
Link Distance (m)	1343.2		646.3		1994.7		464.9		464.9		464.9	
Travel Time (s)	80.6		38.8		119.7		23.9		23.9		23.9	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Adj. Flow (vph)	8	494	18	91	165	3	11	136	125	72	364	28
<b>Shared Lane Traffic (%)</b>												
Lane Group Flow (vph)	0	520	0	0	259	0	0	272	0	0	464	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width(m)	0.0		0.0		3.7		3.7		3.7		3.7	
Link Offset(m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6		1.6		1.6		1.6	
<b>Two way Left Turn Lane</b>												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24	14	24	14	24	14	24	14	24	14
Number of Detectors	1	2	1	2	1	2	1	2	1	2	1	2
Detector Template	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru
Leading Detector (m)	6.1	30.5	6.1	30.5	6.1	30.5	6.1	30.5	6.1	30.5	6.1	30.5
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	1.8	6.1	1.8	6.1	1.8	6.1	1.8	6.1	1.8
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
<b>Detector 1 Channel</b>												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	28.7		28.7		28.7		28.7		28.7		28.7	
Detector 2 Size(m)	1.8		1.8		1.8		1.8		1.8		1.8	
Detector 2 Type	Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex	
<b>Detector 2 Channel</b>												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2		6		6		8		4		4	
Permitted Phases	2		6		6		8		4		4	
Detector Phase	2	2	6	6	8	8	4	4	4	4	4	4
<b>Switch Phase</b>												

Lanes, Volumes, Timings

7: Esquesing Line/Fourth Line & 5 Sideroad

08-15-2021

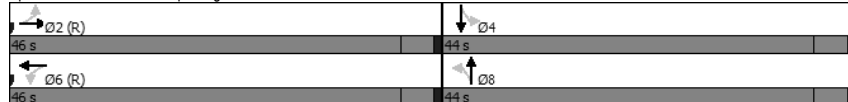


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	46.0	46.0		46.0	46.0		44.0	44.0		44.0	44.0	
Total Split (%)	51.1%	51.1%		51.1%	51.1%		48.9%	48.9%		48.9%	48.9%	
Maximum Green (s)	41.5	41.5		41.5	41.5		39.5	39.5		39.5	39.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		48.5			48.5			32.5			32.5	
Actuated g/C Ratio		0.54			0.54			0.36			0.36	
v/c Ratio		0.57			0.38			0.44			0.85	
Control Delay		18.4			15.8			17.8			41.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		18.4			15.8			17.8			41.2	
LOS		B			B			B			D	
Approach Delay		18.4			15.8			17.8			41.2	
Approach LOS		B			B			B			D	

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 50  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.85  
 Intersection Signal Delay: 24.8  
 Intersection Capacity Utilization 86.9%  
 Analysis Period (min) 15

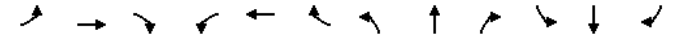
Splits and Phases: 7: Esquesing Line/Fourth Line & 5 Sideroad



HCM Signalized Intersection Capacity Analysis

7: Esquesing Line/Fourth Line & 5 Sideroad

08-15-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	7	435	16	80	145	3	10	120	110	63	320	25
Future Volume (vph)	7	435	16	80	145	3	10	120	110	63	320	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		1.00			1.00			0.94			0.99	
Flt Protected		1.00			0.98			1.00			0.99	
Satd. Flow (prot)		1702			1680			1647			1649	
Flt Permitted		1.00			0.73			0.98			0.90	
Satd. Flow (perm)		1696			1250			1615			1499	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	8	494	18	91	165	3	11	136	125	72	364	28
RTOR Reduction (vph)	0	1	0	0	0	0	0	39	0	0	3	0
Lane Group Flow (vph)	0	519	0	0	259	0	0	233	0	0	461	0
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		48.5			48.5			32.5			32.5	
Effective Green, g (s)		48.5			48.5			32.5			32.5	
Actuated g/C Ratio		0.54			0.54			0.36			0.36	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		913			673			583			541	
v/s Ratio Prot												
v/s Ratio Perm		c0.31			0.21			0.14			c0.31	
v/c Ratio		0.57			0.38			0.40			0.85	
Uniform Delay, d1		13.8			12.1			21.5			26.5	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.6			1.7			0.5			12.3	
Delay (s)		16.3			13.7			21.9			38.8	
Level of Service		B			B			C			D	
Approach Delay (s)		16.3			13.7			21.9			38.8	
Approach LOS		B			B			C			D	

Intersection Summary

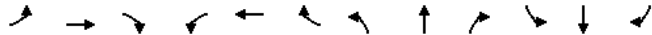
HCM 2000 Control Delay 23.8  
 HCM 2000 Level of Service C  
 HCM 2000 Volume to Capacity ratio 0.68  
 Actuated Cycle Length (s) 90.0  
 Sum of lost time (s) 9.0  
 Intersection Capacity Utilization 86.9%  
 ICU Level of Service E  
 Analysis Period (min) 15  
 c Critical Lane Group

Lanes, Volumes, Timings

2023 FB PM Peak Hour

1: Regional Road 25 & 5 Sideroad

08-15-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	91	112	113	75	253	34	191	662	86	7	303	66
Future Volume (vph)	91	112	113	75	253	34	191	662	86	7	303	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	70.0		0.0	75.0		70.0	35.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	100.0			100.0			75.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.925			0.982				0.850		0.973	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1601	1518	0	1342	1604	0	1225	2920	1338	1601	3028	0
Fit Permitted	0.294			0.610			0.435			0.384		
Satd. Flow (perm)	495	1518	0	862	1604	0	561	2920	1338	647	3028	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					6				91			24
Link Speed (k/h)		60			60				70			70
Link Distance (m)		573.6			536.0				986.0			203.5
Travel Time (s)		34.4			32.2				50.7			10.5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Adj. Flow (vph)	97	119	120	80	269	36	203	704	91	7	322	70
Shared Lane Traffic (%)												
Lane Group Flow (vph)	97	239	0	80	305	0	203	704	91	7	392	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7				3.7			3.7
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		1.6			1.6				1.6			1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99		0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1		1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0		8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0		-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0		-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0		9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA	Perm	Perm		NA
Protected Phases	3	8		4	4		5	2	2	6		6
Permitted Phases	8			4			2		2	6		
Detector Phase	3	8		4	4		5	2	2	6		6
Switch Phase												
Minimum Initial (s)	7.0	10.0		10.0	10.0		7.0	20.0	20.0	20.0		20.0
Minimum Split (s)	11.0	38.0		38.0	38.0		11.0	38.2	38.2	38.2		38.2

Lanes, Volumes, Timings

2023 FB PM Peak Hour

1: Regional Road 25 & 5 Sideroad

08-15-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	20.0	54.0		34.0	34.0		18.0	56.2	56.2	38.2	38.2	
Total Split (%)	18.1%	49.0%		30.9%	30.9%		16.3%	51.0%	51.0%	34.7%	34.7%	
Maximum Green (s)	16.0	48.0		28.0	28.0		14.0	50.0	50.0	32.0	32.0	
Yellow Time (s)	3.0	3.7		3.7	3.7		3.0	4.2	4.2	4.2	4.2	
All-Red Time (s)	1.0	2.3		2.3	2.3		1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0		6.0	6.0		4.0	6.2	6.2	6.2	6.2	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.7		3.7	3.7		3.0	3.6	3.6	4.2	4.2	
Recall Mode	None	None		None	None		None	Ped	Ped	Ped	Ped	
Walk Time (s)		7.0			7.0			7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		25.0			25.0			25.0	25.0	25.0	25.0	
Pedestrian Calls (#/hr)		0			0			0	0	0	0	
Act Effect Green (s)	35.3	33.3		22.7	22.7		52.1	49.8	49.8	32.7	32.7	
Actuated g/C Ratio	0.37	0.35		0.24	0.24		0.54	0.52	0.52	0.34	0.34	
v/c Ratio	0.33	0.45		0.39	0.79		0.51	0.46	0.12	0.03	0.37	
Control Delay	22.2	26.1		38.5	50.4		19.7	17.6	3.9	26.6	25.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	22.2	26.1		38.5	50.4		19.7	17.6	3.9	26.6	25.9	
LOS	C	C		D	D		B	B	A	C	C	
Approach Delay		25.0			47.9			16.8			25.9	
Approach LOS		C			D			B			C	

Intersection Summary

Area Type: Other

Cycle Length: 110.2

Actuated Cycle Length: 95.6

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 25.5

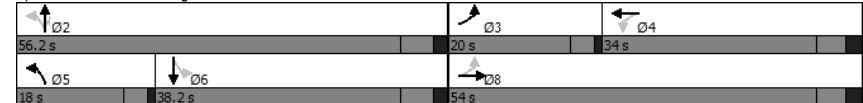
Intersection LOS: C

Intersection Capacity Utilization 76.4%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: Regional Road 25 & 5 Sideroad



HCM Signalized Intersection Capacity Analysis  
1: Regional Road 25 & 5 Sideroad

2023 FB PM Peak Hour  
08-15-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	91	112	113	75	253	34	191	662	86	7	303	66
Future Volume (vph)	91	112	113	75	253	34	191	662	86	7	303	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	6.0	6.0	4.0	6.2	6.2	6.2	6.2	6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95
Frt	1.00	0.92	1.00	0.98	1.00	1.00	1.00	0.85	1.00	0.97	1.00	0.97
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1601	1518	1342	1605	1225	2920	1338	1601	3029	1601	3029	1601
Fit Permitted	0.29	1.00	0.61	1.00	0.44	1.00	1.00	0.38	1.00	0.29	1.00	0.29
Satd. Flow (perm)	496	1518	862	1605	561	2920	1338	647	3029	496	1518	862
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	97	119	120	80	269	36	203	704	91	7	322	70
RTOR Reduction (vph)	0	0	0	0	5	0	0	44	0	16	0	0
Lane Group Flow (vph)	97	239	0	80	300	0	203	704	47	7	376	0
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	Perm	Perm	NA	NA	NA	6
Protected Phases	3	8		4		5	2					
Permitted Phases	8		4		2		2	6				
Actuated Green, G (s)	34.3	34.3	22.7	22.7	49.8	49.8	49.8	32.8	32.8			
Effective Green, g (s)	34.3	34.3	22.7	22.7	49.8	49.8	49.8	32.8	32.8			
Actuated g/C Ratio	0.36	0.36	0.24	0.24	0.52	0.52	0.52	0.34	0.34			
Clearance Time (s)	4.0	6.0	6.0	6.0	4.0	6.2	6.2	6.2	6.2			
Vehicle Extension (s)	3.0	3.7	3.7	3.7	3.0	3.6	3.6	4.2	4.2			
Lane Grp Cap (vph)	263	540	203	378	379	1510	691	220	1031			
v/s Ratio Prot	0.03	c0.16		c0.19		c0.07	0.24		0.12			
v/s Ratio Perm	0.10		0.09		c0.20		0.04	0.01				
v/c Ratio	0.37	0.44	0.39	0.79	0.54	0.47	0.07	0.03	0.36			
Uniform Delay, d1	22.2	23.7	31.0	34.6	13.7	14.8	11.6	21.2	23.9			
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	0.9	0.7	1.6	11.4	1.5	0.3	0.1	0.1	0.3			
Delay (s)	23.1	24.4	32.6	46.0	15.2	15.1	11.7	21.3	24.2			
Level of Service	C	C	C	D	B	B	B	C	C			
Approach Delay (s)		24.0		43.2		14.8		24.2				
Approach LOS		C		D		B		C				
<b>Intersection Summary</b>												
HCM 2000 Control Delay		23.2						C				
HCM 2000 Volume to Capacity ratio		0.63										
Actuated Cycle Length (s)		96.3		Sum of lost time (s)			20.2					
Intersection Capacity Utilization		76.4%		ICU Level of Service			D					
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings

2023 FB PM Peak Hour  
08-15-2021

2: Regional Road 25 & James Snow Parkway N

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	30	165	162	175	107	218	78	771	143	132	433	5
Future Volume (vph)	30	165	162	175	107	218	78	771	143	132	433	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		115.0	85.0		35.0	30.0		0.0	75.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	40.0			90.0			70.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor									0.99	1.00		
Frt			0.850			0.850			0.850		0.998	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1217	2684	1103	1259	3147	1192	1534	2897	1458	1472	2908	0
Fit Permitted	0.682			0.644			0.491			0.241		
Satd. Flow (perm)	873	2684	1103	853	3147	1192	793	2897	1439	373	2908	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			167			225			147			1
Link Speed (k/h)		60			60		70			70		1
Link Distance (m)		452.4			1065.5		592.1			986.0		
Travel Time (s)		27.1			63.9		30.5			50.7		
Confl. Peds. (#/hr)								1		1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Adj. Flow (vph)	31	170	167	180	110	225	80	795	147	136	446	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	170	167	180	110	225	80	795	147	136	451	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
<b>Two way Left Turn Lane</b>												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
<b>Detector Template</b>												
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.2	9.0	9.0	9.0	9.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
<b>Detector 1 Channel</b>												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	
<b>Switch Phase</b>												

Lanes, Volumes, Timings

2023 FB PM Peak Hour

2: Regional Road 25 & James Snow Parkway N

08-15-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	43.6	43.6	43.6	43.6	43.6	43.6	11.0	42.9	42.9	11.0	35.9	
Total Split (s)	55.6	55.6	55.6	55.6	55.6	55.6	15.0	76.9	76.9	15.0	76.9	
Total Split (%)	37.7%	37.7%	37.7%	37.7%	37.7%	37.7%	10.2%	52.1%	52.1%	10.2%	52.1%	
Maximum Green (s)	49.0	49.0	49.0	49.0	49.0	49.0	11.0	70.0	70.0	11.0	70.0	
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	4.2	4.2	3.0	4.2	
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	1.0	2.7	2.7	1.0	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	30.0	30.0	30.0	30.0	30.0	30.0		29.0	29.0		22.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0	0		0	
Act Effect Green (s)	28.7	28.7	28.7	28.7	28.7	28.7	49.5	37.5	37.5	52.5	41.7	
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30	0.30	0.52	0.40	0.40	0.55	0.44	
v/c Ratio	0.12	0.21	0.37	0.70	0.12	0.44	0.17	0.69	0.22	0.42	0.35	
Control Delay	27.3	26.3	6.8	46.4	25.5	6.5	12.0	28.5	4.6	15.5	20.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	27.3	26.3	6.8	46.4	25.5	6.5	12.0	28.5	4.6	15.5	20.9	
LOS	C	C	A	D	C	A	B	C	A	B	C	
Approach Delay		17.5			24.5			23.8			19.7	
Approach LOS		B			C			C			B	

Intersection Summary

Area Type: Other

Cycle Length: 147.5

Actuated Cycle Length: 94.7

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 22.1

Intersection LOS: C

Intersection Capacity Utilization 67.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: Regional Road 25 & James Snow Parkway N

Phase	Duration (s)	Phase	Duration (s)
Ø1	15 s	Ø4	55.6 s
Ø2	76.9 s	Ø5	15 s
Ø3	15 s	Ø6	76.9 s
Ø7	15 s	Ø8	55.6 s

HCM Signalized Intersection Capacity Analysis

2023 FB PM Peak Hour

2: Regional Road 25 & James Snow Parkway N

08-15-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	30	165	162	175	107	218	78	771	143	132	433	5
Future Volume (vph)	30	165	162	175	107	218	78	771	143	132	433	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1217	2684	1103	1259	3147	1192	1534	2897	1439	1472	2909	
Fit Permitted	0.68	1.00	1.00	0.64	1.00	1.00	0.49	1.00	1.00	0.24	1.00	
Satd. Flow (perm)	874	2684	1103	854	3147	1192	793	2897	1439	374	2909	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	31	170	167	180	110	225	80	795	147	136	446	5
RTOR Reduction (vph)	0	0	116	0	0	157	0	0	87	0	1	0
Lane Group Flow (vph)	31	170	51	180	110	68	80	795	60	136	450	0
Conf. Peds. (#/hr)							1	1				
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	28.7	28.7	28.7	28.7	28.7	28.7	45.6	38.8	38.8	51.6	41.8	
Effective Green, g (s)	28.7	28.7	28.7	28.7	28.7	28.7	45.6	38.8	38.8	51.6	41.8	
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30	0.30	0.48	0.41	0.41	0.54	0.44	
Clearance Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	264	812	333	258	952	360	434	1185	588	317	1282	
v/s Ratio Prot		0.06			0.03		0.01	c0.27		c0.04	0.15	
v/s Ratio Perm	0.04		0.05	c0.21		0.06	0.08		0.04	0.19		
v/c Ratio	0.12	0.21	0.15	0.70	0.12	0.19	0.18	0.67	0.10	0.43	0.35	
Uniform Delay, d1	23.9	24.6	24.2	29.2	23.9	24.4	13.5	22.8	17.3	12.0	17.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	0.3	0.4	10.0	0.1	0.5	0.2	2.0	0.2	0.9	0.3	
Delay (s)	24.3	24.9	24.6	39.2	24.0	25.0	13.7	24.8	17.4	13.0	17.9	
Level of Service	C	C	C	D	C	C	B	C	B	B	B	
Approach Delay (s)		24.7			29.8			22.8			16.7	
Approach LOS		C			C			C			B	

Intersection Summary

HCM 2000 Control Delay 23.1

HCM 2000 Level of Service C

HCM 2000 Volume to Capacity ratio 0.65

Actuated Cycle Length (s) 94.8

Sum of lost time (s) 17.5

Intersection Capacity Utilization 67.0%

ICU Level of Service C

Analysis Period (min) 15

c Critical Lane Group

Lanes, Volumes, Timings

2023 FB PM Peak Hour

3: Boston Church Road & James Snow Parkway N

08-15-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗			↖ ↗			↖ ↗			↖ ↗		
Traffic Volume (vph)	101	297	73	29	336	22	145	45	28	10	29	35
Future Volume (vph)	101	297	73	29	336	22	145	45	28	10	29	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		0.0	70.0		0.0	60.0		25.0	60.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			70.0			90.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.970			0.991				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1508	3001	0	1415	2977	0	1113	3650	944	1534	3147	1498
Fit Permitted	0.417			0.511			0.554			0.723		
Satd. Flow (perm)	662	3001	0	761	2977	0	649	3650	944	1167	3147	1498
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		22			5			90			90	
Link Speed (k/h)		70			70			60			60	
Link Distance (m)		358.9			566.0			792.9			198.3	
Travel Time (s)		18.5			29.1			47.6			11.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%
Adj. Flow (vph)	112	330	81	32	373	24	161	50	31	11	32	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	112	411	0	32	397	0	161	50	31	11	32	39
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8	7	4	4	
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0		7.0	20.0		7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	11.0	33.5		11.0	33.5		11.0	31.6	31.6	11.0	31.6	31.6

Lanes, Volumes, Timings

2023 FB PM Peak Hour

3: Boston Church Road & James Snow Parkway N

08-15-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	17.0	50.5		17.0	50.5		24.0	48.6	48.6	24.0	48.6	48.6
Total Split (%)	12.1%	36.0%		12.1%	36.0%		17.1%	34.7%	34.7%	17.1%	34.7%	34.7%
Maximum Green (s)	13.0	44.0		13.0	44.0		20.0	41.0	41.0	20.0	41.0	41.0
Yellow Time (s)	3.0	3.7		3.0	3.7		3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	1.0	2.8		1.0	2.8		1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		7.0			7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		20.0			20.0			17.0	17.0		17.0	17.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effect Green (s)	34.9	26.3		29.7	21.7		33.2	27.6	27.6	21.1	15.8	15.8
Actuated g/C Ratio	0.46	0.34		0.39	0.28		0.43	0.36	0.36	0.28	0.21	0.21
v/c Ratio	0.27	0.39		0.09	0.47		0.42	0.04	0.08	0.03	0.05	0.10
Control Delay	15.6	22.1		14.2	27.9		19.2	18.6	0.4	14.9	30.5	0.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.6	22.1		14.2	27.9		19.2	18.6	0.4	14.9	30.5	0.5
LOS	B	C		B	C		B	B	A	B	C	A
Approach Delay		20.7			26.9			16.7			14.2	
Approach LOS		C			C			B			B	
Intersection Summary												
Area Type:	Other											
Cycle Length:	140.1											
Actuated Cycle Length:	76.7											
Natural Cycle:	90											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.47											
Intersection Signal Delay:	21.6						Intersection LOS: C					
Intersection Capacity Utilization:	52.3%						ICU Level of Service A					
Analysis Period (min):	15											
Splits and Phases:	3: Boston Church Road & James Snow Parkway N											

HCM Signalized Intersection Capacity Analysis  
3: Boston Church Road & James Snow Parkway N

2023 FB PM Peak Hour  
08-15-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	101	297	73	29	336	22	145	45	28	10	29	35
Future Volume (vph)	101	297	73	29	336	22	145	45	28	10	29	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1508	3002		1415	2977		1113	3650	944	1534	3147	1498
Fit Permitted	0.42	1.00		0.51	1.00		0.55	1.00	1.00	0.72	1.00	1.00
Satd. Flow (perm)	663	3002		761	2977		649	3650	944	1167	3147	1498
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	112	330	81	32	373	24	161	50	31	11	32	39
RTOR Reduction (vph)	0	15	0	0	4	0	0	0	20	0	0	33
Lane Group Flow (vph)	112	396	0	32	393	0	161	50	11	11	32	6
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		4
Actuated Green, G (s)	34.2	26.3		26.4	22.4		32.7	27.6	27.6	13.3	12.2	12.2
Effective Green, g (s)	34.2	26.3		26.4	22.4		32.7	27.6	27.6	13.3	12.2	12.2
Actuated g/C Ratio	0.42	0.32		0.33	0.28		0.40	0.34	0.34	0.16	0.15	0.15
Clearance Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	361	973		279	822		356	1242	321	196	473	225
v/s Ratio Prot	c0.03	0.13		0.01	c0.13		c0.09	0.01		0.00	0.01	
v/s Ratio Perm	0.10			0.03			c0.09		0.01	0.01		0.00
v/c Ratio	0.31	0.41		0.11	0.48		0.45	0.04	0.03	0.06	0.07	0.03
Uniform Delay, d1	14.8	21.3		18.9	24.5		17.0	17.9	17.8	28.5	29.6	29.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.6		0.2	0.9		0.9	0.0	0.1	0.1	0.1	0.1
Delay (s)	15.3	21.9		19.1	25.4		17.9	17.9	17.9	28.7	29.7	29.5
Level of Service	B	C		B	C		B	B	B	C	C	C
Approach Delay (s)		20.5			24.9			17.9			29.5	
Approach LOS		C			C			B			C	

Intersection Summary		
HCM 2000 Control Delay	22.1	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.47	C
Actuated Cycle Length (s)	81.1	Sum of lost time (s)
Intersection Capacity Utilization	52.3%	ICU Level of Service
Analysis Period (min)	15	A
c Critical Lane Group		


Lanes, Volumes, Timings  
4: Esquesing Line & James Snow Parkway N

2023 FB PM Peak Hour  
08-15-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	10	250	75	9	274	47	105	326	30	27	157	8
Future Volume (vph)	10	250	75	9	274	47	105	326	30	27	157	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		0.0	70.0		0.0	40.0		25.0	25.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			80.0			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.965			0.978			0.850			0.850	
Fit Protected	0.950			0.950			0.950		0.950		0.950	
Satd. Flow (prot)	1547	2928	0	1644	2864	0	1644	1731	1396	1615	1685	1396
Fit Permitted	0.535			0.532			0.645		0.482		0.482	
Satd. Flow (perm)	871	2928	0	921	2864	0	1116	1731	1396	819	1685	1396
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		36			18			74			74	
Link Speed (k/h)		70			70			60			60	
Link Distance (m)		346.4			1421.7			292.4			1994.7	
Travel Time (s)		17.8			73.1			17.5			119.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	11%	17%	13%	14%	17%
Adj. Flow (vph)	11	284	85	10	311	53	119	370	34	31	178	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	369	0	10	364	0	119	370	34	31	178	9
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8		2	2	2	6	6	6
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	7.0	15.0		7.0	15.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	11.0	30.6		11.0	30.6		33.5	33.5	33.5	33.5	33.5	33.5

Lanes, Volumes, Timings  
4: Esquesing Line & James Snow Parkway N

2023 FB PM Peak Hour  
08-15-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	19.0	41.6		19.0	41.6		51.5	51.5	51.5	51.5	51.5	51.5
Total Split (%)	16.9%	37.1%		16.9%	37.1%		45.9%	45.9%	45.9%	45.9%	45.9%	45.9%
Maximum Green (s)	15.0	35.0		15.0	35.0		45.0	45.0	45.0	45.0	45.0	45.0
Yellow Time (s)	3.0	4.2		3.0	4.2		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	2.4		1.0	2.4		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		17.0			17.0		20.0	20.0	20.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	20.3	16.6		20.3	16.6		22.7	22.7	22.7	22.7	22.7	22.7
Actuated g/C Ratio	0.37	0.30		0.37	0.30		0.42	0.42	0.42	0.42	0.42	0.42
v/c Ratio	0.03	0.40		0.02	0.41		0.26	0.51	0.05	0.09	0.25	0.01
Control Delay	11.2	16.2		11.1	17.2		13.5	15.7	1.0	12.1	12.6	0.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.2	16.2		11.1	17.2		13.5	15.7	1.0	12.1	12.6	0.0
LOS	B	B		B	B		B	B	A	B	B	A
Approach Delay		16.0			17.0			14.3			12.0	
Approach LOS		B			B			B			B	


Intersection Summary	
Area Type:	Other
Cycle Length:	112.1
Actuated Cycle Length:	54.5
Natural Cycle:	80
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.51
Intersection Signal Delay:	15.1
Intersection Capacity Utilization:	62.7%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	B

Splits and Phases: 4: Esquesing Line & James Snow Parkway N

Phase 02	Phase 03	Phase 04
51.5 s	19 s	41.6 s
Phase 06	Phase 07	Phase 08
51.5 s	19 s	41.6 s

HCM Signalized Intersection Capacity Analysis  
4: Esquesing Line & James Snow Parkway N

2023 FB PM Peak Hour  
08-15-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	250	75	9	274	47	105	326	30	27	157	8
Future Volume (vph)	10	250	75	9	274	47	105	326	30	27	157	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1547	2929		1644	2864		1644	1731	1396	1615	1685	1396
Flt Permitted	0.53	1.00		0.53	1.00		0.64	1.00	1.00	0.48	1.00	1.00
Satd. Flow (perm)	871	2929		921	2864		1116	1731	1396	820	1685	1396
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	284	85	10	311	53	119	370	34	31	178	9
RTOR Reduction (vph)	0	26	0	0	13	0	0	0	21	0	0	5
Lane Group Flow (vph)	11	343	0	10	351	0	119	370	13	31	178	4
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	11%	17%	13%	14%	17%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	17.6	16.6		17.6	16.6		22.7	22.7	22.7	22.7	22.7	22.7
Effective Green, g (s)	17.6	16.6		17.6	16.6		22.7	22.7	22.7	22.7	22.7	22.7
Actuated g/C Ratio	0.31	0.29		0.31	0.29		0.40	0.40	0.40	0.40	0.40	0.40
Clearance Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	278	847		294	828		441	684	552	324	666	552
v/s Ratio Prot	c0.00	0.12		0.00	c0.12			c0.21			0.11	
v/s Ratio Perm	0.01			0.01			0.11		0.01	0.04		0.00
v/c Ratio	0.04	0.41		0.03	0.42		0.27	0.54	0.02	0.10	0.27	0.01
Uniform Delay, d1	13.9	16.4		13.9	16.5		11.7	13.3	10.6	10.9	11.7	10.5
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	0.7		0.0	0.7		0.7	1.5	0.0	0.3	0.5	0.0
Delay (s)	14.0	17.1		13.9	17.3		12.4	14.9	10.6	11.2	12.2	10.5
Level of Service	B	B		B	B		B	B	B	B	B	B
Approach Delay (s)		17.0			17.2			14.0			12.0	
Approach LOS		B			B			B			B	

Intersection Summary	
HCM 2000 Control Delay	15.3
HCM 2000 Volume to Capacity ratio	0.48
Actuated Cycle Length (s)	57.4
Intersection Capacity Utilization	62.7%
Analysis Period (min)	15
HCM 2000 Level of Service	B
Sum of lost time (s)	17.1
ICU Level of Service	B

c Critical Lane Group



Lanes, Volumes, Timings

2023 FB PM Peak Hour

5: James Snow Parkway N & Steeles Avenue East

08-15-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	11	384	423	363	678	128	387	191	167	94	205	13
Future Volume (vph)	11	384	423	363	678	128	387	191	167	94	205	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	122.0		72.0	170.0		130.0	105.0		260.0	160.0		0.0
Storage Lanes	1		1	2		1	2		1	1		0
Taper Length (m)	60.0			70.0			80.0			80.0		
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	0.95
Fit			0.850			0.850			0.850		0.991	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3579	1601	3471	3579	1601	3471	3579	1601	1789	3546	0
Fit Permitted	0.372			0.950			0.950			0.621		
Satd. Flow (perm)	701	3579	1601	3471	3579	1601	3471	3579	1601	1170	3546	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			460			139			182			4
Link Speed (k/h)		60			70			60			70	
Link Distance (m)		729.0			881.4			342.7			1421.7	
Travel Time (s)		43.7			45.3			20.6			73.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	417	460	395	737	139	421	208	182	102	223	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	417	460	395	737	139	421	208	182	102	237	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.0			4.0			4.0			4.0	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2		6		6		8	4		
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	7.0	22.0	22.0	7.0	22.0	22.0	7.0	15.0	15.0	7.0	15.0	
Minimum Split (s)	11.0	47.2	47.2	12.0	47.2	47.2	12.0	46.3	46.3	11.0	46.3	
Total Split (s)	15.0	55.2	55.2	26.0	66.2	66.2	29.0	59.0	59.0	24.0	54.0	

Lanes, Volumes, Timings

2023 FB PM Peak Hour

5: James Snow Parkway N & Steeles Avenue East

08-15-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	9.1%	33.6%	33.6%	15.8%	40.3%	40.3%	17.7%	35.9%	14.6%	32.9%		
Maximum Green (s)	11.0	48.0	48.0	21.0	59.0	59.0	24.0	51.7	51.7	20.0	46.7	
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	4.2	4.2	3.0	4.2	
All-Red Time (s)	1.0	3.5	3.5	2.0	3.5	3.5	2.0	3.1	3.1	1.0	3.1	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	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	5.0	5.0	3.0	5.0	
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		33.0	33.0		33.0	33.0		32.0	32.0		32.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effect Green (s)	32.7	22.4	22.4	17.9	43.4	43.4	18.1	25.2	25.2	28.5	15.7	
Actuated g/C Ratio	0.33	0.23	0.23	0.18	0.44	0.44	0.18	0.26	0.26	0.29	0.16	
v/c Ratio	0.04	0.51	0.64	0.63	0.47	0.18	0.66	0.23	0.33	0.26	0.42	
Control Delay	16.0	37.0	8.0	42.8	22.0	4.4	43.3	30.5	6.5	20.4	40.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	16.0	37.0	8.0	42.8	22.0	4.4	43.3	30.5	6.5	20.4	40.4	
LOS	B	D	A	D	C	A	D	C	A	C	D	
Approach Delay		21.7			26.6			31.7			34.4	
Approach LOS		C			C			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 164.2

Actuated Cycle Length: 98.7

Natural Cycle: 130

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 27.3

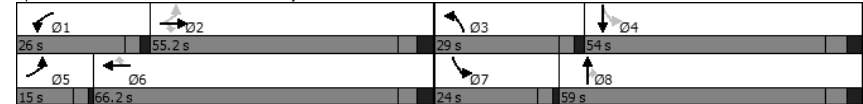
Intersection LOS: C

Intersection Capacity Utilization 72.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: James Snow Parkway N & Steeles Avenue East



HCM Signalized Intersection Capacity Analysis  
5: James Snow Parkway N & Steeles Avenue East

2023 FB PM Peak Hour  
08-15-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	11	384	423	363	678	128	387	191	167	94	205	13
Future Volume (vph)	11	384	423	363	678	128	387	191	167	94	205	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	
Fit	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	3579	1601	3471	3579	1601	3471	3579	1601	1789	3547	
Fit Permitted	0.37	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.62	1.00	
Satd. Flow (perm)	700	3579	1601	3471	3579	1601	3471	3579	1601	1170	3547	
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)	12	417	460	395	737	139	421	208	182	102	223	14
RTOR Reduction (vph)	0	0	344	0	0	80	0	0	137	0	3	0
Lane Group Flow (vph)	12	417	116	395	737	59	421	208	45	102	234	0
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2		6			8		4		
Actuated Green, G (s)	27.1	25.8	25.8	17.9	43.4	43.4	18.1	25.2	25.2	25.3	15.7	
Effective Green, g (s)	27.1	25.8	25.8	17.9	43.4	43.4	18.1	25.2	25.2	25.3	15.7	
Actuated g/C Ratio	0.27	0.25	0.25	0.18	0.43	0.43	0.18	0.25	0.25	0.25	0.15	
Clearance Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	199	905	404	609	1522	681	615	884	395	348	545	
v/s Ratio Prot	0.00	0.12		c0.11	c0.21		c0.12	0.06		0.03	c0.07	
v/s Ratio Perm	0.02		0.07		0.04			0.03		0.05		
v/c Ratio	0.06	0.46	0.29	0.65	0.48	0.09	0.68	0.24	0.11	0.29	0.43	
Uniform Delay, d1	27.7	32.2	30.7	39.1	21.2	17.5	39.3	30.7	29.7	30.6	39.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.4	0.4	2.4	0.2	0.1	3.2	0.3	0.3	0.5	1.1	
Delay (s)	27.8	32.6	31.1	41.5	21.4	17.5	42.4	31.0	30.0	31.1	40.2	
Level of Service	C	C	C	D	C	B	D	C	C	C	D	
Approach Delay (s)		31.8			27.3			36.7			37.5	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	31.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	102.0	Sum of lost time (s)	24.5
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		

Lanes, Volumes, Timings  
6: Boston Church Road/3 Line & 5 Sideroad

2023 FB PM Peak Hour  
08-15-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	23	179	11	29	303	2	23	71	74	5	34	6
Future Volume (vph)	23	179	11	29	303	2	23	71	74	5	34	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit		0.993			0.999			0.941			0.982	
Fit Protected		0.995			0.996			0.993			0.994	
Satd. Flow (prot)	0	1669	0	0	1690	0	0	1571	0	0	1653	0
Fit Permitted		0.995			0.996			0.993			0.994	
Satd. Flow (perm)	0	1669	0	0	1690	0	0	1571	0	0	1653	0
Link Speed (k/h)		60			60			70			60	
Link Distance (m)		166.9			1343.2			219.2			496.0	
Travel Time (s)		10.0			80.6			11.3			29.8	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	13%	13%	27%	13%	13%	33%	13%	17%	12%	43%	9%	13%
Adj. Flow (vph)	26	206	13	33	348	2	26	82	85	6	39	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	245	0	0	383	0	0	193	0	0	52	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		24		14	24		14	24		14	24	14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type:	Unsignalized		
Intersection Capacity Utilization	42.4%	ICU Level of Service A	
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis  
6: Boston Church Road/3 Line & 5 Sideroad

2023 FB PM Peak Hour  
08-15-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	23	179	11	29	303	2	23	71	74	5	34	6
Future Volume (vph)	23	179	11	29	303	2	23	71	74	5	34	6
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	26	206	13	33	348	2	26	82	85	6	39	7
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	245	383	193	52								
Volume Left (vph)	26	33	26	6								
Volume Right (vph)	13	2	85	7								
Hadj (s)	0.22	0.24	0.01	0.17								
Departure Headway (s)	5.4	5.3	5.7	6.2								
Degree Utilization, x	0.37	0.56	0.30	0.09								
Capacity (veh/h)	621	658	571	487								
Control Delay (s)	11.6	14.7	11.2	9.8								
Approach Delay (s)	11.6	14.7	11.2	9.8								
Approach LOS	B	B	B	A								
<b>Intersection Summary</b>												
Delay	12.8											
Level of Service	B											
Intersection Capacity Utilization	42.4%			ICU Level of Service			A					
Analysis Period (min)	15											

Lanes, Volumes, Timings  
7: Esquesing Line/Fourth Line & 5 Sideroad

2023 FB PM Peak Hour  
08-15-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	30	219	11	65	277	18	23	282	78	4	116	39
Future Volume (vph)	30	219	11	65	277	18	23	282	78	4	116	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.994			0.993			0.972			0.967		
Fit Protected	0.994			0.991			0.997			0.999		
Satd. Flow (prot)	0	1646	0	0	1667	0	0	1682	0	0	1624	0
Fit Permitted	0.930			0.890			0.976			0.989		
Satd. Flow (perm)	0	1540	0	0	1497	0	0	1647	0	0	1608	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	4			4			18			22		
Link Speed (k/h)	60			60			60			70		
Link Distance (m)	1343.2			646.3			1994.7			464.9		
Travel Time (s)	80.6			38.8			119.7			23.9		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Adj. Flow (vph)	34	249	13	74	315	20	26	320	89	5	132	44
<b>Shared Lane Traffic (%)</b>												
Lane Group Flow (vph)	0	296	0	0	409	0	0	435	0	0	181	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0			3.7			3.7		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	1.6			1.6			1.6			1.6		
<b>Two way Left Turn Lane</b>												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
<b>Detector 1 Channel</b>												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
<b>Detector 2 Channel</b>												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
<b>Switch Phase</b>												

Lanes, Volumes, Timings

2023 FB PM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

08-15-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	48.0	48.0		48.0	48.0		42.0	42.0		42.0	42.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%		46.7%	46.7%		46.7%	46.7%	
Maximum Green (s)	43.5	43.5		43.5	43.5		37.5	37.5		37.5	37.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		52.4			52.4			28.6			28.6	
Actuated g/C Ratio		0.58			0.58			0.32			0.32	
v/c Ratio		0.33			0.47			0.81			0.34	
Control Delay		12.4			14.6			38.8			20.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		12.4			14.6			38.8			20.8	
LOS		B			B			D			C	
Approach Delay		12.4			14.6			38.8			20.8	
Approach LOS		B			B			D			C	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 44 (49%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 45

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 22.9

Intersection Capacity Utilization 68.5%

Analysis Period (min) 15

Intersection LOS: C

ICU Level of Service C

Splits and Phases: 7: Esquesing Line/Fourth Line & 5 Sideroad

→ Ø2 (R)	↘ Ø4
48 s	42 s
← Ø6 (R)	↙ Ø8
48 s	42 s

HCM Signalized Intersection Capacity Analysis

2023 FB PM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

08-15-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	30	219	11	65	277	18	23	282	78	4	116	39
Future Volume (vph)	30	219	11	65	277	18	23	282	78	4	116	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.97			0.97	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		1647			1667			1683			1624	
Flt Permitted		0.93			0.89			0.98			0.99	
Satd. Flow (perm)		1540			1498			1647			1608	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	34	249	12	74	315	20	26	320	89	5	132	44
RTOR Reduction (vph)	0	2	0	0	2	0	0	12	0	0	15	0
Lane Group Flow (vph)	0	294	0	0	407	0	0	423	0	0	166	0
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		52.4			52.4			28.6			28.6	
Effective Green, g (s)		52.4			52.4			28.6			28.6	
Actuated g/C Ratio		0.58			0.58			0.32			0.32	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		896			872			523			510	
v/s Ratio Prot												
v/s Ratio Perm		0.19			0.27			0.26			0.10	
v/c Ratio		0.33			0.47			0.81			0.33	
Uniform Delay, d1		9.7			10.8			28.2			23.4	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.0			1.8			8.9			0.4	
Delay (s)		10.7			12.6			37.1			23.7	
Level of Service		B			B			D			C	
Approach Delay (s)		10.7			12.6			37.1			23.7	
Approach LOS		B			B			D			C	

Intersection Summary

HCM 2000 Control Delay 21.8

HCM 2000 Level of Service C

HCM 2000 Volume to Capacity ratio 0.59

Actuated Cycle Length (s) 90.0

Intersection Capacity Utilization 68.5%

Analysis Period (min) 15

ICU Level of Service C

Sum of lost time (s) 9.0

ICU Level of Service C

c Critical Lane Group

Lanes, Volumes, Timings

2023 FT AM Peak Hour

1: Regional Road 25 & 5 Sideroad

09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	330	237	66	88	14	86	303	115	110	495	69
Future Volume (vph)	79	330	237	66	88	14	86	303	115	110	495	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	70.0		0.0	75.0		70.0	35.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	100.0			100.0			75.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.937			0.979				0.850		0.982	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1601	1554	0	1342	1598	0	1225	2920	1338	1601	3050	0
Fit Permitted	0.611			0.276			0.286			0.557		
Satd. Flow (perm)	1030	1554	0	390	1598	0	369	2920	1338	939	3050	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					8				122			14
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		573.6			536.0			986.0			203.5	
Travel Time (s)		34.4			32.2			50.7			10.5	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Adj. Flow (vph)	84	351	252	70	94	15	91	322	122	117	527	73
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	603	0	70	109	0	91	322	122	117	600	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	NA
Protected Phases	3	8		4	4		5	2	2	6	6	6
Permitted Phases	8			4			2		2	6		
Detector Phase	3	8		4	4		5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		10.0	10.0		7.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	11.0	38.0		38.0	38.0		11.0	38.2	38.2	38.2	38.2	38.2

Lanes, Volumes, Timings

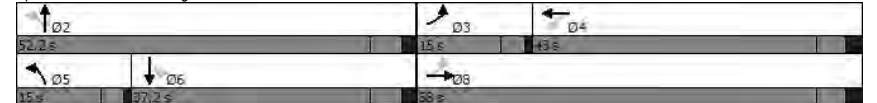
2023 FT AM Peak Hour

1: Regional Road 25 & 5 Sideroad

09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	15.0	58.0		43.0	43.0		15.0	52.2	52.2	37.2	37.2	37.2
Total Split (%)	13.6%	52.6%		39.0%	39.0%		13.6%	47.4%	47.4%	33.8%	33.8%	33.8%
Maximum Green (s)	11.0	52.0		37.0	37.0		11.0	46.0	46.0	31.0	31.0	31.0
Yellow Time (s)	3.0	3.7		3.7	3.7		3.0	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	1.0	2.3		2.3	2.3		1.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0		6.0	6.0		4.0	6.2	6.2	6.2	6.2	6.2
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.7		3.7	3.7		3.0	3.6	3.6	4.2	4.2	4.2
Recall Mode	None	None		None	None		None	Ped	Ped	Ped	Ped	Ped
Walk Time (s)		7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		25.0		25.0	25.0		25.0	25.0	25.0	25.0	25.0	25.0
Pedestrian Calls (#/hr)		0		0	0		0	0	0	0	0	0
Act Effect Green (s)	44.3	42.3		32.5	32.5		46.1	43.8	43.8	33.1	33.1	33.1
Actuated g/C Ratio	0.45	0.43		0.33	0.33		0.47	0.44	0.44	0.34	0.34	0.34
v/c Ratio	0.16	0.91		0.55	0.21		0.36	0.25	0.18	0.37	0.58	0.58
Control Delay	16.8	45.5		48.6	25.3		21.8	19.2	4.4	34.6	32.4	32.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.8	45.5		48.6	25.3		21.8	19.2	4.4	34.6	32.4	32.4
LOS	B	D		D	C		C	B	A	C	C	C
Approach Delay		42.0			34.4			16.3			32.7	
Approach LOS		D			C			B			C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	110.2											
Actuated Cycle Length:	98.7											
Natural Cycle:	100											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.91											
Intersection Signal Delay:	31.7						Intersection LOS: C					
Intersection Capacity Utilization:	93.8%						ICU Level of Service F					
Analysis Period (min):	15											

Splits and Phases: 1: Regional Road 25 & 5 Sideroad



HCM Signalized Intersection Capacity Analysis  
1: Regional Road 25 & 5 Sideroad

2023 FT AM Peak Hour  
09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	79	330	237	66	88	14	86	303	115	110	495	69
Future Volume (vph)	79	330	237	66	88	14	86	303	115	110	495	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	6.0	6.0	4.0	6.2	6.2	6.2	6.2	6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95
Frt	1.00	0.94	1.00	0.98	1.00	1.00	0.85	1.00	0.98	1.00	0.98	1.00
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1601	1554	1342	1599	1225	2920	1338	1601	3049	1601	3049	1601
Fit Permitted	0.61	1.00	0.28	1.00	0.29	1.00	1.00	0.56	1.00	0.61	1.00	0.61
Satd. Flow (perm)	1030	1554	390	1599	369	2920	1338	938	3049	1030	1554	390
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	84	351	252	70	94	15	91	322	122	117	527	73
RTOR Reduction (vph)	0	0	0	0	5	0	0	0	67	0	9	0
Lane Group Flow (vph)	84	603	0	70	104	0	91	322	55	117	591	0
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	Perm	Perm	NA	pm+pt	NA	Perm
Protected Phases	3	8		4	5	2		6		6		6
Permitted Phases	8		4		2		2	6				
Actuated Green, G (s)	43.3	43.3	32.5	32.5	44.9	44.9	44.9	33.1	33.1	43.3	43.3	32.5
Effective Green, g (s)	43.3	43.3	32.5	32.5	44.9	44.9	44.9	33.1	33.1	43.3	43.3	32.5
Actuated g/C Ratio	0.43	0.43	0.32	0.32	0.45	0.45	0.45	0.33	0.33	0.43	0.43	0.32
Clearance Time (s)	4.0	6.0	6.0	6.0	4.0	6.2	6.2	6.2	6.2	4.0	6.2	6.2
Vehicle Extension (s)	3.0	3.7	3.7	3.7	3.0	3.6	3.6	4.2	4.2	3.0	3.7	3.7
Lane Grp Cap (vph)	482	670	126	517	231	1305	598	309	1005	482	670	126
v/s Ratio Prot	0.01	c0.39		0.06	c0.03	0.11		c0.19		c0.19		c0.19
v/s Ratio Perm	0.06		0.18		0.15		0.04	0.12		0.04		0.12
v/c Ratio	0.17	0.90	0.56	0.20	0.39	0.25	0.09	0.38	0.59	0.17	0.90	0.56
Uniform Delay, d1	17.2	26.5	28.0	24.6	17.4	17.2	16.0	25.8	28.0	17.2	26.5	28.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	15.5	6.0	0.2	1.1	0.1	0.1	1.2	1.1	0.2	15.5	6.0
Delay (s)	17.4	42.0	34.0	24.8	18.6	17.4	16.1	26.9	29.1	17.4	42.0	34.0
Level of Service	B	D	C	C	B	B	B	C	C	B	D	C
Approach Delay (s)		39.0		28.4		17.3		28.7			39.0	
Approach LOS		D		C		B		C			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay	29.1		HCM 2000 Level of Service				C					
HCM 2000 Volume to Capacity ratio	0.77											
Actuated Cycle Length (s)	100.4		Sum of lost time (s)				20.2					
Intersection Capacity Utilization	93.8%		ICU Level of Service				F					
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings  
2: Regional Road 25 & James Snow Parkway N

2023 FT AM Peak Hour  
09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	12	89	40	109	110	67	195	500	519	239	435	32
Future Volume (vph)	12	89	40	109	110	67	195	500	519	239	435	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		115.0	85.0		35.0	30.0		0.0	75.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	40.0			90.0			70.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor									0.99	1.00		
Frt			0.850			0.850			0.850		0.990	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1217	2684	1103	1259	3147	1192	1534	2897	1458	1472	2852	0
Fit Permitted	0.681			0.694			0.475			0.441		
Satd. Flow (perm)	872	2684	1103	919	3147	1192	767	2897	1439	683	2852	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			58			69			535		7	
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		452.4			1065.5			592.1			986.0	
Travel Time (s)		27.1			63.9			30.5			50.7	
Confl. Peds. (#/hr)									1		1	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Adj. Flow (vph)	12	92	41	112	113	69	201	515	535	246	448	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	92	41	112	113	69	201	515	535	246	481	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.2	9.0	9.0	9.0	9.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	
Switch Phase												

Lanes, Volumes, Timings

2023 FT AM Peak Hour

2: Regional Road 25 & James Snow Parkway N

09-09-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	43.6	43.6	43.6	43.6	43.6	43.6	11.0	42.9	42.9	11.0	35.9	
Total Split (s)	55.6	55.6	55.6	55.6	55.6	55.6	15.0	76.9	76.9	15.0	76.9	
Total Split (%)	37.7%	37.7%	37.7%	37.7%	37.7%	37.7%	10.2%	52.1%	52.1%	10.2%	52.1%	
Maximum Green (s)	49.0	49.0	49.0	49.0	49.0	49.0	11.0	70.0	70.0	11.0	70.0	
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	4.2	4.2	3.0	4.2	
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	1.0	2.7	2.7	1.0	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	30.0	30.0	30.0	30.0	30.0	30.0		29.0	29.0		22.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0	0		0	
Act Effect Green (s)	16.5	16.5	16.5	16.5	16.5	16.5	39.1	25.8	25.8	39.3	26.0	
Actuated g/C Ratio	0.23	0.23	0.23	0.23	0.23	0.23	0.55	0.36	0.36	0.56	0.37	
v/c Ratio	0.06	0.15	0.14	0.52	0.15	0.21	0.38	0.49	0.62	0.50	0.46	
Control Delay	23.6	23.2	5.5	34.8	23.0	8.2	9.2	19.7	5.3	11.2	18.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	23.6	23.2	5.5	34.8	23.0	8.2	9.2	19.7	5.3	11.2	18.9	
LOS	C	C	A	C	C	A	A	B	A	B	B	
Approach Delay		18.2			24.0			11.8			16.3	
Approach LOS		B			C			B			B	

Intersection Summary

Area Type:	Other
Cycle Length:	147.5
Actuated Cycle Length:	70.7
Natural Cycle:	100
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.62
Intersection Signal Delay:	15.0
Intersection LOS:	B
Intersection Capacity Utilization:	68.4%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 2: Regional Road 25 & James Snow Parkway N

Ø1	Ø2	Ø3	Ø4
15 s	76.9 s	55.6 s	55.6 s
Ø5	Ø6	Ø7	Ø8
15 s	76.9 s	55.6 s	55.6 s

HCM Signalized Intersection Capacity Analysis

2023 FT AM Peak Hour

2: Regional Road 25 & James Snow Parkway N

09-09-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	12	89	40	109	110	67	195	500	519	239	435	32
Future Volume (vph)	12	89	40	109	110	67	195	500	519	239	435	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1217	2684	1103	1259	3147	1192	1534	2897	1440	1472	2851	
Fit Permitted	0.68	1.00	1.00	0.69	1.00	1.00	0.47	1.00	1.00	0.44	1.00	
Satd. Flow (perm)	872	2684	1103	920	3147	1192	767	2897	1440	683	2851	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	12	92	41	112	113	69	201	515	535	246	448	33
RTOR Reduction (vph)	0	0	31	0	0	53	0	0	338	0	4	0
Lane Group Flow (vph)	12	92	10	112	113	16	201	515	197	246	477	0
Confl. Peds. (#/hr)							1		1			
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	16.5	16.5	16.5	16.5	16.5	16.5	36.0	25.8	25.8	36.4	26.0	
Effective Green, g (s)	16.5	16.5	16.5	16.5	16.5	16.5	36.0	25.8	25.8	36.4	26.0	
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24	0.24	0.51	0.37	0.37	0.52	0.37	
Clearance Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	204	630	259	216	739	280	504	1064	529	471	1055	
v/s Ratio Prot		0.03			0.04		0.06	0.18		c0.08	0.17	
v/s Ratio Perm	0.01		0.01	c0.12		0.01	0.15		0.14	c0.19		
v/c Ratio	0.06	0.15	0.04	0.52	0.15	0.06	0.40	0.48	0.37	0.52	0.45	
Uniform Delay, d1	20.8	21.3	20.7	23.4	21.3	20.8	9.6	17.1	16.3	9.8	16.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.2	0.1	4.1	0.2	0.2	0.5	0.7	0.9	1.0	0.6	
Delay (s)	21.1	21.5	20.8	27.5	21.5	21.0	10.1	17.8	17.2	10.8	17.4	
Level of Service	C	C	C	C	C	C	B	B	B	B	B	
Approach Delay (s)		21.3			23.7			16.3			15.1	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	70.2	Sum of lost time (s)	17.5
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

2023 FT AM Peak Hour

3: Boston Church Road & James Snow Parkway N

09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	102	583	127	14	222	275	28	5	11	98	32	136
Future Volume (vph)	102	583	127	14	222	275	28	5	11	98	32	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		0.0	70.0		0.0	60.0		25.0	60.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			70.0			90.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.973			0.917				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1508	3010	0	1415	2847	0	1113	3650	944	1534	3147	1498
Fit Permitted	0.339			0.333			0.732			0.522		
Satd. Flow (perm)	538	3010	0	496	2847	0	857	3650	944	843	3147	1498
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			234				90			151
Link Speed (k/h)		70			70				60			60
Link Distance (m)		358.9			547.4				792.9			198.3
Travel Time (s)		18.5			28.2				47.6			11.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%
Adj. Flow (vph)	113	648	141	16	247	306	31	6	12	109	36	151
Shared Lane Traffic (%)												
Lane Group Flow (vph)	113	789	0	16	553	0	31	6	12	109	36	151
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7				3.7			3.7
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		1.6			1.6				1.6			1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8	8	7	4	4
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0		7.0	20.0		7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	11.0	33.5		11.0	33.5		11.0	31.6	31.6	11.0	31.6	31.6

Lanes, Volumes, Timings

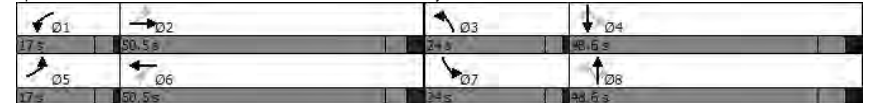
2023 FT AM Peak Hour

3: Boston Church Road & James Snow Parkway N

09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	17.0	50.5		17.0	50.5		24.0	48.6	48.6	24.0	48.6	48.6
Total Split (%)	12.1%	36.0%		12.1%	36.0%		17.1%	34.7%	34.7%	17.1%	34.7%	34.7%
Maximum Green (s)	13.0	44.0		13.0	44.0		20.0	41.0	41.0	20.0	41.0	41.0
Yellow Time (s)	3.0	3.7		3.0	3.7		3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	1.0	2.8		1.0	2.8		1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		7.0			7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		20.0			20.0			17.0	17.0		17.0	17.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effect Green (s)	39.1	33.1		33.6	25.5		17.3	16.1	16.1	25.3	17.5	17.5
Actuated g/C Ratio	0.54	0.45		0.46	0.35		0.24	0.22	0.22	0.35	0.24	0.24
v/c Ratio	0.27	0.57		0.05	0.48		0.13	0.01	0.04	0.25	0.05	0.32
Control Delay	11.2	18.4		10.4	13.2		22.7	32.6	0.3	20.8	28.0	8.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.2	18.4		10.4	13.2		22.7	32.6	0.3	20.8	28.0	8.0
LOS	B	B		B	B		C	C	A	C	C	A
Approach Delay		17.5			13.1			18.4			15.2	
Approach LOS		B			B			B			B	
Intersection Summary												
Area Type:	Other											
Cycle Length:	140.1											
Actuated Cycle Length:	73											
Natural Cycle:	90											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.57											
Intersection Signal Delay:	15.8						Intersection LOS: B					
Intersection Capacity Utilization:	53.6%						ICU Level of Service A					
Analysis Period (min):	15											

Splits and Phases: 3: Boston Church Road & James Snow Parkway N





HCM Signalized Intersection Capacity Analysis  
3: Boston Church Road & James Snow Parkway N

2023 FT AM Peak Hour  
09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↕	↔	↔	↕	↔	↕	↕	↔	↔	↕	↕	
Traffic Volume (vph)	102	583	127	14	222	275	28	5	11	98	32	136	
Future Volume (vph)	102	583	127	14	222	275	28	5	11	98	32	136	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	6.5	4.0	6.5	4.0	7.6	7.6	4.0	7.6	4.0	7.6	7.6	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	
Frt	1.00	0.97	1.00	0.92	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1508	3010	1415	2847	1113	3650	944	1534	3147	1498			
Fit Permitted	0.34	1.00	0.33	1.00	0.73	1.00	1.00	0.52	1.00	1.00			
Satd. Flow (perm)	538	3010	495	2847	858	3650	944	842	3147	1498			
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Adj. Flow (vph)	113	648	141	16	247	306	31	6	12	109	36	151	
RTOR Reduction (vph)	0	11	0	0	153	0	0	11	0	0	0	114	
Lane Group Flow (vph)	113	778	0	16	400	0	31	6	1	109	36	37	
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%	
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	Perm	
Protected Phases	5	2		1	6		3	8		7	4		
Permitted Phases	2			6			8	4				4	
Actuated Green, G (s)	39.2	33.1		29.5	27.4		11.6	9.0		9.0	25.8	19.2	
Effective Green, g (s)	39.2	33.1		29.5	27.4		11.6	9.0		9.0	25.8	19.2	
Actuated g/C Ratio	0.50	0.42		0.37	0.35		0.15	0.11		0.11	0.33	0.24	
Clearance Time (s)	4.0	6.5		4.0	6.5		4.0	7.6		7.6	4.0	7.6	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	5.0	
Lane Grp Cap (vph)	362	1259		209	986		134	415		107	386	763	
v/s Ratio Prot	c0.03	c0.26		0.00	0.14		0.01	0.00		c0.05	0.01		
v/s Ratio Perm	0.12			0.03			0.03	0.00		c0.05		0.02	
v/c Ratio	0.31	0.62		0.08	0.41		0.23	0.01		0.28	0.05	0.10	
Uniform Delay, d1	11.3	18.0		15.7	19.7		29.6	31.1		31.1	19.4	22.9	
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	1.3		0.2	0.6		0.9	0.0		0.1	0.4	0.1	
Delay (s)	11.8	19.4		15.9	20.2		30.5	31.1		31.2	19.8	23.0	
Level of Service	B	B		B	C		C	C		C	B	C	
Approach Delay (s)		18.4			20.1			30.8			22.1		
Approach LOS		B			C			C			C		
<b>Intersection Summary</b>													
HCM 2000 Control Delay	19.9			HCM 2000 Level of Service				B					
HCM 2000 Volume to Capacity ratio	0.50												
Actuated Cycle Length (s)	79.1			Sum of lost time (s)				22.1					
Intersection Capacity Utilization	53.6%			ICU Level of Service				A					
Analysis Period (min)	15												
c Critical Lane Group													

Lanes, Volumes, Timings  
4: Esquesing Line & James Snow Parkway N

2023 FT AM Peak Hour  
09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↕	↕	↔	↔	↕	↕
Traffic Volume (vph)	18	541	141	38	481	39	64	184	6	40	364	17
Future Volume (vph)	18	541	141	38	481	39	64	184	6	40	364	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		0.0	70.0		0.0	40.0		25.0	25.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			80.0			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.969			0.989			0.850				0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1547	2938	0	1644	2859	0	1644	1731	1396	1615	1685	1396
Fit Permitted	0.400			0.247			0.368			0.626		
Satd. Flow (perm)	651	2938	0	427	2859	0	637	1731	1396	1064	1685	1396
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			8				74			74
Link Speed (k/h)		70			70			60				60
Link Distance (m)		346.4			1421.7			292.4				1994.7
Travel Time (s)		17.8			73.1			17.5				119.7
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	17%	13%	14%	17%	17%
Adj. Flow (vph)	20	615	160	43	547	44	73	209	7	45	414	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	775	0	43	591	0	73	209	7	45	414	19
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7				3.7
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		1.6			1.6			1.6				1.6
<b>Two way Left Turn Lane</b>												
Headway Factor	0.99	0.99		0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
<b>Detector Template</b>												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
<b>Detector 1 Channel</b>												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8		2	2	2	6		6
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6		6
<b>Switch Phase</b>												
Minimum Initial (s)	7.0	15.0		7.0	15.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	11.0	30.6		11.0	30.6		33.5	33.5	33.5	33.5	33.5	33.5

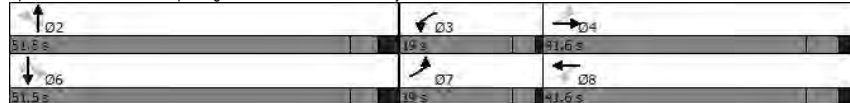
Lanes, Volumes, Timings  
4: Esquesing Line & James Snow Parkway N

2023 FT AM Peak Hour  
09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	19.0	41.6		19.0	41.6		51.5	51.5	51.5	51.5	51.5	51.5
Total Split (%)	16.9%	37.1%		16.9%	37.1%		45.9%	45.9%	45.9%	45.9%	45.9%	45.9%
Maximum Green (s)	15.0	35.0		15.0	35.0		45.0	45.0	45.0	45.0	45.0	45.0
Yellow Time (s)	3.0	4.2		3.0	4.2		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	2.4		1.0	2.4		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		17.0			17.0		20.0	20.0	20.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	34.6	28.2		35.8	30.4		28.6	28.6	28.6	28.6	28.6	28.6
Actuated g/C Ratio	0.45	0.37		0.47	0.40		0.37	0.37	0.37	0.37	0.37	0.37
v/c Ratio	0.05	0.71		0.13	0.52		0.31	0.32	0.01	0.11	0.66	0.03
Control Delay	12.1	25.8		12.5	20.9		24.6	21.1	0.0	19.8	28.0	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.1	25.8		12.5	20.9		24.6	21.1	0.0	19.8	28.0	0.1
LOS	B	C		B	C		C	C	A	B	C	A
Approach Delay		25.4			20.3			21.4			26.1	
Approach LOS		C			C			C			C	

Intersection Summary	
Area Type:	Other
Cycle Length:	112.1
Actuated Cycle Length:	76.8
Natural Cycle:	80
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.71
Intersection Signal Delay:	23.6
Intersection Capacity Utilization:	80.8%
Intersection LOS:	C
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 4: Esquesing Line & James Snow Parkway N



HCM Signalized Intersection Capacity Analysis  
4: Esquesing Line & James Snow Parkway N

2023 FT AM Peak Hour  
09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	18	541	141	38	481	39	64	184	6	40	364	17
Future Volume (vph)	18	541	141	38	481	39	64	184	6	40	364	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1547	2938		1644	2858		1644	1731	1396	1615	1685	1396
Flt Permitted	0.40	1.00		0.25	1.00		0.37	1.00	1.00	0.63	1.00	1.00
Satd. Flow (perm)	652	2938		428	2858		636	1731	1396	1064	1685	1396
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	20	615	160	43	547	44	73	209	7	45	414	19
RTOR Reduction (vph)	0	19	0	0	5	0	0	0	4	0	0	12
Lane Group Flow (vph)	20	756	0	43	586	0	73	209	3	45	414	7
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	11%	17%	13%	14%	17%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	31.2	28.9		34.2	30.4		28.6	28.6	28.6	28.6	28.6	28.6
Effective Green, g (s)	31.2	28.9		34.2	30.4		28.6	28.6	28.6	28.6	28.6	28.6
Actuated g/C Ratio	0.40	0.37		0.44	0.39		0.36	0.36	0.36	0.36	0.36	0.36
Clearance Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	285	1083		245	1108		232	631	509	388	614	509
v/s Ratio Prot	0.00	c0.26		c0.01	0.21			0.12			c0.25	
v/s Ratio Perm	0.03			0.07			0.11		0.00	0.04		0.00
v/c Ratio	0.07	0.70		0.18	0.53		0.31	0.33	0.01	0.12	0.67	0.01
Uniform Delay, d1	14.4	21.0		13.4	18.5		17.9	18.0	15.8	16.5	21.0	15.9
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		0.3	0.9		1.6	0.6	0.0	0.3	3.8	0.0
Delay (s)	14.5	23.6		13.7	19.4		19.5	18.6	15.9	16.8	24.8	15.9
Level of Service	B	C		B	B		B	B	B	B	C	B
Approach Delay (s)		23.3			19.0			18.8			23.7	
Approach LOS		C			B			B			C	

Intersection Summary	
HCM 2000 Control Delay	21.6
HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65
Actuated Cycle Length (s)	78.4
Sum of lost time (s)	17.1
Intersection Capacity Utilization	80.8%
ICU Level of Service	D
Analysis Period (min)	15
c Critical Lane Group	

Lanes, Volumes, Timings

2023 FT AM Peak Hour

5: James Snow Parkway N & Steeles Avenue East

09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	1	517	268	118	288	68	380	489	412	167	405	10
Future Volume (vph)	1	517	268	118	288	68	380	489	412	167	405	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	122.0		72.0	170.0		130.0	105.0		260.0	160.0		0.0
Storage Lanes	1		1	2		1	2		1	1		0
Taper Length (m)	60.0			70.0			80.0			80.0		
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.996	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3579	1601	3471	3579	1601	3471	3579	1601	1789	3564	0
Fit Permitted	0.562			0.950			0.950			0.450		
Satd. Flow (perm)	1058	3579	1601	3471	3579	1601	3471	3579	1601	848	3564	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			291			82			372			1
Link Speed (k/h)		60			70			60			70	
Link Distance (m)		729.0			881.4			342.7			1421.7	
Travel Time (s)		43.7			45.3			20.6			73.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	562	291	128	313	74	413	532	448	182	440	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	562	291	128	313	74	413	532	448	182	451	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.0			4.0			4.0			4.0	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2		6			8		4		
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	7.0	22.0	22.0	7.0	22.0	22.0	7.0	15.0	15.0	7.0	15.0	
Minimum Split (s)	11.0	47.2	47.2	12.0	47.2	47.2	12.0	46.3	46.3	11.0	46.3	
Total Split (s)	15.0	55.2	55.2	26.0	66.2	66.2	29.0	59.0	59.0	24.0	54.0	

Lanes, Volumes, Timings

2023 FT AM Peak Hour

5: James Snow Parkway N & Steeles Avenue East

09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	9.1%	33.6%	33.6%	15.8%	40.3%	40.3%	17.7%	35.9%	35.9%	14.6%	32.9%	
Maximum Green (s)	11.0	48.0	48.0	21.0	59.0	59.0	24.0	51.7	51.7	20.0	46.7	
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	4.2	4.2	3.0	4.2	
All-Red Time (s)	1.0	3.5	3.5	2.0	3.5	3.5	2.0	3.1	3.1	1.0	3.1	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	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	5.0	5.0	3.0	5.0	
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		33.0	33.0		33.0	33.0		32.0	32.0		32.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effect Green (s)	35.2	24.8	24.8	9.7	37.9	37.9	18.2	27.6	27.6	37.8	21.4	
Actuated g/C Ratio	0.36	0.25	0.25	0.10	0.38	0.38	0.18	0.28	0.28	0.38	0.22	
v/c Ratio	0.00	0.63	0.47	0.38	0.23	0.11	0.65	0.53	0.63	0.41	0.59	
Control Delay	20.0	37.9	6.8	48.0	23.5	5.8	43.9	33.1	10.7	18.6	39.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	20.0	37.9	6.8	48.0	23.5	5.8	43.9	33.1	10.7	18.6	39.0	
LOS	B	D	A	D	C	A	D	C	B	B	D	
Approach Delay		27.3			27.0			29.1			33.1	
Approach LOS		C			C			C			C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	164.2											
Actuated Cycle Length:	99.1											
Natural Cycle:	120											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.65											
Intersection Signal Delay:	29.1						Intersection LOS: C					
Intersection Capacity Utilization:	68.5%						ICU Level of Service C					
Analysis Period (min):	15											
Splits and Phases:	5: James Snow Parkway N & Steeles Avenue East											

HCM Signalized Intersection Capacity Analysis  
 5: James Snow Parkway N & Steeles Avenue East

2023 FT AM Peak Hour  
 09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	1	517	268	118	288	68	380	489	412	167	405	10
Future Volume (vph)	1	517	268	118	288	68	380	489	412	167	405	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	
Fit	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	3579	1601	3471	3579	1601	3471	3579	1601	1789	3565	
Fit Permitted	0.56	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.45	1.00	
Satd. Flow (perm)	1058	3579	1601	3471	3579	1601	3471	3579	1601	847	3565	
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)	1	562	291	128	313	74	413	532	448	182	440	11
RTOR Reduction (vph)	0	0	210	0	0	47	0	0	271	0	1	0
Lane Group Flow (vph)	1	562	81	128	313	27	413	532	177	182	450	0
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2			6			8		4	
Actuated Green, G (s)	29.4	28.3	28.3	9.7	37.9	37.9	18.2	27.6	27.6	34.4	21.4	
Effective Green, g (s)	29.4	28.3	28.3	9.7	37.9	37.9	18.2	27.6	27.6	34.4	21.4	
Actuated g/C Ratio	0.29	0.28	0.28	0.10	0.37	0.37	0.18	0.27	0.27	0.34	0.21	
Clearance Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	312	992	443	329	1328	594	618	967	432	405	747	
v/s Ratio Prot	0.00	c0.16		c0.04	0.09		c0.12	c0.15		0.06	0.13	
v/s Ratio Perm	0.00		0.05			0.02			0.11		0.09	
v/c Ratio	0.00	0.57	0.18	0.39	0.24	0.05	0.67	0.55	0.41	0.45	0.60	
Uniform Delay, d1	25.9	31.6	28.1	43.4	22.1	20.5	39.1	31.9	30.6	25.0	36.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.7	0.2	0.8	0.1	0.0	2.7	1.2	1.3	0.8	2.0	
Delay (s)	25.9	32.4	28.3	44.2	22.2	20.6	41.9	33.1	31.9	25.8	38.5	
Level of Service	C	C	C	D	C	C	D	C	C	C	D	
Approach Delay (s)		31.0			27.4			35.3			34.9	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	32.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	102.1	Sum of lost time (s)	24.5
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

Lanes, Volumes, Timings  
 6: Boston Church Road/3 Line & 5 Sideroad

2023 FT AM Peak Hour  
 09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	8	436	71	72	136	3	52	22	22	7	95	24
Future Volume (vph)	8	436	71	72	136	3	52	22	22	7	95	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit		0.981			0.998			0.969			0.974	
Fit Protected		0.999			0.983			0.973			0.997	
Satd. Flow (prot)	0	1638	0	0	1664	0	0	1593	0	0	1671	0
Fit Permitted		0.999			0.983			0.973			0.997	
Satd. Flow (perm)	0	1638	0	0	1664	0	0	1593	0	0	1671	0
Link Speed (k/h)		60			60			70			60	
Link Distance (m)		166.9			1343.2			219.2			496.0	
Travel Time (s)		10.0			80.6			11.3			29.8	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	13%	13%	27%	13%	13%	33%	13%	17%	12%	43%	9%	13%
Adj. Flow (vph)	9	501	82	83	156	3	60	25	25	8	109	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	592	0	0	242	0	0	110	0	0	145	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		24		14	24		14	24		14	24	14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	61.1%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
6: Boston Church Road/3 Line & 5 Sideroad

2023 FT AM Peak Hour  
09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	8	436	71	72	136	3	52	22	22	7	95	24
Future Volume (vph)	8	436	71	72	136	3	52	22	22	7	95	24
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	9	501	82	83	156	3	60	25	25	8	109	28
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	592	242	110	145								
Volume Left (vph)	9	83	60	8								
Volume Right (vph)	82	3	25	28								
Hadj (s)	0.17	0.29	0.21	0.09								
Departure Headway (s)	5.4	6.0	6.8	6.6								
Degree Utilization, x	0.88	0.40	0.21	0.27								
Capacity (veh/h)	656	567	490	507								
Control Delay (s)	35.5	13.0	11.6	12.0								
Approach Delay (s)	35.5	13.0	11.6	12.0								
Approach LOS	E	B	B	B								
<b>Intersection Summary</b>												
Delay				25.0								
Level of Service				C								
Intersection Capacity Utilization			61.1%	ICU Level of Service			B					
Analysis Period (min)				15								

Lanes, Volumes, Timings  
7: Esquesing Line/Fourth Line & 5 Sideroad

2023 FT AM Peak Hour  
09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	7	441	16	83	164	3	10	120	111	63	322	44
Future Volume (vph)	7	441	16	83	164	3	10	120	111	63	322	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.995			0.999			0.938			0.986		
Fit Protected	0.999			0.984			0.998			0.993		
Satd. Flow (prot)	0	1701	0	0	1683	0	0	1648	0	0	1642	0
Fit Permitted	0.995			0.727			0.978			0.910		
Satd. Flow (perm)	0	1694	0	0	1243	0	0	1615	0	0	1505	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	3			1			62			8		
Link Speed (k/h)	60			60			60			70		
Link Distance (m)	1343.2			646.3			1994.7			464.9		
Travel Time (s)	80.6			38.8			119.7			23.9		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Adj. Flow (vph)	8	501	18	94	186	3	11	136	126	72	366	50
<b>Shared Lane Traffic (%)</b>												
Lane Group Flow (vph)	0	527	0	0	283	0	0	273	0	0	488	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0			3.7			3.7		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	1.6			1.6			1.6			1.6		
<b>Two way Left Turn Lane</b>												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
<b>Detector 1 Channel</b>												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	28.7			28.7			28.7			28.7		
Detector 2 Size(m)	1.8			1.8			1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
<b>Detector 2 Channel</b>												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	2			6			8			4		
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
<b>Switch Phase</b>												

Lanes, Volumes, Timings

2023 FT AM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

09-09-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	45.0	45.0		45.0	45.0		45.0	45.0		45.0	45.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	40.5	40.5		40.5	40.5		40.5	40.5		40.5	40.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		47.2			47.2			33.8			33.8	
Actuated g/C Ratio		0.52			0.52			0.38			0.38	
v/c Ratio		0.59			0.43			0.42			0.86	
Control Delay		19.8			17.5			16.8			40.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		19.8			17.5			16.8			40.0	
LOS		B			B			B			D	
Approach Delay		19.8			17.5			16.8			40.0	
Approach LOS		B			B			B			D	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	50
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.86
Intersection Signal Delay:	25.2
Intersection Capacity Utilization:	89.7%
Analysis Period (min):	15
Intersection LOS:	C
ICU Level of Service:	E

Splits and Phases: 7: Esquesing Line/Fourth Line & 5 Sideroad

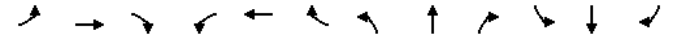
→ 02 (R)	↓ 04
← 05 (L)	↑ 08
→ 06 (R)	↓ 04
← 05 (L)	↑ 08

HCM Signalized Intersection Capacity Analysis

2023 FT AM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

09-09-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	7	441	16	83	164	3	10	120	111	63	322	44
Future Volume (vph)	7	441	16	83	164	3	10	120	111	63	322	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		1.00			1.00			0.94			0.99	
Flt Protected		1.00			0.98			1.00			0.99	
Satd. Flow (prot)		1702			1682			1647			1642	
Flt Permitted		1.00			0.73			0.98			0.91	
Satd. Flow (perm)		1695			1243			1614			1506	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	8	501	18	94	186	3	11	136	126	72	366	50
RTOR Reduction (vph)	0	1	0	0	0	0	0	39	0	0	5	0
Lane Group Flow (vph)	0	526	0	0	283	0	0	234	0	0	483	0
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		47.2			47.2			33.8			33.8	
Effective Green, g (s)		47.2			47.2			33.8			33.8	
Actuated g/C Ratio		0.52			0.52			0.38			0.38	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		888			651			606			565	
v/s Ratio Prot												
v/s Ratio Perm		c0.31			0.23			0.15			c0.32	
v/c Ratio		0.59			0.43			0.39			0.85	
Uniform Delay, d1		14.8			13.2			20.5			25.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.9			2.1			0.4			12.0	
Delay (s)		17.7			15.3			20.9			37.9	
Level of Service		B			B			C			D	
Approach Delay (s)		17.7			15.3			20.9			37.9	
Approach LOS		B			B			C			D	

Intersection Summary

HCM 2000 Control Delay	24.1	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)	9.0
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings  
101: Boston Church Road & East Access 1

2023 FT AM Peak Hour  
09-09-2021

	↖		↑		↗	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↖	↑	↗	↗	↑
Traffic Volume (vph)	56	6	193	189	46	210
Future Volume (vph)	56	6	193	189	46	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	15.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				75.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1674	1633	1642	1585	1825	1642
Fit Permitted	0.950				0.950	
Satd. Flow (perm)	1674	1633	1642	1585	1825	1642
Link Speed (k/h)	48		70			70
Link Distance (m)	173.1		269.9			183.3
Travel Time (s)	13.0		13.9			9.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	0%	17%	3%	0%	17%
Adj. Flow (vph)	61	7	210	205	50	228
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	7	210	205	50	228
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free		Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	26.8%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis  
101: Boston Church Road & East Access 1

2023 FT AM Peak Hour  
09-09-2021

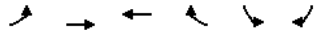
	↖		↑		↗	
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↖	↑	↗	↗	↑
Traffic Volume (veh/h)	56	6	193	189	46	210
Future Volume (Veh/h)	56	6	193	189	46	210
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	61	7	210	205	50	228
Pedestrians						
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	538	210			415	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	538	210			415	
tC, single (s)	6.5	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.3			2.2	
p0 queue free %	87	99			96	
cM capacity (veh/h)	471	835			1155	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	61	7	210	205	50	228
Volume Left	61	0	0	0	50	0
Volume Right	0	7	0	205	0	0
cSH	471	835	1700	1700	1155	1700
Volume to Capacity	0.13	0.01	0.12	0.12	0.04	0.13
Queue Length 95th (m)	3.4	0.2	0.0	0.0	1.0	0.0
Control Delay (s)	13.8	9.3	0.0	0.0	8.3	0.0
Lane LOS	B	A			A	
Approach Delay (s)	13.3		0.0		1.5	
Approach LOS	B					

Intersection Summary	
Average Delay	1.7
Intersection Capacity Utilization	26.8%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings  
102: James Snow Parkway N & East Access 2

2023 FT AM Peak Hour  
09-09-2021

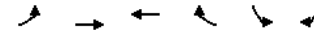


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↕↕	↕↕	↗	↘	↗
Traffic Volume (vph)	23	669	493	19	19	18
Future Volume (vph)	23	669	493	19	19	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0			80.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	100.0				2.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt				0.850		0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1106	3042	2920	816	913	892
Fit Permitted	0.950				0.950	
Satd. Flow (perm)	1106	3042	2920	816	913	892
Link Speed (k/h)		70	70		48	
Link Distance (m)		547.4	558.8		147.4	
Travel Time (s)		28.2	28.7		11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	65%	20%	25%	100%	100%	83%
Adj. Flow (vph)	25	727	536	21	21	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	25	727	536	21	21	20
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		24		14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	29.1%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis  
102: James Snow Parkway N & East Access 2

2023 FT AM Peak Hour  
09-09-2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↕↕	↕↕	↗	↘	↗
Traffic Volume (veh/h)	23	669	493	19	19	18
Future Volume (Veh/h)	23	669	493	19	19	18
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	727	536	21	21	20
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	557				950	268
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	557				950	268
tC, single (s)	5.4				8.8	8.6
tC, 2 stage (s)						
tF (s)	2.9				4.5	4.1
p0 queue free %	96				84	96
cM capacity (veh/h)	677				129	535

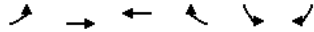
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	25	364	364	268	268	21	21	20
Volume Left	25	0	0	0	0	0	21	0
Volume Right	0	0	0	0	0	0	21	0
cSH	677	1700	1700	1700	1700	1700	129	535
Volume to Capacity	0.04	0.21	0.21	0.16	0.16	0.01	0.16	0.04
Queue Length 95th (m)	0.9	0.0	0.0	0.0	0.0	0.0	4.2	0.9
Control Delay (s)	10.5	0.0	0.0	0.0	0.0	0.0	38.2	12.0
Lane LOS	B						E	B
Approach Delay (s)	0.3			0.0			25.4	
Approach LOS							D	

Intersection Summary	
Average Delay	1.0
Intersection Capacity Utilization	29.1%
Analysis Period (min)	15
	ICU Level of Service A



Lanes, Volumes, Timings  
103: James Snow Parkway N & East Access 3

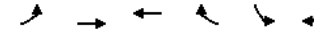
2023 FT AM Peak Hour  
09-09-2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕	↕	↕↕	↕
Traffic Volume (vph)	18	670	503	59	30	9
Future Volume (vph)	18	670	503	59	30	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0			80.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	100.0				2.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt				0.850		0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1217	3042	2920	1192	1074	816
Fit Permitted	0.448				0.950	
Satd. Flow (perm)	574	3042	2920	1192	1074	816
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				64		10
Link Speed (k/h)		70	70		48	
Link Distance (m)		558.8	346.4		152.7	
Travel Time (s)		28.7	17.8		11.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	50%	20%	25%	37%	70%	100%
Adj. Flow (vph)	20	728	547	64	33	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	728	547	64	33	10
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	6.1	30.5	30.5	6.1	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8	6.1	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			

Lanes, Volumes, Timings  
103: James Snow Parkway N & East Access 3

2023 FT AM Peak Hour  
09-09-2021

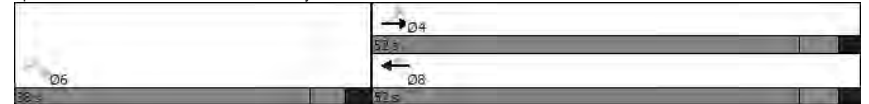


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.6	30.6	30.6	30.6	33.5	33.5
Total Split (s)	52.0	52.0	52.0	52.0	38.0	38.0
Total Split (%)	57.8%	57.8%	57.8%	57.8%	42.2%	42.2%
Maximum Green (s)	45.4	45.4	45.4	45.4	31.5	31.5
Yellow Time (s)	4.2	4.2	4.2	4.2	3.7	3.7
All-Red Time (s)	2.4	2.4	2.4	2.4	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	62.4	62.4	62.4	62.4	7.9	7.9
Actuated g/C Ratio	0.83	0.83	0.83	0.83	0.11	0.11
v/c Ratio	0.04	0.29	0.23	0.06	0.29	0.11
Control Delay	3.7	3.4	3.2	1.3	38.6	19.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.7	3.4	3.2	1.3	38.6	19.3
LOS	A	A	A	A	D	B
Approach Delay		3.4	3.0		34.1	
Approach LOS		A	A		C	

Intersection Summary

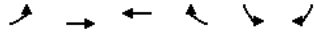
Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 75  
 Natural Cycle: 65  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.29  
 Intersection Signal Delay: 4.2  
 Intersection Capacity Utilization 33.6%  
 Analysis Period (min) 15  
 Intersection LOS: A  
 ICU Level of Service A

Splits and Phases: 103: James Snow Parkway N & East Access 3



HCM Signalized Intersection Capacity Analysis  
103: James Snow Parkway N & East Access 3

2023 FT AM Peak Hour  
09-09-2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↗	↗	↗	↘	↘
Traffic Volume (vph)	18	670	503	59	30	9
Future Volume (vph)	18	670	503	59	30	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1217	3042	2920	1192	1074	816
Fit Permitted	0.45	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	573	3042	2920	1192	1074	816
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	20	728	547	64	33	10
RTOR Reduction (vph)	0	0	0	15	0	9
Lane Group Flow (vph)	20	728	547	49	33	1
Heavy Vehicles (%)	50%	20%	25%	37%	70%	100%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			
Permitted Phases	4			8	6	6
Actuated Green, G (s)	59.4	59.4	59.4	59.4	5.3	5.3
Effective Green, g (s)	59.4	59.4	59.4	59.4	5.3	5.3
Actuated g/C Ratio	0.76	0.76	0.76	0.76	0.07	0.07
Clearance Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	437	2322	2229	910	73	55
v/s Ratio Prot		c0.24	0.19			
v/s Ratio Perm	0.03			0.04	c0.03	0.00
v/c Ratio	0.05	0.31	0.25	0.05	0.45	0.01
Uniform Delay, d1	2.3	2.9	2.7	2.3	34.9	33.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.4	0.3	0.1	4.4	0.1
Delay (s)	2.5	3.2	2.9	2.4	39.3	33.9
Level of Service	A	A	A	A	D	C
Approach Delay (s)		3.2	2.9		38.0	
Approach LOS	A	A			D	

Intersection Summary			
HCM 2000 Control Delay	4.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	77.8	Sum of lost time (s)	13.1
Intersection Capacity Utilization	33.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
201: West Access 1 & 5 Sideroad

2023 FT AM Peak Hour  
09-09-2021



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘	↘	↗	↗	↗	↗
Traffic Volume (vph)	514	11	23	168	4	5
Future Volume (vph)	514	11	23	168	4	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.997				0.925	
Fit Protected				0.994	0.978	
Satd. Flow (prot)	1699	0	0	1714	1738	0
Fit Permitted				0.994	0.978	
Satd. Flow (perm)	1699	0	0	1714	1738	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	198.7			175.4	89.6	
Travel Time (s)	11.9			10.5	6.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	0%	0%	13%	0%	0%
Adj. Flow (vph)	559	12	25	183	4	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	571	0	0	208	9	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	38.2%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
201: West Access 1 & 5 Sideroad

2023 FT AM Peak Hour  
09-09-2021

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	514	11	23	168	4	5
Future Volume (Veh/h)	514	11	23	168	4	5
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	559	12	25	183	4	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			571		798	565
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			571		798	565
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		99	99
cM capacity (veh/h)			1012		349	528
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	571	208	9			
Volume Left	0	25	4			
Volume Right	12	0	5			
cSH	1700	1012	430			
Volume to Capacity	0.34	0.02	0.02			
Queue Length 95th (m)	0.0	0.6	0.5			
Control Delay (s)	0.0	1.3	13.5			
Lane LOS	A		B			
Approach Delay (s)	0.0	1.3	13.5			
Approach LOS	A		B			
<b>Intersection Summary</b>						
Average Delay			0.5			
Intersection Capacity Utilization			38.2%		ICU Level of Service A	
Analysis Period (min)			15			

Lanes, Volumes, Timings  
202: West Access 2 & 5 Sideroad

2023 FT AM Peak Hour  
09-09-2021

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	509	10	23	189	2	6
Future Volume (vph)	509	10	23	189	2	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.997		0.895			
Fit Protected			0.995		0.989	
Satd. Flow (prot)	1699	0	0	1713	1700	0
Fit Permitted			0.995			
Satd. Flow (perm)	1699	0	0	1713	1700	0
Link Speed (k/h)	60		60		48	
Link Distance (m)	175.4		166.9		91.3	
Travel Time (s)	10.5		10.0		6.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	0%	0%	13%	0%	0%
Adj. Flow (vph)	553	11	25	205	2	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	564	0	0	230	9	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0		0.0		3.7	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	14		24		24	
Sign Control	Free		Free		Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 39.2%					ICU Level of Service A	
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis  
202: West Access 2 & 5 Sideroad

2023 FT AM Peak Hour  
09-09-2021

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	509	10	23	189	2	6
Future Volume (Veh/h)	509	10	23	189	2	6
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	553	11	25	205	2	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			564		814	558
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			564		814	558
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		99	99
cM capacity (veh/h)			1018		342	533
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	564	230	9			
Volume Left	0	25	2			
Volume Right	11	0	7			
cSH	1700	1018	474			
Volume to Capacity	0.33	0.02	0.02			
Queue Length 95th (m)	0.0	0.6	0.4			
Control Delay (s)	0.0	1.2	12.7			
Lane LOS	A		B			
Approach Delay (s)	0.0	1.2	12.7			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.5			
Intersection Capacity Utilization			39.2%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings  
203: Boston Church Road & West Access 3

2023 FT AM Peak Hour  
09-09-2021

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	13	18	96	237	1
Future Volume (vph)	0	13	18	96	237	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	40.0			0.0
Storage Lanes	1	0	1			
Taper Length (m)	2.5	75.0				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865				0.999	
Fit Protected			0.950			
Satd. Flow (prot)	898	0	1093	1642	1641	0
Fit Permitted	0.950					
Satd. Flow (perm)	898	0	1093	1642	1641	0
Link Speed (k/h)	48		70		70	
Link Distance (m)	99.5		207.3		219.2	
Travel Time (s)	7.5		10.7		11.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	85%	67%	17%	17%	0%
Adj. Flow (vph)	0	14	20	104	258	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	14	0	20	104	259	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop		Free		Free	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 25.0%					ICU Level of Service A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
203: Boston Church Road & West Access 3

2023 FT AM Peak Hour  
09-09-2021

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↑	↑	↔
Traffic Volume (veh/h)	0	13	18	96	237	1
Future Volume (Veh/h)	0	13	18	96	237	1
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)	0	14	20	104	258	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	402	258	259			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	402	258	259			
tC, single (s)	6.4	7.0	4.8			
tC, 2 stage (s)						
tF (s)	3.5	4.1	2.8			
p0 queue free %	100	98	98			
cM capacity (veh/h)	596	616	1006			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>		
Volume Total	14	20	104	259		
Volume Left	0	20	0	0		
Volume Right	14	0	0	1		
cSH	616	1006	1700	1700		
Volume to Capacity	0.02	0.02	0.06	0.15		
Queue Length 95th (m)	0.5	0.5	0.0	0.0		
Control Delay (s)	11.0	8.7	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	11.0	1.4	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.8			
Intersection Capacity Utilization			25.0%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings  
204: Boston Church Road & West Access 4

2023 FT AM Peak Hour  
09-09-2021

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↑	↑	↔
Traffic Volume (vph)	3	23	84	111	230	20
Future Volume (vph)	3	23	84	111	230	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	15.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	2.5	75.0				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.879		0.989			
Fit Protected	0.995		0.950			
Satd. Flow (prot)	1671	0	1825	1642	1643	0
Fit Permitted	0.995		0.950			
Satd. Flow (perm)	1671	0	1825	1642	1643	0
Link Speed (k/h)	48		70		70	
Link Distance (m)	101.5		171.0		207.3	
Travel Time (s)	7.6		8.8		10.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	0%	0%	17%	17%	0%
Adj. Flow (vph)	3	25	91	121	250	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	0	91	121	272	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7		3.7		3.7	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop		Free		Free	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 31.3%			ICU Level of Service A			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
204: Boston Church Road & West Access 4

2023 FT AM Peak Hour  
09-09-2021

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	3	23	84	111	230	20
Future Volume (Veh/h)	3	23	84	111	230	20
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)	3	25	91	121	250	22
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	564	261	272			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	564	261	272			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	97	93			
cM capacity (veh/h)	448	783	1303			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>		
Volume Total	28	91	121	272		
Volume Left	3	91	0	0		
Volume Right	25	0	0	22		
cSH	725	1303	1700	1700		
Volume to Capacity	0.04	0.07	0.07	0.16		
Queue Length 95th (m)	0.9	1.7	0.0	0.0		
Control Delay (s)	10.2	8.0	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	10.2	3.4	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay	2.0					
Intersection Capacity Utilization	31.3%		ICU Level of Service	A		
Analysis Period (min)	15					

Lanes, Volumes, Timings  
205: Boston Church Road & West Access 5

2023 FT AM Peak Hour  
09-09-2021

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	0	3	4	195	253	0
Future Volume (vph)	0	3	4	195	253	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	40.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	2.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Fit Protected			0.950			
Satd. Flow (prot)	831	0	913	1642	1642	0
Fit Permitted	0.950					
Satd. Flow (perm)	831	0	913	1642	1642	0
Link Speed (k/h)	48		70		70	
Link Distance (m)	100.3		183.3		171.0	
Travel Time (s)	7.5		9.4		8.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	100%	100%	17%	17%	0%
Adj. Flow (vph)	0	3	4	212	275	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	3	0	4	212	275	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7		3.7		3.7	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop		Free		Free	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 23.3%			ICU Level of Service A			
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis  
 205: Boston Church Road & West Access 5

2023 FT AM Peak Hour  
 09-09-2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	0	3	4	195	253	0
Future Volume (Veh/h)	0	3	4	195	253	0
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)	0	3	4	212	275	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	495	275	275			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	495	275	275			
tC, single (s)	6.4	7.2	5.1			
tC, 2 stage (s)						
tF (s)	3.5	4.2	3.1			
p0 queue free %	100	99	100			
cM capacity (veh/h)	535	578	883			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>		
Volume Total	3	4	212	275		
Volume Left	0	4	0	0		
Volume Right	3	0	0	0		
cSH	578	883	1700	1700		
Volume to Capacity	0.01	0.00	0.12	0.16		
Queue Length 95th (m)	0.1	0.1	0.0	0.0		
Control Delay (s)	11.3	9.1	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	11.3	0.2		0.0		
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.1			
Intersection Capacity Utilization			23.3%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings

2023 FT PM Peak Hour

1: Regional Road 25 & 5 Sideroad

09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	124	113	90	274	57	191	672	93	14	311	66
Future Volume (vph)	91	124	113	90	274	57	191	672	93	14	311	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	70.0		0.0	75.0		70.0	35.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	100.0			100.0			75.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.929			0.974				0.850		0.974	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1601	1530	0	1342	1588	0	1225	2920	1338	1601	3031	0
Fit Permitted	0.251			0.603			0.423			0.380		
Satd. Flow (perm)	423	1530	0	852	1588	0	545	2920	1338	640	3031	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					9				99			23
Link Speed (k/h)		60			60				70			70
Link Distance (m)		573.6			536.0				986.0			203.5
Travel Time (s)		34.4			32.2				50.7			10.5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Adj. Flow (vph)	97	132	120	96	291	61	203	715	99	15	331	70
Shared Lane Traffic (%)												
Lane Group Flow (vph)	97	252	0	96	352	0	203	715	99	15	401	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7				3.7			3.7
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		1.6			1.6				1.6			1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99		0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1		1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0		8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0		-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0		-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0		9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA	Perm	Perm		NA
Protected Phases	3	8		4	4		5	2	2	6		6
Permitted Phases	8			4			2		2	6		
Detector Phase	3	8		4	4		5	2	2	6		6
Switch Phase												
Minimum Initial (s)	7.0	10.0		10.0	10.0		7.0	20.0	20.0	20.0		20.0
Minimum Split (s)	11.0	38.0		38.0	38.0		11.0	38.2	38.2	38.2		38.2

Lanes, Volumes, Timings

2023 FT PM Peak Hour

1: Regional Road 25 & 5 Sideroad

09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	20.0	54.0		34.0	34.0		18.0	56.2	56.2	38.2	38.2	
Total Split (%)	18.1%	49.0%		30.9%	30.9%		16.3%	51.0%	51.0%	34.7%	34.7%	
Maximum Green (s)	16.0	48.0		28.0	28.0		14.0	50.0	50.0	32.0	32.0	
Yellow Time (s)	3.0	3.7		3.7	3.7		3.0	4.2	4.2	4.2	4.2	
All-Red Time (s)	1.0	2.3		2.3	2.3		1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0		6.0	6.0		4.0	6.2	6.2	6.2	6.2	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.7		3.7	3.7		3.0	3.6	3.6	4.2	4.2	
Recall Mode	None	None		None	None		None	Ped	Ped	Ped	Ped	
Walk Time (s)		7.0			7.0			7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		25.0			25.0			25.0	25.0	25.0	25.0	
Pedestrian Calls (#/hr)		0			0			0	0	0	0	
Act Effect Green (s)	37.9	35.9		25.2	25.2		51.9	49.7	49.7	32.5	32.5	
Actuated g/C Ratio	0.39	0.37		0.26	0.26		0.53	0.51	0.51	0.33	0.33	
v/c Ratio	0.35	0.45		0.44	0.85		0.54	0.48	0.14	0.07	0.39	
Control Delay	22.3	25.7		39.4	54.6		21.1	18.7	3.8	27.6	27.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	22.3	25.7		39.4	54.6		21.1	18.7	3.8	27.6	27.0	
LOS	C	C		D	D		C	B	A	C	C	
Approach Delay		24.8			51.4			17.7			27.0	
Approach LOS		C			D			B			C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	110.2											
Actuated Cycle Length:	98											
Natural Cycle:	100											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.85											
Intersection Signal Delay:	27.3						Intersection LOS: C					
Intersection Capacity Utilization:	77.6%						ICU Level of Service D					
Analysis Period (min):	15											
Splits and Phases:	1: Regional Road 25 & 5 Sideroad											



HCM Signalized Intersection Capacity Analysis

2023 FT PM Peak Hour

1: Regional Road 25 & 5 Sideroad

09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	91	124	113	90	274	57	191	672	93	14	311	66
Future Volume (vph)	91	124	113	90	274	57	191	672	93	14	311	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		6.0	6.0		4.0	6.2	6.2	6.2	6.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.93		1.00	0.97		1.00	1.00	0.85	1.00	0.97	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1601	1529		1342	1588		1225	2920	1338	1601	3030	
Fit Permitted	0.25	1.00		0.60	1.00		0.42	1.00	1.00	0.38	1.00	
Satd. Flow (perm)	423	1529		852	1588		546	2920	1338	640	3030	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	97	132	120	96	291	61	203	715	99	15	331	70
RTOR Reduction (vph)	0	0	0	0	7	0	0	0	49	0	15	0
Lane Group Flow (vph)	97	252	0	96	345	0	203	715	50	15	386	0
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases	3	8		4			5	2			6	
Permitted Phases	8			4			2		2	6		
Actuated Green, G (s)	36.8	36.8		25.2	25.2		49.7	49.7	49.7	32.6	32.6	
Effective Green, g (s)	36.8	36.8		25.2	25.2		49.7	49.7	49.7	32.6	32.6	
Actuated g/C Ratio	0.37	0.37		0.26	0.26		0.50	0.50	0.50	0.33	0.33	
Clearance Time (s)	4.0	6.0		6.0	6.0		4.0	6.2	6.2	6.2	6.2	
Vehicle Extension (s)	3.0	3.7		3.7	3.7		3.0	3.6	3.6	4.2	4.2	
Lane Grp Cap (vph)	248	570		217	405		365	1470	673	211	1000	
v/s Ratio Prot	0.03	c0.16		c0.22			c0.07	0.24			0.13	
v/s Ratio Perm	0.12			0.11			c0.21		0.04	0.02		
v/c Ratio	0.39	0.44		0.44	0.85		0.56	0.49	0.07	0.07	0.39	
Uniform Delay, d1	22.1	23.2		30.9	35.0		14.9	16.1	12.6	22.7	25.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	0.7		1.8	16.2		1.8	0.3	0.1	0.2	0.4	
Delay (s)	23.1	23.9		32.7	51.2		16.7	16.4	12.7	22.9	25.7	
Level of Service	C	C		C	D		B	B	B	C	C	
Approach Delay (s)		23.7			47.2			16.1			25.6	
Approach LOS		C			D			B			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		25.3									C	
HCM 2000 Volume to Capacity ratio		0.67										
Actuated Cycle Length (s)		98.7			Sum of lost time (s)			20.2				
Intersection Capacity Utilization		77.6%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings

2023 FT PM Peak Hour

2: Regional Road 25 & James Snow Parkway N

09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	30	170	162	279	112	228	78	778	195	140	448	5
Future Volume (vph)	30	170	162	279	112	228	78	778	195	140	448	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		115.0	85.0		35.0	30.0		0.0	75.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	40.0			90.0			70.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor									0.99	1.00		
Frt			0.850			0.850			0.850		0.998	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1217	2684	1103	1259	3147	1192	1534	2897	1458	1472	2908	0
Fit Permitted	0.679			0.641			0.466			0.201		
Satd. Flow (perm)	870	2684	1103	849	3147	1192	752	2897	1439	311	2908	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			167			235			201			1
Link Speed (k/h)		60			60			70				70
Link Distance (m)		452.4			1065.5			592.1				986.0
Travel Time (s)		27.1			63.9			30.5				50.7
Confl. Peds. (#/hr)									1		1	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Adj. Flow (vph)	31	175	167	288	115	235	80	802	201	144	462	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	175	167	288	115	235	80	802	201	144	467	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.2	9.0	9.0	9.0	9.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	
Switch Phase												

Lanes, Volumes, Timings

2023 FT PM Peak Hour

2: Regional Road 25 & James Snow Parkway N

09-09-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	43.6	43.6	43.6	43.6	43.6	43.6	11.0	42.9	42.9	11.0	35.9	
Total Split (s)	55.6	55.6	55.6	55.6	55.6	55.6	15.0	76.9	76.9	15.0	76.9	
Total Split (%)	37.7%	37.7%	37.7%	37.7%	37.7%	37.7%	10.2%	52.1%	52.1%	10.2%	52.1%	
Maximum Green (s)	49.0	49.0	49.0	49.0	49.0	49.0	11.0	70.0	70.0	11.0	70.0	
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	4.2	4.2	3.0	4.2	
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	1.0	2.7	2.7	1.0	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	30.0	30.0	30.0	30.0	30.0	30.0		29.0	29.0		22.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0	0		0	
Act Effect Green (s)	49.3	49.3	49.3	49.3	49.3	49.3	54.9	43.2	43.2	58.6	47.2	
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.41	0.46	0.36	0.36	0.49	0.39	
v/c Ratio	0.09	0.16	0.30	0.83	0.09	0.38	0.20	0.77	0.31	0.57	0.41	
Control Delay	26.3	25.0	5.6	55.4	24.4	5.3	16.4	39.6	4.5	25.4	28.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.3	25.0	5.6	55.4	24.4	5.3	16.4	39.6	4.5	25.4	28.1	
LOS	C	C	A	E	C	A	B	D	A	C	C	
Approach Delay	16.4			31.4			31.4			27.5		
Approach LOS	B			C			C			C		

Intersection Summary

Area Type:	Other
Cycle Length:	147.5
Actuated Cycle Length:	120.5
Natural Cycle:	100
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.83
Intersection Signal Delay:	28.4
Intersection LOS:	C
Intersection Capacity Utilization:	73.4%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 2: Regional Road 25 & James Snow Parkway N

Ø1	Ø2	Ø4
15 s	76.9 s	55.6 s
Ø5	Ø6	Ø8
15 s	76.9 s	55.6 s

HCM Signalized Intersection Capacity Analysis

2023 FT PM Peak Hour

2: Regional Road 25 & James Snow Parkway N

09-09-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	30	170	162	279	112	228	78	778	195	140	448	5
Future Volume (vph)	30	170	162	279	112	228	78	778	195	140	448	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1217	2684	1103	1259	3147	1192	1534	2897	1439	1472	2909	
Fit Permitted	0.68	1.00	1.00	0.64	1.00	1.00	0.47	1.00	1.00	0.20	1.00	
Satd. Flow (perm)	870	2684	1103	850	3147	1192	753	2897	1439	312	2909	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	31	175	167	288	115	235	80	802	201	144	462	5
RTOR Reduction (vph)	0	0	99	0	0	139	0	0	128	0	1	0
Lane Group Flow (vph)	31	175	68	288	115	96	80	802	73	144	466	0
Conf. Peds. (#/hr)									1	1		
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	49.3	49.3	49.3	49.3	49.3	49.3	51.2	44.0	44.0	57.6	47.2	
Effective Green, g (s)	49.3	49.3	49.3	49.3	49.3	49.3	51.2	44.0	44.0	57.6	47.2	
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.41	0.42	0.36	0.36	0.48	0.39	
Clearance Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	353	1091	448	345	1280	484	364	1051	522	247	1132	
v/s Ratio Prot		0.07			0.04		0.01	c0.28		c0.05	0.16	
v/s Ratio Perm	0.04		0.06	c0.34		0.08	0.08		0.05	0.23		
v/c Ratio	0.09	0.16	0.15	0.83	0.09	0.20	0.22	0.76	0.14	0.58	0.41	
Uniform Delay, d1	22.1	22.8	22.7	32.3	22.1	23.2	21.3	34.0	25.9	20.7	26.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.1	0.3	17.4	0.1	0.4	0.3	3.9	0.3	3.5	0.5	
Delay (s)	22.3	23.0	23.1	49.7	22.2	23.6	21.6	37.9	26.2	24.2	27.4	
Level of Service	C	C	C	D	C	C	C	D	C	C	C	
Approach Delay (s)	23.0			35.1			34.6			26.7		
Approach LOS	C			D			C			C		

Intersection Summary

HCM 2000 Control Delay	31.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	121.2	Sum of lost time (s)	17.5
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

2023 FT PM Peak Hour

3: Boston Church Road & James Snow Parkway N

09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↕	↔		↕	↔		↕	↔		↕
Traffic Volume (vph)	133	330	73	29	379	108	145	45	28	283	29	111
Future Volume (vph)	133	330	73	29	379	108	145	45	28	283	29	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		0.0	70.0		0.0	60.0		25.0	60.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			70.0			90.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.973			0.967				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1508	3010	0	1415	2936	0	1113	3650	944	1534	3147	1498
Fit Permitted	0.297			0.493			0.735			0.537		
Satd. Flow (perm)	472	3010	0	734	2936	0	861	3650	944	867	3147	1498
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			27				90			123
Link Speed (k/h)		70			70				60			60
Link Distance (m)		358.9			548.1				792.9			198.3
Travel Time (s)		18.5			28.2				47.6			11.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%
Adj. Flow (vph)	148	367	81	32	421	120	161	50	31	314	32	123
Shared Lane Traffic (%)												
Lane Group Flow (vph)	148	448	0	32	541	0	161	50	31	314	32	123
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7				3.7			3.7
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		1.6			1.6				1.6			1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8	7	4	4	4
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0		7.0	20.0		7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	11.0	33.5		11.0	33.5		11.0	31.6	31.6	11.0	31.6	31.6

Lanes, Volumes, Timings

2023 FT PM Peak Hour

3: Boston Church Road & James Snow Parkway N

09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	17.0	50.5		17.0	50.5		24.0	48.6	48.6	24.0	48.6	48.6
Total Split (%)	12.1%	36.0%		12.1%	36.0%		17.1%	34.7%	34.7%	17.1%	34.7%	34.7%
Maximum Green (s)	13.0	44.0		13.0	44.0		20.0	41.0	41.0	20.0	41.0	41.0
Yellow Time (s)	3.0	3.7		3.0	3.7		3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	1.0	2.8		1.0	2.8		1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		7.0			7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		20.0			20.0			17.0	17.0		17.0	17.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effect Green (s)	42.6	33.6		34.3	24.4		28.8	15.1	15.1	39.4	18.2	18.2
Actuated g/C Ratio	0.47	0.37		0.38	0.27		0.32	0.17	0.17	0.43	0.20	0.20
v/c Ratio	0.42	0.40		0.10	0.67		0.52	0.08	0.13	0.58	0.05	0.31
Control Delay	18.4	22.9		14.6	33.2		25.6	35.7	1.2	24.0	33.6	9.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.4	22.9		14.6	33.2		25.6	35.7	1.2	24.0	33.6	9.5
LOS	B	C		B	C		C	D	A	C	C	A
Approach Delay		21.8			32.1			24.5			20.9	
Approach LOS		C			C			C			C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	140.1											
Actuated Cycle Length:	91											
Natural Cycle:	90											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.67											
Intersection Signal Delay:	25.1						Intersection LOS: C					
Intersection Capacity Utilization:	61.5%						ICU Level of Service B					
Analysis Period (min):	15											
Splits and Phases:	3: Boston Church Road & James Snow Parkway N											
	17 s			50.5 s			24 s			48.6 s		
	17 s			50.5 s			24 s			48.6 s		

HCM Signalized Intersection Capacity Analysis  
3: Boston Church Road & James Snow Parkway N

2023 FT PM Peak Hour  
09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	133	330	73	29	379	108	145	45	28	283	29	111
Future Volume (vph)	133	330	73	29	379	108	145	45	28	283	29	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.5	4.0	6.5	4.0	7.6	7.6	4.0	7.6	4.0	7.6	7.6
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Frt	1.00	0.97	1.00	0.97	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1508	3009	1415	2935	1113	3650	944	1534	3147	1498		
Fit Permitted	0.30	1.00	0.49	1.00	0.74	1.00	1.00	0.54	1.00	1.00		
Satd. Flow (perm)	472	3009	734	2935	861	3650	944	868	3147	1498		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	148	367	81	32	421	120	161	50	31	314	32	123
RTOR Reduction (vph)	0	13	0	0	19	0	0	0	27	0	0	97
Lane Group Flow (vph)	148	435	0	32	522	0	161	50	4	314	32	26
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	Perm
Protected Phases	5	2	1	6	3	8	7	4				
Permitted Phases	2		6		8		4				4	
Actuated Green, G (s)	41.9	33.7	30.5	26.3	26.1	11.6	11.6	38.5	20.0	20.0		
Effective Green, g (s)	41.9	33.7	30.5	26.3	26.1	11.6	11.6	38.5	20.0	20.0		
Actuated g/C Ratio	0.44	0.36	0.32	0.28	0.28	0.12	0.12	0.41	0.21	0.21		
Clearance Time (s)	4.0	6.5	4.0	6.5	4.0	7.6	7.6	4.0	7.6	4.0	7.6	7.6
Vehicle Extension (s)	3.0	5.0	3.0	5.0	3.0	5.0	5.0	3.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	336	1073	267	816	276	448	115	515	666	317		
v/s Ratio Prot	c0.05	0.14	0.01	c0.18	0.09	0.01		c0.15	0.01			
v/s Ratio Perm	0.14		0.03		0.07		0.00	c0.10		0.02		
v/c Ratio	0.44	0.41	0.12	0.64	0.58	0.11	0.03	0.61	0.05	0.08		
Uniform Delay, d1	16.9	22.9	22.2	29.9	28.9	36.9	36.5	21.0	29.7	29.9		
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	0.9	0.5	0.2	2.3	3.1	0.2	0.2	2.1	0.1	0.2		
Delay (s)	17.9	23.4	22.4	32.2	32.1	37.1	36.8	23.0	29.7	30.1		
Level of Service	B	C	C	C	C	D	D	C	C	C		
Approach Delay (s)		22.0		31.7		33.7		25.3				
Approach LOS		C		C		C		C				

Intersection Summary			
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	94.5	Sum of lost time (s)	22.1
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings  
4: Esquesing Line & James Snow Parkway N

2023 FT PM Peak Hour  
09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	16	596	75	9	409	47	105	326	30	27	157	9
Future Volume (vph)	16	596	75	9	409	47	105	326	30	27	157	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0	0.0	70.0	0.0	40.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Storage Lanes	1	0	1	0	1	1	1	1	1	1	1	1
Taper Length (m)	100.0		100.0		80.0		100.0		100.0		100.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.983			0.985			0.850			0.850	
Fit Protected	0.950		0.950		0.950		0.950		0.950		0.950	
Satd. Flow (prot)	1547	2974	0	1644	2861	0	1644	1731	1396	1615	1685	1396
Fit Permitted	0.440		0.280		0.645		0.439					
Satd. Flow (perm)	716	2974	0	485	2861	0	1116	1731	1396	746	1685	1396
Right Turn on Red		Yes		Yes		Yes			Yes		Yes	
Satd. Flow (RTOR)		13		11		74					74	
Link Speed (k/h)		70		70		60		60			60	
Link Distance (m)		346.4		1421.7		292.4		1994.7			1994.7	
Travel Time (s)		17.8		73.1		17.5		119.7			119.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	17%	13%	14%	17%	17%
Adj. Flow (vph)	18	677	85	10	465	53	119	370	34	31	178	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	18	762	0	10	518	0	119	370	34	31	178	10
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	Perm	NA	Perm	Perm
Protected Phases	7	4		3	8		2	2	2	6	6	6
Permitted Phases	4			8			2	2	2	6	6	6
Detector Phase	7	4		3	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	7.0	15.0		7.0	15.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	11.0	30.6		11.0	30.6		33.5	33.5	33.5	33.5	33.5	33.5

Lanes, Volumes, Timings  
4: Esquesing Line & James Snow Parkway N

2023 FT PM Peak Hour  
09-09-2021

	←		→		←		→		←		→	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	19.0	41.6		19.0	41.6		51.5	51.5	51.5	51.5	51.5	51.5
Total Split (%)	16.9%	37.1%		16.9%	37.1%		45.9%	45.9%	45.9%	45.9%	45.9%	45.9%
Maximum Green (s)	15.0	35.0		15.0	35.0		45.0	45.0	45.0	45.0	45.0	45.0
Yellow Time (s)	3.0	4.2		3.0	4.2		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	2.4		1.0	2.4		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		17.0			17.0		20.0	20.0	20.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	29.3	25.5		29.2	25.5		25.2	25.2	25.2	25.2	25.2	25.2
Actuated g/C Ratio	0.44	0.39		0.44	0.39		0.38	0.38	0.38	0.38	0.38	0.38
v/c Ratio	0.04	0.66		0.03	0.47		0.28	0.56	0.06	0.11	0.28	0.02
Control Delay	11.1	20.6		11.1	17.5		18.6	21.6	0.8	17.3	17.4	0.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.1	20.6		11.1	17.5		18.6	21.6	0.8	17.3	17.4	0.0
LOS	B	C		B	B		B	C	A	B	B	A
Approach Delay		20.4			17.4			19.6			16.6	
Approach LOS		C			B			B			B	

Intersection Summary	
Area Type:	Other
Cycle Length:	112.1
Actuated Cycle Length:	66.1
Natural Cycle:	80
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.66
Intersection Signal Delay:	19.0
Intersection Capacity Utilization:	69.0%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	C

Splits and Phases: 4: Esquesing Line & James Snow Parkway N

↑ Ø2	↙ Ø3	→ Ø4
51.5 s	19 s	41.6 s
↓ Ø6	↘ Ø7	← Ø8
51.5 s	19 s	41.6 s

HCM Signalized Intersection Capacity Analysis  
4: Esquesing Line & James Snow Parkway N

2023 FT PM Peak Hour  
09-09-2021

	←		→		←		→		←		→	
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	16	596	75	9	409	47	105	326	30	27	157	9
Future Volume (vph)	16	596	75	9	409	47	105	326	30	27	157	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1547	2974		1644	2860		1644	1731	1396	1615	1685	1396
Flt Permitted	0.44	1.00		0.28	1.00		0.64	1.00	1.00	0.44	1.00	1.00
Satd. Flow (perm)	717	2974		485	2860		1116	1731	1396	746	1685	1396
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	18	677	85	10	465	53	119	370	34	31	178	10
RTOR Reduction (vph)	0	8	0	0	7	0	0	0	22	0	0	6
Lane Group Flow (vph)	18	754	0	10	511	0	119	370	12	31	178	4
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	11%	17%	13%	14%	17%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	26.5	25.5		26.5	25.5		25.2	25.2	25.2	25.2	25.2	25.2
Effective Green, g (s)	26.5	25.5		26.5	25.5		25.2	25.2	25.2	25.2	25.2	25.2
Actuated g/C Ratio	0.39	0.37		0.39	0.37		0.37	0.37	0.37	0.37	0.37	0.37
Clearance Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	288	1102		203	1060		408	634	511	273	617	511
v/s Ratio Prot	c0.00	c0.25		0.00	0.18			c0.21			0.11	
v/s Ratio Perm	0.02			0.02			0.11		0.01	0.04		0.00
v/c Ratio	0.06	0.68		0.05	0.48		0.29	0.58	0.02	0.11	0.29	0.01
Uniform Delay, d1	13.2	18.3		13.3	16.6		15.5	17.6	13.9	14.4	15.4	13.9
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	2.3		0.1	0.7		0.8	2.1	0.0	0.4	0.5	0.0
Delay (s)	13.3	20.5		13.4	17.3		16.3	19.7	14.0	14.8	16.0	13.9
Level of Service	B	C		B	B		B	B	B	B	B	B
Approach Delay (s)		20.4			17.2			18.6			15.7	
Approach LOS		C			B			B			B	

Intersection Summary	
HCM 2000 Control Delay	18.6
HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62
Actuated Cycle Length (s)	68.8
Sum of lost time (s)	17.1
Intersection Capacity Utilization	69.0%
ICU Level of Service	C
Analysis Period (min)	15
c Critical Lane Group	

Lanes, Volumes, Timings

2023 FT PM Peak Hour

5: James Snow Parkway N & Steeles Avenue East

09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	11	384	423	363	678	128	387	326	167	94	551	13
Future Volume (vph)	11	384	423	363	678	128	387	326	167	94	551	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	122.0		72.0	170.0		130.0	105.0		260.0	160.0		0.0
Storage Lanes	1		1	2		1	2		1	1		0
Taper Length (m)	60.0			70.0			80.0			80.0		
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	0.95
Fit			0.850			0.850			0.850		0.997	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3579	1601	3471	3579	1601	3471	3579	1601	1789	3568	0
Fit Permitted	0.372			0.950			0.950			0.540		
Satd. Flow (perm)	701	3579	1601	3471	3579	1601	3471	3579	1601	1017	3568	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			300			139			182			1
Link Speed (k/h)		60			70			60			70	
Link Distance (m)		729.0			881.4			342.7			1421.7	
Travel Time (s)		43.7			45.3			20.6			73.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	417	460	395	737	139	421	354	182	102	599	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	417	460	395	737	139	421	354	182	102	613	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.0			4.0			4.0			4.0	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2		6		6		8	4		
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	7.0	22.0	22.0	7.0	22.0	22.0	7.0	15.0	15.0	7.0	15.0	
Minimum Split (s)	11.0	47.2	47.2	12.0	47.2	47.2	12.0	46.3	46.3	11.0	46.3	
Total Split (s)	15.0	55.2	55.2	26.0	66.2	66.2	29.0	59.0	59.0	24.0	54.0	

Lanes, Volumes, Timings

2023 FT PM Peak Hour

5: James Snow Parkway N & Steeles Avenue East

09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	9.1%	33.6%	33.6%	15.8%	40.3%	40.3%	17.7%	35.9%	14.6%	32.9%		
Maximum Green (s)	11.0	48.0	48.0	21.0	59.0	59.0	24.0	51.7	51.7	20.0	46.7	
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	4.2	4.2	3.0	4.2	
All-Red Time (s)	1.0	3.5	3.5	2.0	3.5	3.5	2.0	3.1	3.1	1.0	3.1	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	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	5.0	5.0	3.0	5.0	
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		33.0	33.0		33.0	33.0		32.0	32.0		32.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effect Green (s)	37.0	26.5	26.5	19.3	47.2	47.2	20.2	41.2	41.2	43.1	29.8	
Actuated g/C Ratio	0.31	0.22	0.22	0.16	0.39	0.39	0.17	0.34	0.34	0.36	0.25	
v/c Ratio	0.04	0.53	0.79	0.71	0.53	0.20	0.73	0.29	0.27	0.24	0.70	
Control Delay	22.8	45.5	26.5	58.1	32.0	5.6	57.6	30.7	5.4	20.6	46.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	22.8	45.5	26.5	58.1	32.0	5.6	57.6	30.7	5.4	20.6	46.9	
LOS	C	D	C	E	C	A	E	C	A	C	D	
Approach Delay		35.4			37.2			37.7			43.1	
Approach LOS		D			D			D			D	
Intersection Summary												
Area Type:	Other											
Cycle Length:	164.2											
Actuated Cycle Length:	121											
Natural Cycle:	130											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.79											
Intersection Signal Delay:	38.0						Intersection LOS: D					
Intersection Capacity Utilization 75.8%							ICU Level of Service D					
Analysis Period (min)	15											
Splits and Phases:	5: James Snow Parkway N & Steeles Avenue East											

HCM Signalized Intersection Capacity Analysis  
5: James Snow Parkway N & Steeles Avenue East

2023 FT PM Peak Hour  
09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	11	384	423	363	678	128	387	326	167	94	551	13
Future Volume (vph)	11	384	423	363	678	128	387	326	167	94	551	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	3579	1601	3471	3579	1601	3471	3579	1601	1789	3566	
Fit Permitted	0.37	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.54	1.00	
Satd. Flow (perm)	700	3579	1601	3471	3579	1601	3471	3579	1601	1017	3566	
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)	12	417	460	395	737	139	421	354	182	102	599	14
RTOR Reduction (vph)	0	0	229	0	0	86	0	0	121	0	1	0
Lane Group Flow (vph)	12	417	231	395	737	53	421	354	61	102	612	0
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2		6			8		4		
Actuated Green, G (s)	31.7	29.3	29.3	19.3	47.2	47.2	20.2	41.2	41.2	39.8	29.9	
Effective Green, g (s)	31.7	29.3	29.3	19.3	47.2	47.2	20.2	41.2	41.2	39.8	29.9	
Actuated g/C Ratio	0.26	0.24	0.24	0.16	0.38	0.38	0.16	0.33	0.33	0.32	0.24	
Clearance Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	201	851	380	543	1371	613	569	1196	535	390	865	
v/s Ratio Prot	0.00	0.12		c0.11	0.21		c0.12	0.10		0.02	c0.17	
v/s Ratio Perm	0.01		c0.14		0.03			0.04		0.06		
v/c Ratio	0.06	0.49	0.61	0.73	0.54	0.09	0.74	0.30	0.11	0.26	0.71	
Uniform Delay, d1	34.2	40.5	41.8	49.4	29.5	24.2	49.0	30.3	28.4	29.9	42.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.4	2.8	4.8	0.4	0.1	5.0	0.3	0.2	0.4	3.3	
Delay (s)	34.3	41.0	44.6	54.3	29.9	24.3	54.0	30.6	28.6	30.3	46.0	
Level of Service	C	D	D	D	C	C	D	C	C	C	D	
Approach Delay (s)		42.7			36.9			40.5			43.8	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	40.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	123.2	Sum of lost time (s)	24.5
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
6: Boston Church Road/3 Line & 5 Sideroad

2023 FT PM Peak Hour  
09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	23	185	68	34	304	2	71	71	109	5	34	6
Future Volume (vph)	23	185	68	34	304	2	71	71	109	5	34	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.967			0.999			0.942			0.982	
Fit Protected		0.996			0.995			0.986			0.994	
Satd. Flow (prot)	0	1589	0	0	1688	0	0	1569	0	0	1653	0
Fit Permitted		0.996			0.995			0.986			0.994	
Satd. Flow (perm)	0	1589	0	0	1688	0	0	1569	0	0	1653	0
Link Speed (k/h)		60			60			70			60	
Link Distance (m)		166.9			1343.2			219.2			496.0	
Travel Time (s)		10.0			80.6			11.3			29.8	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	13%	13%	27%	13%	13%	33%	13%	17%	12%	43%	9%	13%
Adj. Flow (vph)	26	213	78	39	349	2	82	82	125	6	39	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	317	0	0	390	0	0	289	0	0	52	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type:	Unsignalized		
Intersection Capacity Utilization	52.5%	ICU Level of Service A	
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis  
6: Boston Church Road/3 Line & 5 Sideroad

2023 FT PM Peak Hour  
09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	23	185	68	34	304	2	71	71	109	5	34	6
Future Volume (vph)	23	185	68	34	304	2	71	71	109	5	34	6
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	26	213	78	39	349	2	82	82	125	6	39	7
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	317	390	289	52								
Volume Left (vph)	26	39	82	6								
Volume Right (vph)	78	2	125	7								
Hadj (s)	0.15	0.24	0.03	0.17								
Departure Headway (s)	5.9	5.8	6.1	6.9								
Degree Utilization, x	0.52	0.63	0.49	0.10								
Capacity (veh/h)	578	593	544	420								
Control Delay (s)	15.0	18.3	14.8	10.6								
Approach Delay (s)	15.0	18.3	14.8	10.6								
Approach LOS	B	C	B	B								
<b>Intersection Summary</b>												
Delay	16.0											
Level of Service	C											
Intersection Capacity Utilization	52.5%		ICU Level of Service		A							
Analysis Period (min)	15											

Lanes, Volumes, Timings  
7: Esquesing Line/Fourth Line & 5 Sideroad

2023 FT PM Peak Hour  
09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	50	240	11	66	283	18	23	285	81	4	116	39
Future Volume (vph)	50	240	11	66	283	18	23	285	81	4	116	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.995			0.994			0.972			0.967		
Fit Protected	0.992			0.991			0.997			0.999		
Satd. Flow (prot)	0	1622	0	0	1668	0	0	1683	0	0	1624	0
Fit Permitted	0.883			0.881			0.976			0.989		
Satd. Flow (perm)	0	1444	0	0	1483	0	0	1647	0	0	1608	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	3			4			18			22		
Link Speed (k/h)	60			60			60			70		
Link Distance (m)	1343.2			646.3			1994.7			464.9		
Travel Time (s)	80.6			38.8			119.7			23.9		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Adj. Flow (vph)	57	273	13	75	322	20	26	324	92	5	132	44
<b>Shared Lane Traffic (%)</b>												
Lane Group Flow (vph)	0	343	0	0	417	0	0	442	0	0	181	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width(m)	0.0			0.0			3.7			3.7		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	1.6			1.6			1.6			1.6		
<b>Two way Left Turn Lane</b>												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
<b>Detector 1 Channel</b>												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	28.7			28.7			28.7			28.7		
Detector 2 Size(m)	1.8			1.8			1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
<b>Detector 2 Channel</b>												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	2			6			8			4		
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
<b>Switch Phase</b>												



Lanes, Volumes, Timings

2023 FT PM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

09-09-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	48.0	48.0		48.0	48.0		42.0	42.0		42.0	42.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%		46.7%	46.7%		46.7%	46.7%	
Maximum Green (s)	43.5	43.5		43.5	43.5		37.5	37.5		37.5	37.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		52.1			52.1			28.9			28.9	
Actuated g/C Ratio		0.58			0.58			0.32			0.32	
v/c Ratio		0.41			0.49			0.82			0.34	
Control Delay		13.8			15.1			39.0			20.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		13.8			15.1			39.0			20.6	
LOS		B			B			D			C	
Approach Delay		13.8			15.1			39.0			20.6	
Approach LOS		B			B			D			C	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 23.1

Intersection Capacity Utilization 65.8%

Analysis Period (min) 15

Intersection LOS: C

ICU Level of Service C

Splits and Phases: 7: Esquesing Line/Fourth Line & 5 Sideroad

→ Ø2 (R)	↘ Ø4
48 s	42 s
← Ø6 (R)	↙ Ø8
48 s	42 s

HCM Signalized Intersection Capacity Analysis

2023 FT PM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

09-09-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	50	240	11	66	283	18	23	285	81	4	116	39
Future Volume (vph)	50	240	11	66	283	18	23	285	81	4	116	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.97			0.97	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		1621			1668			1683			1624	
Flt Permitted		0.88			0.88			0.98			0.99	
Satd. Flow (perm)		1444			1482			1647			1608	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	57	273	12	75	322	20	26	324	92	5	132	44
RTOR Reduction (vph)	0	1	0	0	2	0	0	12	0	0	15	0
Lane Group Flow (vph)	0	342	0	0	415	0	0	430	0	0	166	0
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		52.1			52.1			28.9			28.9	
Effective Green, g (s)		52.1			52.1			28.9			28.9	
Actuated g/C Ratio		0.58			0.58			0.32			0.32	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		835			857			528			516	
v/s Ratio Prot												
v/s Ratio Perm		0.24			0.28			0.26			0.10	
v/c Ratio		0.41			0.48			0.81			0.32	
Uniform Delay, d1		10.5			11.1			28.1			23.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.5			2.0			9.3			0.4	
Delay (s)		11.9			13.1			37.4			23.5	
Level of Service		B			B			D			C	
Approach Delay (s)		11.9			13.1			37.4			23.5	
Approach LOS		B			B			D			C	

Intersection Summary

HCM 2000 Control Delay 21.9

HCM 2000 Level of Service C

HCM 2000 Volume to Capacity ratio 0.60

Actuated Cycle Length (s) 90.0

Intersection Capacity Utilization 65.8%

Analysis Period (min) 15

ICU Level of Service C

Sum of lost time (s) 9.0

ICU Level of Service C

c Critical Lane Group

Lanes, Volumes, Timings  
101: Boston Church Road & East Access 1

2023 FT PM Peak Hour  
09-09-2021

	←		↑		→	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↑	↔	↔	↑
Traffic Volume (vph)	196	48	227	59	14	227
Future Volume (vph)	196	48	227	59	14	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	15.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				75.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1772	1633	1642	1498	1825	1642
Fit Permitted	0.950				0.950	
Satd. Flow (perm)	1772	1633	1642	1498	1825	1642
Link Speed (k/h)	48		70		70	
Link Distance (m)	169.5		269.9		183.3	
Travel Time (s)	12.7		13.9		9.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	0%	17%	9%	0%	17%
Adj. Flow (vph)	213	52	247	64	15	247
Shared Lane Traffic (%)						
Lane Group Flow (vph)	213	52	247	64	15	247
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7		3.7	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free		Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	29.5%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis  
101: Boston Church Road & East Access 1

2023 FT PM Peak Hour  
09-09-2021

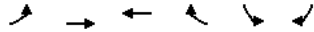
	←		↑		→	
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↑	↔	↔	↑
Traffic Volume (veh/h)	196	48	227	59	14	227
Future Volume (Veh/h)	196	48	227	59	14	227
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	213	52	247	64	15	247
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	524	247			311	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	524	247			311	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	58	93			99	
cM capacity (veh/h)	506	797			1261	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	213	52	247	64	15	247
Volume Left	213	0	0	0	15	0
Volume Right	0	52	0	64	0	0
cSH	506	797	1700	1700	1261	1700
Volume to Capacity	0.42	0.07	0.15	0.04	0.01	0.15
Queue Length 95th (m)	15.7	1.6	0.0	0.0	0.3	0.0
Control Delay (s)	17.2	9.8	0.0	0.0	7.9	0.0
Lane LOS	C	A			A	
Approach Delay (s)	15.8		0.0		0.5	
Approach LOS	C					

Intersection Summary	
Average Delay	5.1
Intersection Capacity Utilization	29.5%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings  
102: James Snow Parkway N & East Access 2

2023 FT PM Peak Hour  
09-09-2021

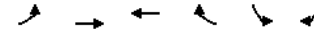


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕	↔	↔	↔
Traffic Volume (vph)	18	623	496	19	19	20
Future Volume (vph)	18	623	496	19	19	20
Future Volume (Veh/h)	18	623	496	19	19	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0			80.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	100.0				2.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt				0.850		0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	997	3042	2920	816	913	933
Fit Permitted	0.950				0.950	
Satd. Flow (perm)	997	3042	2920	816	913	933
Link Speed (k/h)		70	70			48
Link Distance (m)		548.1	558.1			147.4
Travel Time (s)		28.2	28.7			11.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	83%	20%	25%	100%	100%	75%
Adj. Flow (vph)	20	677	539	21	21	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	677	539	21	21	22
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		24		14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	27.2%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
102: James Snow Parkway N & East Access 2

2023 FT PM Peak Hour  
09-09-2021



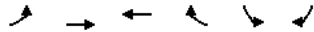
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕	↔	↔	↔
Traffic Volume (veh/h)	18	623	496	19	19	20
Future Volume (Veh/h)	18	623	496	19	19	20
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	677	539	21	21	22
Pedestrians						
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	560				918	270
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	560				918	270
tC, single (s)	5.8				8.8	8.4
tC, 2 stage (s)						
tF (s)	3.0				4.5	4.0
p0 queue free %	97				85	96
cM capacity (veh/h)	608				138	549

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	20	338	338	270	270	21	21	22
Volume Left	20	0	0	0	0	0	21	0
Volume Right	0	0	0	0	0	0	21	22
cSH	608	1700	1700	1700	1700	1700	138	549
Volume to Capacity	0.03	0.20	0.20	0.16	0.16	0.01	0.15	0.04
Queue Length 95th (m)	0.8	0.0	0.0	0.0	0.0	0.0	4.0	0.9
Control Delay (s)	11.1	0.0	0.0	0.0	0.0	0.0	35.7	11.8
Lane LOS	B						E	B
Approach Delay (s)	0.3			0.0			23.5	
Approach LOS							C	

Intersection Summary	
Average Delay	0.9
Intersection Capacity Utilization	27.2%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
103: James Snow Parkway N & East Access 3

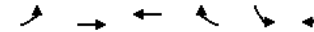
2023 FT PM Peak Hour  
09-09-2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕	↕	↕↕	↕
Traffic Volume (vph)	15	627	492	31	60	23
Future Volume (vph)	15	627	492	31	60	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0			80.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	100.0				2.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt				0.850		0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1055	3042	2920	955	1332	1134
Fit Permitted	0.453				0.950	
Satd. Flow (perm)	503	3042	2920	955	1332	1134
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				34		25
Link Speed (k/h)		70	70		48	
Link Distance (m)		558.1	346.4		152.7	
Travel Time (s)		28.7	17.8		11.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	73%	20%	25%	71%	37%	44%
Adj. Flow (vph)	16	682	535	34	65	25
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	682	535	34	65	25
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	6.1	30.5	30.5	6.1	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8	6.1	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			

Lanes, Volumes, Timings  
103: James Snow Parkway N & East Access 3

2023 FT PM Peak Hour  
09-09-2021

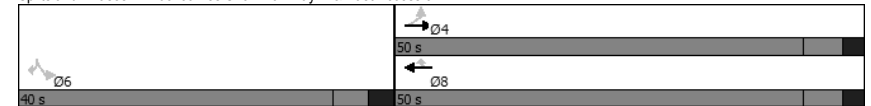


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.6	30.6	30.6	30.6	33.5	33.5
Total Split (s)	50.0	50.0	50.0	50.0	40.0	40.0
Total Split (%)	55.6%	55.6%	55.6%	55.6%	44.4%	44.4%
Maximum Green (s)	43.4	43.4	43.4	43.4	33.5	33.5
Yellow Time (s)	4.2	4.2	4.2	4.2	3.7	3.7
All-Red Time (s)	2.4	2.4	2.4	2.4	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	54.7	54.7	54.7	54.7	8.9	8.9
Actuated g/C Ratio	0.75	0.75	0.75	0.75	0.12	0.12
v/c Ratio	0.04	0.30	0.24	0.05	0.40	0.16
Control Delay	4.7	4.7	4.4	1.9	35.9	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.7	4.7	4.4	1.9	35.9	13.2
LOS	A	A	A	A	D	B
Approach Delay		4.7	4.3		29.6	
Approach LOS		A	A		C	

Intersection Summary

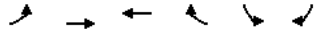
Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 72.6  
 Natural Cycle: 65  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.40  
 Intersection Signal Delay: 6.1  
 Intersection Capacity Utilization 32.4%  
 Analysis Period (min) 15  
 Intersection LOS: A  
 ICU Level of Service A

Splits and Phases: 103: James Snow Parkway N & East Access 3



HCM Signalized Intersection Capacity Analysis  
103: James Snow Parkway N & East Access 3

2023 FT PM Peak Hour  
09-09-2021

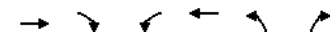


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↘↘	↘↘	↘	↘	↘
Traffic Volume (vph)	15	627	492	31	60	23
Future Volume (vph)	15	627	492	31	60	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1055	3042	2920	955	1332	1134
Fit Permitted	0.45	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	503	3042	2920	955	1332	1134
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	682	535	34	65	25
RTOR Reduction (vph)	0	0	0	10	0	22
Lane Group Flow (vph)	16	682	535	24	65	3
Heavy Vehicles (%)	73%	20%	25%	71%	37%	44%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			
Permitted Phases	4			8	6	6
Actuated Green, G (s)	53.2	53.2	53.2	53.2	7.7	7.7
Effective Green, g (s)	53.2	53.2	53.2	53.2	7.7	7.7
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.10	0.10
Clearance Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	361	2186	2099	686	138	117
v/s Ratio Prot		c0.22	0.18			
v/s Ratio Perm	0.03			0.03	c0.05	0.00
v/c Ratio	0.04	0.31	0.25	0.04	0.47	0.02
Uniform Delay, d1	3.0	3.8	3.6	3.0	31.2	29.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.4	0.3	0.1	2.5	0.1
Delay (s)	3.3	4.1	3.9	3.1	33.8	29.8
Level of Service	A	A	A	A	C	C
Approach Delay (s)		4.1	3.8		32.7	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	5.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	74.0	Sum of lost time (s)	13.1
Intersection Capacity Utilization	32.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings  
201: West Access 1 & 5 Sideroad

2023 FT PM Peak Hour  
09-09-2021



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘	↘	↘	↘	↘	↘
Traffic Volume (vph)	234	5	6	379	12	22
Future Volume (vph)	234	5	6	379	12	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.997			0.999	0.912	
Fit Protected				0.999	0.983	
Satd. Flow (prot)	1699	0	0	1702	1722	0
Fit Permitted				0.999	0.983	
Satd. Flow (perm)	1699	0	0	1702	1722	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	198.7			175.4	89.6	
Travel Time (s)	11.9			10.5	6.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	0%	0%	13%	0%	0%
Adj. Flow (vph)	254	5	7	412	13	24
Shared Lane Traffic (%)						
Lane Group Flow (vph)	259	0	0	419	37	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	34.7%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
201: West Access 1 & 5 Sideroad

2023 FT PM Peak Hour  
09-09-2021

	→	↖	↗	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖			↖	↗	↗
Traffic Volume (veh/h)	234	5	6	379	12	22
Future Volume (Veh/h)	234	5	6	379	12	22
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	254	5	7	412	13	24
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			259	682	256	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			259	682	256	
tC, single (s)			4.1	6.4	6.2	
tC, 2 stage (s)						
tF (s)			2.2	3.5	3.3	
p0 queue free %			99	97	97	
cM capacity (veh/h)			1317	416	787	
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	259	419	37			
Volume Left	0	7	13			
Volume Right	5	0	24			
cSH	1700	1317	599			
Volume to Capacity	0.15	0.01	0.06			
Queue Length 95th (m)	0.0	0.1	1.5			
Control Delay (s)	0.0	0.2	11.4			
Lane LOS	A		B			
Approach Delay (s)	0.0	0.2	11.4			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.7			
Intersection Capacity Utilization			34.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings  
202: West Access 2 & 5 Sideroad

2023 FT PM Peak Hour  
09-09-2021

	→	↖	↗	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖			↖	↗	↗
Traffic Volume (vph)	251	5	6	375	10	25
Future Volume (vph)	251	5	6	375	10	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998				0.904	
Fit Protected					0.999	0.986
Satd. Flow (prot)	1700	0	0	1702	1712	0
Fit Permitted					0.999	0.986
Satd. Flow (perm)	1700	0	0	1702	1712	0
Link Speed (k/h)	60				60	48
Link Distance (m)	175.4				166.9	91.3
Travel Time (s)	10.5				10.0	6.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	0%	0%	13%	0%	0%
Adj. Flow (vph)	273	5	7	408	11	27
Shared Lane Traffic (%)						
Lane Group Flow (vph)	278	0	0	415	38	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0				0.0	3.7
Link Offset(m)	0.0				0.0	0.0
Crosswalk Width(m)	1.6				1.6	1.6
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	14		24		24	14
Sign Control	Free				Free	Stop
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 34.5%					ICU Level of Service A	
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis  
202: West Access 2 & 5 Sideroad

2023 FT PM Peak Hour  
09-09-2021

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (veh/h)	251	5	6	375	10	25
Future Volume (Veh/h)	251	5	6	375	10	25
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	273	5	7	408	11	27
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			278		698	276
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			278		698	276
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		97	96
cM capacity (veh/h)			1296		408	768
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	278	415	38			
Volume Left	0	7	11			
Volume Right	5	0	27			
cSH	1700	1296	612			
Volume to Capacity	0.16	0.01	0.06			
Queue Length 95th (m)	0.0	0.1	1.5			
Control Delay (s)	0.0	0.2	11.3			
Lane LOS	A		B			
Approach Delay (s)	0.0	0.2	11.3			
Approach LOS			B			
<b>Intersection Summary</b>						
Average Delay			0.7			
Intersection Capacity Utilization			34.5%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
203: Boston Church Road & West Access 3

2023 FT PM Peak Hour  
09-09-2021

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔		↔	
Traffic Volume (vph)	1	21	19	250	136	0
Future Volume (vph)	1	21	19	250	136	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	40.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	2.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.871					
Fit Protected	0.998		0.950			
Satd. Flow (prot)	994	0	1560	1011	1642	0
Fit Permitted	0.998		0.950			
Satd. Flow (perm)	994	0	1560	1011	1642	0
Link Speed (k/h)	48		70			
Link Distance (m)	99.5		207.3		219.2	
Travel Time (s)	7.5		10.7		11.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%		71%	17%	90%	17%
Adj. Flow (vph)	1	23	21	272	148	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	24	0	21	272	148	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7		3.7			
Link Offset(m)	0.0		0.0			
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop		Free		Free	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 23.8%					ICU Level of Service A	
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis  
203: Boston Church Road & West Access 3

2023 FT PM Peak Hour  
09-09-2021

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	21	19	250	136	0
Future Volume (Veh/h)	1	21	19	250	136	0
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)	1	23	21	272	148	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	462	148	148			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	462	148	148			
tC, single (s)	6.4	6.9	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.9	2.4			
p0 queue free %	100	97	98			
cM capacity (veh/h)	553	745	1347			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>		
Volume Total	24	21	272	148		
Volume Left	1	21	0	0		
Volume Right	23	0	0	0		
cSH	734	1347	1700	1700		
Volume to Capacity	0.03	0.02	0.16	0.09		
Queue Length 95th (m)	0.8	0.4	0.0	0.0		
Control Delay (s)	10.1	7.7	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	10.1	0.6	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.9			
Intersection Capacity Utilization			23.8%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings  
204: Boston Church Road & West Access 4

2023 FT PM Peak Hour  
09-09-2021

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	23	86	23	246	150	7
Future Volume (vph)	23	86	23	246	150	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	15.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	2.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.894				0.994	
Fit Protected	0.990		0.950			
Satd. Flow (prot)	1700	0	1825	1642	1643	0
Fit Permitted	0.990		0.950			
Satd. Flow (perm)	1700	0	1825	1642	1643	0
Link Speed (k/h)	48			70	70	
Link Distance (m)	101.5			171.0	207.3	
Travel Time (s)	7.6			8.8	10.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	17%	17%	0%
Adj. Flow (vph)	25	93	25	267	163	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	118	0	25	267	171	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop		Free		Free	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 28.2%				ICU Level of Service A		
Analysis Period (min) 15						



HCM Unsignalized Intersection Capacity Analysis  
204: Boston Church Road & West Access 4

2023 FT PM Peak Hour  
09-09-2021

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	23	86	23	246	150	7
Future Volume (Veh/h)	23	86	23	246	150	7
Sign Control	Stop		Free			
Grade	0%		0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	93	25	267	163	8
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	484	167	171			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	484	167	171			
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	89	98			
cM capacity (veh/h)	536	882	1418			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>		
Volume Total	118	25	267	171		
Volume Left	25	25	0	0		
Volume Right	93	0	0	8		
cSH	776	1418	1700	1700		
Volume to Capacity	0.15	0.02	0.16	0.10		
Queue Length 95th (m)	4.1	0.4	0.0	0.0		
Control Delay (s)	10.5	7.6	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	10.5	0.6	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			2.5			
Intersection Capacity Utilization			28.2%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
205: Boston Church Road & West Access 5

2023 FT PM Peak Hour  
09-09-2021

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	5	6	269	236	0
Future Volume (vph)	0	5	6	269	236	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	40.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	2.5	75.0				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Fit Protected			0.950			
Satd. Flow (prot)	831	0	913	1642	1642	0
Fit Permitted	0.950					
Satd. Flow (perm)	831	0	913	1642	1642	0
Link Speed (k/h)	48		70		70	
Link Distance (m)	100.3		183.3		171.0	
Travel Time (s)	7.5		9.4		8.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	100%	100%	17%	17%	0%
Adj. Flow (vph)	0	5	7	292	257	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	0	7	292	257	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7		3.7		3.7	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop		Free		Free	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 24.2%			ICU Level of Service		A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
 205: Boston Church Road & West Access 5

2023 FT PM Peak Hour  
 09-09-2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	←	←	←	↑	↑	←
Traffic Volume (veh/h)	0	5	6	269	236	0
Future Volume (Veh/h)	0	5	6	269	236	0
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)	0	5	7	292	257	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	563	257	257			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	563	257	257			
tC, single (s)	6.4	7.2	5.1			
tC, 2 stage (s)						
tF (s)	3.5	4.2	3.1			
p0 queue free %	100	99	99			
cM capacity (veh/h)	487	593	899			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>		
Volume Total	5	7	292	257		
Volume Left	0	7	0	0		
Volume Right	5	0	0	0		
cSH	593	899	1700	1700		
Volume to Capacity	0.01	0.01	0.17	0.15		
Queue Length 95th (m)	0.2	0.2	0.0	0.0		
Control Delay (s)	11.1	9.0	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	11.1	0.2		0.0		
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.2			
Intersection Capacity Utilization			24.2%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings

2028 FT AM Peak Hour

1: Regional Road 25 & 5 Sideroad

09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	375	237	66	103	14	86	343	115	110	536	69
Future Volume (vph)	79	375	237	66	103	14	86	343	115	110	536	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	70.0		0.0	75.0		75.0	35.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	100.0			100.0			75.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Frt		0.942			0.982				0.850		0.983	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1601	1568	0	1342	1604	0	1225	4196	1338	1601	4386	0
Fit Permitted	0.663			0.174			0.292			0.526		
Satd. Flow (perm)	1117	1568	0	246	1604	0	376	4196	1338	886	4386	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					7				122			19
Link Speed (k/h)		60			60				70			70
Link Distance (m)		573.6			536.0				986.0			203.5
Travel Time (s)		34.4			32.2				50.7			10.5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Adj. Flow (vph)	84	399	252	70	110	15	91	365	122	117	570	73
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	651	0	70	125	0	91	365	122	117	643	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7				3.7			3.7
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		1.6			1.6				1.6			1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases	3	8		7	4		5	2		2	6	
Permitted Phases	8			4			2		2	6		
Detector Phase	3	8		7	4		5	2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	10.0		5.0	10.0		7.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	11.0	38.0		9.5	38.0		11.0	38.2	38.2	38.2	38.2	

Lanes, Volumes, Timings

2028 FT AM Peak Hour

1: Regional Road 25 & 5 Sideroad

09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	11.0	60.0		9.5	58.5		11.0	50.2	50.2	39.2	39.2	
Total Split (%)	9.2%	50.1%		7.9%	48.9%		9.2%	41.9%	41.9%	32.7%	32.7%	
Maximum Green (s)	7.0	54.0		5.0	52.5		7.0	44.0	44.0	33.0	33.0	
Yellow Time (s)	3.0	3.7		3.5	3.7		3.0	4.2	4.2	4.2	4.2	
All-Red Time (s)	1.0	2.3		1.0	2.3		1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0		4.5	6.0		4.0	6.2	6.2	6.2	6.2	
Lead/Lag	Lead	Lag		Lead	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.7		3.0	3.7		3.0	3.6	3.6	4.2	4.2	
Recall Mode	None	None		None	None		None	Ped	Ped	Ped	Ped	
Walk Time (s)		7.0			7.0			7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		25.0			25.0			25.0	25.0	25.0	25.0	
Pedestrian Calls (#/hr)		0			0			0	0	0	0	
Act Effect Green (s)	57.1	49.8		54.0	48.7		43.4	41.2	41.2	33.0	33.0	
Actuated g/C Ratio	0.52	0.45		0.49	0.44		0.39	0.37	0.37	0.30	0.30	
v/c Ratio	0.14	0.92		0.41	0.18		0.45	0.23	0.21	0.44	0.49	
Control Delay	13.5	49.9		21.1	19.7		32.4	25.5	5.5	42.1	34.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	13.5	49.9		21.1	19.7		32.4	25.5	5.5	42.1	34.6	
LOS	B	D		C	B		C	C	A	D	C	
Approach Delay		45.7			20.2			22.4			35.7	
Approach LOS		D			C			C			D	
Intersection Summary												
Area Type:	Other											
Cycle Length:	119.7											
Actuated Cycle Length:	110.6											
Natural Cycle:	100											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.92											
Intersection Signal Delay:	34.2						Intersection LOS: C					
Intersection Capacity Utilization:	90.8%						ICU Level of Service E					
Analysis Period (min):	15											
Splits and Phases:	1: Regional Road 25 & 5 Sideroad											

HCM Signalized Intersection Capacity Analysis  
1: Regional Road 25 & 5 Sideroad

2028 FT AM Peak Hour  
09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	79	375	237	66	103	14	86	343	115	110	536	69
Future Volume (vph)	79	375	237	66	103	14	86	343	115	110	536	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.5	6.0		4.0	6.2	6.2	6.2	6.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.91	1.00	1.00	0.91	
Frt	1.00	0.94		1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1601	1568		1342	1604		1225	4196	1338	1601	4386	
Fit Permitted	0.66	1.00		0.17	1.00		0.29	1.00	1.00	0.53	1.00	
Satd. Flow (perm)	1118	1568		246	1604		376	4196	1338	886	4386	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	84	399	252	70	110	15	91	365	122	117	570	73
RTOR Reduction (vph)	0	0	0	0	4	0	0	0	76	0	13	0
Lane Group Flow (vph)	84	651	0	70	121	0	91	365	46	117	630	0
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases	3	8		7	4		5	2			6	
Permitted Phases	8			4			2		2		6	
Actuated Green, G (s)	55.0	49.8		52.5	48.8		42.2	42.2	42.2	33.0	33.0	
Effective Green, g (s)	55.0	49.8		52.5	48.8		42.2	42.2	42.2	33.0	33.0	
Actuated g/C Ratio	0.49	0.44		0.47	0.43		0.38	0.38	0.38	0.29	0.29	
Clearance Time (s)	4.0	6.0		4.5	6.0		4.0	6.2	6.2	6.2	6.2	
Vehicle Extension (s)	3.0	3.7		3.0	3.7		3.0	3.6	3.6	4.2	4.2	
Lane Grp Cap (vph)	569	694		150	696		180	1575	502	260	1287	
v/s Ratio Prot	0.01	c0.42		c0.02	0.08		c0.02	0.09			0.14	
v/s Ratio Perm	0.07			0.20			c0.17		0.03	0.13		
v/c Ratio	0.15	0.94		0.47	0.17		0.51	0.23	0.09	0.45	0.49	
Uniform Delay, d1	15.5	29.8		20.9	19.5		24.8	24.0	22.7	32.3	32.7	
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	20.4		2.3	0.2		2.2	0.1	0.1	1.9	0.4	
Delay (s)	15.6	50.3		23.2	19.6		27.0	24.1	22.8	34.2	33.2	
Level of Service	B	D		C	B		C	C	C	C	C	
Approach Delay (s)		46.3			20.9			24.3			33.3	
Approach LOS		D			C			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay	34.2			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	0.75											
Actuated Cycle Length (s)	112.4			Sum of lost time (s)			20.7					
Intersection Capacity Utilization	90.8%			ICU Level of Service			E					
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings

2028 FT AM Peak Hour  
09-09-2021

2: Regional Road 25 & James Snow Parkway N

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	12	146	40	109	130	67	195	540	519	239	476	32
Future Volume (vph)	12	146	40	109	130	67	195	540	519	239	476	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		115.0	85.0		35.0	30.0		30.0	75.0		75.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	40.0			90.0			70.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Ped Bike Factor									0.99	1.00		
Frt			0.850			0.850			0.850		0.991	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1217	2684	1103	1259	3147	1192	1534	4162	1458	1472	4106	0
Fit Permitted	0.667			0.656			0.448			0.427		
Satd. Flow (perm)	854	2684	1103	869	3147	1192	723	4162	1439	661	4106	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			58			69			535		10	
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		452.4			1065.5			592.1			986.0	
Travel Time (s)		27.1			63.9			30.5			50.7	
Confl. Peds. (#/hr)								1		1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Adj. Flow (vph)	12	151	41	112	134	69	201	557	535	246	491	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	151	41	112	134	69	201	557	535	246	524	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.2	9.0	9.0	9.0	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	
Switch Phase												

Lanes, Volumes, Timings

2028 FT AM Peak Hour

2: Regional Road 25 & James Snow Parkway N

09-09-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	43.6	43.6	43.6	43.6	43.6	43.6	11.0	42.9	42.9	11.0	35.9	
Total Split (s)	55.6	55.6	55.6	55.6	55.6	55.6	15.0	76.9	76.9	15.0	76.9	
Total Split (%)	37.7%	37.7%	37.7%	37.7%	37.7%	37.7%	10.2%	52.1%	52.1%	10.2%	52.1%	
Maximum Green (s)	49.0	49.0	49.0	49.0	49.0	49.0	11.0	70.0	70.0	11.0	70.0	
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	4.2	4.2	3.0	4.2	
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	1.0	2.7	2.7	1.0	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	30.0	30.0	30.0	30.0	30.0	30.0		29.0	29.0		22.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0	0		0	
Act Effect Green (s)	16.4	16.4	16.4	16.4	16.4	16.4	36.8	23.8	23.8	37.4	24.1	
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24	0.24	0.54	0.35	0.35	0.55	0.35	
v/c Ratio	0.06	0.24	0.13	0.54	0.18	0.20	0.40	0.39	0.63	0.51	0.36	
Control Delay	21.9	22.4	5.2	34.2	21.7	7.8	9.7	18.3	5.7	11.7	17.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	21.9	22.4	5.2	34.2	21.7	7.8	9.7	18.3	5.7	11.7	17.7	
LOS	C	C	A	C	C	A	A	B	A	B	B	
Approach Delay	18.9			23.1			11.8			15.8		
Approach LOS	B			C			B			B		

Intersection Summary

Area Type:	Other
Cycle Length:	147.5
Actuated Cycle Length:	68.4
Natural Cycle:	100
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.63
Intersection Signal Delay:	14.9
Intersection LOS:	B
Intersection Capacity Utilization:	68.4%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 2: Regional Road 25 & James Snow Parkway N

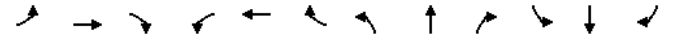
15 s	76.9 s	55.6 s
15 s	76.9 s	55.6 s

HCM Signalized Intersection Capacity Analysis

2028 FT AM Peak Hour

2: Regional Road 25 & James Snow Parkway N

09-09-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	146	40	109	130	67	195	540	519	239	476	32
Future Volume (vph)	12	146	40	109	130	67	195	540	519	239	476	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00	1.00	0.91	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1217	2684	1103	1259	3147	1192	1534	4162	1440	1472	4104	
Fit Permitted	0.67	1.00	1.00	0.66	1.00	1.00	0.45	1.00	1.00	0.43	1.00	
Satd. Flow (perm)	854	2684	1103	869	3147	1192	723	4162	1440	662	4104	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	12	151	41	112	134	69	201	557	535	246	491	33
RTOR Reduction (vph)	0	0	31	0	0	52	0	0	348	0	6	0
Lane Group Flow (vph)	12	151	10	112	134	17	201	557	187	246	518	0
Confl. Peds. (#/hr)							1	1				
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	16.4	16.4	16.4	16.4	16.4	16.4	33.9	23.8	23.8	34.5	24.1	
Effective Green, g (s)	16.4	16.4	16.4	16.4	16.4	16.4	33.9	23.8	23.8	34.5	24.1	
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24	0.24	0.50	0.35	0.35	0.51	0.35	
Clearance Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	205	646	265	209	757	287	480	1454	503	459	1452	
v/s Ratio Prot		0.06			0.04		0.06	0.13		c0.08	0.13	
v/s Ratio Perm	0.01		0.01	c0.13		0.01	0.15		0.13	c0.19		
v/c Ratio	0.06	0.23	0.04	0.54	0.18	0.06	0.42	0.38	0.37	0.54	0.36	
Uniform Delay, d1	19.9	20.8	19.8	22.5	20.5	19.9	9.9	16.6	16.6	10.0	16.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.4	0.1	4.8	0.2	0.2	0.6	0.4	1.0	1.2	0.3	
Delay (s)	20.2	21.2	19.9	27.3	20.7	20.1	10.5	17.0	17.5	11.2	16.6	
Level of Service	C	C	B	C	C	C	B	B	B	B	B	
Approach Delay (s)	20.9			22.9			16.2			14.8		
Approach LOS	C			C			B			B		

Intersection Summary

HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	68.1	Sum of lost time (s)	17.5
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		

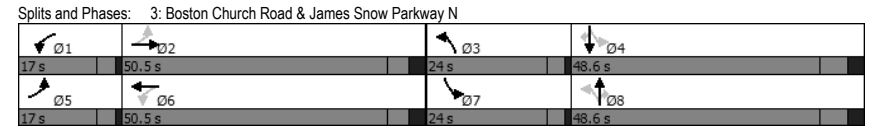
c Critical Lane Group

Lanes, Volumes, Timings  
3: Boston Church Road & James Snow Parkway N  
2028 FT AM Peak Hour  
09-09-2021

	↖	→	↘	↙	←	↖	↗	↘	↙	↕	↖	↗	↘	↙	↕
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations	↖	↖		↖	↖		↖	↖	↖	↖	↖	↖			
Traffic Volume (vph)	102	640	127	14	242	275	28	7	11	98	42	136			
Future Volume (vph)	102	640	127	14	242	275	28	7	11	98	42	136			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Storage Length (m)	70.0		0.0	70.0		0.0	60.0		25.0	60.0		25.0			
Storage Lanes	1		0	1		0	1		1	1		1			
Taper Length (m)	100.0			100.0			70.0			90.0					
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00			
Frt		0.975			0.920					0.850					0.850
Fit Protected	0.950			0.950			0.950			0.950					
Satd. Flow (prot)	1508	3016	0	1415	2852	0	1113	3650	944	1534	3147	1498			
Fit Permitted	0.327			0.317			0.725			0.511					
Satd. Flow (perm)	519	3016	0	472	2852	0	849	3650	944	825	3147	1498			
Right Turn on Red		Yes			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		17			216					90				151	
Link Speed (k/h)		70			70					60				60	
Link Distance (m)		358.9			546.2					792.9				198.3	
Travel Time (s)		18.5			28.1					47.6				11.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90			
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%			
Adj. Flow (vph)	113	711	141	16	269	306	31	8	12	109	47	151			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	113	852	0	16	575	0	31	8	12	109	47	151			
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No			
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right			
Median Width(m)		3.7			3.7					3.7				3.7	
Link Offset(m)		0.0			0.0					0.0				0.0	
Crosswalk Width(m)		1.6			1.6					1.6				1.6	
Two way Left Turn Lane															
Headway Factor	0.99	0.99		0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99			
Turning Speed (k/h)		24		14	24		14	24		14	24			14	
Number of Detectors	1	1		1	1		1	1		1	1			1	
Detector Template															
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0			8.0	
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0			-1.0	
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0			-1.0	
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0		9.0	9.0			9.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex	
Detector 1 Channel															
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Perm	pm+pt			NA	Perm
Protected Phases	5	2		1	6		3	8		7	4			4	
Permitted Phases	2			6			8			8	4			4	
Detector Phase	5	2		1	6		3	8		8	7			4	4
Switch Phase															
Minimum Initial (s)	7.0	20.0		7.0	20.0		7.0	15.0		15.0	7.0			15.0	15.0
Minimum Split (s)	11.0	33.5		11.0	33.5		11.0	31.6		31.6	11.0			31.6	31.6

Lanes, Volumes, Timings  
3: Boston Church Road & James Snow Parkway N  
2028 FT AM Peak Hour  
09-09-2021

	↖	→	↘	↙	←	↖	↗	↘	↙	↕	↖	↗	↘	↙	↕
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Total Split (s)	17.0	50.5		17.0	50.5		24.0	48.6		48.6	24.0	48.6			
Total Split (%)	12.1%	36.0%		12.1%	36.0%		17.1%	34.7%		34.7%	17.1%	34.7%			
Maximum Green (s)	13.0	44.0		13.0	44.0		20.0	41.0		41.0	20.0	41.0			
Yellow Time (s)	3.0	3.7		3.0	3.7		3.0	4.6		4.6	3.0	4.6			
All-Red Time (s)	1.0	2.8		1.0	2.8		1.0	3.0		3.0	1.0	3.0			
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0			
Total Lost Time (s)	4.0	6.5		4.0	6.5		4.0	7.6		7.6	4.0	7.6			
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lag	Lead	Lag			
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes			
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		5.0	3.0	5.0			
Recall Mode	None	Min		None	Min		None	None		None	None	None			
Walk Time (s)		7.0			7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		20.0			20.0			17.0			17.0			17.0	17.0
Pedestrian Calls (#/hr)		0			0			0			0			0	0
Act Effect Green (s)	42.9	37.0		36.4	26.4		16.8	15.8		15.8	25.1	17.3		17.3	17.3
Actuated g/C Ratio	0.56	0.48		0.48	0.35		0.22	0.21		0.21	0.33	0.23		0.23	0.23
v/c Ratio	0.27	0.58		0.05	0.51		0.14	0.01		0.05	0.27	0.07		0.33	0.33
Control Delay	10.9	18.2		10.0	14.2		23.9	33.7		0.4	21.9	28.9		8.3	8.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0		0.0	0.0
Total Delay	10.9	18.2		10.0	14.2		23.9	33.7		0.4	21.9	28.9		8.3	8.3
LOS	B	B		A	B		C	C		A	C	C		C	A
Approach Delay		17.4			14.1			19.9				16.3			
Approach LOS		B			B			B			B			B	
Intersection Summary															
Area Type:	Other														
Cycle Length:	140.1														
Actuated Cycle Length:	76.5														
Natural Cycle:	90														
Control Type:	Actuated-Uncoordinated														
Maximum v/c Ratio:	0.58														
Intersection Signal Delay:	16.2														
Intersection Capacity Utilization:	55.2%														
ICU Level of Service:	B														
Analysis Period (min):	15														



HCM Signalized Intersection Capacity Analysis  
3: Boston Church Road & James Snow Parkway N

2028 FT AM Peak Hour  
09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↕	↕	↔	↔	↕	↔
Traffic Volume (vph)	102	640	127	14	242	275	28	7	11	98	42	136
Future Volume (vph)	102	640	127	14	242	275	28	7	11	98	42	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.5	4.0	6.5	4.0	7.6	7.6	4.0	7.6	4.0	7.6	7.6
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Frt	1.00	0.98	1.00	0.92	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1508	3017	1415	2853	1113	3650	944	1534	3147	1498		
Fit Permitted	0.33	1.00	0.32	1.00	0.72	1.00	1.00	0.51	1.00	1.00	1.00	1.00
Satd. Flow (perm)	519	3017	472	2853	849	3650	944	826	3147	1498		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	113	711	141	16	269	306	31	8	12	109	47	151
RTOR Reduction (vph)	0	9	0	0	139	0	0	0	11	0	0	116
Lane Group Flow (vph)	113	843	0	16	436	0	31	8	1	109	47	35
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	NA	Perm	Perm
Protected Phases	5	2	1	6	3	8	8	4	7	4		
Permitted Phases	2		6		8		8	4			4	
Actuated Green, G (s)	43.1	36.9	31.6	29.4	11.2	8.5	8.5	25.8	19.1	19.1		
Effective Green, g (s)	43.1	36.9	31.6	29.4	11.2	8.5	8.5	25.8	19.1	19.1		
Actuated g/C Ratio	0.52	0.44	0.38	0.35	0.13	0.10	0.10	0.31	0.23	0.23		
Clearance Time (s)	4.0	6.5	4.0	6.5	4.0	7.6	7.6	4.0	7.6	7.6		
Vehicle Extension (s)	3.0	5.0	3.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0		
Lane Grp Cap (vph)	385	1341	204	1010	123	373	96	370	724	344		
v/s Ratio Prot	c0.03	c0.28	0.00	0.15	0.01	0.00		c0.05	0.01			
v/s Ratio Perm	0.12		0.03		0.03		0.00	c0.04		0.02		
v/c Ratio	0.29	0.63	0.08	0.43	0.25	0.02	0.01	0.29	0.06	0.10		
Uniform Delay, d1	10.9	17.8	16.1	20.4	31.9	33.5	33.5	21.3	25.0	25.2		
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	0.4	1.3	0.2	0.6	1.1	0.0	0.1	0.4	0.1	0.3		
Delay (s)	11.3	19.1	16.3	21.0	33.0	33.6	33.6	21.8	25.1	25.5		
Level of Service	B	B	B	C	C	C	C	C	C	C		
Approach Delay (s)	18.2		20.9		33.2		24.1					
Approach LOS	B		C		C		C					

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	83.0	Sum of lost time (s)	22.1
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

Lanes, Volumes, Timings  
4: Esquesing Line & James Snow Parkway N

2028 FT AM Peak Hour  
09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↕	↕	↔	↔	↕	↔
Traffic Volume (vph)	18	598	141	38	501	39	64	203	6	40	402	17
Future Volume (vph)	18	598	141	38	501	39	64	203	6	40	402	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		0.0	70.0		0.0	40.0		25.0	25.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			80.0			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.971			0.989			0.850			0.850	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1547	2943	0	1644	2857	0	1644	1731	1396	1615	1685	1396
Fit Permitted	0.383			0.216			0.315			0.589		
Satd. Flow (perm)	624	2943	0	374	2857	0	545	1731	1396	1001	1685	1396
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		26			7			74			74	
Link Speed (k/h)		70			70			60			60	
Link Distance (m)		346.4			1421.7			292.4			1994.7	
Travel Time (s)		17.8			73.1			17.5			119.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	17%	13%	14%	17%	17%
Adj. Flow (vph)	20	680	160	43	569	44	73	231	7	45	457	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	840	0	43	613	0	73	231	7	45	457	19
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8		2	2	2	6		6
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6		6
Switch Phase												
Minimum Initial (s)	7.0	15.0		7.0	15.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	11.0	30.6		11.0	30.6		33.5	33.5	33.5	33.5	33.5	33.5

Lanes, Volumes, Timings  
4: Esquesing Line & James Snow Parkway N

2028 FT AM Peak Hour  
09-09-2021

	←		→		↖		↗		↙		↘	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	19.0	41.6		19.0	41.6		51.5	51.5	51.5	51.5	51.5	51.5
Total Split (%)	16.9%	37.1%		16.9%	37.1%		45.9%	45.9%	45.9%	45.9%	45.9%	45.9%
Maximum Green (s)	15.0	35.0		15.0	35.0		45.0	45.0	45.0	45.0	45.0	45.0
Yellow Time (s)	3.0	4.2		3.0	4.2		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	2.4		1.0	2.4		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		17.0			17.0		20.0	20.0	20.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	37.6	31.2		38.9	33.4		31.0	31.0	31.0	31.0	31.0	31.0
Actuated g/C Ratio	0.46	0.38		0.47	0.41		0.38	0.38	0.38	0.38	0.38	0.38
v/c Ratio	0.05	0.74		0.14	0.52		0.36	0.35	0.01	0.12	0.72	0.03
Control Delay	13.4	28.6		13.9	22.3		26.6	21.6	0.0	19.7	30.5	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.4	28.6		13.9	22.3		26.6	21.6	0.0	19.7	30.5	0.1
LOS	B	C		B	C		C	C	A	B	C	A
Approach Delay		28.2			21.8			22.2			28.5	
Approach LOS		C			C			C			C	

Intersection Summary	
Area Type:	Other
Cycle Length:	112.1
Actuated Cycle Length:	82.1
Natural Cycle:	80
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.74
Intersection Signal Delay:	25.7
Intersection Capacity Utilization:	84.4%
Analysis Period (min):	15
Intersection LOS:	C
ICU Level of Service:	E

Splits and Phases: 4: Esquesing Line & James Snow Parkway N

↑ Ø2	↙ Ø3	→ Ø4
51.5 s	19 s	41.6 s
↓ Ø6	↘ Ø7	← Ø8
51.5 s	19 s	41.6 s

HCM Signalized Intersection Capacity Analysis  
4: Esquesing Line & James Snow Parkway N

2028 FT AM Peak Hour  
09-09-2021

	←		→		↖		↗		↙		↘	
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖
Traffic Volume (vph)	18	598	141	38	501	39	64	203	6	40	402	17
Future Volume (vph)	18	598	141	38	501	39	64	203	6	40	402	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1547	2944		1644	2858		1644	1731	1396	1615	1685	1396
Flt Permitted	0.38	1.00		0.22	1.00		0.31	1.00	1.00	0.59	1.00	1.00
Satd. Flow (perm)	623	2944		374	2858		545	1731	1396	1002	1685	1396
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	20	680	160	43	569	44	73	231	7	45	457	19
RTOR Reduction (vph)	0	16	0	0	4	0	0	0	4	0	0	12
Lane Group Flow (vph)	20	824	0	43	609	0	73	231	3	45	457	7
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	11%	17%	13%	14%	17%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		6		6	
Actuated Green, G (s)	34.1	31.8		37.3	33.4		31.0	31.0	31.0	31.0	31.0	31.0
Effective Green, g (s)	34.1	31.8		37.3	33.4		31.0	31.0	31.0	31.0	31.0	31.0
Actuated g/C Ratio	0.41	0.38		0.45	0.40		0.37	0.37	0.37	0.37	0.37	0.37
Clearance Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	278	1117		225	1139		201	640	516	370	623	516
v/s Ratio Prot	0.00	c0.28		c0.01	0.21		0.13				c0.27	
v/s Ratio Perm	0.03			0.08			0.13		0.00	0.04		0.01
v/c Ratio	0.07	0.74		0.19	0.53		0.36	0.36	0.01	0.12	0.73	0.01
Uniform Delay, d1	15.0	22.4		14.2	19.3		19.2	19.2	16.7	17.4	22.8	16.7
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	3.1		0.4	0.9		2.3	0.7	0.0	0.3	5.4	0.0
Delay (s)	15.1	25.5		14.6	20.1		21.5	19.9	16.7	17.7	28.2	16.7
Level of Service	B	C		B	C		C	B	B	B	C	B
Approach Delay (s)		25.3			19.8			20.2			26.9	
Approach LOS		C			B			C			C	

Intersection Summary	
HCM 2000 Control Delay	23.4
HCM 2000 Volume to Capacity ratio	0.70
Actuated Cycle Length (s)	83.8
Intersection Capacity Utilization	84.4%
Analysis Period (min)	15
HCM 2000 Level of Service	C
Sum of lost time (s)	17.1
ICU Level of Service	E
c Critical Lane Group	



Lanes, Volumes, Timings

2028 FT AM Peak Hour

5: James Snow Parkway N & Steeles Avenue East

09-09-2021



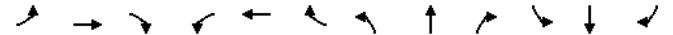
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔	↔	↔↔	↔↔↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	1	590	268	118	328	68	380	509	412	167	462	10
Future Volume (vph)	1	590	268	118	328	68	380	509	412	167	462	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	122.0		72.0	170.0		130.0	105.0		260.0	160.0		0.0
Storage Lanes	1		1	2		1	2		1	1		0
Taper Length (m)	60.0			70.0			80.0			80.0		
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	1.00	0.95	0.95
Friction			0.850			0.850			0.850		0.997	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	5142	1601	3471	5142	1601	3471	3579	1601	1789	3568	0
Fit Permitted	0.530			0.950			0.950			0.443		
Satd. Flow (perm)	998	5142	1601	3471	5142	1601	3471	3579	1601	834	3568	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			291			82			356			1
Link Speed (k/h)		60			70			60			70	
Link Distance (m)		729.0			881.4			342.7			1421.7	
Travel Time (s)		43.7			45.3			20.6			73.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	641	291	128	357	74	413	553	448	182	502	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	641	291	128	357	74	413	553	448	182	513	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.0			4.0			4.0			4.0	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2		6		6		8	4		
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	7.0	22.0	22.0	7.0	22.0	22.0	7.0	15.0	15.0	7.0	15.0	
Minimum Split (s)	11.0	47.2	47.2	12.0	47.2	47.2	12.0	46.3	46.3	11.0	46.3	
Total Split (s)	15.0	55.2	55.2	26.0	66.2	66.2	29.0	59.0	59.0	24.0	54.0	

Lanes, Volumes, Timings

2028 FT AM Peak Hour

5: James Snow Parkway N & Steeles Avenue East

09-09-2021

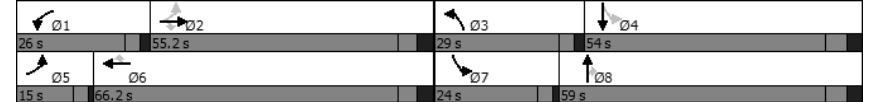


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	9.1%	33.6%	33.6%	15.8%	40.3%	40.3%	17.7%	35.9%	35.9%	14.6%	32.9%	
Maximum Green (s)	11.0	48.0	48.0	21.0	59.0	59.0	24.0	51.7	51.7	20.0	46.7	
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	4.2	4.2	3.0	4.2	
All-Red Time (s)	1.0	3.5	3.5	2.0	3.5	3.5	2.0	3.1	3.1	1.0	3.1	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	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	5.0	5.0	3.0	5.0	
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		33.0	33.0		33.0	33.0		32.0	32.0		32.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effect Green (s)	33.4	23.1	23.1	9.6	35.8	35.8	18.1	29.5	29.5	38.9	23.0	
Actuated g/C Ratio	0.34	0.23	0.23	0.10	0.36	0.36	0.18	0.30	0.30	0.39	0.23	
v/c Ratio	0.00	0.53	0.49	0.38	0.19	0.12	0.65	0.52	0.62	0.40	0.62	
Control Delay	21.0	36.3	7.4	47.2	23.9	6.2	43.3	30.8	10.7	17.2	37.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	21.0	36.3	7.4	47.2	23.9	6.2	43.3	30.8	10.7	17.2	37.9	
LOS	C	D	A	D	C	A	D	C	B	B	D	
Approach Delay		27.2			26.9			28.1			32.4	
Approach LOS		C			C			C			C	

Intersection Summary

Area Type:	Other
Cycle Length:	164.2
Actuated Cycle Length:	98.5
Natural Cycle:	120
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.65
Intersection Signal Delay:	28.5
Intersection Capacity Utilization:	68.5%
Intersection LOS:	C
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 5: James Snow Parkway N & Steeles Avenue East



HCM Signalized Intersection Capacity Analysis  
5: James Snow Parkway N & Steeles Avenue East

2028 FT AM Peak Hour  
09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔	↔	↔↔	↔↔↔	↔	↔↔	↔↔	↔	↔↔	↔↔	↔
Traffic Volume (vph)	1	590	268	118	328	68	380	509	412	167	462	10
Future Volume (vph)	1	590	268	118	328	68	380	509	412	167	462	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	1.00	0.95	
Fit	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	5142	1601	3471	5142	1601	3471	3579	1601	1789	3567	
Fit Permitted	0.53	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.44	1.00	
Satd. Flow (perm)	999	5142	1601	3471	5142	1601	3471	3579	1601	834	3567	
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)	1	641	291	128	357	74	413	553	448	182	502	11
RTOR Reduction (vph)	0	0	215	0	0	48	0	0	253	0	1	0
Lane Group Flow (vph)	1	641	76	128	357	26	413	553	195	182	512	0
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	NA
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2			6			8		4	
Actuated Green, G (s)	27.6	26.4	26.4	9.6	35.8	35.8	18.1	29.4	29.4	35.5	22.9	
Effective Green, g (s)	27.6	26.4	26.4	9.6	35.8	35.8	18.1	29.4	29.4	35.5	22.9	
Actuated g/C Ratio	0.27	0.26	0.26	0.09	0.35	0.35	0.18	0.29	0.29	0.35	0.23	
Clearance Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	280	1337	416	328	1813	564	618	1036	463	410	804	
v/s Ratio Prot	0.00	c0.12		c0.04	0.07		c0.12	0.15		0.06	c0.14	
v/s Ratio Perm	0.00		0.05			0.02			0.12		0.10	
v/c Ratio	0.00	0.48	0.18	0.39	0.20	0.05	0.67	0.53	0.42	0.44	0.64	
Uniform Delay, d1	26.9	31.7	29.2	43.2	22.9	21.6	38.9	30.3	29.2	23.9	35.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.3	0.2	0.8	0.1	0.0	2.7	1.0	1.3	0.8	2.3	
Delay (s)	26.9	32.0	29.4	44.0	22.9	21.7	41.6	31.3	30.5	24.7	37.9	
Level of Service	C	C	C	D	C	C	D	C	C	C	D	
Approach Delay (s)		31.2			27.6			34.0			34.4	
Approach LOS		C			C			C			C	

Intersection Summary		
HCM 2000 Control Delay	32.4	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.56	
Actuated Cycle Length (s)	101.5	Sum of lost time (s)
Intersection Capacity Utilization	68.5%	ICU Level of Service
Analysis Period (min)	15	

Lanes, Volumes, Timings  
6: Boston Church Road/3 Line & 5 Sideroad

2028 FT AM Peak Hour  
09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	8	481	71	72	151	3	52	24	22	7	105	24
Future Volume (vph)	8	481	71	72	151	3	52	24	22	7	105	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit		0.983			0.998			0.970			0.976	
Fit Protected		0.999			0.984			0.974			0.997	
Satd. Flow (prot)	0	1644	0	0	1666	0	0	1595	0	0	1677	0
Fit Permitted		0.996			0.721			0.576			0.983	
Satd. Flow (perm)	0	1639	0	0	1221	0	0	943	0	0	1654	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			1			17			13	
Link Speed (k/h)		60			60			70			60	
Link Distance (m)		166.9			1343.2			219.2			496.0	
Travel Time (s)		10.0			80.6			11.3			29.8	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	13%	13%	27%	13%	13%	33%	13%	17%	12%	43%	9%	13%
Adj. Flow (vph)	9	553	82	83	174	3	60	28	25	8	121	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	644	0	0	260	0	0	113	0	0	157	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												

Lanes, Volumes, Timings

2028 FT AM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

09-09-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	55.0	55.0		55.0	55.0		35.0	35.0		35.0	35.0	
Total Split (%)	61.1%	61.1%		61.1%	61.1%		38.9%	38.9%		38.9%	38.9%	
Maximum Green (s)	50.5	50.5		50.5	50.5		30.5	30.5		30.5	30.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		67.8			67.8			13.2			13.2	
Actuated g/C Ratio		0.75			0.75			0.15			0.15	
v/c Ratio		0.52			0.28			0.74			0.62	
Control Delay		6.9			2.4			57.8			43.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		6.9			2.4			57.8			43.0	
LOS		A			A			E			D	
Approach Delay		6.9			2.4			57.8			43.0	
Approach LOS		A			A			E			D	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 15.6

Intersection Capacity Utilization 70.0%

Analysis Period (min) 15

Intersection LOS: B

ICU Level of Service C

Splits and Phases: 6: Boston Church Road/3 Line & 5 Sideroad

← Ø2 (R)	↓ Ø4
55 s	35 s
← Ø6 (R)	↑ Ø8
55 s	35 s

HCM Signalized Intersection Capacity Analysis

2028 FT AM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

09-09-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	8	481	71	72	151	3	52	24	22	7	105	24
Future Volume (vph)	8	481	71	72	151	3	52	24	22	7	105	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			0.97			0.98	
Flt Protected		1.00			0.98			0.97			1.00	
Satd. Flow (prot)		1644			1667			1596			1678	
Flt Permitted		1.00			0.72			0.58			0.98	
Satd. Flow (perm)		1638			1221			944			1654	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	9	553	82	83	174	3	60	28	25	8	121	28
RTOR Reduction (vph)	0	3	0	0	0	0	0	15	0	0	11	0
Lane Group Flow (vph)	0	641	0	0	260	0	98	0	0	146	0	0
Heavy Vehicles (%)	13%	13%	27%	13%	13%	33%	13%	17%	12%	43%	9%	13%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		67.8			67.8			13.2			13.2	
Effective Green, g (s)		67.8			67.8			13.2			13.2	
Actuated g/C Ratio		0.75			0.75			0.15			0.15	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1233			919			138			242	
v/s Ratio Prot												
v/s Ratio Perm		c0.39			0.21			c0.10			0.09	
v/c Ratio		0.52			0.28			0.71			0.60	
Uniform Delay, d1		4.5			3.5			36.6			35.9	
Progression Factor		1.00			0.42			1.00			1.00	
Incremental Delay, d2		1.6			0.7			16.0			4.2	
Delay (s)		6.1			2.1			52.6			40.1	
Level of Service		A			A			D			D	
Approach Delay (s)		6.1			2.1			52.6			40.1	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay 14.2

HCM 2000 Level of Service B

HCM 2000 Volume to Capacity ratio 0.55

Actuated Cycle Length (s) 90.0

Intersection Capacity Utilization 70.0%

Analysis Period (min) 15

ICU Level of Service C

Sum of lost time (s) 9.0

c Critical Lane Group

Lanes, Volumes, Timings

2028 FT AM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

09-09-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	7	486	16	83	179	3	10	139	111	63	360	44
Future Volume (vph)	7	486	16	83	179	3	10	139	111	63	360	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.996			0.999			0.942			0.987		
Flt Protected	0.999			0.985			0.998			0.993		
Satd. Flow (prot)	0	1703	0	0	1684	0	0	1651	0	0	1643	0
Flt Permitted	0.996			0.703			0.978			0.914		
Satd. Flow (perm)	0	1698	0	0	1202	0	0	1618	0	0	1513	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	2			1			53			7		
Link Speed (k/h)	60			60			60			70		
Link Distance (m)	1343.2			646.3			1994.7			464.9		
Travel Time (s)	80.6			38.8			119.7			23.9		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Adj. Flow (vph)	8	552	18	94	203	3	11	158	126	72	409	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	578	0	0	300	0	0	295	0	0	531	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0			3.7			3.7		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	1.6			1.6			1.6			1.6		
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14		24		14		24		14	
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	28.7			28.7			28.7			28.7		
Detector 2 Size(m)	1.8			1.8			1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	2			6			8			4		
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												

Lanes, Volumes, Timings

2028 FT AM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

09-09-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	46.0	46.0		46.0	46.0		44.0	44.0		44.0	44.0	
Total Split (%)	51.1%	51.1%		51.1%	51.1%		48.9%	48.9%		48.9%	48.9%	
Maximum Green (s)	41.5	41.5		41.5	41.5		39.5	39.5		39.5	39.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0			0.0			0.0			0.0		
Total Lost Time (s)	4.5			4.5			4.5			4.5		
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)	45.7			45.7			35.3			35.3		
Actuated g/C Ratio	0.51			0.51			0.39			0.39		
v/c Ratio	0.67			0.49			0.44			0.89		
Control Delay	18.8			19.3			17.7			43.2		
Queue Delay	0.0			0.0			0.0			0.0		
Total Delay	18.8			19.3			17.7			43.2		
LOS	B			B			B			D		
Approach Delay	18.8			19.3			17.7			43.2		
Approach LOS	B			B			B			D		

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 26.3

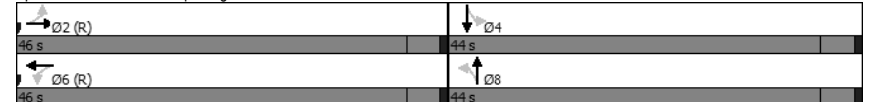
Intersection LOS: C

Intersection Capacity Utilization 95.9%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 7: Esquesing Line/Fourth Line & 5 Sideroad



HCM Signalized Intersection Capacity Analysis  
7: Esquesing Line/Fourth Line & 5 Sideroad

2028 FT AM Peak Hour  
09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	7	486	16	83	179	3	10	139	111	63	360	44
Future Volume (vph)	7	486	16	83	179	3	10	139	111	63	360	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5			4.5			4.5		
Lane Util. Factor	1.00			1.00			1.00			1.00		
Frt	1.00			1.00			0.94			0.99		
Fit Protected	1.00			0.98			1.00			0.99		
Satd. Flow (prot)	1703			1683			1652			1644		
Fit Permitted	1.00			0.70			0.98			0.91		
Satd. Flow (perm)	1697			1202			1620			1513		
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	8	552	18	94	203	3	11	158	126	72	409	50
RTOR Reduction (vph)	0	1	0	0	0	0	0	32	0	0	4	0
Lane Group Flow (vph)	0	577	0	0	300	0	0	263	0	0	527	0
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	2			6			8			4		
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	45.7			45.7			35.3			35.3		
Effective Green, g (s)	45.7			45.7			35.3			35.3		
Actuated g/C Ratio	0.51			0.51			0.39			0.39		
Clearance Time (s)	4.5			4.5			4.5			4.5		
Vehicle Extension (s)	3.0			3.0			3.0			3.0		
Lane Grp Cap (vph)	861			610			635			593		
v/s Ratio Prot												
v/s Ratio Perm	c0.34			0.25			0.16			c0.35		
v/c Ratio	0.67			0.49			0.41			0.89		
Uniform Delay, d1	16.5			14.5			19.8			25.5		
Progression Factor	0.83			1.00			1.00			1.00		
Incremental Delay, d2	3.6			2.8			0.4			15.0		
Delay (s)	17.3			17.3			20.3			40.5		
Level of Service	B			B			C			D		
Approach Delay (s)	17.3			17.3			20.3			40.5		
Approach LOS	B			B			C			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)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	95.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
101: Boston Church Road & East Access 1

2028 FT AM Peak Hour  
09-09-2021

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↑	↔	↔	↑
Traffic Volume (vph)	56	6	195	189	46	220
Future Volume (vph)	56	6	195	189	46	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	15.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				75.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.850			0.850		
Fit Protected	0.950			0.950		
Satd. Flow (prot)	1674	1633	1642	1585	1825	1642
Fit Permitted	0.950			0.950		
Satd. Flow (perm)	1674	1633	1642	1585	1825	1642
Link Speed (k/h)	48			70		
Link Distance (m)	168.8			269.9		
Travel Time (s)	12.7			13.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	0%	17%	3%	0%	17%
Adj. Flow (vph)	61	7	212	205	50	239
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	7	212	205	50	239
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7			3.7		
Link Offset(m)	0.0			0.0		
Crosswalk Width(m)	1.6			1.6		
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop			Free		

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	26.9%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
101: Boston Church Road & East Access 1

2028 FT AM Peak Hour  
09-09-2021

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↑	↘	↗	↑
Traffic Volume (veh/h)	56	6	195	189	46	220
Future Volume (Veh/h)	56	6	195	189	46	220
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)	61	7	212	205	50	239
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	551	212			417	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	551	212			417	
tC, single (s)	6.5	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.3			2.2	
p0 queue free %	87	99			96	
cM capacity (veh/h)	463	833			1153	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>WB 2</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>
Volume Total	61	7	212	205	50	239
Volume Left	61	0	0	0	50	0
Volume Right	0	7	0	205	0	0
cSH	463	833	1700	1700	1153	1700
Volume to Capacity	0.13	0.01	0.12	0.12	0.04	0.14
Queue Length 95th (m)	3.4	0.2	0.0	0.0	1.0	0.0
Control Delay (s)	14.0	9.4	0.0	0.0	8.3	0.0
Lane LOS	B	A			A	
Approach Delay (s)	13.5		0.0		1.4	
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			1.7			
Intersection Capacity Utilization			26.9%		ICU Level of Service	A
Analysis Period (min)			15			

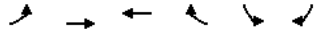
Lanes, Volumes, Timings  
102: James Snow Parkway N & East Access 2

2028 FT AM Peak Hour  
09-09-2021

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↗	↗	↘	↘	↗
Traffic Volume (vph)	23	726	513	19	19	18
Future Volume (vph)	23	726	513	19	19	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0			80.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	100.0				2.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt				0.850		0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1106	3042	2920	816	913	892
Fit Permitted	0.950				0.950	
Satd. Flow (perm)	1106	3042	2920	816	913	892
Link Speed (k/h)		70	70			48
Link Distance (m)		546.2	560.0			147.4
Travel Time (s)		28.1	28.8			11.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	65%	20%	25%	100%	100%	83%
Adj. Flow (vph)	25	789	558	21	21	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	25	789	558	21	21	20
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	30.1%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
102: James Snow Parkway N & East Access 2

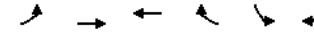
2028 FT AM Peak Hour  
09-09-2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations	↘	↕	↕	↕	↘	↘		
Traffic Volume (veh/h)	23	726	513	19	19	18		
Future Volume (Veh/h)	23	726	513	19	19	18		
Sign Control		Free	Free		Stop			
Grade		0%	0%		0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	25	789	558	21	21	20		
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	579				1002	279		
vC1, stage 1 conf vol								
vC2, stage 2 conf vol								
vCu, unblocked vol	579				1002	279		
tC, single (s)	5.4				8.8	8.6		
tC, 2 stage (s)								
tF (s)	2.9				4.5	4.1		
p0 queue free %	96				82	96		
cM capacity (veh/h)	661				116	525		
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>EB 2</b>	<b>EB 3</b>	<b>WB 1</b>	<b>WB 2</b>	<b>WB 3</b>	<b>SB 1</b>	<b>SB 2</b>
Volume Total	25	394	394	279	279	21	21	20
Volume Left	25	0	0	0	0	0	21	0
Volume Right	0	0	0	0	0	0	21	20
cSH	661	1700	1700	1700	1700	1700	116	525
Volume to Capacity	0.04	0.23	0.23	0.16	0.16	0.01	0.18	0.04
Queue Length 95th (m)	0.9	0.0	0.0	0.0	0.0	0.0	4.8	0.9
Control Delay (s)	10.7	0.0	0.0	0.0	0.0	0.0	42.6	12.1
Lane LOS	B						E	B
Approach Delay (s)	0.3			0.0			27.7	
Approach LOS							D	
<b>Intersection Summary</b>								
Average Delay			1.0					
Intersection Capacity Utilization			30.1%		ICU Level of Service		A	
Analysis Period (min)			15					

Lanes, Volumes, Timings  
103: James Snow Parkway N & East Access 3

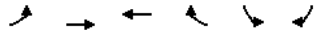
2028 FT AM Peak Hour  
09-09-2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↕	↕	↕	↘	↘
Traffic Volume (vph)	18	727	523	59	30	9
Future Volume (vph)	18	727	523	59	30	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0			80.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	100.0				2.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt				0.850		0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1217	3042	2920	1192	1074	816
Fit Permitted	0.439				0.950	
Satd. Flow (perm)	562	3042	2920	1192	1074	816
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				64		10
Link Speed (k/h)		70	70		48	
Link Distance (m)		560.0	346.4		152.7	
Travel Time (s)		28.8	17.8		11.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	50%	20%	25%	37%	70%	100%
Adj. Flow (vph)	20	790	568	64	33	10
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	20	790	568	64	33	10
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
<b>Two way Left Turn Lane</b>						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	6.1	30.5	30.5	6.1	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8	6.1	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
<b>Detector 1 Channel</b>						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
<b>Detector 2 Position(m)</b>						
Detector 2 Position(m)		28.7	28.7			
<b>Detector 2 Size(m)</b>						
Detector 2 Size(m)		1.8	1.8			
<b>Detector 2 Type</b>						
Detector 2 Type		CI+Ex	CI+Ex			
<b>Detector 2 Channel</b>						
Detector 2 Extend (s)		0.0	0.0			
<b>Turn Type</b>						
Turn Type	Perm	NA	NA	Perm	Perm	Perm
<b>Protected Phases</b>						
Protected Phases		4	8			

Lanes, Volumes, Timings  
103: James Snow Parkway N & East Access 3

2028 FT AM Peak Hour  
09-09-2021

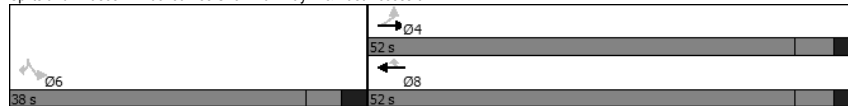


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.6	30.6	30.6	30.6	33.5	33.5
Total Split (s)	52.0	52.0	52.0	52.0	38.0	38.0
Total Split (%)	57.8%	57.8%	57.8%	57.8%	42.2%	42.2%
Maximum Green (s)	45.4	45.4	45.4	45.4	31.5	31.5
Yellow Time (s)	4.2	4.2	4.2	4.2	3.7	3.7
All-Red Time (s)	2.4	2.4	2.4	2.4	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	62.4	62.4	62.4	62.4	7.9	7.9
Actuated g/C Ratio	0.83	0.83	0.83	0.83	0.11	0.11
v/c Ratio	0.04	0.31	0.23	0.06	0.29	0.11
Control Delay	3.7	3.5	3.2	1.3	38.6	19.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.7	3.5	3.2	1.3	38.6	19.3
LOS	A	A	A	A	D	B
Approach Delay		3.5	3.0		34.1	
Approach LOS		A	A		C	

Intersection Summary

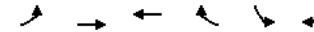
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	75
Natural Cycle:	65
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.31
Intersection Signal Delay:	4.2
Intersection Capacity Utilization:	35.2%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service:	A

Splits and Phases: 103: James Snow Parkway N & East Access 3



HCM Signalized Intersection Capacity Analysis  
103: James Snow Parkway N & East Access 3

2028 FT AM Peak Hour  
09-09-2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕
Traffic Volume (vph)	18	727	523	59	30	9
Future Volume (vph)	18	727	523	59	30	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Flt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1217	3042	2920	1192	1074	816
Flt Permitted	0.44	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	562	3042	2920	1192	1074	816
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	20	790	568	64	33	10
RTOR Reduction (vph)	0	0	0	15	0	9
Lane Group Flow (vph)	20	790	568	49	33	1
Heavy Vehicles (%)	50%	20%	25%	37%	70%	100%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			
Permitted Phases	4			8	6	6
Actuated Green, G (s)	59.4	59.4	59.4	59.4	5.3	5.3
Effective Green, g (s)	59.4	59.4	59.4	59.4	5.3	5.3
Actuated g/C Ratio	0.76	0.76	0.76	0.76	0.07	0.07
Clearance Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	429	2322	2229	910	73	55
v/s Ratio Prot		c0.26	0.19			
v/s Ratio Perm	0.04			0.04	c0.03	0.00
v/c Ratio	0.05	0.34	0.25	0.05	0.45	0.01
Uniform Delay, d1	2.3	2.9	2.7	2.3	34.9	33.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.4	0.3	0.1	4.4	0.1
Delay (s)	2.5	3.3	3.0	2.4	39.3	33.9
Level of Service	A	A	A	A	D	C
Approach Delay (s)		3.3	2.9		38.0	
Approach LOS		A	A		D	

Intersection Summary

HCM 2000 Control Delay	4.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	77.8	Sum of lost time (s)	13.1
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Lanes, Volumes, Timings  
201: West Access 1 & 5 Sideroad

2028 FT AM Peak Hour  
09-09-2021

	→	↖	↗	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖			↖	↗	↗
Traffic Volume (vph)	559	11	23	183	4	5
Future Volume (vph)	559	11	23	183	4	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.997			0.925		
Flt Protected				0.994	0.978	
Satd. Flow (prot)	1699	0	0	1712	1738	0
Flt Permitted				0.994	0.978	
Satd. Flow (perm)	1699	0	0	1712	1738	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	198.7			175.4	89.6	
Travel Time (s)	11.9			10.5	6.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	0%	0%	13%	0%	0%
Adj. Flow (vph)	608	12	25	199	4	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	620	0	0	224	9	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	40.1%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis  
201: West Access 1 & 5 Sideroad

2028 FT AM Peak Hour  
09-09-2021

	→	↖	↗	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖			↖	↗	↗
Traffic Volume (veh/h)	559	11	23	183	4	5
Future Volume (Veh/h)	559	11	23	183	4	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	608	12	25	199	4	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)					342	
pX, platoon unblocked						
vC, conflicting volume			620		863	614
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			620		863	614
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		99	99
cM capacity (veh/h)			970		319	496

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	620	224	9
Volume Left	0	25	4
Volume Right	12	0	5
cSH	1700	970	398
Volume to Capacity	0.36	0.03	0.02
Queue Length 95th (m)	0.0	0.6	0.5
Control Delay (s)	0.0	1.2	14.3
Lane LOS		A	B
Approach Delay (s)	0.0	1.2	14.3
Approach LOS			B

Intersection Summary

Average Delay		0.5	
Intersection Capacity Utilization	40.1%		ICU Level of Service A
Analysis Period (min)	15		

Lanes, Volumes, Timings  
202: West Access 2 & 5 Sideroad

2028 FT AM Peak Hour  
09-09-2021

	→	↖	↗	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖			↖	↗	↗
Traffic Volume (vph)	554	10	23	204	2	6
Future Volume (vph)	554	10	23	204	2	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998			0.995	0.895	
Flt Protected				0.995	0.989	
Satd. Flow (prot)	1700	0	0	1712	1700	0
Flt Permitted				0.995	0.989	
Satd. Flow (perm)	1700	0	0	1712	1700	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	175.4			166.9	91.3	
Travel Time (s)	10.5			10.0	6.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	0%	0%	13%	0%	0%
Adj. Flow (vph)	602	11	25	222	2	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	613	0	0	247	9	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other  
Control Type: Unsignalized  
Intersection Capacity Utilization 39.9% ICU Level of Service A  
Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis  
202: West Access 2 & 5 Sideroad

2028 FT AM Peak Hour  
09-09-2021

	→	↖	↗	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖			↖	↗	↗
Traffic Volume (veh/h)	554	10	23	204	2	6
Future Volume (Veh/h)	554	10	23	204	2	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	602	11	25	222	2	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)					167	
pX, platoon unblocked						
vC, conflicting volume			613		880	608
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			613		880	608
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		99	99
cM capacity (veh/h)			976		312	500

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	613	247	9
Volume Left	0	25	2
Volume Right	11	0	7
cSH	1700	976	441
Volume to Capacity	0.36	0.03	0.02
Queue Length 95th (m)	0.0	0.6	0.5
Control Delay (s)	0.0	1.1	13.3
Lane LOS		A	B
Approach Delay (s)	0.0	1.1	13.3
Approach LOS			B

Intersection Summary

Average Delay 0.5  
Intersection Capacity Utilization 39.9% ICU Level of Service A  
Analysis Period (min) 15

Lanes, Volumes, Timings  
203: Boston Church Road & West Access 3

2028 FT AM Peak Hour  
09-09-2021

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	13	18	98	247	1
Future Volume (vph)	0	13	18	98	247	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	40.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	2.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865			0.999		
Fit Protected			0.950			
Satd. Flow (prot)	898	0	1093	1642	1641	0
Fit Permitted			0.950			
Satd. Flow (perm)	898	0	1093	1642	1641	0
Link Speed (k/h)	48			70	70	
Link Distance (m)	99.5			207.3	219.2	
Travel Time (s)	7.5			10.7	11.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	85%	67%	17%	17%	0%
Adj. Flow (vph)	0	14	20	107	268	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	14	0	20	107	269	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	25.0%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
203: Boston Church Road & West Access 3

2028 FT AM Peak Hour  
09-09-2021

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	13	18	98	247	1
Future Volume (Veh/h)	0	13	18	98	247	1
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)	0	14	20	107	268	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked	0.98	0.98	0.98			
vC, conflicting volume	416	268	269			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	393	243	244			
tC, single (s)	6.4	7.0	4.8			
tC, 2 stage (s)						
tF (s)	3.5	4.1	2.8			
p0 queue free %	100	98	98			
cM capacity (veh/h)	591	616	1000			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	14	20	107	269
Volume Left	0	20	0	0
Volume Right	14	0	0	1
cSH	616	1000	1700	1700
Volume to Capacity	0.02	0.02	0.06	0.16
Queue Length 95th (m)	0.5	0.5	0.0	0.0
Control Delay (s)	11.0	8.7	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	11.0	1.4		0.0
Approach LOS	B			

Intersection Summary			
Average Delay		0.8	
Intersection Capacity Utilization	25.0%	ICU Level of Service	A
Analysis Period (min)		15	

Lanes, Volumes, Timings  
204: Boston Church Road & West Access 4

2028 FT AM Peak Hour  
09-09-2021

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↑	↑	↔
Traffic Volume (vph)	3	23	84	113	240	20
Future Volume (vph)	3	23	84	113	240	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	15.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	2.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.879			0.990		
Fit Protected	0.995		0.950			
Satd. Flow (prot)	1680	0	1825	1642	1644	0
Fit Permitted	0.995		0.950			
Satd. Flow (perm)	1680	0	1825	1642	1644	0
Link Speed (k/h)	48			70	70	
Link Distance (m)	101.5			171.0	207.3	
Travel Time (s)	7.6			8.8	10.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	17%	17%	0%
Adj. Flow (vph)	3	25	91	123	261	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	0	91	123	283	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	31.8%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis  
204: Boston Church Road & West Access 4

2028 FT AM Peak Hour  
09-09-2021

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	↔	↔	↔	↑	↑	↔
Lane Configurations	↔	↔	↔	↑	↑	↔
Traffic Volume (veh/h)	3	23	84	113	240	20
Future Volume (Veh/h)	3	23	84	113	240	20
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)	3	25	91	123	261	22
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	577	272	283			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	577	272	283			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	97	93			
cM capacity (veh/h)	448	772	1291			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	28	91	123	283
Volume Left	3	91	0	0
Volume Right	25	0	0	22
cSH	716	1291	1700	1700
Volume to Capacity	0.04	0.07	0.07	0.17
Queue Length 95th (m)	0.9	1.7	0.0	0.0
Control Delay (s)	10.2	8.0	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	10.2	3.4		0.0
Approach LOS	B			

Intersection Summary	
Average Delay	1.9
Intersection Capacity Utilization	31.8%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings  
205: Boston Church Road & West Access5

2028 FT AM Peak Hour  
09-09-2021

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	3	4	197	263	0
Future Volume (vph)	0	3	4	197	263	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	40.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	2.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Fit Protected			0.950			
Satd. Flow (prot)	831	0	913	1642	1642	0
Fit Permitted			0.950			
Satd. Flow (perm)	831	0	913	1642	1642	0
Link Speed (k/h)	48			70	70	
Link Distance (m)	100.3			183.3	171.0	
Travel Time (s)	7.5			9.4	8.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	100%	100%	17%	17%	0%
Adj. Flow (vph)	0	3	4	214	286	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	3	0	4	214	286	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	23.8%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
205: Boston Church Road & West Access5

2028 FT AM Peak Hour  
09-09-2021

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	3	4	197	263	0
Future Volume (Veh/h)	0	3	4	197	263	0
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)	0	3	4	214	286	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	508	286	286			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	508	286	286			
tC, single (s)	6.4	7.2	5.1			
tC, 2 stage (s)						
tF (s)	3.5	4.2	3.1			
p0 queue free %	100	99	100			
cM capacity (veh/h)	526	569	874			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	3	4	214	286
Volume Left	0	4	0	0
Volume Right	3	0	0	0
cSH	569	874	1700	1700
Volume to Capacity	0.01	0.00	0.13	0.17
Queue Length 95th (m)	0.1	0.1	0.0	0.0
Control Delay (s)	11.4	9.1	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	11.4	0.2		0.0
Approach LOS	B			

Intersection Summary	
Average Delay	0.1
Intersection Capacity Utilization	23.8%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings

2028 FT PM Peak Hour

1: Regional Road 25 & 5 Sideroad

09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	146	113	90	306	57	191	736	93	14	347	66
Future Volume (vph)	91	146	113	90	306	57	191	736	93	14	347	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	70.0		0.0	75.0		75.0	35.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	100.0			100.0			75.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Frt		0.935				0.976			0.850		0.976	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1601	1547	0	1342	1592	0	1225	4196	1338	1601	4362	0
Fit Permitted	0.220			0.590			0.428			0.343		
Satd. Flow (perm)	371	1547	0	833	1592	0	552	4196	1338	578	4362	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					8				99			35
Link Speed (k/h)		60			60				70			70
Link Distance (m)		573.6			536.0				986.0			203.5
Travel Time (s)		34.4			32.2				50.7			10.5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Adj. Flow (vph)	97	155	120	96	326	61	203	783	99	15	369	70
Shared Lane Traffic (%)												
Lane Group Flow (vph)	97	275	0	96	387	0	203	783	99	15	439	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7				3.7			3.7
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		1.6			1.6				1.6			1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	NA
Protected Phases	3	8		4	4		5	2	2	6	6	6
Permitted Phases	8			4			2		2	6		
Detector Phase	3	8		4	4		5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		10.0	10.0		7.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	11.0	38.0		38.0	38.0		11.0	38.2	38.2	38.2	38.2	38.2

Lanes, Volumes, Timings

2028 FT PM Peak Hour

1: Regional Road 25 & 5 Sideroad

09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	20.0	54.0		34.0	34.0		18.0	56.2	56.2	38.2	38.2	
Total Split (%)	18.1%	49.0%		30.9%	30.9%		16.3%	51.0%	51.0%	34.7%	34.7%	
Maximum Green (s)	16.0	48.0		28.0	28.0		14.0	50.0	50.0	32.0	32.0	
Yellow Time (s)	3.0	3.7		3.7	3.7		3.0	4.2	4.2	4.2	4.2	
All-Red Time (s)	1.0	2.3		2.3	2.3		1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0		6.0	6.0		4.0	6.2	6.2	6.2	6.2	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.7		3.7	3.7		3.0	3.6	3.6	4.2	4.2	
Recall Mode	None	None		None	None		None	Ped	Ped	Ped	Ped	
Walk Time (s)		7.0			7.0			7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		25.0			25.0			25.0	25.0	25.0	25.0	
Pedestrian Calls (#/hr)		0			0			0	0	0	0	
Act Effect Green (s)	39.7	37.7		26.9	26.9		51.8	49.6	49.6	32.4	32.4	
Actuated g/C Ratio	0.40	0.38		0.27	0.27		0.52	0.50	0.50	0.33	0.33	
v/c Ratio	0.37	0.47		0.43	0.89		0.54	0.38	0.14	0.08	0.30	
Control Delay	22.7	26.0		38.9	59.2		21.5	17.1	3.8	28.0	25.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	22.7	26.0		38.9	59.2		21.5	17.1	3.8	28.0	25.2	
LOS	C	C		D	E		C	B	A	C	C	
Approach Delay		25.1			55.2			16.7			25.3	
Approach LOS		C			E			B			C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	110.2											
Actuated Cycle Length:	99.6											
Natural Cycle:	100											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.89											
Intersection Signal Delay:	27.4						Intersection LOS: C					
Intersection Capacity Utilization:	77.4%						ICU Level of Service D					
Analysis Period (min):	15											
Splits and Phases:	1: Regional Road 25 & 5 Sideroad											

HCM Signalized Intersection Capacity Analysis  
1: Regional Road 25 & 5 Sideroad

2028 FT PM Peak Hour  
09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔	↔		↔	↑↑↑		↔	↑↑↑		↔
Traffic Volume (vph)	91	146	113	90	306	57	191	736	93	14	347	66
Future Volume (vph)	91	146	113	90	306	57	191	736	93	14	347	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		6.0	6.0		4.0	6.2	6.2	6.2	6.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.91	1.00	1.00	0.91	
Frt	1.00	0.93		1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1601	1546		1342	1592		1225	4196	1338	1601	4362	
Fit Permitted	0.22	1.00		0.59	1.00		0.43	1.00	1.00	0.34	1.00	
Satd. Flow (perm)	371	1546		834	1592		552	4196	1338	579	4362	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	97	155	120	96	326	61	203	783	99	15	369	70
RTOR Reduction (vph)	0	0	0	0	6	0	0	0	50	0	24	0
Lane Group Flow (vph)	97	275	0	96	381	0	203	783	49	15	415	0
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases	3	8		4			5	2			6	
Permitted Phases	8			4			2		2	6		
Actuated Green, G (s)	38.6	38.6		26.9	26.9		49.6	49.6	49.6	32.4	32.4	
Effective Green, g (s)	38.6	38.6		26.9	26.9		49.6	49.6	49.6	32.4	32.4	
Actuated g/C Ratio	0.38	0.38		0.27	0.27		0.49	0.49	0.49	0.32	0.32	
Clearance Time (s)	4.0	6.0		6.0	6.0		4.0	6.2	6.2	6.2	6.2	
Vehicle Extension (s)	3.0	3.7		3.7	3.7		3.0	3.6	3.6	4.2	4.2	
Lane Grp Cap (vph)	236	594		223	426		361	2072	661	186	1407	
v/s Ratio Prot	0.03	c0.18			c0.24			c0.07	0.19		0.10	
v/s Ratio Perm	0.13			0.12				c0.20	0.04	0.03		
v/c Ratio	0.41	0.46		0.43	0.89		0.56	0.38	0.07	0.08	0.30	
Uniform Delay, d1	22.1	23.1		30.4	35.4		15.6	15.8	13.3	23.6	25.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.2	0.7		1.7	21.0		2.0	0.1	0.1	0.3	0.2	
Delay (s)	23.2	23.9		32.1	56.4		17.6	15.9	13.4	23.9	25.6	
Level of Service	C	C		C	E		B	B	B	C	C	
Approach Delay (s)		23.7			51.6			16.0			25.6	
Approach LOS		C			D			B			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		26.2									C	
HCM 2000 Volume to Capacity ratio		0.69										
Actuated Cycle Length (s)		100.4			Sum of lost time (s)				20.2			
Intersection Capacity Utilization		77.4%			ICU Level of Service				D			
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings  
2: Regional Road 25 & James Snow Parkway N

2028 FT PM Peak Hour  
09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔	↔		↔	↑↑↑		↔	↑↑↑		↔
Traffic Volume (vph)	30	200	162	279	146	228	78	842	195	140	484	5
Future Volume (vph)	30	200	162	279	146	228	78	842	195	140	484	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		115.0	85.0		35.0	30.0		30.0	75.0		75.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	40.0			90.0			70.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Ped Bike Factor									0.99	1.00		
Frt			0.850			0.850			0.850		0.999	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1217	2684	1103	1259	3147	1192	1534	4162	1458	1472	4183	0
Fit Permitted	0.656			0.623			0.457			0.210		
Satd. Flow (perm)	840	2684	1103	825	3147	1192	738	4162	1439	325	4183	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			167			231			145			1
Link Speed (k/h)		60			60			70				70
Link Distance (m)		452.4			1065.5			592.1				986.0
Travel Time (s)		27.1			63.9			30.5				50.7
Confl. Peds. (#/hr)								1		1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Adj. Flow (vph)	31	206	167	288	151	235	80	868	201	144	499	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	206	167	288	151	235	80	868	201	144	504	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.2	9.0	9.0	9.0	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	
Switch Phase												

Lanes, Volumes, Timings

2028 FT PM Peak Hour

2: Regional Road 25 & James Snow Parkway N

09-09-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	43.6	43.6	43.6	43.6	43.6	43.6	11.0	42.9	42.9	11.0	35.9	
Total Split (s)	55.6	55.6	55.6	55.6	55.6	55.6	15.0	76.9	76.9	15.0	76.9	
Total Split (%)	37.7%	37.7%	37.7%	37.7%	37.7%	37.7%	10.2%	52.1%	52.1%	10.2%	52.1%	
Maximum Green (s)	49.0	49.0	49.0	49.0	49.0	49.0	11.0	70.0	70.0	11.0	70.0	
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	4.2	4.2	3.0	4.2	
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	1.0	2.7	2.7	1.0	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	30.0	30.0	30.0	30.0	30.0	30.0		29.0	29.0		22.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0	0		0	
Act Effect Green (s)	49.2	49.2	49.2	49.2	49.2	49.2	46.1	34.4	34.4	49.7	38.3	
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44	0.41	0.31	0.31	0.45	0.34	
v/c Ratio	0.08	0.17	0.29	0.79	0.11	0.36	0.22	0.68	0.37	0.57	0.35	
Control Delay	21.6	20.7	4.8	46.4	20.1	4.8	18.0	36.4	11.0	26.8	28.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	21.6	20.7	4.8	46.4	20.1	4.8	18.0	36.4	11.0	26.8	28.6	
LOS	C	C	A	D	C	A	B	D	B	C	C	
Approach Delay		14.2			26.0			30.7			28.2	
Approach LOS		B			C			C			C	

Intersection Summary

Area Type:	Other
Cycle Length:	147.5
Actuated Cycle Length:	111.5
Natural Cycle:	100
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.79
Intersection Signal Delay:	26.7
Intersection LOS:	C
Intersection Capacity Utilization:	68.7%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 2: Regional Road 25 & James Snow Parkway N

Ø1	Ø2	Ø4
15 s	76.9 s	55.6 s
Ø5	Ø6	Ø8
15 s	76.9 s	55.6 s

HCM Signalized Intersection Capacity Analysis

2028 FT PM Peak Hour

2: Regional Road 25 & James Snow Parkway N

09-09-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	30	200	162	279	146	228	78	842	195	140	484	5
Future Volume (vph)	30	200	162	279	146	228	78	842	195	140	484	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00	1.00	0.91	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1217	2684	1103	1259	3147	1192	1534	4162	1439	1472	4181	
Fit Permitted	0.66	1.00	1.00	0.62	1.00	1.00	0.46	1.00	1.00	0.21	1.00	
Satd. Flow (perm)	840	2684	1103	825	3147	1192	738	4162	1439	325	4181	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	31	206	167	288	151	235	80	868	201	144	499	5
RTOR Reduction (vph)	0	0	94	0	0	130	0	0	100	0	1	0
Lane Group Flow (vph)	31	206	73	288	151	105	80	868	101	144	503	0
Conf. Peds. (#/hr)									1		1	
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2		6	
Actuated Green, G (s)	49.2	49.2	49.2	49.2	49.2	49.2	42.5	35.2	35.2	48.7	38.3	
Effective Green, g (s)	49.2	49.2	49.2	49.2	49.2	49.2	42.5	35.2	35.2	48.7	38.3	
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44	0.38	0.31	0.31	0.43	0.34	
Clearance Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	368	1175	483	361	1378	522	331	1304	451	247	1425	
v/s Ratio Prot		0.08			0.05			c0.21		c0.05	0.12	
v/s Ratio Perm	0.04		0.07	c0.35		0.09	0.08		0.07	0.20		
v/c Ratio	0.08	0.18	0.15	0.80	0.11	0.20	0.24	0.67	0.22	0.58	0.35	
Uniform Delay, d1	18.4	19.2	19.0	27.3	18.6	19.4	22.9	33.4	28.5	21.0	27.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.1	0.3	13.2	0.1	0.4	0.4	1.7	0.5	3.5	0.3	
Delay (s)	18.6	19.4	19.3	40.5	18.7	19.8	23.3	35.2	29.0	24.5	28.0	
Level of Service	B	B	B	D	B	B	C	D	C	C	C	
Approach Delay (s)		19.3			28.4			33.3			27.2	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	28.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	112.3	Sum of lost time (s)	17.5
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lanes, Volumes, Timings

2028 FT PM Peak Hour

3: Boston Church Road & James Snow Parkway N

09-09-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	133	360	73	29	413	108	145	53	28	283	32	111
Future Volume (vph)	133	360	73	29	413	108	145	53	28	283	32	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		0.0	70.0		0.0	60.0		25.0	60.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			70.0			90.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.975			0.969				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1508	3016	0	1415	2939	0	1113	3650	944	1534	3147	1498
Fit Permitted	0.277			0.477			0.732			0.532		
Satd. Flow (perm)	440	3016	0	710	2939	0	857	3650	944	859	3147	1498
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		18			24			90			123	
Link Speed (k/h)		70			70			60			60	
Link Distance (m)		358.9			546.3			792.9			198.3	
Travel Time (s)		18.5			28.1			47.6			11.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%
Adj. Flow (vph)	148	400	81	32	459	120	161	59	31	314	36	123
Shared Lane Traffic (%)												
Lane Group Flow (vph)	148	481	0	32	579	0	161	59	31	314	36	123
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8	7	4	4	
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0		7.0	20.0		7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	11.0	33.5		11.0	33.5		11.0	31.6	31.6	11.0	31.6	31.6

Lanes, Volumes, Timings

2028 FT PM Peak Hour

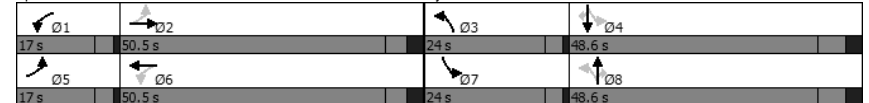
3: Boston Church Road & James Snow Parkway N

09-09-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	17.0	50.5		17.0	50.5		24.0	48.6	48.6	24.0	48.6	48.6
Total Split (%)	12.1%	36.0%		12.1%	36.0%		17.1%	34.7%	34.7%	17.1%	34.7%	34.7%
Maximum Green (s)	13.0	44.0		13.0	44.0		20.0	41.0	41.0	20.0	41.0	41.0
Yellow Time (s)	3.0	3.7		3.0	3.7		3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	1.0	2.8		1.0	2.8		1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		7.0			7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		20.0			20.0			17.0	17.0		17.0	17.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effect Green (s)	44.1	35.2		35.7	25.9		29.1	15.2	15.2	39.5	18.1	18.1
Actuated g/C Ratio	0.48	0.38		0.39	0.28		0.31	0.16	0.16	0.43	0.20	0.20
v/c Ratio	0.43	0.42		0.10	0.69		0.52	0.10	0.14	0.59	0.06	0.32
Control Delay	18.4	23.0		14.4	33.8		26.6	36.8	1.2	25.3	34.7	9.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.4	23.0		14.4	33.8		26.6	36.8	1.2	25.3	34.7	9.7
LOS	B	C		B	C		C	D	A	C	C	A
Approach Delay		21.9			32.8			25.9			21.9	
Approach LOS		C			C			C			C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	140.1											
Actuated Cycle Length:	92.7											
Natural Cycle:	90											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.69											
Intersection Signal Delay:	25.8						Intersection LOS: C					
Intersection Capacity Utilization:	61.5%						ICU Level of Service B					
Analysis Period (min):	15											

Splits and Phases: 3: Boston Church Road & James Snow Parkway N



HCM Signalized Intersection Capacity Analysis  
3: Boston Church Road & James Snow Parkway N

2028 FT PM Peak Hour  
09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	133	360	73	29	413	108	145	53	28	283	32	111
Future Volume (vph)	133	360	73	29	413	108	145	53	28	283	32	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1508	3015		1415	2939		1113	3650	944	1534	3147	1498
Fit Permitted	0.28	1.00		0.48	1.00		0.73	1.00	1.00	0.53	1.00	1.00
Satd. Flow (perm)	440	3015		711	2939		858	3650	944	858	3147	1498
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	148	400	81	32	459	120	161	59	31	314	36	123
RTOR Reduction (vph)	0	11	0	0	17	0	0	0	27	0	0	98
Lane Group Flow (vph)	148	470	0	32	562	0	161	59	4	314	36	25
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		4
Actuated Green, G (s)	43.3	35.1		31.8	27.6		26.3	11.5	11.5	38.6	19.8	19.8
Effective Green, g (s)	43.3	35.1		31.8	27.6		26.3	11.5	11.5	38.6	19.8	19.8
Actuated g/C Ratio	0.45	0.37		0.33	0.29		0.27	0.12	0.12	0.40	0.21	0.21
Clearance Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	328	1102		266	844		274	437	113	507	649	308
v/s Ratio Prot	c0.05	0.16		0.01	c0.19		0.09	0.02		c0.15	0.01	
v/s Ratio Perm	0.15			0.03			0.07		0.00	c0.10		0.02
v/c Ratio	0.45	0.43		0.12	0.67		0.59	0.14	0.03	0.62	0.06	0.08
Uniform Delay, d1	16.9	22.9		22.0	30.1		29.6	37.8	37.3	21.7	30.6	30.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	0.6		0.2	2.6		3.2	0.3	0.2	2.3	0.1	0.2
Delay (s)	17.9	23.4		22.2	32.8		32.8	38.1	37.6	24.0	30.7	31.0
Level of Service	B	C		C	C		C	D	D	C	C	C
Approach Delay (s)		22.1			32.2			34.6			26.3	
Approach LOS		C			C			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay	27.9			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	0.64											
Actuated Cycle Length (s)	96.0			Sum of lost time (s)			22.1					
Intersection Capacity Utilization	61.5%			ICU Level of Service			B					
Analysis Period (min)	15											
c Critical Lane Group												

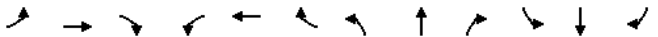
Lanes, Volumes, Timings  
4: Esquesing Line & James Snow Parkway N

2028 FT PM Peak Hour  
09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	16	626	75	9	443	47	105	360	30	27	173	9
Future Volume (vph)	16	626	75	9	443	47	105	360	30	27	173	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		0.0	70.0		0.0	40.0		25.0	25.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			80.0			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.984			0.986			0.850				0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1547	2976	0	1644	2861	0	1644	1731	1396	1615	1685	1396
Fit Permitted	0.385			0.275			0.634			0.385		
Satd. Flow (perm)	627	2976	0	476	2861	0	1097	1731	1396	655	1685	1396
Right Turn on Red	Yes			Yes			Yes			Yes		Yes
Satd. Flow (RTOR)	12			10			74			74		74
Link Speed (k/h)	70			70			60			60		
Link Distance (m)	346.4			1421.7			292.4			1994.7		
Travel Time (s)	17.8			73.1			17.5			119.7		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	17%	13%	14%	17%	17%
Adj. Flow (vph)	18	711	85	10	503	53	119	409	34	31	197	10
<b>Shared Lane Traffic (%)</b>												
Lane Group Flow (vph)	18	796	0	10	556	0	119	409	34	31	197	10
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.7			3.7			3.7			3.7		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	1.6			1.6			1.6			1.6		
<b>Two way Left Turn Lane</b>												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14		24		14		24		14	
Number of Detectors	1	1		1	1		1	1	1	1	1	1
<b>Detector Template</b>												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
<b>Detector 1 Channel</b>												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8		2	2	2	6	6	6
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6	6	6
<b>Switch Phase</b>												
Minimum Initial (s)	7.0	15.0		7.0	15.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	11.0	30.6		11.0	30.6		33.5	33.5	33.5	33.5	33.5	33.5

Lanes, Volumes, Timings  
4: Esquesing Line & James Snow Parkway N

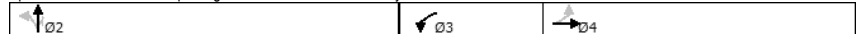
2028 FT PM Peak Hour  
09-09-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	19.0	41.6		19.0	41.6		51.5	51.5	51.5	51.5	51.5	51.5
Total Split (%)	16.9%	37.1%		16.9%	37.1%		45.9%	45.9%	45.9%	45.9%	45.9%	45.9%
Maximum Green (s)	15.0	35.0		15.0	35.0		45.0	45.0	45.0	45.0	45.0	45.0
Yellow Time (s)	3.0	4.2		3.0	4.2		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	2.4		1.0	2.4		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		17.0			17.0		20.0	20.0	20.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	32.1	28.3		31.3	26.3		27.1	27.1	27.1	27.1	27.1	27.1
Actuated g/C Ratio	0.45	0.40		0.44	0.37		0.38	0.38	0.38	0.38	0.38	0.38
v/c Ratio	0.05	0.67		0.03	0.52		0.28	0.62	0.06	0.12	0.31	0.02
Control Delay	12.0	21.6		11.9	20.9		19.6	24.0	0.7	18.4	18.5	0.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.0	21.6		11.9	20.9		19.6	24.0	0.7	18.4	18.5	0.0
LOS	B	C		B	C		B	C	A	B	B	A
Approach Delay		21.4			20.7			21.6			17.8	
Approach LOS		C			C			C			B	

Intersection Summary	
Area Type:	Other
Cycle Length:	112.1
Actuated Cycle Length:	70.8
Natural Cycle:	80
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.67
Intersection Signal Delay:	20.9
Intersection Capacity Utilization:	71.6%
ICU Level of Service:	C
Analysis Period (min):	15


Splits and Phases: 4: Esquesing Line & James Snow Parkway N



Phase 1 (EBL, EBT, EBR)	51.5 s	Phase 2 (WBL, WBT, WBR)	19 s	Phase 3 (NBL, NBT, NBR)	41.6 s
Phase 4 (SBL, SBT, SBR)	51.5 s	Phase 5 (EBL, EBT, EBR)	19 s	Phase 6 (WBL, WBT, WBR)	41.6 s

HCM Signalized Intersection Capacity Analysis  
4: Esquesing Line & James Snow Parkway N

2028 FT PM Peak Hour  
09-09-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	16	626	75	9	443	47	105	360	30	27	173	9
Future Volume (vph)	16	626	75	9	443	47	105	360	30	27	173	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1547	2976		1644	2860		1644	1731	1396	1615	1685	1396
Flt Permitted	0.39	1.00		0.28	1.00		0.63	1.00	1.00	0.38	1.00	1.00
Satd. Flow (perm)	627	2976		476	2860		1097	1731	1396	654	1685	1396
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	18	711	85	10	503	53	119	409	34	31	197	10
RTOR Reduction (vph)	0	7	0	0	6	0	0	0	21	0	0	6
Lane Group Flow (vph)	18	789	0	10	550	0	119	409	13	31	197	4
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	11%	17%	13%	14%	17%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2				6
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	30.6	28.3		28.0	27.0		27.1	27.1	27.1	27.1	27.1	27.1
Effective Green, g (s)	30.6	28.3		28.0	27.0		27.1	27.1	27.1	27.1	27.1	27.1
Actuated g/C Ratio	0.42	0.39		0.38	0.37		0.37	0.37	0.37	0.37	0.37	0.37
Clearance Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	289	1145		197	1050		404	638	514	241	621	514
v/s Ratio Prot	c0.00	c0.26		0.00	0.19			c0.24				0.12
v/s Ratio Perm	0.02			0.02			0.11		0.01	0.05		0.00
v/c Ratio	0.06	0.69		0.05	0.52		0.29	0.64	0.02	0.13	0.32	0.01
Uniform Delay, d1	12.8	18.9		14.4	18.2		16.4	19.2	14.8	15.4	16.6	14.7
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	2.2		0.1	0.9		0.9	3.0	0.0	0.5	0.6	0.0
Delay (s)	12.9	21.2		14.5	19.1		17.3	22.2	14.8	15.9	17.2	14.7
Level of Service	B	C		B	B		B	C	B	B	B	B
Approach Delay (s)		21.0			19.0			20.7			16.9	
Approach LOS		C			B			C			B	

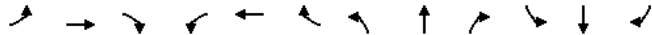
Intersection Summary	
HCM 2000 Control Delay	20.0
HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66
Actuated Cycle Length (s)	73.5
Sum of lost time (s)	17.1
Intersection Capacity Utilization	71.6%
ICU Level of Service	C
Analysis Period (min)	15
c Critical Lane Group	

Lanes, Volumes, Timings

2028 FT PM Peak Hour

5: James Snow Parkway N & Steeles Avenue East

09-09-2021



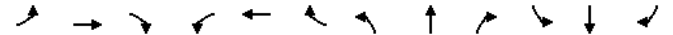
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔	↔	↔↔	↔↔↔	↔	↔↔	↔↔	↔	↔	↔↔	↔
Traffic Volume (vph)	11	438	423	363	773	128	387	360	167	94	581	13
Future Volume (vph)	11	438	423	363	773	128	387	360	167	94	581	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	122.0		72.0	170.0		130.0	105.0		260.0	160.0		0.0
Storage Lanes	1		1	2		1	2		1	1		0
Taper Length (m)	60.0			70.0			80.0			80.0		
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	1.00	0.95	0.95
Fit			0.850			0.850			0.850		0.997	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	5142	1601	3471	5142	1601	3471	3579	1601	1789	3568	0
Fit Permitted	0.324			0.950			0.950			0.521		
Satd. Flow (perm)	610	5142	1601	3471	5142	1601	3471	3579	1601	981	3568	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			359			139			182			1
Link Speed (k/h)		60			70			60			70	
Link Distance (m)		729.0			881.4			342.7			1421.7	
Travel Time (s)		43.7			45.3			20.6			73.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	476	460	395	840	139	421	391	182	102	632	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	476	460	395	840	139	421	391	182	102	646	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.0			4.0			4.0			4.0	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2		6		6		8	4		
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	7.0	22.0	22.0	7.0	22.0	22.0	7.0	15.0	15.0	7.0	15.0	
Minimum Split (s)	11.0	47.2	47.2	12.0	47.2	47.2	12.0	46.3	46.3	11.0	46.3	
Total Split (s)	15.0	55.2	55.2	26.0	66.2	66.2	35.0	59.0	59.0	24.0	48.0	

Lanes, Volumes, Timings

2028 FT PM Peak Hour

5: James Snow Parkway N & Steeles Avenue East

09-09-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	9.1%	33.6%	33.6%	15.8%	40.3%	40.3%	21.3%	35.9%	35.9%	14.6%	29.2%	
Maximum Green (s)	11.0	48.0	48.0	21.0	59.0	59.0	30.0	51.7	51.7	20.0	40.7	
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	4.2	4.2	3.0	4.2	
All-Red Time (s)	1.0	3.5	3.5	2.0	3.5	3.5	2.0	3.1	3.1	1.0	3.1	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	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	5.0	5.0	3.0	5.0	
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		33.0	33.0		33.0	33.0		32.0	32.0		32.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effect Green (s)	35.2	24.8	24.8	19.4	45.4	45.4	20.6	42.4	42.4	43.7	30.6	
Actuated g/C Ratio	0.29	0.21	0.21	0.16	0.38	0.38	0.17	0.35	0.35	0.36	0.25	
v/c Ratio	0.05	0.45	0.75	0.71	0.43	0.20	0.71	0.31	0.27	0.24	0.71	
Control Delay	24.4	44.6	19.7	57.3	30.9	6.0	55.4	29.4	4.9	19.4	46.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	24.4	44.6	19.7	57.3	30.9	6.0	55.4	29.4	4.9	19.4	46.5	
LOS	C	D	B	E	C	A	E	C	A	B	D	
Approach Delay		32.3			36.0			35.9			42.8	
Approach LOS		C			D			D			D	

Intersection Summary

Area Type: Other

Cycle Length: 164.2

Actuated Cycle Length: 120.3

Natural Cycle: 130

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 36.3

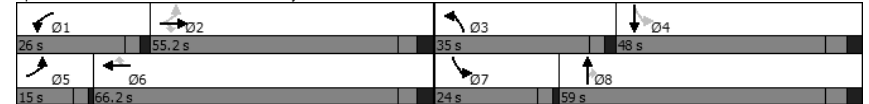
Intersection LOS: D

Intersection Capacity Utilization 76.6%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 5: James Snow Parkway N & Steeles Avenue East



HCM Signalized Intersection Capacity Analysis  
5: James Snow Parkway N & Steeles Avenue East

2028 FT PM Peak Hour  
09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔	↔	↔	↔↔↔	↔	↔	↔↔↔	↔	↔	↔	↔
Traffic Volume (vph)	11	438	423	363	773	128	387	360	167	94	581	13
Future Volume (vph)	11	438	423	363	773	128	387	360	167	94	581	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	1.00	0.95	
Fit	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	5142	1601	3471	5142	1601	3471	3579	1601	1789	3567	
Fit Permitted	0.32	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.52	1.00	
Satd. Flow (perm)	610	5142	1601	3471	5142	1601	3471	3579	1601	981	3567	
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)	12	476	460	395	840	139	421	391	182	102	632	14
RTOR Reduction (vph)	0	0	278	0	0	88	0	0	119	0	1	0
Lane Group Flow (vph)	12	476	182	395	840	51	421	391	63	102	645	0
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2			6			8		4	
Actuated Green, G (s)	30.0	27.5	27.5	19.4	45.4	45.4	20.6	42.4	42.4	40.4	30.6	
Effective Green, g (s)	30.0	27.5	27.5	19.4	45.4	45.4	20.6	42.4	42.4	40.4	30.6	
Actuated g/C Ratio	0.24	0.22	0.22	0.16	0.37	0.37	0.17	0.35	0.35	0.33	0.25	
Clearance Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	173	1153	359	549	1904	592	583	1237	553	387	890	
v/s Ratio Prot	0.00	0.09		c0.11	0.16		c0.12	0.11		0.02	c0.18	
v/s Ratio Perm	0.02		c0.11		0.03			0.04		0.07		
v/c Ratio	0.07	0.41	0.51	0.72	0.44	0.09	0.72	0.32	0.11	0.26	0.72	
Uniform Delay, d1	35.2	40.6	41.6	49.0	29.1	25.1	48.3	29.5	27.3	29.2	42.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.2	1.1	4.5	0.2	0.1	4.4	0.3	0.2	0.4	3.6	
Delay (s)	35.4	40.9	42.7	53.5	29.2	25.2	52.7	29.8	27.5	29.6	45.8	
Level of Service	D	D	D	D	C	C	D	C	C	C	D	
Approach Delay (s)		41.7			35.8			39.1			43.6	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	39.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	122.6	Sum of lost time (s)	24.5
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
6: Boston Church Road/3 Line & 5 Sideroad

2028 FT PM Peak Hour  
09-09-2021

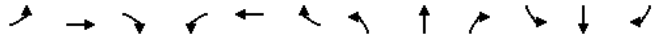
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	23	207	68	34	336	2	71	79	109	5	37	6
Future Volume (vph)	23	207	68	34	336	2	71	79	109	5	37	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.969				0.999			0.943			0.983	
Fit Protected	0.996				0.995			0.986			0.995	
Satd. Flow (prot)	0	1596	0	0	1689	0	0	1570	0	0	1661	0
Fit Permitted	0.956				0.948			0.893			0.965	
Satd. Flow (perm)	0	1532	0	0	1609	0	0	1422	0	0	1611	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26						45			7	
Link Speed (k/h)		60			60			70			60	
Link Distance (m)		166.9			1343.2			219.2			496.0	
Travel Time (s)		10.0			80.6			11.3			29.8	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	13%	13%	27%	13%	13%	33%	13%	17%	12%	43%	9%	13%
Adj. Flow (vph)	26	238	78	39	386	2	82	91	125	6	43	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	342	0	0	427	0	0	298	0	0	56	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			6			8	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												

Lanes, Volumes, Timings

2028 FT PM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

09-09-2021

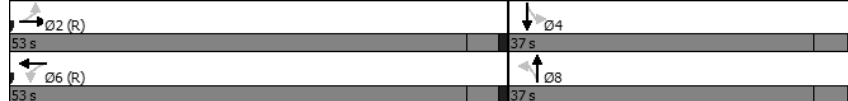


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	53.0	53.0		53.0	53.0		37.0	37.0		37.0	37.0	
Total Split (%)	58.9%	58.9%		58.9%	58.9%		41.1%	41.1%		41.1%	41.1%	
Maximum Green (s)	48.5	48.5		48.5	48.5		32.5	32.5		32.5	32.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		59.3			59.3			21.7			21.7	
Actuated g/C Ratio		0.66			0.66			0.24			0.24	
v/c Ratio		0.34			0.40			0.79			0.14	
Control Delay		8.5			11.8			41.4			22.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.5			11.8			41.4			22.2	
LOS		A			B			D			C	
Approach Delay		8.5			11.8			41.4			22.2	
Approach LOS		A			B			D			C	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle:	45
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.79
Intersection Signal Delay:	19.2
Intersection Capacity Utilization:	55.8%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 6: Boston Church Road/3 Line & 5 Sideroad



HCM Signalized Intersection Capacity Analysis

2028 FT PM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

09-09-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	23	207	68	34	336	2	71	79	109	5	37	6
Future Volume (vph)	23	207	68	34	336	2	71	79	109	5	37	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.97			1.00			0.94			0.98	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1596			1690			1571			1660	
Flt Permitted		0.96			0.95			0.89			0.97	
Satd. Flow (perm)		1531			1609			1423			1611	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	26	238	78	39	386	2	82	91	125	6	43	7
RTOR Reduction (vph)	0	9	0	0	0	0	0	34	0	0	5	0
Lane Group Flow (vph)	0	333	0	0	427	0	0	264	0	0	51	0
Heavy Vehicles (%)	13%	13%	27%	13%	13%	33%	13%	17%	12%	43%	9%	13%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		59.3			59.3			21.7			21.7	
Effective Green, g (s)		59.3			59.3			21.7			21.7	
Actuated g/C Ratio		0.66			0.66			0.24			0.24	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1008			1060			343			388	
v/s Ratio Prot												
v/s Ratio Perm		0.22			0.27			0.19			0.03	
v/c Ratio		0.33			0.40			0.77			0.13	
Uniform Delay, d1		6.7			7.1			31.8			26.8	
Progression Factor		1.00			1.24			1.00			1.00	
Incremental Delay, d2		0.9			1.0			10.0			0.2	
Delay (s)		7.6			9.8			41.8			26.9	
Level of Service		A			A			D			C	
Approach Delay (s)		7.6			9.8			41.8			26.9	
Approach LOS		A			A			D			C	

Intersection Summary

HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings

2028 FT PM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

09-09-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	50	262	11	66	315	18	23	319	81	4	132	39
Future Volume (vph)	50	262	11	66	315	18	23	319	81	4	132	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.995			0.994			0.974			0.970		
Flt Protected	0.992			0.992			0.997			0.999		
Satd. Flow (prot)	0	1626	0	0	1671	0	0	1685	0	0	1629	0
Flt Permitted	0.883			0.883			0.977			0.989		
Satd. Flow (perm)	0	1448	0	0	1487	0	0	1651	0	0	1612	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	3			3			17			20		
Link Speed (k/h)	60			60			60			70		
Link Distance (m)	1343.2			646.3			1994.7			464.9		
Travel Time (s)	80.6			38.8			119.7			23.9		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Adj. Flow (vph)	57	298	13	75	358	20	26	363	92	5	150	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	368	0	0	453	0	0	481	0	0	199	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0			3.7			3.7		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	1.6			1.6			1.6			1.6		
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	28.7			28.7			28.7			28.7		
Detector 2 Size(m)	1.8			1.8			1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	2			6			8			4		
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												

Lanes, Volumes, Timings

2028 FT PM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

09-09-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	46.6	46.6		46.6	46.6		43.4	43.4		43.4	43.4	
Total Split (%)	51.8%	51.8%		51.8%	51.8%		48.2%	48.2%		48.2%	48.2%	
Maximum Green (s)	42.1	42.1		42.1	42.1		38.9	38.9		38.9	38.9	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0			0.0			0.0			0.0		
Total Lost Time (s)	4.5			4.5			4.5			4.5		
Lead/Lag												
Lead/Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	50.0			50.0			31.0			31.0		
Actuated g/C Ratio	0.56			0.56			0.34			0.34		
v/c Ratio	0.46			0.55			0.83			0.35		
Control Delay	13.3			17.6			38.3			20.0		
Queue Delay	0.0			0.0			0.0			0.0		
Total Delay	13.3			17.6			38.3			20.0		
LOS	B			B			D			C		
Approach Delay	13.3			17.6			38.3			20.0		
Approach LOS	B			B			D			C		

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 44 (49%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 50  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.83  
 Intersection Signal Delay: 23.5 Intersection LOS: C  
 Intersection Capacity Utilization 70.1% ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 7: Esquesing Line/Fourth Line & 5 Sideroad

↔ 02 (R)	↕ 04
46.6 s	43.4 s
← 06 (R)	↕ 08
46.6 s	43.4 s

HCM Signalized Intersection Capacity Analysis  
7: Esquesing Line/Fourth Line & 5 Sideroad

2028 FT PM Peak Hour  
09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	50	262	11	66	315	18	23	319	81	4	132	39
Future Volume (vph)	50	262	11	66	315	18	23	319	81	4	132	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5			4.5			4.5		
Lane Util. Factor	1.00			1.00			1.00			1.00		
Frt	1.00			0.99			0.97			0.97		
Fit Protected	0.99			0.99			1.00			1.00		
Satd. Flow (prot)	1627			1670			1685			1628		
Fit Permitted	0.88			0.88			0.98			0.99		
Satd. Flow (perm)	1448			1488			1652			1613		
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	57	298	12	75	358	20	26	362	92	5	150	44
RTOR Reduction (vph)	0	1	0	0	1	0	0	11	0	0	13	0
Lane Group Flow (vph)	0	367	0	0	452	0	0	470	0	0	186	0
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	2			6			8			4		
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	50.0			50.0			31.0			31.0		
Effective Green, g (s)	50.0			50.0			31.0			31.0		
Actuated g/C Ratio	0.56			0.56			0.34			0.34		
Clearance Time (s)	4.5			4.5			4.5			4.5		
Vehicle Extension (s)	3.0			3.0			3.0			3.0		
Lane Grp Cap (vph)	804			826			569			555		
v/s Ratio Prot												
v/s Ratio Perm	0.25			c0.30			c0.28			0.12		
v/c Ratio	0.46			0.55			0.83			0.33		
Uniform Delay, d1	11.9			12.8			27.0			21.9		
Progression Factor	0.83			1.00			1.00			1.00		
Incremental Delay, d2	1.7			2.6			9.5			0.4		
Delay (s)	11.6			15.4			36.5			22.2		
Level of Service	B			B			D			C		
Approach Delay (s)	11.6			15.4			36.5			22.2		
Approach LOS	B			B			D			C		
<b>Intersection Summary</b>												
HCM 2000 Control Delay	22.1		HCM 2000 Level of Service				C					
HCM 2000 Volume to Capacity ratio	0.65											
Actuated Cycle Length (s)	90.0		Sum of lost time (s)				9.0					
Intersection Capacity Utilization	70.1%		ICU Level of Service				C					
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings  
101: Boston Church Road & East Access 1

2028 FT PM Peak Hour  
09-09-2021

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↑	↔	↔	↑
Traffic Volume (vph)	196	48	235	59	14	230
Future Volume (vph)	196	48	235	59	14	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	15.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				75.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.850			0.850		
Fit Protected	0.950			0.950		
Satd. Flow (prot)	1772	1633	1642	1498	1825	1642
Fit Permitted	0.950			0.950		
Satd. Flow (perm)	1772	1633	1642	1498	1825	1642
Link Speed (k/h)	48			70		
Link Distance (m)	168.6			269.9		
Travel Time (s)	12.6			13.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	0%	17%	9%	0%	17%
Adj. Flow (vph)	213	52	255	64	15	250
Shared Lane Traffic (%)						
Lane Group Flow (vph)	213	52	255	64	15	250
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7			3.7		
Link Offset(m)	0.0			0.0		
Crosswalk Width(m)	1.6			1.6		
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop			Free		
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	29.9%		ICU Level of Service A			
Analysis Period (min)	15					



HCM Unsignalized Intersection Capacity Analysis  
101: Boston Church Road & East Access 1

2028 FT PM Peak Hour  
09-09-2021

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↑	↘	↗	↑
Traffic Volume (veh/h)	196	48	235	59	14	230
Future Volume (Veh/h)	196	48	235	59	14	230
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)	213	52	255	64	15	250
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	535	255			319	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	535	255			319	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	57	93			99	
cM capacity (veh/h)	498	789			1252	
<b>Direction_Lane #</b>	<b>WB 1</b>	<b>WB 2</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>
Volume Total	213	52	255	64	15	250
Volume Left	213	0	0	0	15	0
Volume Right	0	52	0	64	0	0
cSH	498	789	1700	1700	1252	1700
Volume to Capacity	0.43	0.07	0.15	0.04	0.01	0.15
Queue Length 95th (m)	16.1	1.6	0.0	0.0	0.3	0.0
Control Delay (s)	17.5	9.9	0.0	0.0	7.9	0.0
Lane LOS	C	A			A	
Approach Delay (s)	16.0		0.0		0.4	
Approach LOS	C					
<b>Intersection Summary</b>						
Average Delay			5.1			
Intersection Capacity Utilization			29.9%		ICU Level of Service	A
Analysis Period (min)			15			

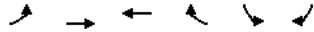
Lanes, Volumes, Timings  
102: James Snow Parkway N & East Access 2

2028 FT PM Peak Hour  
09-09-2021

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↗	↗	↗	↘	↘
Traffic Volume (vph)	18	653	530	19	19	20
Future Volume (vph)	18	653	530	19	19	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0			80.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	100.0				2.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt				0.850		0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	997	3042	2920	816	913	933
Fit Permitted	0.950				0.950	
Satd. Flow (perm)	997	3042	2920	816	913	933
Link Speed (k/h)		70	70			
Link Distance (m)		546.3	559.9		147.4	
Travel Time (s)		28.1	28.8		11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	83%	20%	25%	100%	100%	75%
Adj. Flow (vph)	20	710	576	21	21	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	710	576	21	21	22
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	28.1%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
102: James Snow Parkway N & East Access 2

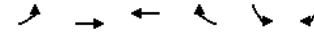
2028 FT PM Peak Hour  
09-09-2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations	↘	↕	↕	↕	↘	↘		
Traffic Volume (veh/h)	18	653	530	19	19	20		
Future Volume (Veh/h)	18	653	530	19	19	20		
Sign Control		Free	Free		Stop			
Grade		0%	0%		0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	20	710	576	21	21	22		
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	597				971	288		
vC1, stage 1 conf vol								
vC2, stage 2 conf vol								
vCu, unblocked vol	597				971	288		
tC, single (s)	5.8				8.8	8.4		
tC, 2 stage (s)								
tF (s)	3.0				4.5	4.0		
p0 queue free %	97				83	96		
cM capacity (veh/h)	582				124	531		
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	20	355	355	288	288	21	21	22
Volume Left	20	0	0	0	0	0	21	0
Volume Right	0	0	0	0	0	0	21	22
cSH	582	1700	1700	1700	1700	1700	124	531
Volume to Capacity	0.03	0.21	0.21	0.17	0.17	0.01	0.17	0.04
Queue Length 95th (m)	0.8	0.0	0.0	0.0	0.0	0.0	4.4	1.0
Control Delay (s)	11.4	0.0	0.0	0.0	0.0	0.0	39.8	12.1
Lane LOS	B						E	B
Approach Delay (s)	0.3			0.0			25.6	
Approach LOS							D	
Intersection Summary								
Average Delay			1.0					
Intersection Capacity Utilization			28.1%		ICU Level of Service		A	
Analysis Period (min)			15					

Lanes, Volumes, Timings  
103: James Snow Parkway N & East Access 3

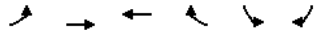
2028 FT PM Peak Hour  
09-09-2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↕	↕	↕	↘	↘
Traffic Volume (vph)	15	657	526	31	60	23
Future Volume (vph)	15	657	526	31	60	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0			80.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	100.0				2.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt				0.850		0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1055	3042	2920	955	1332	1134
Fit Permitted	0.437				0.950	
Satd. Flow (perm)	485	3042	2920	955	1332	1134
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				34		25
Link Speed (k/h)		70	70		48	
Link Distance (m)		559.9	346.4		152.7	
Travel Time (s)		28.8	17.8		11.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	73%	20%	25%	71%	37%	44%
Adj. Flow (vph)	16	714	572	34	65	25
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	714	572	34	65	25
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	6.1	30.5	30.5	6.1	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8	6.1	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			

Lanes, Volumes, Timings  
103: James Snow Parkway N & East Access 3

2028 FT PM Peak Hour  
09-09-2021

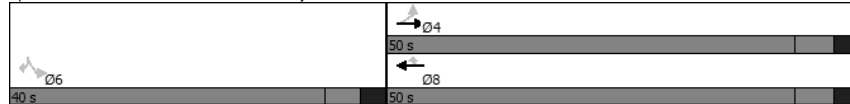


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.6	30.6	30.6	30.6	33.5	33.5
Total Split (s)	50.0	50.0	50.0	50.0	40.0	40.0
Total Split (%)	55.6%	55.6%	55.6%	55.6%	44.4%	44.4%
Maximum Green (s)	43.4	43.4	43.4	43.4	33.5	33.5
Yellow Time (s)	4.2	4.2	4.2	4.2	3.7	3.7
All-Red Time (s)	2.4	2.4	2.4	2.4	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	54.7	54.7	54.7	54.7	8.9	8.9
Actuated g/C Ratio	0.75	0.75	0.75	0.75	0.12	0.12
v/c Ratio	0.04	0.31	0.26	0.05	0.40	0.16
Control Delay	4.7	4.7	4.5	1.9	35.9	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.7	4.7	4.5	1.9	35.9	13.2
LOS	A	A	A	A	D	B
Approach Delay		4.7	4.3		29.6	
Approach LOS		A	A		C	

Intersection Summary

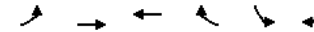
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	72.6
Natural Cycle:	65
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.40
Intersection Signal Delay:	6.1
Intersection Capacity Utilization:	33.2%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service:	A

Splits and Phases: 103: James Snow Parkway N & East Access 3



HCM Signalized Intersection Capacity Analysis  
103: James Snow Parkway N & East Access 3

2028 FT PM Peak Hour  
09-09-2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕
Traffic Volume (vph)	15	657	526	31	60	23
Future Volume (vph)	15	657	526	31	60	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1055	3042	2920	955	1332	1134
Flt Permitted	0.44	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	485	3042	2920	955	1332	1134
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	714	572	34	65	25
RTOR Reduction (vph)	0	0	0	10	0	22
Lane Group Flow (vph)	16	714	572	24	65	3
Heavy Vehicles (%)	73%	20%	25%	71%	37%	44%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			
Permitted Phases	4			8	6	6
Actuated Green, G (s)	53.2	53.2	53.2	53.2	7.7	7.7
Effective Green, g (s)	53.2	53.2	53.2	53.2	7.7	7.7
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.10	0.10
Clearance Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	348	2186	2099	686	138	117
v/s Ratio Prot		c0.23	0.20			
v/s Ratio Perm	0.03			0.03	c0.05	0.00
v/c Ratio	0.05	0.33	0.27	0.04	0.47	0.02
Uniform Delay, d1	3.0	3.8	3.6	3.0	31.2	29.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.4	0.3	0.1	2.5	0.1
Delay (s)	3.3	4.2	4.0	3.1	33.8	29.8
Level of Service	A	A	A	A	C	C
Approach Delay (s)		4.2	3.9		32.7	
Approach LOS		A	A		C	

Intersection Summary

HCM 2000 Control Delay	5.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	74.0	Sum of lost time (s)	13.1
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings  
201: West Access 1 & 5 Sideroad

2028 FT PM Peak Hour  
09-09-2021

	→	↖	↗	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖			↖	↗	↗
Traffic Volume (vph)	256	5	6	411	12	22
Future Volume (vph)	256	5	6	411	12	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998			0.999	0.983	
Flt Protected				0.999	0.983	
Satd. Flow (prot)	1700	0	0	1701	1722	0
Flt Permitted				0.999	0.983	
Satd. Flow (perm)	1700	0	0	1701	1722	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	198.7			175.4	89.6	
Travel Time (s)	11.9			10.5	6.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	0%	0%	13%	0%	0%
Adj. Flow (vph)	278	5	7	447	13	24
Shared Lane Traffic (%)						
Lane Group Flow (vph)	283	0	0	454	37	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other  
Control Type: Unsignalized  
Intersection Capacity Utilization 36.4% ICU Level of Service A  
Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis  
201: West Access 1 & 5 Sideroad

2028 FT PM Peak Hour  
09-09-2021

	→	↖	↗	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖			↖	↗	↗
Traffic Volume (veh/h)	256	5	6	411	12	22
Future Volume (Veh/h)	256	5	6	411	12	22
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	278	5	7	447	13	24
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)					342	
pX, platoon unblocked					0.96	
vC, conflicting volume			283		742	280
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			283		707	280
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		97	97
cM capacity (veh/h)			1291		385	763

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	283	454	37
Volume Left	0	7	13
Volume Right	5	0	24
cSH	1700	1291	567
Volume to Capacity	0.17	0.01	0.07
Queue Length 95th (m)	0.0	0.1	1.6
Control Delay (s)	0.0	0.2	11.8
Lane LOS		A	B
Approach Delay (s)	0.0	0.2	11.8
Approach LOS			B

Intersection Summary

Average Delay 0.7  
Intersection Capacity Utilization 36.4% ICU Level of Service A  
Analysis Period (min) 15

Lanes, Volumes, Timings  
202: West Access 2 & 5 Sideroad

2028 FT PM Peak Hour  
09-09-2021

	→	↖	↗	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖			↗	↖	↗
Traffic Volume (vph)	273	5	6	407	10	25
Future Volume (vph)	273	5	6	407	10	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998			0.904		
Flt Protected				0.999	0.986	
Satd. Flow (prot)	1700	0	0	1701	1712	0
Flt Permitted				0.999	0.986	
Satd. Flow (perm)	1700	0	0	1701	1712	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	175.4			166.9	91.3	
Travel Time (s)	10.5			10.0	6.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	0%	0%	13%	0%	0%
Adj. Flow (vph)	297	5	7	442	11	27
Shared Lane Traffic (%)						
Lane Group Flow (vph)	302	0	0	449	38	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other  
Control Type: Unsignalized  
Intersection Capacity Utilization 36.2% ICU Level of Service A  
Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis  
202: West Access 2 & 5 Sideroad

2028 FT PM Peak Hour  
09-09-2021

	→	↖	↗	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖			↗	↖	↗
Traffic Volume (veh/h)	273	5	6	407	10	25
Future Volume (Veh/h)	273	5	6	407	10	25
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	297	5	7	442	11	27
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)					167	
pX, platoon unblocked					0.91	
vC, conflicting volume			302		756	300
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			302		683	300
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		97	96
cM capacity (veh/h)			1270		379	745

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	302	449	38
Volume Left	0	7	11
Volume Right	5	0	27
cSH	1700	1270	582
Volume to Capacity	0.18	0.01	0.07
Queue Length 95th (m)	0.0	0.1	1.6
Control Delay (s)	0.0	0.2	11.6
Lane LOS		A	B
Approach Delay (s)	0.0	0.2	11.6
Approach LOS			B

Intersection Summary

Average Delay 0.7  
Intersection Capacity Utilization 36.2% ICU Level of Service A  
Analysis Period (min) 15

Lanes, Volumes, Timings  
203: Boston Church Road & West Access 3

2028 FT PM Peak Hour  
09-09-2021

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	21	19	258	139	0
Future Volume (vph)	1	21	19	258	139	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	40.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	2.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.871					
Fit Protected	0.998		0.950			
Satd. Flow (prot)	994	0	961	1642	1642	0
Fit Permitted	0.998		0.950			
Satd. Flow (perm)	994	0	961	1642	1642	0
Link Speed (k/h)	48			70	70	
Link Distance (m)	99.5			207.3	219.2	
Travel Time (s)	7.5			10.7	11.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	71%	90%	17%	17%	0%
Adj. Flow (vph)	1	23	21	280	151	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	24	0	21	280	151	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	24.0%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis  
203: Boston Church Road & West Access 3

2028 FT PM Peak Hour  
09-09-2021

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	21	19	258	139	0
Future Volume (Veh/h)	1	21	19	258	139	0
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)	1	23	21	280	151	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					219	
pX, platoon unblocked						
vC, conflicting volume	473	151	151			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	473	151	151			
tC, single (s)	6.4	6.9	5.0			
tC, 2 stage (s)						
tF (s)	3.5	3.9	3.0			
p0 queue free %	100	97	98			
cM capacity (veh/h)	542	742	1032			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	24	21	280	151
Volume Left	1	21	0	0
Volume Right	23	0	0	0
cSH	731	1032	1700	1700
Volume to Capacity	0.03	0.02	0.16	0.09
Queue Length 95th (m)	0.8	0.5	0.0	0.0
Control Delay (s)	10.1	8.6	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	10.1	0.6		0.0
Approach LOS	B			

Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization	24.0%	ICU Level of Service	A
Analysis Period (min)		15	

Lanes, Volumes, Timings  
204: Boston Church Road & West Access 4

2028 FT PM Peak Hour  
09-09-2021

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↑	↑	↔
Traffic Volume (vph)	23	86	23	254	153	7
Future Volume (vph)	23	86	23	254	153	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	15.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	2.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.894			0.994		
Fit Protected	0.990		0.950			
Satd. Flow (prot)	1700	0	1825	1642	1643	0
Fit Permitted	0.990		0.950			
Satd. Flow (perm)	1700	0	1825	1642	1643	0
Link Speed (k/h)	48			70	70	
Link Distance (m)	101.5			171.0	207.3	
Travel Time (s)	7.6			8.8	10.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	17%	17%	0%
Adj. Flow (vph)	25	93	25	276	166	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	118	0	25	276	174	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	28.4%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis  
204: Boston Church Road & West Access 4

2028 FT PM Peak Hour  
09-09-2021

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	↔	↔	↔	↑	↑	↔
Lane Configurations	↔	↔	↔	↑	↑	↔
Traffic Volume (veh/h)	23	86	23	254	153	7
Future Volume (Veh/h)	23	86	23	254	153	7
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)	25	93	25	276	166	8
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	496	170	174			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	496	170	174			
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	89	98			
cM capacity (veh/h)	527	879	1415			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	118	25	276	174
Volume Left	25	25	0	0
Volume Right	93	0	0	8
cSH	770	1415	1700	1700
Volume to Capacity	0.15	0.02	0.16	0.10
Queue Length 95th (m)	4.1	0.4	0.0	0.0
Control Delay (s)	10.5	7.6	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	10.5	0.6		0.0
Approach LOS	B			

Intersection Summary

Average Delay	2.4
Intersection Capacity Utilization	28.4%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings  
205: Boston Church Road & West Access 5

2028 FT PM Peak Hour  
09-09-2021

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	5	6	277	239	0
Future Volume (vph)	0	5	6	277	239	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	40.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	2.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Fit Protected			0.950			
Satd. Flow (prot)	831	0	913	1642	1642	0
Fit Permitted			0.950			
Satd. Flow (perm)	831	0	913	1642	1642	0
Link Speed (k/h)	48			70	70	
Link Distance (m)	100.3			183.3	171.0	
Travel Time (s)	7.5			9.4	8.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	100%	100%	17%	17%	0%
Adj. Flow (vph)	0	5	7	301	260	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	0	7	301	260	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	24.6%		ICU Level of Service		A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
205: Boston Church Road & West Access 5

2028 FT PM Peak Hour  
09-09-2021

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	5	6	277	239	0
Future Volume (Veh/h)	0	5	6	277	239	0
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)	0	5	7	301	260	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	575	260	260			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	575	260	260			
tC, single (s)	6.4	7.2	5.1			
tC, 2 stage (s)						
tF (s)	3.5	4.2	3.1			
p0 queue free %	100	99	99			
cM capacity (veh/h)	479	591	897			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	5	7	301	260
Volume Left	0	7	0	0
Volume Right	5	0	0	0
cSH	591	897	1700	1700
Volume to Capacity	0.01	0.01	0.18	0.15
Queue Length 95th (m)	0.2	0.2	0.0	0.0
Control Delay (s)	11.1	9.0	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	11.1	0.2	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	24.6%	ICU Level of Service	A
Analysis Period (min)	15		



Lanes, Volumes, Timings

2033 FT AM Peak Hour

1: Regional Road 25 & 5 Sideroad

09-09-2021

	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↗		↖	↗		↖	↗	↘	↙	↖	↗	↘
Traffic Volume (vph)	79	425	237	66	120	14	86	433	115	110	625	69	
Future Volume (vph)	79	425	237	66	120	14	86	433	115	110	625	69	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (m)	80.0		0.0	70.0		0.0	75.0		75.0	35.0		0.0	
Storage Lanes	1		0	1		0	1		1	1		0	
Taper Length (m)	100.0			100.0			75.0			100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	0.91	
Frt		0.946					0.984			0.850		0.985	
Fit Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1601	1580	0	1342	1608	0	1225	4196	1338	1601	4393	0	
Fit Permitted	0.604			0.197			0.253			0.477			
Satd. Flow (perm)	1018	1580	0	278	1608	0	326	4196	1338	804	4393	0	
Right Turn on Red			No			Yes			Yes			Yes	
Satd. Flow (RTOR)					6				122			17	
Link Speed (k/h)		60			60				70			70	
Link Distance (m)		573.6			536.0				986.0			203.5	
Travel Time (s)		34.4			32.2				50.7			10.5	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%	
Adj. Flow (vph)	84	452	252	70	128	15	91	461	122	117	665	73	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	84	704	0	70	143	0	91	461	122	117	738	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)		3.7			3.7				3.7			3.7	
Link Offset(m)		0.0			0.0				0.0			0.0	
Crosswalk Width(m)		1.6			1.6				1.6			1.6	
Two way Left Turn Lane													
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
Turning Speed (k/h)	24		14	24		14	24		14	24		14	
Number of Detectors	1	1		1	1		1	1	1	1	1	1	
Detector Template													
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0	
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	NA	
Protected Phases	3	8		4	4		5	2	2	6	6	6	
Permitted Phases	8			4			2		2	6			
Detector Phase	3	8		4	4		5	2	2	6	6	6	
Switch Phase													
Minimum Initial (s)	7.0	10.0		10.0	10.0		7.0	20.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	11.0	38.0		38.0	38.0		11.0	38.2	38.2	38.2	38.2	38.2	

Lanes, Volumes, Timings

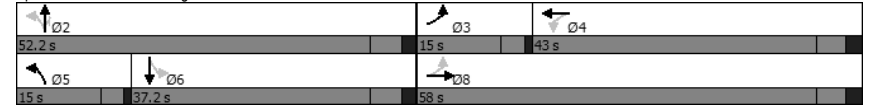
2033 FT AM Peak Hour

1: Regional Road 25 & 5 Sideroad

09-09-2021

	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Total Split (s)	15.0	58.0		43.0	43.0		15.0	52.2	52.2	37.2	37.2		
Total Split (%)	13.6%	52.6%		39.0%	39.0%		13.6%	47.4%	47.4%	33.8%	33.8%		
Maximum Green (s)	11.0	52.0		37.0	37.0		11.0	46.0	46.0	31.0	31.0		
Yellow Time (s)	3.0	3.7		3.7	3.7		3.0	4.2	4.2	4.2	4.2		
All-Red Time (s)	1.0	2.3		2.3	2.3		1.0	2.0	2.0	2.0	2.0		
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	4.0	6.0		6.0	6.0		4.0	6.2	6.2	6.2	6.2		
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag		
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes		
Vehicle Extension (s)	3.0	3.7		3.7	3.7		3.0	3.6	3.6	4.2	4.2		
Recall Mode	None	Min		None	None		None	Ped	Ped	Ped	Ped		
Walk Time (s)		7.0			7.0			7.0	7.0	7.0	7.0		
Flash Dont Walk (s)		25.0			25.0			25.0	25.0	25.0	25.0		
Pedestrian Calls (#/hr)		0			0			0	0	0	0		
Act Effect Green (s)	50.8	48.7		38.9	38.9		45.8	43.6	43.6	32.5	32.5		
Actuated g/C Ratio	0.49	0.47		0.37	0.37		0.44	0.42	0.42	0.31	0.31		
v/c Ratio	0.16	0.96		0.68	0.24		0.40	0.26	0.19	0.47	0.54		
Control Delay	16.3	53.1		67.4	25.6		24.3	20.9	4.4	40.0	32.5		
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0		
Total Delay	16.3	53.1		67.4	25.6		24.3	20.9	4.4	40.0	32.5		
LOS	B	D		E	C		C	C	A	D	C		
Approach Delay		49.2			39.4			18.3			33.6		
Approach LOS		D			D			B			C		
Intersection Summary													
Area Type:	Other												
Cycle Length:	110.2												
Actuated Cycle Length:	104.7												
Natural Cycle:	100												
Control Type:	Actuated-Uncoordinated												
Maximum v/c Ratio:	0.96												
Intersection Signal Delay:	34.9						Intersection LOS: C						
Intersection Capacity Utilization:	98.8%						ICU Level of Service F						
Analysis Period (min):	15												

Splits and Phases: 1: Regional Road 25 & 5 Sideroad



HCM Signalized Intersection Capacity Analysis

2033 FT AM Peak Hour

1: Regional Road 25 & 5 Sideroad

09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	79	425	237	66	120	14	86	433	115	110	625	69
Future Volume (vph)	79	425	237	66	120	14	86	433	115	110	625	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		6.0	6.0		4.0	6.2	6.2	6.2	6.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.91	1.00	1.00	0.91	
Frt	1.00	0.95		1.00	0.98		1.00	1.00	0.85	1.00	0.99	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1601	1581		1342	1609		1225	4196	1338	1601	4393	
Fit Permitted	0.60	1.00		0.20	1.00		0.25	1.00	1.00	0.48	1.00	
Satd. Flow (perm)	1017	1581		278	1609		326	4196	1338	804	4393	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	84	452	252	70	128	15	91	461	122	117	665	73
RTOR Reduction (vph)	0	0	0	0	4	0	0	0	71	0	12	0
Lane Group Flow (vph)	84	704	0	70	139	0	91	461	51	117	726	0
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases	3	8		4			5	2			6	
Permitted Phases	8			4			2		2	6		
Actuated Green, G (s)	49.7	49.7		38.9	38.9		44.5	44.5	44.5	32.5	32.5	
Effective Green, g (s)	49.7	49.7		38.9	38.9		44.5	44.5	44.5	32.5	32.5	
Actuated g/C Ratio	0.47	0.47		0.37	0.37		0.42	0.42	0.42	0.31	0.31	
Clearance Time (s)	4.0	6.0		6.0	6.0		4.0	6.2	6.2	6.2	6.2	
Vehicle Extension (s)	3.0	3.7		3.7	3.7		3.0	3.6	3.6	4.2	4.2	
Lane Grp Cap (vph)	512	738		101	588		203	1754	559	245	1341	
v/s Ratio Prot	0.01	c0.45		0.09			c0.03	0.11			c0.17	
v/s Ratio Perm	0.07			0.25			0.15		0.04	0.15		
v/c Ratio	0.16	0.95		0.69	0.24		0.45	0.26	0.09	0.48	0.54	
Uniform Delay, d1	16.0	27.2		28.7	23.4		20.1	20.2	18.7	30.0	30.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	22.5		19.5	0.3		1.6	0.1	0.1	2.2	0.6	
Delay (s)	16.2	49.8		48.2	23.7		21.7	20.3	18.8	32.3	31.4	
Level of Service	B	D		D	C		C	C	B	C	C	
Approach Delay (s)		46.2			31.7			20.2			31.5	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	33.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	106.4	Sum of lost time (s)	20.2
Intersection Capacity Utilization	98.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings

2033 FT AM Peak Hour

2: Regional Road 25 & James Snow Parkway N

09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	12	251	40	109	168	67	195	630	519	239	565	32
Future Volume (vph)	12	251	40	109	168	67	195	630	519	239	565	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		115.0	85.0		35.0	30.0		30.0	75.0		75.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	40.0			90.0			70.0			100.0		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Ped Bike Factor									0.99	1.00		
Frt			0.850			0.850			0.850		0.992	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1217	3856	1103	1259	4521	1192	1534	4162	1458	1472	4118	0
Fit Permitted	0.638			0.585			0.408			0.386		
Satd. Flow (perm)	817	3856	1103	775	4521	1192	659	4162	1439	598	4118	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			58			69			388		8	
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		452.4			1065.5			592.1			986.0	
Travel Time (s)		27.1			63.9			30.5			50.7	
Confl. Peds. (#/hr)									1		1	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Adj. Flow (vph)	12	259	41	112	173	69	201	649	535	246	582	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	259	41	112	173	69	201	649	535	246	615	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.2	9.0	9.0	9.0	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	
Switch Phase												

Lanes, Volumes, Timings

2033 FT AM Peak Hour

2: Regional Road 25 & James Snow Parkway N

09-09-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	20.0	20.0	7.0	20.0	20.0
Minimum Split (s)	43.6	43.6	43.6	43.6	43.6	43.6	11.0	42.9	42.9	11.0	35.9	35.9
Total Split (s)	55.6	55.6	55.6	55.6	55.6	55.6	15.0	76.9	76.9	15.0	76.9	76.9
Total Split (%)	37.7%	37.7%	37.7%	37.7%	37.7%	37.7%	10.2%	52.1%	52.1%	10.2%	52.1%	52.1%
Maximum Green (s)	49.0	49.0	49.0	49.0	49.0	49.0	11.0	70.0	70.0	11.0	70.0	70.0
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	1.0	2.7	2.7	1.0	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	6.9
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	30.0	30.0	30.0	30.0	30.0	30.0	29.0	29.0	29.0	22.0	22.0	22.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effect Green (s)	19.0	19.0	19.0	19.0	19.0	19.0	42.1	28.6	28.6	42.6	28.8	28.8
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.25	0.25	0.55	0.37	0.37	0.56	0.38	0.38
v/c Ratio	0.06	0.27	0.13	0.59	0.15	0.20	0.42	0.42	0.69	0.54	0.40	0.40
Control Delay	25.4	24.8	5.3	40.8	23.9	8.4	10.8	19.1	11.0	13.5	18.5	18.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.4	24.8	5.3	40.8	23.9	8.4	10.8	19.1	11.0	13.5	18.5	18.5
LOS	C	C	A	D	C	A	B	B	B	B	B	B
Approach Delay		22.3			26.2			14.8			17.0	
Approach LOS		C			C			B			B	

Intersection Summary

Area Type:	Other
Cycle Length:	147.5
Actuated Cycle Length:	76.7
Natural Cycle:	100
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.69
Intersection Signal Delay:	17.6
Intersection LOS:	B
Intersection Capacity Utilization:	68.4%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 2: Regional Road 25 & James Snow Parkway N

Ø1	Ø2	Ø4
15 s	76.9 s	55.6 s
Ø5	Ø6	Ø8
15 s	76.9 s	55.6 s

HCM Signalized Intersection Capacity Analysis

2033 FT AM Peak Hour

2: Regional Road 25 & James Snow Parkway N

09-09-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	12	251	40	109	168	67	195	630	519	239	565	32
Future Volume (vph)	12	251	40	109	168	67	195	630	519	239	565	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	6.9
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	0.99
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1217	3856	1103	1259	4521	1192	1534	4162	1440	1472	4118	4118
Fit Permitted	0.64	1.00	1.00	0.59	1.00	1.00	0.41	1.00	1.00	0.39	1.00	1.00
Satd. Flow (perm)	817	3856	1103	775	4521	1192	659	4162	1440	598	4118	4118
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	12	259	41	112	173	69	201	649	535	246	582	33
RTOR Reduction (vph)	0	0	31	0	0	52	0	0	242	0	5	0
Lane Group Flow (vph)	12	259	10	112	173	17	201	649	293	246	610	0
Confl. Peds. (#/hr)							1	1				
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	NA
Protected Phases		4			8		5	2		1		6
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	19.0	19.0	19.0	19.0	19.0	19.0	39.0	28.6	28.6	39.6	28.9	28.9
Effective Green, g (s)	19.0	19.0	19.0	19.0	19.0	19.0	39.0	28.6	28.6	39.6	28.9	28.9
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.25	0.25	0.51	0.38	0.38	0.52	0.38	0.38
Clearance Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	6.9
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	204	966	276	194	1133	298	459	1570	543	435	1570	1570
v/s Ratio Prot		0.07			0.04		0.06	0.16		c0.08		0.15
v/s Ratio Perm	0.01		0.01	c0.14		0.01	0.17		0.20	c0.22		
v/c Ratio	0.06	0.27	0.04	0.58	0.15	0.06	0.44	0.41	0.54	0.57	0.39	0.39
Uniform Delay, d1	21.6	22.8	21.5	24.9	22.1	21.6	10.3	17.4	18.5	10.4	17.0	17.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.3	0.1	6.5	0.1	0.2	0.7	0.4	1.9	1.7	0.3	0.3
Delay (s)	21.9	23.1	21.6	31.4	22.3	21.8	11.0	17.8	20.4	12.1	17.4	17.4
Level of Service	C	C	C	C	C	C	B	B	C	B	B	B
Approach Delay (s)		22.9			25.0			17.8			15.9	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	18.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	75.8	Sum of lost time (s)	17.5
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

2033 FT AM Peak Hour

3: Boston Church Road & James Snow Parkway N

09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	745	127	14	280	275	28	9	11	98	53	136
Future Volume (vph)	102	745	127	14	280	275	28	9	11	98	53	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		0.0	70.0		0.0	60.0		25.0	60.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			70.0			90.0		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.978			0.926				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1508	4347	0	1415	4115	0	1113	3650	944	1534	3147	1498
Fit Permitted	0.340			0.283			0.717			0.520		
Satd. Flow (perm)	540	4347	0	421	4115	0	840	3650	944	839	3147	1498
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		25			185			90			151	
Link Speed (k/h)		70			70			60			60	
Link Distance (m)		358.9			545.5			792.9			198.3	
Travel Time (s)		18.5			28.1			47.6			11.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%
Adj. Flow (vph)	113	828	141	16	311	306	31	10	12	109	59	151
Shared Lane Traffic (%)												
Lane Group Flow (vph)	113	969	0	16	617	0	31	10	12	109	59	151
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8	7	4	4	
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0		7.0	20.0		7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	11.0	33.5		11.0	33.5		11.0	31.6	31.6	11.0	31.6	31.6

Lanes, Volumes, Timings

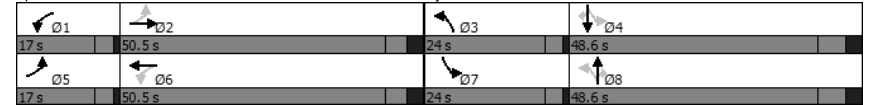
2033 FT AM Peak Hour

3: Boston Church Road & James Snow Parkway N

09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	17.0	50.5		17.0	50.5		24.0	48.6	48.6	24.0	48.6	48.6
Total Split (%)	12.1%	36.0%		12.1%	36.0%		17.1%	34.7%	34.7%	17.1%	34.7%	34.7%
Maximum Green (s)	13.0	44.0		13.0	44.0		20.0	41.0	41.0	20.0	41.0	41.0
Yellow Time (s)	3.0	3.7		3.0	3.7		3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	1.0	2.8		1.0	2.8		1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		7.0			7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		20.0			20.0			17.0	17.0		17.0	17.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effect Green (s)	37.7	31.6		32.2	24.1		17.2	15.9	15.9	25.2	17.5	17.5
Actuated g/C Ratio	0.53	0.44		0.45	0.34		0.24	0.22	0.22	0.35	0.25	0.25
v/c Ratio	0.27	0.50		0.05	0.41		0.13	0.01	0.04	0.25	0.08	0.31
Control Delay	11.5	17.0		10.9	14.9		21.4	30.7	0.3	19.5	26.2	7.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.5	17.0		10.9	14.9		21.4	30.7	0.3	19.5	26.2	7.6
LOS	B	B		B	B		C	C	A	B	C	A
Approach Delay		16.4			14.8			18.3			15.1	
Approach LOS		B			B			B			B	
Intersection Summary												
Area Type:	Other											
Cycle Length:	140.1											
Actuated Cycle Length:	71.4											
Natural Cycle:	90											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.50											
Intersection Signal Delay:	15.8						Intersection LOS: B					
Intersection Capacity Utilization:	50.6%						ICU Level of Service A					
Analysis Period (min):	15											

Splits and Phases: 3: Boston Church Road & James Snow Parkway N



HCM Signalized Intersection Capacity Analysis  
3: Boston Church Road & James Snow Parkway N

2033 FT AM Peak Hour  
09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑↑		↓	↑↑↑		↓	↑↑↑		↓	↑↑↑		↓
Traffic Volume (vph)	102	745	127	14	280	275	28	9	11	98	53	136
Future Volume (vph)	102	745	127	14	280	275	28	9	11	98	53	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.5	4.0	6.5	4.0	6.5	4.0	6.5	4.0	6.5	4.0	6.5
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98	1.00	0.93	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1508	4348	1415	4113	1113	3650	944	1534	3147	1498		
Fit Permitted	0.34	1.00	0.28	1.00	0.72	1.00	1.00	0.52	1.00	1.00		
Satd. Flow (perm)	540	4348	422	4113	839	3650	944	839	3147	1498		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	113	828	141	16	311	306	31	10	12	109	59	151
RTOR Reduction (vph)	0	15	0	0	123	0	0	0	11	0	0	114
Lane Group Flow (vph)	113	954	0	16	494	0	31	10	1	109	59	37
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	NA	Perm	
Protected Phases	5	2	1	6	3	8	7	4				
Permitted Phases	2		6		8		4				4	
Actuated Green, G (s)	37.8	31.6	28.1	25.9	11.6	9.0	9.0	25.8	19.2	19.2		
Effective Green, g (s)	37.8	31.6	28.1	25.9	11.6	9.0	9.0	25.8	19.2	19.2		
Actuated g/C Ratio	0.49	0.41	0.36	0.33	0.15	0.12	0.12	0.33	0.25	0.25		
Clearance Time (s)	4.0	6.5	4.0	6.5	4.0	6.5	4.0	6.5	4.0	6.5		
Vehicle Extension (s)	3.0	5.0	3.0	5.0	3.0	5.0	3.0	5.0	3.0	5.0		
Lane Grp Cap (vph)	361	1768	180	1371	134	422	109	393	777	370		
v/s Ratio Prot	c0.03	c0.22	0.00	0.12	0.01	0.00		c0.05	0.02			
v/s Ratio Perm	0.12		0.03		0.03		0.00	c0.05		0.02		
v/c Ratio	0.31	0.54	0.09	0.36	0.23	0.02	0.01	0.28	0.08	0.10		
Uniform Delay, d1	11.3	17.5	16.0	19.6	28.9	30.5	30.4	18.8	22.4	22.6		
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	0.5	0.6	0.2	0.3	0.9	0.0	0.1	0.4	0.1	0.3		
Delay (s)	11.8	18.1	16.2	20.0	29.8	30.5	30.5	19.2	22.5	22.8		
Level of Service	B	B	B	B	C	C	C	B	C	C		
Approach Delay (s)		17.4		19.9		30.1		21.5				
Approach LOS		B		B		C		C				

Intersection Summary		
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.45	B
Actuated Cycle Length (s)	77.7	Sum of lost time (s)
Intersection Capacity Utilization	50.6%	ICU Level of Service
Analysis Period (min)	15	A
c Critical Lane Group		

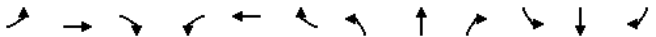
Lanes, Volumes, Timings  
4: Esquesing Line & James Snow Parkway N

2033 FT AM Peak Hour  
09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑↑		↓	↑↑↑		↓	↑↑↑		↓	↑↑↑		↓
Traffic Volume (vph)	18	703	141	38	539	39	64	224	6	40	443	17
Future Volume (vph)	18	703	141	38	539	39	64	224	6	40	443	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0	0.0	70.0	0.0	40.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Storage Lanes	1	0	1	0	1	1	1	1	1	1	1	1
Taper Length (m)	100.0		100.0		80.0		100.0					
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.975			0.990			0.850			0.850	
Fit Protected	0.950		0.950		0.950		0.950		0.950			
Satd. Flow (prot)	1547	4244	0	1644	4106	0	1644	1731	1396	1615	1685	1396
Fit Permitted	0.391		0.211		0.290		0.290		0.568			
Satd. Flow (perm)	637	4244	0	365	4106	0	502	1731	1396	966	1685	1396
Right Turn on Red		Yes		Yes		Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		39		10				74				74
Link Speed (k/h)		70		70			60			60		
Link Distance (m)		346.4		1421.7			292.4			1994.7		
Travel Time (s)		17.8		73.1			17.5			119.7		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	17%	13%	14%	17%	17%
Adj. Flow (vph)	20	799	160	43	613	44	73	255	7	45	503	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	959	0	43	657	0	73	255	7	45	503	19
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0		0.0		0.0		0.0		0.0		0.0
Crosswalk Width(m)		1.6		1.6		1.6		1.6		1.6		1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	Perm	NA	Perm	
Protected Phases	7	4		3	8		2	2		6		
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2		6		6
Switch Phase												
Minimum Initial (s)	7.0	15.0		7.0	15.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	11.0	30.6		11.0	30.6		33.5	33.5	33.5	33.5	33.5	33.5

Lanes, Volumes, Timings  
4: Esquesing Line & James Snow Parkway N

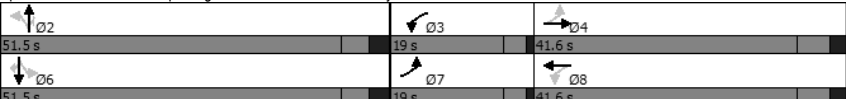
2033 FT AM Peak Hour  
09-09-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	19.0	41.6		19.0	41.6		51.5	51.5	51.5	51.5	51.5	51.5
Total Split (%)	16.9%	37.1%		16.9%	37.1%		45.9%	45.9%	45.9%	45.9%	45.9%	45.9%
Maximum Green (s)	15.0	35.0		15.0	35.0		45.0	45.0	45.0	45.0	45.0	45.0
Yellow Time (s)	3.0	4.2		3.0	4.2		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	2.4		1.0	2.4		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		17.0			17.0		20.0	20.0	20.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	35.0	28.6		36.3	30.9		33.0	33.0	33.0	33.0	33.0	33.0
Actuated g/C Ratio	0.43	0.35		0.44	0.38		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.06	0.64		0.15	0.42		0.36	0.36	0.01	0.12	0.74	0.03
Control Delay	14.3	25.2		14.9	21.1		26.1	20.5	0.0	18.8	30.1	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.3	25.2		14.9	21.1		26.1	20.5	0.0	18.8	30.1	0.1
LOS	B	C		B	C		C	C	A	B	C	A
Approach Delay		25.0			20.7			21.3			28.2	
Approach LOS		C			C			C			C	

Intersection Summary	
Area Type:	Other
Cycle Length:	112.1
Actuated Cycle Length:	81.7
Natural Cycle:	80
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.74
Intersection Signal Delay:	24.1
Intersection Capacity Utilization:	82.2%
Analysis Period (min):	15
Intersection LOS:	C
ICU Level of Service:	E

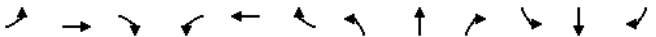
Splits and Phases: 4: Esquesing Line & James Snow Parkway N



Phase 1 (EBL)	51.5 s	Phase 2 (EBT)	19 s	Phase 3 (EBR)	41.6 s
Phase 4 (WBL)	51.5 s	Phase 5 (WBT)	19 s	Phase 6 (WBR)	41.6 s

HCM Signalized Intersection Capacity Analysis  
4: Esquesing Line & James Snow Parkway N

2033 FT AM Peak Hour  
09-09-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑↑	↑↑↑		↑↑↑	↑↑↑		↑↑↑	↑↑↑	↑↑↑	↑↑↑	↑↑↑	↑↑↑
Traffic Volume (vph)	18	703	141	38	539	39	64	224	6	40	443	17
Future Volume (vph)	18	703	141	38	539	39	64	224	6	40	443	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1547	4243		1644	4106		1644	1731	1396	1615	1685	1396
Flt Permitted	0.39	1.00		0.21	1.00		0.29	1.00	1.00	0.57	1.00	1.00
Satd. Flow (perm)	636	4243		366	4106		502	1731	1396	966	1685	1396
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	20	799	160	43	612	44	73	255	7	45	503	19
RTOR Reduction (vph)	0	25	0	0	6	0	0	0	4	0	0	11
Lane Group Flow (vph)	20	934	0	43	651	0	73	255	3	45	503	8
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	11%	17%	13%	14%	17%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		6		6	
Actuated Green, G (s)	31.6	29.3		34.8	30.9		33.0	33.0	33.0	33.0	33.0	33.0
Effective Green, g (s)	31.6	29.3		34.8	30.9		33.0	33.0	33.0	33.0	33.0	33.0
Actuated g/C Ratio	0.38	0.35		0.42	0.37		0.40	0.40	0.40	0.40	0.40	0.40
Clearance Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	266	1492		212	1523		198	685	553	382	667	553
v/s Ratio Prot	0.00	c0.22		c0.01	0.16			0.15			c0.30	
v/s Ratio Perm	0.03			0.08			0.15		0.00	0.05		0.01
v/c Ratio	0.08	0.63		0.20	0.43		0.37	0.37	0.01	0.12	0.75	0.01
Uniform Delay, d1	16.3	22.4		14.9	19.6		17.8	17.8	15.2	15.9	21.7	15.3
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	1.2		0.5	0.4		2.4	0.7	0.0	0.3	5.7	0.0
Delay (s)	16.4	23.6		15.4	20.0		20.2	18.5	15.2	16.2	27.4	15.3
Level of Service	B	C		B	B		C	B	B	B	C	B
Approach Delay (s)		23.5			19.7			18.8			26.1	
Approach LOS		C			B			B			C	

Intersection Summary	
HCM 2000 Control Delay	22.4
HCM 2000 Volume to Capacity ratio	0.66
Actuated Cycle Length (s)	83.3
Intersection Capacity Utilization	82.2%
Analysis Period (min)	15
HCM 2000 Level of Service	C
Sum of lost time (s)	17.1
ICU Level of Service	E

Lanes, Volumes, Timings

2033 FT AM Peak Hour

5: James Snow Parkway N & Steeles Avenue East

09-09-2021



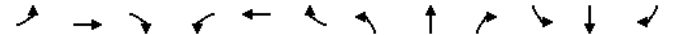
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔	↔	↔↔	↔↔↔	↔	↔	↔↔↔	↔	↔	↔↔↔	↔
Traffic Volume (vph)	1	726	268	118	404	68	380	547	412	167	567	10
Future Volume (vph)	1	726	268	118	404	68	380	547	412	167	567	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	122.0		72.0	170.0		130.0	105.0		260.0	160.0		70.0
Storage Lanes	1		1	2		1	2		1	1		1
Taper Length (m)	60.0			70.0			80.0			80.0		
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Fit			0.850			0.850			0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	5142	1601	3471	5142	1601	3471	5142	1601	1789	5142	1601
Fit Permitted	0.488			0.950			0.950			0.416		
Satd. Flow (perm)	919	5142	1601	3471	5142	1601	3471	5142	1601	784	5142	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			291			82			336			114
Link Speed (k/h)		60			70			60			70	
Link Distance (m)		729.0			881.4			342.7			1421.7	
Travel Time (s)		43.7			45.3			20.6			73.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	789	291	128	439	74	413	595	448	182	616	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	789	291	128	439	74	413	595	448	182	616	11
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.0			4.0			4.0			4.0	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												Right
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	6.1
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	0.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	0.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2		6		6		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	22.0	22.0	7.0	22.0	22.0	7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	11.0	47.2	47.2	12.0	47.2	47.2	12.0	46.3	46.3	11.0	46.3	46.3
Total Split (s)	15.0	55.2	55.2	26.0	66.2	66.2	29.0	59.0	59.0	24.0	54.0	54.0

Lanes, Volumes, Timings

2033 FT AM Peak Hour

5: James Snow Parkway N & Steeles Avenue East

09-09-2021

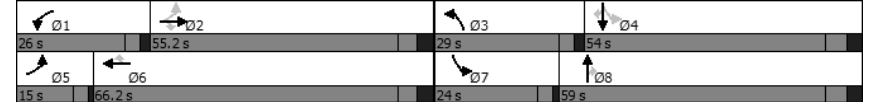


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	9.1%	33.6%	33.6%	15.8%	40.3%	40.3%	17.7%	35.9%	35.9%	14.6%	32.9%	32.9%
Maximum Green (s)	11.0	48.0	48.0	21.0	59.0	59.0	24.0	51.7	51.7	20.0	46.7	46.7
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	1.0	3.5	3.5	2.0	3.5	3.5	2.0	3.1	3.1	1.0	3.1	3.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	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	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		33.0	33.0		33.0	33.0		32.0	32.0		32.0	32.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effect Green (s)	35.4	25.0	25.0	9.7	38.0	38.0	18.3	28.6	28.6	38.9	22.4	22.4
Actuated g/C Ratio	0.35	0.25	0.25	0.10	0.38	0.38	0.18	0.28	0.28	0.39	0.22	0.22
v/c Ratio	0.00	0.62	0.47	0.38	0.23	0.11	0.65	0.41	0.64	0.42	0.54	0.02
Control Delay	20.0	37.0	6.9	48.9	23.4	5.9	44.8	30.4	13.2	18.7	36.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	37.0	6.9	48.9	23.4	5.9	44.8	30.4	13.2	18.7	36.9	0.1
LOS	B	D	A	D	C	A	D	C	B	B	D	A
Approach Delay		28.9			26.5			29.2				32.3
Approach LOS		C			C			C				C

Intersection Summary

Area Type:	Other
Cycle Length:	164.2
Actuated Cycle Length:	100.4
Natural Cycle:	120
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.65
Intersection Signal Delay:	29.3
Intersection Capacity Utilization:	68.5%
Intersection LOS:	C
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 5: James Snow Parkway N & Steeles Avenue East



HCM Signalized Intersection Capacity Analysis  
5: James Snow Parkway N & Steeles Avenue East

2033 FT AM Peak Hour  
09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔	↔	↔↔	↔↔↔	↔	↔↔	↔↔↔	↔	↔↔	↔↔↔	↔
Traffic Volume (vph)	1	726	268	118	404	68	380	547	412	167	567	10
Future Volume (vph)	1	726	268	118	404	68	380	547	412	167	567	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	7.3
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Fit	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	5142	1601	3471	5142	1601	3471	5142	1601	1789	5142	1601
Fit Permitted	0.49	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.42	1.00	1.00
Satd. Flow (perm)	919	5142	1601	3471	5142	1601	3471	5142	1601	784	5142	1601
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)	1	789	291	128	439	74	413	595	448	182	616	11
RTOR Reduction (vph)	0	0	211	0	0	47	0	0	243	0	0	9
Lane Group Flow (vph)	1	789	80	128	439	27	413	595	205	182	616	2
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2			6			8	4		4
Actuated Green, G (s)	29.5	28.4	28.4	9.7	38.0	38.0	18.3	28.6	28.6	35.5	22.4	22.4
Effective Green, g (s)	29.5	28.4	28.4	9.7	38.0	38.0	18.3	28.6	28.6	35.5	22.4	22.4
Actuated g/C Ratio	0.29	0.27	0.27	0.09	0.37	0.37	0.18	0.28	0.28	0.34	0.22	0.22
Clearance Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	271	1413	440	325	1891	588	614	1423	443	396	1115	347
v/s Ratio Prot	0.00	c0.15		c0.04	0.09		c0.12	0.12		0.06	c0.12	
v/s Ratio Perm	0.00		0.05		0.02			0.13	0.10			0.00
v/c Ratio	0.00	0.56	0.18	0.39	0.23	0.05	0.67	0.42	0.46	0.46	0.55	0.01
Uniform Delay, d1	26.4	32.1	28.6	44.0	22.6	21.0	39.7	30.5	31.0	24.8	36.0	31.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.5	0.2	0.8	0.1	0.0	2.9	0.4	1.6	0.8	1.0	0.0
Delay (s)	26.4	32.6	28.8	44.8	22.6	21.0	42.6	31.0	32.6	25.6	37.0	31.7
Level of Service	C	C	C	D	C	C	D	C	C	C	D	C
Approach Delay (s)		31.5			26.9			34.8			34.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	32.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	103.3	Sum of lost time (s)	24.5
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
6: Boston Church Road/3 Line & 5 Sideroad

2033 FT AM Peak Hour  
09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	8	531	71	72	168	3	52	26	22	7	116	24
Future Volume (vph)	8	531	71	72	168	3	52	26	22	7	116	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.984				0.999			0.971				0.978
Fit Protected	0.999				0.985			0.975				0.998
Satd. Flow (prot)	0	1647	0	0	1670	0	0	1598	0	0	1685	0
Fit Permitted	0.996				0.717			0.561				0.985
Satd. Flow (perm)	0	1642	0	0	1215	0	0	919	0	0	1663	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		17			1			14			10	
Link Speed (k/h)		60			60			70			60	
Link Distance (m)		166.9			1343.2			219.2			496.0	
Travel Time (s)		10.0			80.6			11.3			29.8	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	13%	13%	27%	13%	13%	33%	13%	17%	12%	43%	9%	13%
Adj. Flow (vph)	9	610	82	83	193	3	60	30	25	8	133	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	701	0	0	279	0	0	115	0	0	169	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			6			8	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												



Lanes, Volumes, Timings

2033 FT AM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

09-09-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	66.0	66.0		66.0	66.0		24.0	24.0		24.0	24.0	
Total Split (%)	73.3%	73.3%		73.3%	73.3%		26.7%	26.7%		26.7%	26.7%	
Maximum Green (s)	61.5	61.5		61.5	61.5		19.5	19.5		19.5	19.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		67.2			67.2			13.8			13.8	
Actuated g/C Ratio		0.75			0.75			0.15			0.15	
v/c Ratio		0.57			0.31			0.75			0.64	
Control Delay		7.9			4.3			60.1			44.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		7.9			4.3			60.1			44.1	
LOS		A			A			E			D	
Approach Delay		7.9			4.3			60.1			44.1	
Approach LOS		A			A			E			D	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 16.7

Intersection Capacity Utilization 74.2%

Analysis Period (min) 15

Intersection LOS: B

ICU Level of Service D

Splits and Phases: 6: Boston Church Road/3 Line & 5 Sideroad

→ Ø2 (R)	↓ Ø4
66 s	24 s
← Ø6 (R)	↑ Ø8
66 s	24 s

HCM Signalized Intersection Capacity Analysis

2033 FT AM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

09-09-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	8	531	71	72	168	3	52	26	22	7	116	24
Future Volume (vph)	8	531	71	72	168	3	52	26	22	7	116	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			0.97			0.98	
Flt Protected		1.00			0.99			0.97			1.00	
Satd. Flow (prot)		1648			1670			1597			1684	
Flt Permitted		1.00			0.72			0.56			0.98	
Satd. Flow (perm)		1643			1215			918			1662	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	9	610	82	83	193	3	60	30	25	8	133	28
RTOR Reduction (vph)	0	4	0	0	0	0	0	12	0	0	8	0
Lane Group Flow (vph)	0	697	0	0	279	0	0	103	0	0	161	0
Heavy Vehicles (%)	13%	13%	27%	13%	13%	33%	13%	17%	12%	43%	9%	13%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		67.2			67.2			13.8			13.8	
Effective Green, g (s)		67.2			67.2			13.8			13.8	
Actuated g/C Ratio		0.75			0.75			0.15			0.15	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1226			907			140			254	
v/s Ratio Prot												
v/s Ratio Perm		c0.42			0.23			c0.11			0.10	
v/c Ratio		0.57			0.31			0.74			0.63	
Uniform Delay, d1		5.0			3.7			36.4			35.7	
Progression Factor		1.00			0.79			1.00			1.00	
Incremental Delay, d2		1.9			0.7			18.2			5.1	
Delay (s)		6.9			3.7			54.5			40.8	
Level of Service		A			A			D			D	
Approach Delay (s)		6.9			3.7			54.5			40.8	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay 15.1

HCM 2000 Level of Service B

HCM 2000 Volume to Capacity ratio 0.60

Actuated Cycle Length (s) 90.0

Intersection Capacity Utilization 74.2%

Analysis Period (min) 15

ICU Level of Service D

Sum of lost time (s) 9.0

ICU Level of Service D

c Critical Lane Group

Lanes, Volumes, Timings

2033 FT AM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

09-09-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	7	536	16	83	196	3	10	160	111	63	401	44
Future Volume (vph)	7	536	16	83	196	3	10	160	111	63	401	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.996			0.999			0.947			0.988		
Flt Protected	0.999			0.986			0.998			0.994		
Satd. Flow (prot)	0	1703	0	0	1685	0	0	1657	0	0	1646	0
Flt Permitted	0.996			0.669			0.979			0.919		
Satd. Flow (perm)	0	1698	0	0	1143	0	0	1626	0	0	1522	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	2			1			47			7		
Link Speed (k/h)	60			60			60			70		
Link Distance (m)	1343.2			646.3			1994.7			464.9		
Travel Time (s)	80.6			38.8			119.7			23.9		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Adj. Flow (vph)	8	609	18	94	223	3	11	182	126	72	456	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	635	0	0	320	0	0	319	0	0	578	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0			3.7			3.7		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	1.6			1.6			1.6			1.6		
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	28.7			28.7			28.7			28.7		
Detector 2 Size(m)	1.8			1.8			1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	2			6			8			4		
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												

Lanes, Volumes, Timings

2033 FT AM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

09-09-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	45.2	45.2		45.2	45.2		44.8	44.8		44.8	44.8	
Total Split (%)	50.2%	50.2%		50.2%	50.2%		49.8%	49.8%		49.8%	49.8%	
Maximum Green (s)	40.7	40.7		40.7	40.7		40.3	40.3		40.3	40.3	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0			0.0			0.0			0.0		
Total Lost Time (s)	4.5			4.5			4.5			4.5		
Lead/Lag												
Lead/Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	43.7			43.7			37.3			37.3		
Actuated g/C Ratio	0.49			0.49			0.41			0.41		
v/c Ratio	0.77			0.58			0.45			0.91		
Control Delay	22.5			22.8			17.7			44.4		
Queue Delay	0.0			0.0			0.0			0.0		
Total Delay	22.5			22.8			17.7			44.4		
LOS	C			C			B			D		
Approach Delay	22.5			22.8			17.7			44.4		
Approach LOS	C			C			B			D		

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 28.6

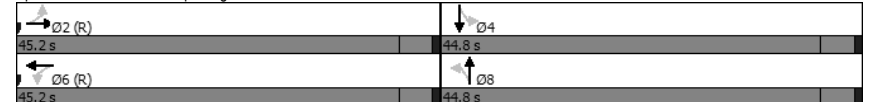
Intersection LOS: C

Intersection Capacity Utilization 102.7%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 7: Esquesing Line/Fourth Line & 5 Sideroad



HCM Signalized Intersection Capacity Analysis  
7: Esquesing Line/Fourth Line & 5 Sideroad

2033 FT AM Peak Hour  
09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔				↔	
Traffic Volume (vph)	7	536	16	83	196	3	10	160	111	63	401	44
Future Volume (vph)	7	536	16	83	196	3	10	160	111	63	401	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5			4.5			4.5		
Lane Util. Factor	1.00			1.00			1.00			1.00		
Frt	1.00			1.00			0.95			0.99		
Fit Protected	1.00			0.99			1.00			0.99		
Satd. Flow (prot)	1704			1684			1657			1646		
Fit Permitted	1.00			0.67			0.98			0.92		
Satd. Flow (perm)	1698			1143			1625			1522		
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	8	609	18	94	223	3	11	182	126	72	456	50
RTOR Reduction (vph)	0	1	0	0	1	0	0	28	0	0	4	0
Lane Group Flow (vph)	0	634	0	0	319	0	0	291	0	0	574	0
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	2			6			8			4		
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	43.7			43.7			37.3			37.3		
Effective Green, g (s)	43.7			43.7			37.3			37.3		
Actuated g/C Ratio	0.49			0.49			0.41			0.41		
Clearance Time (s)	4.5			4.5			4.5			4.5		
Vehicle Extension (s)	3.0			3.0			3.0			3.0		
Lane Grp Cap (vph)	824			554			673			630		
v/s Ratio Prot												
v/s Ratio Perm	c0.37			0.28			0.18			c0.38		
v/c Ratio	0.77			0.58			0.43			0.91		
Uniform Delay, d1	19.0			16.5			18.8			24.8		
Progression Factor	0.77			1.00			1.00			1.00		
Incremental Delay, d2	5.7			4.3			0.4			17.4		
Delay (s)	20.4			20.9			19.3			42.2		
Level of Service	C			C			B			D		
Approach Delay (s)	20.4			20.9			19.3			42.2		
Approach LOS	C			C			B			D		

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	102.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings  
101: Boston Church Road & East Access 1

2033 FT AM Peak Hour  
09-09-2021

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↑	↔	↔	↑
Traffic Volume (vph)	56	6	197	189	46	231
Future Volume (vph)	56	6	197	189	46	231
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	15.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				75.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.850			0.850		
Fit Protected	0.950			0.950		
Satd. Flow (prot)	1674	1633	1642	1585	1825	1642
Fit Permitted	0.950			0.950		
Satd. Flow (perm)	1674	1633	1642	1585	1825	1642
Link Speed (k/h)	48			70		70
Link Distance (m)	117.5			269.9		183.3
Travel Time (s)	8.8			13.9		9.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	0%	17%	3%	0%	17%
Adj. Flow (vph)	61	7	214	205	50	251
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	7	214	205	50	251
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7			3.7		3.7
Link Offset(m)	0.0			0.0		0.0
Crosswalk Width(m)	1.6			1.6		1.6
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop			Free		Free

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 27.0%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
101: Boston Church Road & East Access 1

2033 FT AM Peak Hour  
09-09-2021

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↕	↖	↗	↕
Traffic Volume (veh/h)	56	6	197	189	46	231
Future Volume (Veh/h)	56	6	197	189	46	231
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)	61	7	214	205	50	251
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	565	214			419	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	565	214			419	
tC, single (s)	6.5	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.3			2.2	
p0 queue free %	87	99			96	
cM capacity (veh/h)	454	831			1151	
<b>Direction_Lane #</b>	<b>WB 1</b>	<b>WB 2</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>
Volume Total	61	7	214	205	50	251
Volume Left	61	0	0	0	50	0
Volume Right	0	7	0	205	0	0
cSH	454	831	1700	1700	1151	1700
Volume to Capacity	0.13	0.01	0.13	0.12	0.04	0.15
Queue Length 95th (m)	3.5	0.2	0.0	0.0	1.0	0.0
Control Delay (s)	14.2	9.4	0.0	0.0	8.3	0.0
Lane LOS	B	A			A	
Approach Delay (s)	13.7		0.0		1.4	
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			1.7			
Intersection Capacity Utilization			27.0%	ICU Level of Service	A	
Analysis Period (min)			15			

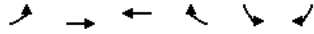
Lanes, Volumes, Timings  
102: James Snow Parkway N & East Access 2

2033 FT AM Peak Hour  
09-09-2021

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↕	↖	↗	↕
Traffic Volume (vph)	23	831	551	19	19	18
Future Volume (vph)	23	831	551	19	19	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0			80.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	100.0				2.5	
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt				0.850		0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1106	4371	4196	816	913	892
Fit Permitted	0.415				0.950	
Satd. Flow (perm)	483	4371	4196	816	913	892
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				21		20
Link Speed (k/h)		70	70		48	
Link Distance (m)		545.5	560.8		147.4	
Travel Time (s)		28.1	28.8		11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	65%	20%	25%	100%	100%	83%
Adj. Flow (vph)	25	903	599	21	21	20
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	25	903	599	21	21	20
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
<b>Two way Left Turn Lane</b>						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	6.1	30.5	30.5	6.1	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8	6.1	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			

Lanes, Volumes, Timings  
102: James Snow Parkway N & East Access 2

2033 FT AM Peak Hour  
09-09-2021

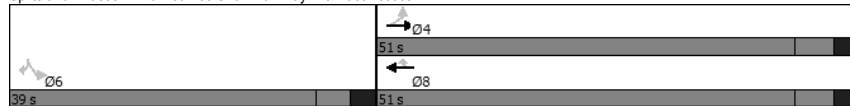


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.6	30.6	30.6	30.6	33.5	33.5
Total Split (s)	51.0	51.0	51.0	51.0	39.0	39.0
Total Split (%)	56.7%	56.7%	56.7%	56.7%	43.3%	43.3%
Maximum Green (s)	44.4	44.4	44.4	44.4	32.5	32.5
Yellow Time (s)	4.2	4.2	4.2	4.2	3.7	3.7
All-Red Time (s)	2.4	2.4	2.4	2.4	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	62.7	62.7	62.7	62.7	7.3	7.3
Actuated g/C Ratio	0.89	0.89	0.89	0.89	0.10	0.10
v/c Ratio	0.06	0.23	0.16	0.03	0.22	0.18
Control Delay	3.2	2.2	2.1	1.7	36.2	18.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.2	2.2	2.1	1.7	36.2	18.1
LOS	A	A	A	A	D	B
Approach Delay		2.3	2.1		27.4	
Approach LOS		A	A		C	

Intersection Summary

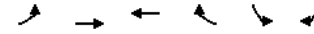
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	70.8
Natural Cycle:	65
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.23
Intersection Signal Delay:	2.8
Intersection Capacity Utilization:	34.2%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service:	A

Splits and Phases: 102: James Snow Parkway N & East Access 2



HCM Signalized Intersection Capacity Analysis  
102: James Snow Parkway N & East Access 2

2033 FT AM Peak Hour  
09-09-2021



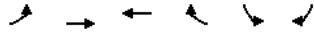
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔↔↔	↔↔↔	↔	↔	↔
Traffic Volume (vph)	23	831	551	19	19	18
Future Volume (vph)	23	831	551	19	19	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1106	4371	4196	816	913	892
Flt Permitted	0.41	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	483	4371	4196	816	913	892
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	903	599	21	21	20
RTOR Reduction (vph)	0	0	0	5	0	19
Lane Group Flow (vph)	25	903	599	16	21	1
Heavy Vehicles (%)	65%	20%	25%	100%	100%	83%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			
Permitted Phases	4			8	6	6
Actuated Green, G (s)	58.5	58.5	58.5	58.5	3.4	3.4
Effective Green, g (s)	58.5	58.5	58.5	58.5	3.4	3.4
Actuated g/C Ratio	0.78	0.78	0.78	0.78	0.05	0.05
Clearance Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	376	3409	3272	636	41	40
v/s Ratio Prot		c0.21	0.14			
v/s Ratio Perm	0.05			0.02	c0.02	0.00
v/c Ratio	0.07	0.26	0.18	0.03	0.51	0.02
Uniform Delay, d1	1.9	2.3	2.1	1.9	35.0	34.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.2	0.1	0.1	10.4	0.2
Delay (s)	2.3	2.5	2.2	1.9	45.4	34.4
Level of Service	A	A	A	A	D	C
Approach Delay (s)		2.5	2.2		40.0	
Approach LOS		A	A		D	

Intersection Summary

HCM 2000 Control Delay	3.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	13.1
Intersection Capacity Utilization	34.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings  
103: James Snow Parkway N & East Access 3

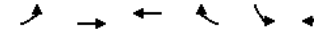
2033 FT AM Peak Hour  
09-09-2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑↑↑	↑↑↑	↔	↔	↔
Traffic Volume (vph)	18	832	561	59	30	9
Future Volume (vph)	18	832	561	59	30	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0			80.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	100.0				2.5	
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt				0.850		0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1217	4371	4196	1192	1074	816
Fit Permitted	0.410				0.950	
Satd. Flow (perm)	525	4371	4196	1192	1074	816
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				64		10
Link Speed (k/h)		70	70		48	
Link Distance (m)		560.8	346.4		152.7	
Travel Time (s)		28.8	17.8		11.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	50%	20%	25%	37%	70%	100%
Adj. Flow (vph)	20	904	610	64	33	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	904	610	64	33	10
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	6.1	30.5	30.5	6.1	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8	6.1	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			

Lanes, Volumes, Timings  
103: James Snow Parkway N & East Access 3

2033 FT AM Peak Hour  
09-09-2021

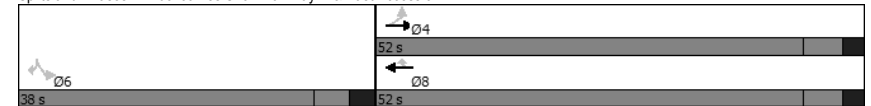


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.6	30.6	30.6	30.6	33.5	33.5
Total Split (s)	52.0	52.0	52.0	52.0	38.0	38.0
Total Split (%)	57.8%	57.8%	57.8%	57.8%	42.2%	42.2%
Maximum Green (s)	45.4	45.4	45.4	45.4	31.5	31.5
Yellow Time (s)	4.2	4.2	4.2	4.2	3.7	3.7
All-Red Time (s)	2.4	2.4	2.4	2.4	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	62.4	62.4	62.4	62.4	7.9	7.9
Actuated g/C Ratio	0.83	0.83	0.83	0.83	0.11	0.11
v/c Ratio	0.05	0.25	0.17	0.06	0.29	0.11
Control Delay	3.8	3.1	2.9	1.3	38.6	19.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.8	3.1	2.9	1.3	38.6	19.3
LOS	A	A	A	A	D	B
Approach Delay		3.1	2.7		34.1	
Approach LOS		A	A		C	

Intersection Summary

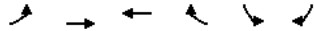
Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 75  
 Natural Cycle: 65  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.29  
 Intersection Signal Delay: 3.7  
 Intersection Capacity Utilization 31.2%  
 Analysis Period (min) 15  
 Intersection LOS: A  
 ICU Level of Service A

Splits and Phases: 103: James Snow Parkway N & East Access 3



HCM Signalized Intersection Capacity Analysis  
103: James Snow Parkway N & East Access 3

2033 FT AM Peak Hour  
09-09-2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑↑	↑↑↑	↗	↘	↗
Traffic Volume (vph)	18	832	561	59	30	9
Future Volume (vph)	18	832	561	59	30	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1217	4371	4196	1192	1074	816
Fit Permitted	0.41	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	525	4371	4196	1192	1074	816
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	20	904	610	64	33	10
RTOR Reduction (vph)	0	0	0	15	0	9
Lane Group Flow (vph)	20	904	610	49	33	1
Heavy Vehicles (%)	50%	20%	25%	37%	70%	100%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			
Permitted Phases	4			8	6	6
Actuated Green, G (s)	59.4	59.4	59.4	59.4	5.3	5.3
Effective Green, g (s)	59.4	59.4	59.4	59.4	5.3	5.3
Actuated g/C Ratio	0.76	0.76	0.76	0.76	0.07	0.07
Clearance Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	400	3337	3203	910	73	55
v/s Ratio Prot		c0.21	0.15			
v/s Ratio Perm	0.04			0.04	c0.03	0.00
v/c Ratio	0.05	0.27	0.19	0.05	0.45	0.01
Uniform Delay, d1	2.3	2.7	2.5	2.3	34.9	33.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.2	0.1	0.1	4.4	0.1
Delay (s)	2.5	2.9	2.7	2.4	39.3	33.9
Level of Service	A	A	A	A	D	C
Approach Delay (s)		2.9	2.6		38.0	
Approach LOS	A	A			D	

Intersection Summary			
HCM 2000 Control Delay	3.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	77.8	Sum of lost time (s)	13.1
Intersection Capacity Utilization	31.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
201: West Access 1 & 5 Sideroad

2033 FT AM Peak Hour  
09-09-2021



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗	↘	↗	↘	↗	↘
Traffic Volume (vph)	609	11	23	200	4	5
Future Volume (vph)	609	11	23	200	4	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998				0.925	0.978
Fit Protected				0.995	0.978	
Satd. Flow (prot)	1700	0	0	1712	1738	0
Fit Permitted				0.995	0.978	
Satd. Flow (perm)	1700	0	0	1712	1738	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	198.7			175.4	89.6	
Travel Time (s)	11.9			10.5	6.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	0%	0%	13%	0%	0%
Adj. Flow (vph)	662	12	25	217	4	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	674	0	0	242	9	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	42.7%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
201: West Access 1 & 5 Sideroad

2033 FT AM Peak Hour  
09-09-2021

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (veh/h)	609	11	23	200	4	5
Future Volume (Veh/h)	609	11	23	200	4	5
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	662	12	25	217	4	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)	342					
pX, platoon unblocked						
vC, conflicting volume			674		935 668	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			674		935 668	
tC, single (s)			4.1		6.4 6.2	
tC, 2 stage (s)						
tF (s)			2.2		3.5 3.3	
p0 queue free %			97		99 99	
cM capacity (veh/h)			927		289 462	
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	674	242	9			
Volume Left	0	25	4			
Volume Right	12	0	5			
cSH	1700	927	365			
Volume to Capacity	0.40	0.03	0.02			
Queue Length 95th (m)	0.0	0.6	0.6			
Control Delay (s)	0.0	1.2	15.1			
Lane LOS	A		C			
Approach Delay (s)	0.0	1.2	15.1			
Approach LOS	C					
<b>Intersection Summary</b>						
Average Delay			0.5			
Intersection Capacity Utilization			42.7%		ICU Level of Service A	
Analysis Period (min)			15			

Lanes, Volumes, Timings  
202: West Access 2 & 5 Sideroad

2033 FT AM Peak Hour  
09-09-2021

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (vph)	604	10	23	221	2	6
Future Volume (vph)	604	10	23	221	2	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998		0.895			
Fit Protected			0.995		0.989	
Satd. Flow (prot)	1700	0	0	1710	1700	0
Fit Permitted			0.995 0.989			
Satd. Flow (perm)	1700	0	0	1710	1700	0
Link Speed (k/h)	60		60		48	
Link Distance (m)	175.4		166.9		91.3	
Travel Time (s)	10.5		10.0		6.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	0%	0%	13%	0%	0%
Adj. Flow (vph)	657	11	25	240	2	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	668	0	0	265	9	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0		0.0		3.7	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	14		24		24 14	
Sign Control	Free		Free		Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 42.4%					ICU Level of Service A	
Analysis Period (min) 15						



HCM Unsignalized Intersection Capacity Analysis  
202: West Access 2 & 5 Sideroad

2033 FT AM Peak Hour  
09-09-2021

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘		↙		↘	
Traffic Volume (veh/h)	604	10	23	221	2	6
Future Volume (Veh/h)	604	10	23	221	2	6
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	657	11	25	240	2	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)	167					
pX, platoon unblocked						
vC, conflicting volume			668		952	662
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			668		952	662
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		99	98
cM capacity (veh/h)			931		282	465
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	668	265	9			
Volume Left	0	25	2			
Volume Right	11	0	7			
cSH	1700	931	407			
Volume to Capacity	0.39	0.03	0.02			
Queue Length 95th (m)	0.0	0.6	0.5			
Control Delay (s)	0.0	1.1	14.1			
Lane LOS	A		B			
Approach Delay (s)	0.0	1.1	14.1			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.4			
Intersection Capacity Utilization			42.4%		ICU Level of Service A	
Analysis Period (min)	15					

Lanes, Volumes, Timings  
203: Boston Church Road & West Access 3

2033 FT AM Peak Hour  
09-09-2021

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘		↙		↘	
Traffic Volume (vph)	0	13	18	100	258	1
Future Volume (vph)	0	13	18	100	258	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	40.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	2.5	75.0				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Fit Protected			0.950			
Satd. Flow (prot)	898	0	1093	1642	1643	0
Fit Permitted	0.950					
Satd. Flow (perm)	898	0	1093	1642	1643	0
Link Speed (k/h)	48		70		70	
Link Distance (m)	99.5		207.3		219.2	
Travel Time (s)	7.5		10.7		11.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	85%	67%	17%	17%	0%
Adj. Flow (vph)	0	14	20	109	280	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	14	0	20	109	281	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7		3.7		3.7	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop		Free		Free	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 25.0%					ICU Level of Service A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
203: Boston Church Road & West Access 3

2033 FT AM Peak Hour  
09-09-2021

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	13	18	100	258	1
Future Volume (Veh/h)	0	13	18	100	258	1
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)	0	14	20	109	280	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)	219					
pX, platoon unblocked	0.97	0.97	0.97			
vC, conflicting volume	430	280	281			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	392	238	239			
tC, single (s)	6.4	7.0	4.8			
tC, 2 stage (s)						
tF (s)	3.5	4.1	2.8			
p0 queue free %	100	98	98			
cM capacity (veh/h)	583	612	991			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>		
Volume Total	14	20	109	281		
Volume Left	0	20	0	0		
Volume Right	14	0	0	1		
cSH	612	991	1700	1700		
Volume to Capacity	0.02	0.02	0.06	0.17		
Queue Length 95th (m)	0.5	0.5	0.0	0.0		
Control Delay (s)	11.0	8.7	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	11.0	1.3	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay	0.8					
Intersection Capacity Utilization	25.0%		ICU Level of Service		A	
Analysis Period (min)	15					

Lanes, Volumes, Timings  
204: Boston Church Road & West Access 4

2033 FT AM Peak Hour  
09-09-2021

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	3	23	84	115	251	20
Future Volume (vph)	3	23	84	115	251	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	15.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	2.5	75.0				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.879			0.990		
Fit Protected	0.995	0.950				
Satd. Flow (prot)	1680	0	1825	1642	1639	0
Fit Permitted	0.995	0.950				
Satd. Flow (perm)	1680	0	1825	1642	1639	0
Link Speed (k/h)	48			70	70	
Link Distance (m)	101.5			171.0	207.3	
Travel Time (s)	7.6			8.8	10.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	17%	17%	4%
Adj. Flow (vph)	3	25	91	125	273	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	0	91	125	295	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop		Free		Free	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 32.4%			ICU Level of Service A			
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis  
204: Boston Church Road & West Access 4

2033 FT AM Peak Hour  
09-09-2021

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	↔
Traffic Volume (veh/h)	3	23	84	115	251	20
Future Volume (Veh/h)	3	23	84	115	251	20
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)	3	25	91	125	273	22
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	591	284	295			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	591	284	295			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	97	93			
cM capacity (veh/h)	439	760	1278			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>		
Volume Total	28	91	125	295		
Volume Left	3	91	0	0		
Volume Right	25	0	0	22		
cSH	705	1278	1700	1700		
Volume to Capacity	0.04	0.07	0.07	0.17		
Queue Length 95th (m)	0.9	1.7	0.0	0.0		
Control Delay (s)	10.3	8.0	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	10.3	3.4	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			1.9			
Intersection Capacity Utilization			32.4%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings  
205: Boston Church Road & West Access 5

2033 FT AM Peak Hour  
09-09-2021

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	↔
Traffic Volume (vph)	0	3	4	199	274	0
Future Volume (vph)	0	3	4	199	274	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	40.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	2.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Fit Protected			0.950			
Satd. Flow (prot)	831	0	913	1642	1642	0
Fit Permitted	0.950					
Satd. Flow (perm)	831	0	913	1642	1642	0
Link Speed (k/h)	48		70	70		
Link Distance (m)	100.3		183.3	171.0		
Travel Time (s)	7.5		9.4	8.8		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	100%	100%	17%	17%	4%
Adj. Flow (vph)	0	3	4	216	298	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	3	0	4	216	298	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop		Free		Free	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 24.4%				ICU Level of Service A		
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis  
 205: Boston Church Road & West Access 5

2033 FT AM Peak Hour  
 09-09-2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↙	↘	↙	↑	↑	↘
Traffic Volume (veh/h)	0	3	4	199	274	0
Future Volume (Veh/h)	0	3	4	199	274	0
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)	0	3	4	216	298	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	522	298	298			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	522	298	298			
tC, single (s)	6.4	7.2	5.1			
tC, 2 stage (s)						
tF (s)	3.5	4.2	3.1			
p0 queue free %	100	99	100			
cM capacity (veh/h)	516	559	863			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>		
Volume Total	3	4	216	298		
Volume Left	0	4	0	0		
Volume Right	3	0	0	0		
cSH	559	863	1700	1700		
Volume to Capacity	0.01	0.00	0.13	0.18		
Queue Length 95th (m)	0.1	0.1	0.0	0.0		
Control Delay (s)	11.5	9.2	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	11.5	0.2		0.0		
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.1			
Intersection Capacity Utilization			24.4%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings

2033 FT PM Peak Hour

1: Regional Road 25 & 5 Sideroad

09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	172	113	90	340	57	191	878	93	14	427	66
Future Volume (vph)	91	172	113	90	340	57	191	878	93	14	427	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	70.0		0.0	75.0		75.0	35.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	100.0			100.0			75.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Frt		0.941				0.978				0.850		0.980
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1601	1565	0	1342	1596	0	1225	4196	1338	1601	4376	0
Fit Permitted	0.187			0.575			0.372			0.294		
Satd. Flow (perm)	315	1565	0	812	1596	0	480	4196	1338	495	4376	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					7				99			26
Link Speed (k/h)		60			60				70			70
Link Distance (m)		573.6			536.0				986.0			203.5
Travel Time (s)		34.4			32.2				50.7			10.5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Adj. Flow (vph)	97	183	120	96	362	61	203	934	99	15	454	70
Shared Lane Traffic (%)												
Lane Group Flow (vph)	97	303	0	96	423	0	203	934	99	15	524	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7				3.7			3.7
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		1.6			1.6				1.6			1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1		1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0		8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0		-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0		-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0		9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA	Perm	Perm		NA
Protected Phases	3	8		4	4		5	2	2	6		6
Permitted Phases	8			4			2		2	6		
Detector Phase	3	8		4	4		5	2	2	6		6
Switch Phase												
Minimum Initial (s)	7.0	10.0		10.0	10.0		7.0	20.0	20.0	20.0		20.0
Minimum Split (s)	11.0	38.0		38.0	38.0		11.0	38.2	38.2	38.2		38.2

Lanes, Volumes, Timings

2033 FT PM Peak Hour

1: Regional Road 25 & 5 Sideroad

09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	20.0	54.0		34.0	34.0		18.0	56.2	56.2	38.2	38.2	
Total Split (%)	18.1%	49.0%		30.9%	30.9%		16.3%	51.0%	51.0%	34.7%	34.7%	
Maximum Green (s)	16.0	48.0		28.0	28.0		14.0	50.0	50.0	32.0	32.0	
Yellow Time (s)	3.0	3.7		3.7	3.7		3.0	4.2	4.2	4.2	4.2	
All-Red Time (s)	1.0	2.3		2.3	2.3		1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0		6.0	6.0		4.0	6.2	6.2	6.2	6.2	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.7		3.7	3.7		3.0	3.6	3.6	4.2	4.2	
Recall Mode	None	None		None	None		None	Ped	Ped	Ped	Ped	
Walk Time (s)		7.0			7.0			7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		25.0			25.0			25.0	25.0	25.0	25.0	
Pedestrian Calls (#/hr)		0			0			0	0	0	0	
Act Effect Green (s)	41.1	39.1		28.2	28.2		51.6	49.4	49.4	32.2	32.2	
Actuated g/C Ratio	0.41	0.39		0.28	0.28		0.51	0.49	0.49	0.32	0.32	
v/c Ratio	0.39	0.50		0.42	0.94		0.59	0.45	0.14	0.09	0.37	
Control Delay	23.3	26.6		38.9	67.1		23.6	18.4	3.8	28.6	27.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	23.3	26.6		38.9	67.1		23.6	18.4	3.8	28.6	27.0	
LOS	C	C		D	E		C	B	A	C	C	
Approach Delay		25.8			61.9			18.1			27.0	
Approach LOS		C			E			B			C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	110.2											
Actuated Cycle Length:	100.8											
Natural Cycle:	100											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.94											
Intersection Signal Delay:	29.4						Intersection LOS: C					
Intersection Capacity Utilization:	79.5%						ICU Level of Service D					
Analysis Period (min):	15											
Splits and Phases:	1: Regional Road 25 & 5 Sideroad											

HCM Signalized Intersection Capacity Analysis  
1: Regional Road 25 & 5 Sideroad

2033 FT PM Peak Hour  
09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔	↔		↔	↔		↔	↔		↔
Traffic Volume (vph)	91	172	113	90	340	57	191	878	93	14	427	66
Future Volume (vph)	91	172	113	90	340	57	191	878	93	14	427	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		6.0	6.0		4.0	6.2	6.2	6.2	6.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.91	1.00	1.00	0.91	
Frt	1.00	0.94		1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1601	1564		1342	1597		1225	4196	1338	1601	4375	
Fit Permitted	0.19	1.00		0.58	1.00		0.37	1.00	1.00	0.29	1.00	
Satd. Flow (perm)	314	1564		813	1597		480	4196	1338	495	4375	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	97	183	120	96	362	61	203	934	99	15	454	70
RTOR Reduction (vph)	0	0	0	0	5	0	0	51	0	18	0	0
Lane Group Flow (vph)	97	303	0	96	418	0	203	934	48	15	506	0
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases	3	8		4			5	2			6	
Permitted Phases	8			4			2		2	6		
Actuated Green, G (s)	40.0	40.0		28.2	28.2		49.4	49.4	49.4	32.2	32.2	
Effective Green, g (s)	40.0	40.0		28.2	28.2		49.4	49.4	49.4	32.2	32.2	
Actuated g/C Ratio	0.39	0.39		0.28	0.28		0.49	0.49	0.49	0.32	0.32	
Clearance Time (s)	4.0	6.0		6.0	6.0		4.0	6.2	6.2	6.2	6.2	
Vehicle Extension (s)	3.0	3.7		3.7	3.7		3.0	3.6	3.6	4.2	4.2	
Lane Grp Cap (vph)	222	615		225	443		330	2040	650	156	1386	
v/s Ratio Prot	0.03	c0.19			c0.26			c0.08	0.22		0.12	
v/s Ratio Perm	0.14			0.12				c0.22	0.04	0.03		
v/c Ratio	0.44	0.49		0.43	0.94		0.62	0.46	0.07	0.10	0.37	
Uniform Delay, d1	22.2	23.2		30.1	35.9		16.4	17.2	13.9	24.4	26.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.4	0.8		1.6	29.0		3.4	0.2	0.1	0.4	0.2	
Delay (s)	23.6	23.9		31.7	64.9		19.7	17.4	14.0	24.9	27.1	
Level of Service	C	C		C	E		B	B	B	C	C	
Approach Delay (s)		23.9			58.8			17.5			27.0	
Approach LOS		C			E			B			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		28.3									C	
HCM 2000 Volume to Capacity ratio		0.75										
Actuated Cycle Length (s)		101.6			Sum of lost time (s)			20.2				
Intersection Capacity Utilization		79.5%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings  
2: Regional Road 25 & James Snow Parkway N

2033 FT PM Peak Hour  
09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔	↔		↔	↔		↔	↔		↔
Traffic Volume (vph)	30	258	162	279	211	228	78	984	195	140	564	5
Future Volume (vph)	30	258	162	279	211	228	78	984	195	140	564	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		115.0	85.0		35.0	30.0		30.0	75.0		75.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	40.0			90.0			70.0			100.0		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Ped Bike Factor									0.99	1.00		
Frt			0.850			0.850			0.850		0.999	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1217	3856	1103	1259	4521	1192	1534	4162	1458	1472	4184	0
Fit Permitted	0.610			0.508			0.420			0.157		
Satd. Flow (perm)	781	3856	1103	673	4521	1192	678	4162	1439	243	4184	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			167			185			116			1
Link Speed (k/h)		60			60			70				70
Link Distance (m)		452.4			1065.5			592.1				986.0
Travel Time (s)		27.1			63.9			30.5				50.7
Confl. Peds. (#/hr)									1		1	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Adj. Flow (vph)	31	266	167	288	218	235	80	1014	201	144	581	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	266	167	288	218	235	80	1014	201	144	586	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.2	9.0	9.0	9.0	9.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	3	8	8	5	2	2	1	6	
Switch Phase					8							

Lanes, Volumes, Timings

2033 FT PM Peak Hour

2: Regional Road 25 & James Snow Parkway N

09-09-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0	10.0	7.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	43.6	43.6	43.6	11.0	43.6	43.6	11.0	42.9	42.9	11.0	35.9	
Total Split (s)	43.6	43.6	43.6	19.0	62.6	62.6	11.0	43.4	43.4	14.0	46.4	
Total Split (%)	36.3%	36.3%	36.3%	15.8%	52.2%	52.2%	9.2%	36.2%	36.2%	11.7%	38.7%	
Maximum Green (s)	37.0	37.0	37.0	15.0	56.0	56.0	7.0	36.5	36.5	10.0	39.5	
Yellow Time (s)	3.7	3.7	3.7	3.0	3.7	3.7	3.0	4.2	4.2	3.0	4.2	
All-Red Time (s)	2.9	2.9	2.9	1.0	2.9	2.9	1.0	2.7	2.7	1.0	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.6	6.6	6.6	4.0	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Lead/Lag	Lag	Lag	Lag	Lead			Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes	Yes	Yes			
Vehicle Extension (s)	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Walk Time (s)	7.0	7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)	30.0	30.0	30.0		30.0	30.0		29.0	29.0		22.0	
Pedestrian Calls (#/hr)	0	0	0		0	0		0	0		0	
Act Effect Green (s)	27.8	27.8	27.8	49.4	46.8	46.8	44.0	33.9	33.9	49.9	39.4	
Actuated g/C Ratio	0.26	0.26	0.26	0.46	0.43	0.43	0.41	0.31	0.31	0.46	0.36	
v/c Ratio	0.15	0.27	0.41	0.74	0.11	0.38	0.24	0.78	0.38	0.65	0.39	
Control Delay	32.6	32.2	8.0	34.8	18.3	6.9	21.0	40.0	16.3	34.8	28.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	32.6	32.2	8.0	34.8	18.3	6.9	21.0	40.0	16.3	34.8	28.8	
LOS	C	C	A	C	B	A	C	D	B	C	C	
Approach Delay		23.5			21.1			35.2			30.0	
Approach LOS		C			C			D			C	

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	108.3
Natural Cycle:	110
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.78
Intersection Signal Delay:	29.1
Intersection LOS:	C
Intersection Capacity Utilization:	68.8%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 2: Regional Road 25 & James Snow Parkway N

14 s	43.4 s	19 s	43.6 s
11 s	46.4 s		62.6 s

HCM Signalized Intersection Capacity Analysis

2033 FT PM Peak Hour

2: Regional Road 25 & James Snow Parkway N

09-09-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	258	162	279	211	228	78	984	195	140	564	5
Future Volume (vph)	30	258	162	279	211	228	78	984	195	140	564	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	4.0	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.91	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1217	3856	1103	1259	4521	1192	1534	4162	1439	1472	4183	
Fit Permitted	0.61	1.00	1.00	0.51	1.00	1.00	0.42	1.00	1.00	0.16	1.00	
Satd. Flow (perm)	781	3856	1103	674	4521	1192	678	4162	1439	243	4183	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	31	266	167	288	218	235	80	1014	201	144	581	5
RTOR Reduction (vph)	0	0	124	0	0	106	0	0	79	0	1	0
Lane Group Flow (vph)	31	266	43	288	218	129	80	1014	122	144	585	0
Confl. Peds. (#/hr)									1		1	
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	28.0	28.0	28.0	46.8	46.8	46.8	40.3	35.0	35.0	48.7	39.4	
Effective Green, g (s)	28.0	28.0	28.0	46.8	46.8	46.8	40.3	35.0	35.0	48.7	39.4	
Actuated g/C Ratio	0.26	0.26	0.26	0.43	0.43	0.43	0.37	0.32	0.32	0.45	0.36	
Clearance Time (s)	6.6	6.6	6.6	4.0	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Vehicle Extension (s)	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	200	990	283	368	1941	511	292	1336	462	217	1512	
v/s Ratio Prot		0.07		c0.11	0.05		0.01	c0.24		c0.06	0.14	
v/s Ratio Perm	0.04		0.04	c0.23		0.11	0.09		0.08	0.24		
v/c Ratio	0.15	0.27	0.15	0.78	0.11	0.25	0.27	0.76	0.26	0.66	0.39	
Uniform Delay, d1	31.3	32.3	31.3	24.1	18.6	19.9	22.8	33.2	27.5	20.4	25.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.3	0.5	10.4	0.1	0.5	0.5	3.0	0.6	7.4	0.3	
Delay (s)	32.1	32.6	31.8	34.4	18.7	20.5	23.4	36.2	28.1	27.8	26.2	
Level of Service	C	C	C	C	B	C	C	D	C	C	C	
Approach Delay (s)		32.3			25.4			34.2			26.5	
Approach LOS		C			C			C			C	

Intersection Summary

HCM 2000 Control Delay	30.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	109.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

2033 FT PM Peak Hour

3: Boston Church Road & James Snow Parkway N

09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	133	418	73	29	478	108	145	61	28	283	36	111
Future Volume (vph)	133	418	73	29	478	108	145	61	28	283	36	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		0.0	70.0		0.0	60.0		25.0	60.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			70.0			90.0		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.978			0.972				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1508	4347	0	1415	4230	0	1113	3650	944	1534	3147	1498
Fit Permitted	0.284			0.438			0.730			0.528		
Satd. Flow (perm)	451	4347	0	652	4230	0	855	3650	944	852	3147	1498
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		25			38			90			123	
Link Speed (k/h)		70			70			60			60	
Link Distance (m)		358.9			546.0			792.9			198.3	
Travel Time (s)		18.5			28.1			47.6			11.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%
Adj. Flow (vph)	148	464	81	32	531	120	161	68	31	314	40	123
Shared Lane Traffic (%)												
Lane Group Flow (vph)	148	545	0	32	651	0	161	68	31	314	40	123
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8	7	4	4	
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0		7.0	20.0		7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	11.0	33.5		11.0	33.5		11.0	31.6	31.6	11.0	31.6	31.6

Lanes, Volumes, Timings

2033 FT PM Peak Hour

3: Boston Church Road & James Snow Parkway N

09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	17.0	50.5		17.0	50.5		24.0	48.6	48.6	24.0	48.6	48.6
Total Split (%)	12.1%	36.0%		12.1%	36.0%		17.1%	34.7%	34.7%	17.1%	34.7%	34.7%
Maximum Green (s)	13.0	44.0		13.0	44.0		20.0	41.0	41.0	20.0	41.0	41.0
Yellow Time (s)	3.0	3.7		3.0	3.7		3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	1.0	2.8		1.0	2.8		1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		7.0			7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		20.0			20.0			17.0	17.0		17.0	17.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effect Green (s)	40.4	31.4		32.3	22.5		28.6	15.1	15.1	39.3	18.2	18.2
Actuated g/C Ratio	0.46	0.35		0.36	0.25		0.32	0.17	0.17	0.44	0.21	0.21
v/c Ratio	0.43	0.35		0.11	0.59		0.51	0.11	0.13	0.57	0.06	0.30
Control Delay	19.2	22.3		15.2	30.2		23.9	34.2	1.1	22.3	31.8	9.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.2	22.3		15.2	30.2		23.9	34.2	1.1	22.3	31.8	9.1
LOS	B	C		B	C		C	C	A	C	C	A
Approach Delay		21.6			29.5			23.9			19.7	
Approach LOS		C			C			C			B	
Intersection Summary												
Area Type:	Other											
Cycle Length:	140.1											
Actuated Cycle Length:	88.6											
Natural Cycle:	90											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.59											
Intersection Signal Delay:	24.0						Intersection LOS: C					
Intersection Capacity Utilization:	61.5%						ICU Level of Service B					
Analysis Period (min):	15											
Splits and Phases:	3: Boston Church Road & James Snow Parkway N											



HCM Signalized Intersection Capacity Analysis  
3: Boston Church Road & James Snow Parkway N

2033 FT PM Peak Hour  
09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	133	418	73	29	478	108	145	61	28	283	36	111
Future Volume (vph)	133	418	73	29	478	108	145	61	28	283	36	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.5	4.0	6.5	4.0	7.6	7.6	4.0	7.6	4.0	7.6	7.6
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Frt	1.00	0.98	1.00	0.97	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1508	4346	1415	4231	1113	3650	944	1534	3147	1498		
Fit Permitted	0.28	1.00	0.44	1.00	0.73	1.00	1.00	0.53	1.00	1.00	1.00	1.00
Satd. Flow (perm)	451	4346	653	4231	855	3650	944	853	3147	1498		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	148	464	81	32	531	120	161	68	31	314	40	123
RTOR Reduction (vph)	0	16	0	0	28	0	0	0	27	0	0	96
Lane Group Flow (vph)	148	529	0	32	623	0	161	68	4	314	40	27
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	Perm
Protected Phases	5	2		1	6		3	8		7		4
Permitted Phases	2			6			8		4			4
Actuated Green, G (s)	39.7	31.5		28.5	24.3		25.8	11.6	11.6	38.2	20.0	20.0
Effective Green, g (s)	39.7	31.5		28.5	24.3		25.8	11.6	11.6	38.2	20.0	20.0
Actuated g/C Ratio	0.43	0.34		0.31	0.26		0.28	0.13	0.13	0.42	0.22	0.22
Clearance Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	325	1488		237	1117		279	460	119	521	684	325
v/s Ratio Prot	c0.06	0.12		0.01	c0.15		0.09	0.02		c0.15	0.01	
v/s Ratio Perm	0.14			0.04			0.07		0.00	c0.10		0.02
v/c Ratio	0.46	0.36		0.14	0.56		0.58	0.15	0.03	0.60	0.06	0.08
Uniform Delay, d1	16.9	22.6		22.4	29.2		27.8	35.8	35.3	19.9	28.5	28.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	0.3		0.3	1.0		2.9	0.3	0.2	2.0	0.1	0.2
Delay (s)	17.9	23.0		22.7	30.2		30.7	36.1	35.5	21.9	28.6	28.9
Level of Service	B	C		C	C		C	D	D	C	C	C
Approach Delay (s)		21.9			29.9			32.7			24.3	
Approach LOS		C			C			C			C	

Intersection Summary		
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.59	
Actuated Cycle Length (s)	92.0	Sum of lost time (s) 22.1
Intersection Capacity Utilization	61.5%	ICU Level of Service B
Analysis Period (min)	15	

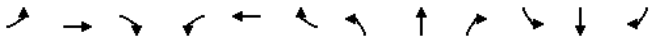
Lanes, Volumes, Timings  
4: Esquesing Line & James Snow Parkway N

2033 FT PM Peak Hour  
09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	16	684	75	9	508	47	105	397	30	27	191	9
Future Volume (vph)	16	684	75	9	508	47	105	397	30	27	191	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0	0.0	70.0	0.0	40.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Storage Lanes	1	0	1	0	1	1	1	1	1	1	1	1
Taper Length (m)	100.0		100.0		80.0		100.0		100.0		100.0	
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.985			0.987			0.850			0.850	
Fit Protected	0.950		0.950		0.950		0.950		0.950		0.950	
Satd. Flow (prot)	1547	4280	0	1644	4106	0	1644	1731	1396	1615	1685	1396
Fit Permitted	0.375		0.292		0.622		0.622		0.358		0.358	
Satd. Flow (perm)	611	4280	0	505	4106	0	1077	1731	1396	609	1685	1396
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		17			14			74			74	
Link Speed (k/h)		70			70			60			60	
Link Distance (m)		346.4			1421.7			292.4			1994.7	
Travel Time (s)		17.8			73.1			17.5			119.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	17%	13%	14%	17%	17%
Adj. Flow (vph)	18	777	85	10	577	53	119	451	34	31	217	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	18	862	0	10	630	0	119	451	34	31	217	10
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8		2	2	2	6	6	6
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	7.0	15.0		7.0	15.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	11.0	30.6		11.0	30.6		33.5	33.5	33.5	33.5	33.5	33.5

Lanes, Volumes, Timings  
4: Esquesing Line & James Snow Parkway N

2033 FT PM Peak Hour  
09-09-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	19.0	41.6		19.0	41.6		51.5	51.5	51.5	51.5	51.5	51.5
Total Split (%)	16.9%	37.1%		16.9%	37.1%		45.9%	45.9%	45.9%	45.9%	45.9%	45.9%
Maximum Green (s)	15.0	35.0		15.0	35.0		45.0	45.0	45.0	45.0	45.0	45.0
Yellow Time (s)	3.0	4.2		3.0	4.2		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	2.4		1.0	2.4		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		17.0			17.0		20.0	20.0	20.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	29.5	25.7		28.7	23.7		28.2	28.2	28.2	28.2	28.2	28.2
Actuated g/C Ratio	0.43	0.37		0.41	0.34		0.41	0.41	0.41	0.41	0.41	0.41
v/c Ratio	0.05	0.54		0.03	0.45		0.27	0.64	0.06	0.13	0.32	0.02
Control Delay	13.3	19.5		13.3	20.3		17.9	22.9	0.6	17.1	17.1	0.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.3	19.5		13.3	20.3		17.9	22.9	0.6	17.1	17.1	0.0
LOS	B	B		B	C		B	C	A	B	B	A
Approach Delay		19.3			20.2			20.7			16.5	
Approach LOS		B			C			C			B	

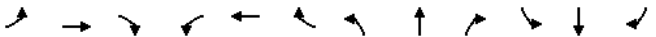
Intersection Summary	
Area Type:	Other
Cycle Length:	112.1
Actuated Cycle Length:	69.4
Natural Cycle:	80
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.64
Intersection Signal Delay:	19.6
Intersection Capacity Utilization:	68.8%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	C

Splits and Phases: 4: Esquesing Line & James Snow Parkway N

Phase 1: 51.5 s	Phase 2: 19 s	Phase 3: 41.6 s
Phase 4: 51.5 s	Phase 5: 19 s	Phase 6: 41.6 s

HCM Signalized Intersection Capacity Analysis  
4: Esquesing Line & James Snow Parkway N

2033 FT PM Peak Hour  
09-09-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	16	684	75	9	508	47	105	397	30	27	191	9
Future Volume (vph)	16	684	75	9	508	47	105	397	30	27	191	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1547	4281		1644	4108		1644	1731	1396	1615	1685	1396
Flt Permitted	0.38	1.00		0.29	1.00		0.62	1.00	1.00	0.36	1.00	1.00
Satd. Flow (perm)	611	4281		505	4108		1077	1731	1396	608	1685	1396
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	18	777	85	10	577	53	119	451	34	31	217	10
RTOR Reduction (vph)	0	11	0	0	9	0	0	0	21	0	0	6
Lane Group Flow (vph)	18	851	0	10	621	0	119	451	13	31	217	4
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	11%	17%	13%	14%	17%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2				6
Permitted Phases	4			8			2		6			6
Actuated Green, G (s)	27.9	25.7		25.3	24.4		28.2	28.2	28.2	28.2	28.2	28.2
Effective Green, g (s)	27.9	25.7		25.3	24.4		28.2	28.2	28.2	28.2	28.2	28.2
Actuated g/C Ratio	0.39	0.36		0.35	0.34		0.39	0.39	0.39	0.39	0.39	0.39
Clearance Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	265	1530		191	1394		422	678	547	238	660	547
v/s Ratio Prot	c0.00	c0.20		0.00	0.15			c0.26				0.13
v/s Ratio Perm	0.02			0.02			0.11		0.01	0.05		0.00
v/c Ratio	0.07	0.56		0.05	0.45		0.28	0.67	0.02	0.13	0.33	0.01
Uniform Delay, d1	13.6	18.5		15.2	18.5		14.9	18.0	13.4	14.0	15.2	13.3
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	0.7		0.1	0.5		0.8	3.3	0.0	0.5	0.6	0.0
Delay (s)	13.8	19.3		15.3	19.0		15.7	21.2	13.4	14.5	15.9	13.3
Level of Service	B	B		B	B		B	C	B	B	B	B
Approach Delay (s)		19.2			18.9			19.7			15.6	
Approach LOS		B			B			B			B	

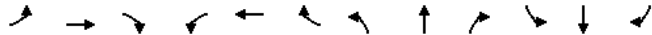
Intersection Summary	
HCM 2000 Control Delay	18.8
HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61
Actuated Cycle Length (s)	71.9
Sum of lost time (s)	17.1
Intersection Capacity Utilization	68.8%
ICU Level of Service	C
Analysis Period (min)	15
c Critical Lane Group	

Lanes, Volumes, Timings

2033 FT PM Peak Hour

5: James Snow Parkway N & Steeles Avenue East

09-09-2021



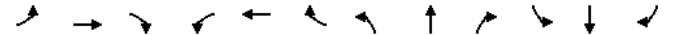
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔	↔	↔↔	↔↔↔	↔	↔	↔↔↔	↔	↔	↔↔↔	↔
Traffic Volume (vph)	11	539	423	363	952	128	387	425	167	94	639	13
Future Volume (vph)	11	539	423	363	952	128	387	425	167	94	639	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	122.0		72.0	170.0		130.0	105.0		260.0	160.0		70.0
Storage Lanes	1		1	2		1	2		1	1		1
Taper Length (m)	60.0			70.0			80.0			80.0		
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Fit			0.850			0.850			0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	5142	1601	3471	5142	1601	3471	5142	1601	1789	5142	1601
Fit Permitted	0.265			0.950			0.950			0.477		
Satd. Flow (perm)	499	5142	1601	3471	5142	1601	3471	5142	1601	898	5142	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			287			139			182			114
Link Speed (k/h)		60			70			60			70	
Link Distance (m)		729.0			881.4			342.7			1421.7	
Travel Time (s)		43.7			45.3			20.6			73.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	586	460	395	1035	139	421	462	182	102	695	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	586	460	395	1035	139	421	462	182	102	695	14
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.0			4.0			4.0			4.0	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												Right
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	6.1
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	0.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	0.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2		6		6		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	22.0	22.0	7.0	22.0	22.0	7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	11.0	47.2	47.2	12.0	47.2	47.2	12.0	46.3	46.3	11.0	46.3	46.3
Total Split (s)	15.0	55.2	55.2	26.0	66.2	66.2	29.0	59.0	59.0	24.0	54.0	54.0

Lanes, Volumes, Timings

2033 FT PM Peak Hour

5: James Snow Parkway N & Steeles Avenue East

09-09-2021

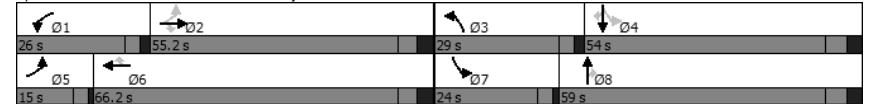


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	9.1%	33.6%	33.6%	15.8%	40.3%	40.3%	17.7%	35.9%	14.6%	32.9%	32.9%	
Maximum Green (s)	11.0	48.0	48.0	21.0	59.0	59.0	24.0	51.7	51.7	20.0	46.7	46.7
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	1.0	3.5	3.5	2.0	3.5	3.5	2.0	3.1	3.1	1.0	3.1	3.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	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	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		33.0	33.0		33.0	33.0		32.0	32.0		32.0	32.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effect Green (s)	37.3	26.9	26.9	19.0	47.2	47.2	19.8	36.5	36.5	39.0	25.6	25.6
Actuated g/C Ratio	0.32	0.23	0.23	0.16	0.41	0.41	0.17	0.31	0.31	0.34	0.22	0.22
v/c Ratio	0.05	0.49	0.78	0.70	0.50	0.19	0.71	0.29	0.29	0.27	0.61	0.03
Control Delay	20.6	41.1	26.1	55.3	28.3	5.1	54.7	31.5	5.9	22.0	44.4	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.6	41.1	26.1	55.3	28.3	5.1	54.7	31.5	5.9	22.0	44.4	0.2
LOS	C	D	C	E	C	A	D	C	A	C	D	A
Approach Delay		34.4			33.0			36.3			40.8	
Approach LOS		C			C			D			D	

Intersection Summary

Area Type:	Other
Cycle Length:	164.2
Actuated Cycle Length:	116.4
Natural Cycle:	130
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.78
Intersection Signal Delay:	35.5
Intersection Capacity Utilization:	72.6%
Intersection LOS:	D
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 5: James Snow Parkway N & Steeles Avenue East



HCM Signalized Intersection Capacity Analysis  
 5: James Snow Parkway N & Steeles Avenue East

2033 FT PM Peak Hour  
 09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔	↔	↔↔	↔↔↔	↔	↔↔	↔↔↔	↔	↔↔↔	↔	↔
Traffic Volume (vph)	11	539	423	363	952	128	387	425	167	94	639	13
Future Volume (vph)	11	539	423	363	952	128	387	425	167	94	639	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	7.3
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Fit	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	5142	1601	3471	5142	1601	3471	5142	1601	1789	5142	1601
Fit Permitted	0.26	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.48	1.00	1.00
Satd. Flow (perm)	498	5142	1601	3471	5142	1601	3471	5142	1601	898	5142	1601
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)	12	586	460	395	1035	139	421	462	182	102	695	14
RTOR Reduction (vph)	0	0	215	0	0	84	0	0	126	0	0	11
Lane Group Flow (vph)	12	586	245	395	1035	55	421	462	56	102	695	3
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7		4
Permitted Phases	2		2			6			8	4		4
Actuated Green, G (s)	32.0	29.6	29.6	19.0	47.2	47.2	19.8	36.5	36.5	35.7	25.7	25.7
Effective Green, g (s)	32.0	29.6	29.6	19.0	47.2	47.2	19.8	36.5	36.5	35.7	25.7	25.7
Actuated g/C Ratio	0.27	0.25	0.25	0.16	0.40	0.40	0.17	0.31	0.31	0.30	0.22	0.22
Clearance Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	160	1283	399	556	2046	637	579	1582	492	345	1114	346
v/s Ratio Prot	0.00	0.11		c0.11	0.20		c0.12	0.09		0.02	c0.14	
v/s Ratio Perm	0.02		c0.15		0.03			0.03		0.06		0.00
v/c Ratio	0.07	0.46	0.61	0.71	0.51	0.09	0.73	0.29	0.11	0.30	0.62	0.01
Uniform Delay, d1	31.8	37.7	39.4	47.2	26.9	22.3	46.8	31.2	29.4	30.7	42.1	36.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.3	2.8	4.3	0.2	0.1	4.5	0.2	0.2	0.5	1.6	0.0
Delay (s)	32.0	37.9	42.2	51.5	27.1	22.3	51.4	31.4	29.7	31.2	43.6	36.5
Level of Service	C	D	D	D	C	C	D	C	C	C	D	D
Approach Delay (s)		39.7			32.8			39.0			41.9	
Approach LOS		D			C			D			D	

Intersection Summary		
HCM 2000 Control Delay	37.6	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.66	
Actuated Cycle Length (s)	118.6	Sum of lost time (s)
Intersection Capacity Utilization	72.6%	ICU Level of Service
Analysis Period (min)	15	

Lanes, Volumes, Timings  
 6: Boston Church Road/3 Line & 5 Sideroad

2033 FT PM Peak Hour  
 09-09-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	23	233	68	34	370	2	71	87	109	5	41	6
Future Volume (vph)	23	233	68	34	370	2	71	87	109	5	41	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.972				0.999			0.945			0.984	
Fit Protected	0.997				0.996			0.987			0.995	
Satd. Flow (prot)	0	1606	0	0	1690	0	0	1573	0	0	1666	0
Fit Permitted	0.956				0.949			0.896			0.965	
Satd. Flow (perm)	0	1540	0	0	1611	0	0	1428	0	0	1616	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23					43				7	
Link Speed (k/h)		60			60		70				60	
Link Distance (m)	166.9				1343.2		219.2				496.0	
Travel Time (s)	10.0				80.6		11.3				29.8	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	13%	13%	27%	13%	13%	33%	13%	17%	12%	43%	9%	13%
Adj. Flow (vph)	26	268	78	39	425	2	82	100	125	6	47	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	372	0	0	466	0	0	307	0	0	60	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												

Lanes, Volumes, Timings

2033 FT PM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

09-09-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	53.0	53.0		53.0	53.0		37.0	37.0		37.0	37.0	
Total Split (%)	58.9%	58.9%		58.9%	58.9%		41.1%	41.1%		41.1%	41.1%	
Maximum Green (s)	48.5	48.5		48.5	48.5		32.5	32.5		32.5	32.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		58.7			58.7			22.3			22.3	
Actuated g/C Ratio		0.65			0.65			0.25			0.25	
v/c Ratio		0.37			0.44			0.80			0.15	
Control Delay		9.2			4.1			41.6			22.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.2			4.1			41.6			22.1	
LOS		A			A			D			C	
Approach Delay		9.2			4.1			41.6			22.1	
Approach LOS		A			A			D			C	

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 39 (43%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 50  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.80  
 Intersection Signal Delay: 16.1  
 Intersection Capacity Utilization 58.5%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service B

Splits and Phases: 6: Boston Church Road/3 Line & 5 Sideroad

← Ø2 (R)	↓ Ø4
53 s	37 s
← Ø6 (R)	↑ Ø8
53 s	37 s

HCM Signalized Intersection Capacity Analysis

2033 FT PM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

09-09-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	23	233	68	34	370	2	71	87	109	5	41	6
Future Volume (vph)	23	233	68	34	370	2	71	87	109	5	41	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.97			1.00			0.95			0.98	
Flt Protected		1.00			1.00			0.99			1.00	
Satd. Flow (prot)		1605			1691			1573			1667	
Flt Permitted		0.96			0.95			0.90			0.97	
Satd. Flow (perm)		1539			1611			1428			1617	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	26	268	78	39	425	2	82	100	125	6	47	7
RTOR Reduction (vph)	0	8	0	0	0	0	0	32	0	0	5	0
Lane Group Flow (vph)	0	364	0	0	466	0	275	0	0	55	0	0
Heavy Vehicles (%)	13%	13%	27%	13%	13%	33%	13%	17%	12%	43%	9%	13%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		58.7			58.7			22.3			22.3	
Effective Green, g (s)		58.7			58.7			22.3			22.3	
Actuated g/C Ratio		0.65			0.65			0.25			0.25	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1003			1050			353			400	
v/s Ratio Prot												
v/s Ratio Perm		0.24			0.29			0.19			0.03	
v/c Ratio		0.36			0.44			0.78			0.14	
Uniform Delay, d1		7.1			7.7			31.5			26.4	
Progression Factor		1.00			0.32			1.00			1.00	
Incremental Delay, d2		1.0			1.1			10.3			0.2	
Delay (s)		8.1			3.6			41.9			26.5	
Level of Service		A			A			D			C	
Approach Delay (s)		8.1			3.6			41.9			26.5	
Approach LOS		A			A			D			C	

Intersection Summary

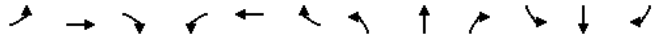
HCM 2000 Control Delay 15.9  
 HCM 2000 Volume to Capacity ratio 0.54  
 Actuated Cycle Length (s) 90.0  
 Intersection Capacity Utilization 58.5%  
 Analysis Period (min) 15  
 HCM 2000 Level of Service B  
 Sum of lost time (s) 9.0  
 ICU Level of Service B  
 c Critical Lane Group

Lanes, Volumes, Timings

2033 FT PM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

09-09-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	50	288	11	66	349	18	23	356	81	4	150	39
Future Volume (vph)	50	288	11	66	349	18	23	356	81	4	150	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.996			0.995			0.976			0.973		
Flt Protected	0.993			0.992			0.998			0.999		
Satd. Flow (prot)	0	1634	0	0	1673	0	0	1688	0	0	1633	0
Flt Permitted	0.883			0.885			0.978			0.990		
Satd. Flow (perm)	0	1453	0	0	1492	0	0	1654	0	0	1618	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	3			3			15			17		
Link Speed (k/h)	60			60			60			70		
Link Distance (m)	1343.2			646.3			1994.7			464.9		
Travel Time (s)	80.6			38.8			119.7			23.9		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Adj. Flow (vph)	57	327	13	75	397	20	26	405	92	5	170	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	397	0	0	492	0	0	523	0	0	219	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0			3.7			3.7		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	1.6			1.6			1.6			1.6		
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	28.7			28.7			28.7			28.7		
Detector 2 Size(m)	1.8			1.8			1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	2			6			8			4		
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												

Lanes, Volumes, Timings

2033 FT PM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

09-09-2021

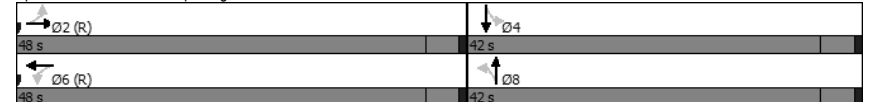


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	48.0	48.0		48.0	48.0		42.0	42.0		42.0	42.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%		46.7%	46.7%		46.7%	46.7%	
Maximum Green (s)	43.5	43.5		43.5	43.5		37.5	37.5		37.5	37.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0			0.0			0.0			0.0		
Total Lost Time (s)	4.5			4.5			4.5			4.5		
Lead/Lag												
Lead/Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	48.6			48.6			32.4			32.4		
Actuated g/C Ratio	0.54			0.54			0.36			0.36		
v/c Ratio	0.51			0.61			0.86			0.37		
Control Delay	20.6			19.7			40.9			20.3		
Queue Delay	0.0			0.0			0.0			0.0		
Total Delay	20.6			19.7			40.9			20.3		
LOS	C			B			D			C		
Approach Delay	20.6			19.7			40.9			20.3		
Approach LOS	C			B			D			C		

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 44 (49%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 50  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.86  
 Intersection Signal Delay: 26.8 Intersection LOS: C  
 Intersection Capacity Utilization 74.8% ICU Level of Service D  
 Analysis Period (min) 15

Splits and Phases: 7: Esquesing Line/Fourth Line & 5 Sideroad



HCM Signalized Intersection Capacity Analysis  
7: Esquesing Line/Fourth Line & 5 Sideroad

2033 FT PM Peak Hour  
09-09-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	50	288	11	66	349	18	23	356	81	4	150	39
Future Volume (vph)	50	288	11	66	349	18	23	356	81	4	150	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5			4.5			4.5		
Lane Util. Factor	1.00			1.00			1.00			1.00		
Frt	1.00			0.99			0.98			0.97		
Fit Protected	0.99			0.99			1.00			1.00		
Satd. Flow (prot)	1633			1673			1688			1632		
Fit Permitted	0.88			0.89			0.98			0.99		
Satd. Flow (perm)	1453			1492			1655			1617		
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	57	327	12	75	397	20	26	405	92	5	170	44
RTOR Reduction (vph)	0	1	0	0	1	0	0	10	0	0	11	0
Lane Group Flow (vph)	0	396	0	0	491	0	0	513	0	0	208	0
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	2			6			8			4		
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	48.6			48.6			32.4			32.4		
Effective Green, g (s)	48.6			48.6			32.4			32.4		
Actuated g/C Ratio	0.54			0.54			0.36			0.36		
Clearance Time (s)	4.5			4.5			4.5			4.5		
Vehicle Extension (s)	3.0			3.0			3.0			3.0		
Lane Grp Cap (vph)	784			805			595			582		
v/s Ratio Prot												
v/s Ratio Perm	0.27			c0.33			c0.31			0.13		
v/c Ratio	0.50			0.61			0.86			0.36		
Uniform Delay, d1	13.1			14.2			26.7			21.2		
Progression Factor	1.24			1.00			1.00			1.00		
Incremental Delay, d2	2.1			3.4			12.3			0.4		
Delay (s)	18.4			17.6			39.1			21.5		
Level of Service	B			B			D			C		
Approach Delay (s)	18.4			17.6			39.1			21.5		
Approach LOS	B			B			D			C		
<b>Intersection Summary</b>												
HCM 2000 Control Delay	25.2		HCM 2000 Level of Service				C					
HCM 2000 Volume to Capacity ratio	0.71											
Actuated Cycle Length (s)	90.0		Sum of lost time (s)				9.0					
Intersection Capacity Utilization	74.8%		ICU Level of Service				D					
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings  
101: Boston Church Road & East Access 1

2033 FT PM Peak Hour  
09-09-2021

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	
Traffic Volume (vph)	196	48	243	59	14	234
Future Volume (vph)	196	48	243	59	14	234
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		80.0		15.0	
Storage Lanes	1		1		1	
Taper Length (m)	2.5				75.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.850		0.850			
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1772	1633	1642	1498	1825	1642
Fit Permitted	0.950				0.950	
Satd. Flow (perm)	1772	1633	1642	1498	1825	1642
Link Speed (k/h)	48		70		70	
Link Distance (m)	117.5		269.9		183.3	
Travel Time (s)	8.8		13.9		9.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	0%	17%	9%	0%	17%
Adj. Flow (vph)	213	52	264	64	15	254
Shared Lane Traffic (%)						
Lane Group Flow (vph)	213	52	264	64	15	254
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7		3.7	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14		24	
Sign Control	Stop		Free		Free	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	30.3%				ICU Level of Service A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
101: Boston Church Road & East Access 1

2033 FT PM Peak Hour  
09-09-2021

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↑	↘	↗	↑
Traffic Volume (veh/h)	196	48	243	59	14	234
Future Volume (Veh/h)	196	48	243	59	14	234
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)	213	52	264	64	15	254
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	548	264			328	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	548	264			328	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	57	93			99	
cM capacity (veh/h)	490	780			1243	
<b>Direction_Lane #</b>	<b>WB 1</b>	<b>WB 2</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>
Volume Total	213	52	264	64	15	254
Volume Left	213	0	0	0	15	0
Volume Right	0	52	0	64	0	0
cSH	490	780	1700	1700	1243	1700
Volume to Capacity	0.43	0.07	0.16	0.04	0.01	0.15
Queue Length 95th (m)	16.5	1.6	0.0	0.0	0.3	0.0
Control Delay (s)	17.9	9.9	0.0	0.0	7.9	0.0
Lane LOS	C	A			A	
Approach Delay (s)	16.3		0.0		0.4	
Approach LOS	C					
<b>Intersection Summary</b>						
Average Delay			5.2			
Intersection Capacity Utilization			30.3%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings  
102: James Snow Parkway N & East Access 2

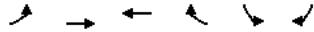
2033 FT PM Peak Hour  
09-09-2021

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↗	↗	↗	↘	↘
Traffic Volume (vph)	18	711	595	19	19	20
Future Volume (vph)	18	711	595	19	19	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0			80.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	100.0				2.5	
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt				0.850		0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	997	4371	4196	816	913	933
Fit Permitted	0.395				0.950	
Satd. Flow (perm)	415	4371	4196	816	913	933
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				21		22
Link Speed (k/h)		70	70		48	
Link Distance (m)		546.0	560.2		147.4	
Travel Time (s)		28.1	28.8		11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	83%	20%	25%	100%	100%	75%
Adj. Flow (vph)	20	773	647	21	21	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	773	647	21	21	22
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	6.1	30.5	30.5	6.1	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8	6.1	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			



Lanes, Volumes, Timings  
102: James Snow Parkway N & East Access 2

2033 FT PM Peak Hour  
09-09-2021

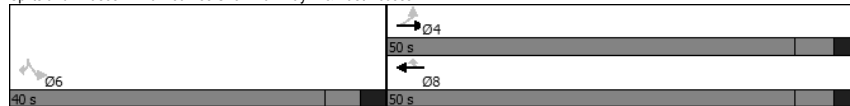


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.6	30.6	30.6	30.6	33.5	33.5
Total Split (s)	50.0	50.0	50.0	50.0	40.0	40.0
Total Split (%)	55.6%	55.6%	55.6%	55.6%	44.4%	44.4%
Maximum Green (s)	43.4	43.4	43.4	43.4	33.5	33.5
Yellow Time (s)	4.2	4.2	4.2	4.2	3.7	3.7
All-Red Time (s)	2.4	2.4	2.4	2.4	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	60.3	60.3	60.3	60.3	7.3	7.3
Actuated g/C Ratio	0.83	0.83	0.83	0.83	0.10	0.10
v/c Ratio	0.06	0.21	0.19	0.03	0.23	0.19
Control Delay	3.8	2.8	2.8	1.7	36.9	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.8	2.8	2.8	1.7	36.9	17.4
LOS	A	A	A	A	D	B
Approach Delay		2.9	2.7		27.0	
Approach LOS		A	A		C	

Intersection Summary

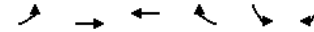
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	72.4
Natural Cycle:	65
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.23
Intersection Signal Delay:	3.5
Intersection Capacity Utilization:	30.0%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service:	A

Splits and Phases: 102: James Snow Parkway N & East Access 2



HCM Signalized Intersection Capacity Analysis  
102: James Snow Parkway N & East Access 2

2033 FT PM Peak Hour  
09-09-2021



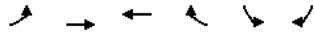
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔↔↔	↔↔↔	↔	↔	↔
Traffic Volume (vph)	18	711	595	19	19	20
Future Volume (vph)	18	711	595	19	19	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	997	4371	4196	816	913	933
Flt Permitted	0.39	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	415	4371	4196	816	913	933
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	20	773	647	21	21	22
RTOR Reduction (vph)	0	0	0	5	0	21
Lane Group Flow (vph)	20	773	647	16	21	1
Heavy Vehicles (%)	83%	20%	25%	100%	100%	75%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			
Permitted Phases	4			8	6	6
Actuated Green, G (s)	57.3	57.3	57.3	57.3	4.8	4.8
Effective Green, g (s)	57.3	57.3	57.3	57.3	4.8	4.8
Actuated g/C Ratio	0.76	0.76	0.76	0.76	0.06	0.06
Clearance Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	316	3330	3197	621	58	59
v/s Ratio Prot		c0.18	0.15			
v/s Ratio Perm	0.05			0.02	c0.02	0.00
v/c Ratio	0.06	0.23	0.20	0.03	0.36	0.02
Uniform Delay, d1	2.2	2.6	2.5	2.2	33.7	33.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.2	0.1	0.1	3.8	0.2
Delay (s)	2.6	2.8	2.7	2.2	37.6	33.2
Level of Service	A	A	A	A	D	C
Approach Delay (s)		2.7	2.6		35.3	
Approach LOS		A	A		D	

Intersection Summary

HCM 2000 Control Delay	3.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	75.2	Sum of lost time (s)	13.1
Intersection Capacity Utilization	30.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings  
103: James Snow Parkway N & East Access 3

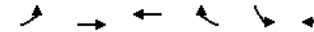
2033 FT PM Peak Hour  
09-09-2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↖↖↖	↖↖↖	↖	↖	↖
Traffic Volume (vph)	15	715	591	31	60	23
Future Volume (vph)	15	715	591	31	60	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0			80.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	100.0				2.5	
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt				0.850		0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1055	4371	4196	955	1332	1134
Fit Permitted	0.397				0.950	
Satd. Flow (perm)	441	4371	4196	955	1332	1134
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				34		25
Link Speed (k/h)		70	70		48	
Link Distance (m)		560.2	346.4		152.7	
Travel Time (s)		28.8	17.8		11.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	73%	20%	25%	71%	37%	44%
Adj. Flow (vph)	16	777	642	34	65	25
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	777	642	34	65	25
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	6.1	30.5	30.5	6.1	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8	6.1	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			

Lanes, Volumes, Timings  
103: James Snow Parkway N & East Access 3

2033 FT PM Peak Hour  
09-09-2021

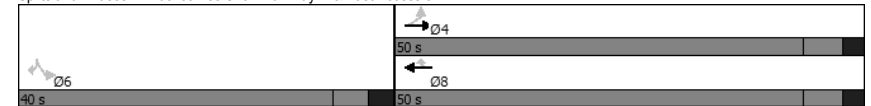


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.6	30.6	30.6	30.6	33.5	33.5
Total Split (s)	50.0	50.0	50.0	50.0	40.0	40.0
Total Split (%)	55.6%	55.6%	55.6%	55.6%	44.4%	44.4%
Maximum Green (s)	43.4	43.4	43.4	43.4	33.5	33.5
Yellow Time (s)	4.2	4.2	4.2	4.2	3.7	3.7
All-Red Time (s)	2.4	2.4	2.4	2.4	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	54.7	54.7	54.7	54.7	8.9	8.9
Actuated g/C Ratio	0.75	0.75	0.75	0.75	0.12	0.12
v/c Ratio	0.05	0.24	0.20	0.05	0.40	0.16
Control Delay	4.7	4.2	4.0	1.9	35.9	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.7	4.2	4.0	1.9	35.9	13.2
LOS	A	A	A	A	D	B
Approach Delay		4.2	3.9		29.6	
Approach LOS		A	A		C	

Intersection Summary

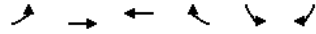
Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 72.6  
 Natural Cycle: 65  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.40  
 Intersection Signal Delay: 5.5  
 Intersection Capacity Utilization 28.9%  
 Analysis Period (min) 15  
 Intersection LOS: A  
 ICU Level of Service A

Splits and Phases: 103: James Snow Parkway N & East Access 3



HCM Signalized Intersection Capacity Analysis  
103: James Snow Parkway N & East Access 3

2033 FT PM Peak Hour  
09-09-2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↘↘↘	↘↘↘	↘	↘	↘
Traffic Volume (vph)	15	715	591	31	60	23
Future Volume (vph)	15	715	591	31	60	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Fit	1.00	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1055	4371	4196	955	1332	1134
Fit Permitted	0.40	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	441	4371	4196	955	1332	1134
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	777	642	34	65	25
RTOR Reduction (vph)	0	0	0	10	0	22
Lane Group Flow (vph)	16	777	642	24	65	3
Heavy Vehicles (%)	73%	20%	25%	71%	37%	44%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4		8		6
Permitted Phases	4			8	6	6
Actuated Green, G (s)	53.2	53.2	53.2	53.2	7.7	7.7
Effective Green, g (s)	53.2	53.2	53.2	53.2	7.7	7.7
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.10	0.10
Clearance Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	317	3142	3016	686	138	117
v/s Ratio Prot		c0.18	0.15			
v/s Ratio Perm	0.04			0.03	c0.05	0.00
v/c Ratio	0.05	0.25	0.21	0.04	0.47	0.02
Uniform Delay, d1	3.0	3.6	3.5	3.0	31.2	29.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.2	0.2	0.1	2.5	0.1
Delay (s)	3.3	3.7	3.6	3.1	33.8	29.8
Level of Service	A	A	A	A	C	C
Approach Delay (s)		3.7	3.6		32.7	
Approach LOS	A	A		C		

Intersection Summary			
HCM 2000 Control Delay	5.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	74.0	Sum of lost time (s)	13.1
Intersection Capacity Utilization	28.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
201: West Access 1 & 5 Sideroad

2033 FT PM Peak Hour  
09-09-2021



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↘	↘	↘
Traffic Volume (vph)	282	5	6	445	12	22
Future Volume (vph)	282	5	6	445	12	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.998			0.999	0.912	
Fit Protected				0.999	0.983	
Satd. Flow (prot)	1700	0	0	1613	1722	0
Fit Permitted				0.999	0.983	
Satd. Flow (perm)	1700	0	0	1613	1722	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	198.7			175.4	89.6	
Travel Time (s)	11.9			10.5	6.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	0%	0%	13%	0%	0%
Bus Blockages (#/hr)	0	0	0	13	0	0
Adj. Flow (vph)	307	5	7	484	13	24
Shared Lane Traffic (%)						
Lane Group Flow (vph)	312	0	0	491	37	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	1.06	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	38.2%
	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
201: West Access 1 & 5 Sideroad

2033 FT PM Peak Hour  
09-09-2021

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↖	↗	↗
Traffic Volume (veh/h)	282	5	6	445	12	22
Future Volume (Veh/h)	282	5	6	445	12	22
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	307	5	7	484	13	24
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)	342					
pX, platoon unblocked	0.93					
vC, conflicting volume	312		808			
vC1, stage 1 conf vol	310					
vC2, stage 2 conf vol						
vCu, unblocked vol	312		755			
tC, single (s)	4.1		6.4			
tC, 2 stage (s)	6.2					
tF (s)	2.2		3.5			
p0 queue free %	99		96			
cM capacity (veh/h)	1260		351			
	735					
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	312	491	37			
Volume Left	0	7	13			
Volume Right	5	0	24			
cSH	1700	1260	531			
Volume to Capacity	0.18	0.01	0.07			
Queue Length 95th (m)	0.0	0.1	1.7			
Control Delay (s)	0.0	0.2	12.3			
Lane LOS	A		B			
Approach Delay (s)	0.0	0.2	12.3			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay	0.6					
Intersection Capacity Utilization	38.2%		ICU Level of Service			
Analysis Period (min)	15					

Lanes, Volumes, Timings  
202: West Access 2 & 5 Sideroad

2033 FT PM Peak Hour  
09-09-2021

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↖	↗	↗
Traffic Volume (vph)	299	5	6	441	10	25
Future Volume (vph)	299	5	6	441	10	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998		0.904			
Fit Protected			0.999			
Satd. Flow (prot)	1611	0	0	1701	1712	0
Fit Permitted			0.999			
Satd. Flow (perm)	1611	0	0	1701	1712	0
Link Speed (k/h)	60		60			
Link Distance (m)	175.4		166.9			
Travel Time (s)	10.5		10.0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	0%	0%	13%	0%	0%
Bus Blockages (#/hr)	13	0	0	0	0	0
Adj. Flow (vph)	325	5	7	479	11	27
<b>Shared Lane Traffic (%)</b>						
Lane Group Flow (vph)	330	0	0	486	38	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0		0.0			
Link Offset(m)	0.0		0.0			
Crosswalk Width(m)	1.6		1.6			
<b>Two way Left Turn Lane</b>						
Headway Factor	1.06	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	14		24		24	
Sign Control	Free		Free		Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	38.0%		ICU Level of Service A			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
202: West Access 2 & 5 Sideroad

2033 FT PM Peak Hour  
09-09-2021

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔	↔	↔	↔
Traffic Volume (veh/h)	299	5	6	441	10	25
Future Volume (Veh/h)	299	5	6	441	10	25
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	325	5	7	479	11	27
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)				167		
pX, platoon unblocked					0.89	
vC, conflicting volume			330		820	328
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			330		737	328
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		97	96
cM capacity (veh/h)			1241		344	718
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	330	486	38			
Volume Left	0	7	11			
Volume Right	5	0	27			
cSH	1700	1241	546			
Volume to Capacity	0.19	0.01	0.07			
Queue Length 95th (m)	0.0	0.1	1.7			
Control Delay (s)	0.0	0.2	12.1			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.2	12.1			
Approach LOS			B			
<b>Intersection Summary</b>						
Average Delay			0.6			
Intersection Capacity Utilization			38.0%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
203: Boston Church Road & West Access 3

2033 FT PM Peak Hour  
09-09-2021

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↔	↔	↔
Traffic Volume (vph)	1	21	19	266	143	0
Future Volume (vph)	1	21	19	266	143	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	40.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	2.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.871					
Fit Protected	0.998		0.950			
Satd. Flow (prot)	994	0	961	1642	1642	0
Fit Permitted	0.998		0.950			
Satd. Flow (perm)	994	0	961	1642	1642	0
Link Speed (k/h)	48			70	70	
Link Distance (m)	99.5			207.3	219.2	
Travel Time (s)	7.5			10.7	11.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	71%	90%	17%	17%	0%
Adj. Flow (vph)	1	23	21	289	155	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	24	0	21	289	155	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	24.2%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
203: Boston Church Road & West Access 3

2033 FT PM Peak Hour  
09-09-2021

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↑	↑	↔
Traffic Volume (veh/h)	1	21	19	266	143	0
Future Volume (Veh/h)	1	21	19	266	143	0
Sign Control	Stop		Free			
Grade	0%		0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	23	21	289	155	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)	219					
pX, platoon unblocked						
vC, conflicting volume	486	155	155			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	486	155	155			
tC, single (s)	6.4	6.9	5.0			
tC, 2 stage (s)						
tF (s)	3.5	3.9	3.0			
p0 queue free %	100	97	98			
cM capacity (veh/h)	533	738	1028			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>		
Volume Total	24	21	289	155		
Volume Left	1	21	0	0		
Volume Right	23	0	0	0		
cSH	726	1028	1700	1700		
Volume to Capacity	0.03	0.02	0.17	0.09		
Queue Length 95th (m)	0.8	0.5	0.0	0.0		
Control Delay (s)	10.1	8.6	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	10.1	0.6	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay	0.9					
Intersection Capacity Utilization	24.2%		ICU Level of Service		A	
Analysis Period (min)	15					

Lanes, Volumes, Timings  
204: Boston Church Road & West Access 4

2033 FT PM Peak Hour  
09-09-2021

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↑	↑	↔
Traffic Volume (vph)	23	86	23	262	157	7
Future Volume (vph)	23	86	23	262	157	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	15.0	0.0		
Storage Lanes	1	0	1	0		
Taper Length (m)	2.5	75.0				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.894		0.994			
Flt Protected	0.990		0.950			
Satd. Flow (prot)	1700	0	1825	1642	1643	0
Flt Permitted	0.990		0.950			
Satd. Flow (perm)	1700	0	1825	1642	1643	0
Link Speed (k/h)	48		70		70	
Link Distance (m)	101.5		171.0		207.3	
Travel Time (s)	7.6		8.8		10.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	17%	17%	0%
Adj. Flow (vph)	25	93	25	285	171	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	118	0	25	285	179	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7		3.7		3.7	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop		Free		Free	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 28.6%			ICU Level of Service A			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
204: Boston Church Road & West Access 4

2033 FT PM Peak Hour  
09-09-2021

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	23	86	23	262	157	7
Future Volume (Veh/h)	23	86	23	262	157	7
Sign Control	Stop		Free			
Grade	0%		0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	93	25	285	171	8
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	510	175	179			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	510	175	179			
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	89	98			
cM capacity (veh/h)	518	874	1409			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>		
Volume Total	118	25	285	179		
Volume Left	25	25	0	0		
Volume Right	93	0	0	8		
cSH	762	1409	1700	1700		
Volume to Capacity	0.15	0.02	0.17	0.11		
Queue Length 95th (m)	4.1	0.4	0.0	0.0		
Control Delay (s)	10.6	7.6	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	10.6	0.6	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			2.4			
Intersection Capacity Utilization			28.6%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings  
205: Boston Church Road & West Access 5

2033 FT PM Peak Hour  
09-09-2021

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	5	6	285	243	0
Future Volume (vph)	0	5	6	285	243	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	40.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	2.5	75.0				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Fit Protected			0.950			
Satd. Flow (prot)	831	0	913	1642	1642	0
Fit Permitted	0.950					
Satd. Flow (perm)	831	0	913	1642	1642	0
Link Speed (k/h)	48		70		70	
Link Distance (m)	100.3		183.3		171.0	
Travel Time (s)	7.5		9.4		8.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	100%	100%	17%	17%	0%
Adj. Flow (vph)	0	5	7	310	264	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	0	7	310	264	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7		3.7		3.7	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop		Free		Free	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 25.0%			ICU Level of Service		A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
 205: Boston Church Road & West Access 5

2033 FT PM Peak Hour  
 09-09-2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↙	↘	↙	↑	↑	↘
Traffic Volume (veh/h)	0	5	6	285	243	0
Future Volume (Veh/h)	0	5	6	285	243	0
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)	0	5	7	310	264	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	588	264	264			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	588	264	264			
tC, single (s)	6.4	7.2	5.1			
tC, 2 stage (s)						
tF (s)	3.5	4.2	3.1			
p0 queue free %	100	99	99			
cM capacity (veh/h)	471	587	893			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>		
Volume Total	5	7	310	264		
Volume Left	0	7	0	0		
Volume Right	5	0	0	0		
cSH	587	893	1700	1700		
Volume to Capacity	0.01	0.01	0.18	0.16		
Queue Length 95th (m)	0.2	0.2	0.0	0.0		
Control Delay (s)	11.2	9.1	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	11.2	0.2		0.0		
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.2			
Intersection Capacity Utilization			25.0%	ICU Level of Service	A	
Analysis Period (min)			15			



## **APPENDIX J**

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### **Building D Sensitivity Synchro Capacity Analysis Reports**

Lanes, Volumes, Timings  
1: Regional Road 25 & 5 Sideroad

2023 FT - Phase 1 - AM Peak Hour  
08-18-2021

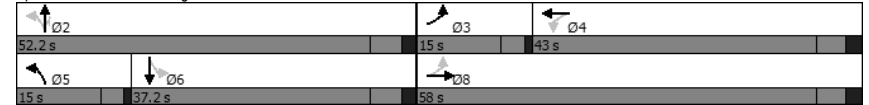
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	322	237	61	88	12	86	303	101	100	492	69
Future Volume (vph)	79	322	237	61	88	12	86	303	101	100	492	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	70.0		0.0	75.0		70.0	35.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	100.0			100.0			75.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.936			0.982			0.850			0.982	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1601	1551	0	1342	1604	0	1225	2920	1338	1601	3050	0
Fit Permitted	0.612			0.283			0.290			0.557		
Satd. Flow (perm)	1031	1551	0	400	1604	0	374	2920	1338	939	3050	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					7				107			14
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		573.6			536.0			986.0			203.5	
Travel Time (s)		34.4			32.2			50.7			10.5	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Adj. Flow (vph)	84	343	252	65	94	13	91	322	107	106	523	73
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	595	0	65	107	0	91	322	107	106	596	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	NA
Protected Phases	3	8		4	4		5	2	2	6	6	6
Permitted Phases	8			4			2		2	6		
Detector Phase	3	8		4	4		5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		10.0	10.0		7.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	11.0	38.0		38.0	38.0		11.0	38.2	38.2	38.2	38.2	38.2

Lanes, Volumes, Timings  
1: Regional Road 25 & 5 Sideroad

2023 FT - Phase 1 - AM Peak Hour  
08-18-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	15.0	58.0		43.0	43.0		15.0	52.2	52.2	37.2	37.2	
Total Split (%)	13.6%	52.6%		39.0%	39.0%		13.6%	47.4%	47.4%	33.8%	33.8%	
Maximum Green (s)	11.0	52.0		37.0	37.0		11.0	46.0	46.0	31.0	31.0	
Yellow Time (s)	3.0	3.7		3.7	3.7		3.0	4.2	4.2	4.2	4.2	
All-Red Time (s)	1.0	2.3		2.3	2.3		1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0		6.0	6.0		4.0	6.2	6.2	6.2	6.2	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.7		3.7	3.7		3.0	3.6	3.6	4.2	4.2	
Recall Mode	None	None		None	None		None	Ped	Ped	Ped	Ped	
Walk Time (s)		7.0			7.0			7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		25.0			25.0			25.0	25.0	25.0	25.0	
Pedestrian Calls (#/hr)		0			0			0	0	0	0	
Act Effect Green (s)	43.8	41.8		32.0	32.0		46.1	43.8	43.8	33.1	33.1	
Actuated g/C Ratio	0.45	0.43		0.33	0.33		0.47	0.45	0.45	0.34	0.34	
v/c Ratio	0.16	0.90		0.50	0.20		0.35	0.25	0.16	0.34	0.58	
Control Delay	16.9	45.0		45.0	25.6		21.5	19.0	4.6	33.7	32.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	16.9	45.0		45.0	25.6		21.5	19.0	4.6	33.7	32.1	
LOS	B	D		D	C		C	B	A	C	C	
Approach Delay		41.5			32.9			16.5			32.3	
Approach LOS		D			C			B			C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	110.2											
Actuated Cycle Length:	98.2											
Natural Cycle:	100											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.90											
Intersection Signal Delay:	31.4						Intersection LOS: C					
Intersection Capacity Utilization:	93.4%						ICU Level of Service F					
Analysis Period (min):	15											

Splits and Phases: 1: Regional Road 25 & 5 Sideroad



HCM Signalized Intersection Capacity Analysis  
1: Regional Road 25 & 5 Sideroad

2023 FT - Phase 1 - AM Peak Hour  
08-18-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	79	322	237	61	88	12	86	303	101	100	492	69
Future Volume (vph)	79	322	237	61	88	12	86	303	101	100	492	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	6.0	6.0	4.0	6.2	6.2	6.2	6.2	6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95
Frt	1.00	0.94	1.00	0.98	1.00	1.00	0.85	1.00	0.98	1.00	0.98	1.00
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1601	1552	1342	1604	1225	2920	1338	1601	3049	1601	3049	1601
Fit Permitted	0.61	1.00	0.28	1.00	0.29	1.00	1.00	0.56	1.00	0.61	1.00	1.00
Satd. Flow (perm)	1031	1552	400	1604	374	2920	1338	938	3049	1031	1552	400
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	84	343	252	65	94	13	91	322	107	106	523	73
RTOR Reduction (vph)	0	0	0	0	5	0	0	0	59	0	9	0
Lane Group Flow (vph)	84	595	0	65	102	0	91	322	48	106	587	0
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	Perm	Perm	NA	pm+pt	NA	Perm
Protected Phases	3	8		4		5	2		6		6	
Permitted Phases	8		4		2		2	6				
Actuated Green, G (s)	42.8	42.8	32.0	32.0	44.9	44.9	44.9	33.1	33.1	42.8	42.8	32.0
Effective Green, g (s)	42.8	42.8	32.0	32.0	44.9	44.9	44.9	33.1	33.1	42.8	42.8	32.0
Actuated g/C Ratio	0.43	0.43	0.32	0.32	0.45	0.45	0.45	0.33	0.33	0.43	0.43	0.32
Clearance Time (s)	4.0	6.0	6.0	6.0	4.0	6.2	6.2	6.2	6.2	4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.7	3.7	3.7	3.0	3.6	3.6	4.2	4.2	3.0	3.7	3.7
Lane Grp Cap (vph)	480	664	128	513	234	1312	601	310	1010	480	664	128
v/s Ratio Prot	0.01	c0.38		0.06	c0.03	0.11		c0.19		0.01	c0.38	
v/s Ratio Perm	0.06		0.16		0.14		0.04	0.11		0.06		0.16
v/c Ratio	0.17	0.90	0.51	0.20	0.39	0.25	0.08	0.34	0.58	0.17	0.90	0.51
Uniform Delay, d1	17.3	26.5	27.6	24.6	17.2	17.0	15.7	25.2	27.7	17.3	26.5	27.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	15.0	3.9	0.2	1.1	0.1	0.1	1.0	1.1	0.2	15.0	3.9
Delay (s)	17.5	41.4	31.5	24.9	18.3	17.1	15.8	26.2	28.7	17.5	41.4	31.5
Level of Service	B	D	C	C	B	B	B	C	C	B	D	C
Approach Delay (s)		38.5		27.4		17.1		28.3			38.5	
Approach LOS		D		C		B		C			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay	28.8		HCM 2000 Level of Service				C					
HCM 2000 Volume to Capacity ratio	0.76											
Actuated Cycle Length (s)	99.9		Sum of lost time (s)				20.2					
Intersection Capacity Utilization	93.4%		ICU Level of Service				F					
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings

2023 FT - Phase 1 - AM Peak Hour  
08-18-2021

2: Regional Road 25 & James Snow Parkway N

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	12	86	40	95	110	67	195	486	480	236	430	32
Future Volume (vph)	12	86	40	95	110	67	195	486	480	236	430	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		115.0	85.0		35.0	30.0		0.0	75.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	40.0			90.0			70.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor									0.99	1.00		
Frt			0.850			0.850			0.850		0.990	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1217	2684	1103	1259	3147	1192	1534	2897	1458	1472	2851	0
Fit Permitted	0.681			0.696			0.480			0.457		
Satd. Flow (perm)	872	2684	1103	922	3147	1192	775	2897	1439	708	2851	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			58			69			495		7	
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		452.4			1065.5			592.1			986.0	
Travel Time (s)		27.1			63.9			30.5			50.7	
Confl. Peds. (#/hr)								1		1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Adj. Flow (vph)	12	89	41	98	113	69	201	501	495	243	443	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	89	41	98	113	69	201	501	495	243	476	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.2	9.0	9.0	9.0	9.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	
Switch Phase												

Lanes, Volumes, Timings

2023 FT - Phase 1 - AM Peak Hour

2: Regional Road 25 & James Snow Parkway N

08-18-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	43.6	43.6	43.6	43.6	43.6	43.6	11.0	42.9	42.9	11.0	35.9	
Total Split (s)	55.6	55.6	55.6	55.6	55.6	55.6	15.0	76.9	76.9	15.0	76.9	
Total Split (%)	37.7%	37.7%	37.7%	37.7%	37.7%	37.7%	10.2%	52.1%	52.1%	10.2%	52.1%	
Maximum Green (s)	49.0	49.0	49.0	49.0	49.0	49.0	11.0	70.0	70.0	11.0	70.0	
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	4.2	4.2	3.0	4.2	
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	1.0	2.7	2.7	1.0	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	30.0	30.0	30.0	30.0	30.0	30.0		29.0	29.0		22.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0	0		0	
Act Effect Green (s)	15.2	15.2	15.2	15.2	15.2	15.2	37.6	24.5	24.5	37.8	24.6	
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22	0.22	0.55	0.36	0.36	0.56	0.36	
v/c Ratio	0.06	0.15	0.14	0.48	0.16	0.22	0.37	0.48	0.59	0.48	0.46	
Control Delay	23.2	22.8	5.6	32.6	22.7	8.4	8.6	19.0	5.1	10.2	18.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	23.2	22.8	5.6	32.6	22.7	8.4	8.6	19.0	5.1	10.2	18.5	
LOS	C	C	A	C	C	A	A	B	A	B	B	
Approach Delay		17.8			22.6			11.5			15.7	
Approach LOS		B			C			B			B	

Intersection Summary

Area Type:	Other
Cycle Length:	147.5
Actuated Cycle Length:	67.8
Natural Cycle:	100
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.59
Intersection Signal Delay:	14.5
Intersection LOS:	B
Intersection Capacity Utilization:	65.8%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 2: Regional Road 25 & James Snow Parkway N

Ø1	Ø2	Ø4
15 s	76.9 s	55.6 s
Ø5	Ø6	Ø8
15 s	76.9 s	55.6 s

HCM Signalized Intersection Capacity Analysis

2023 FT - Phase 1 - AM Peak Hour

2: Regional Road 25 & James Snow Parkway N

08-18-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	12	86	40	95	110	67	195	486	480	236	430	32
Future Volume (vph)	12	86	40	95	110	67	195	486	480	236	430	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1217	2684	1103	1259	3147	1192	1534	2897	1440	1472	2850	
Fit Permitted	0.68	1.00	1.00	0.70	1.00	1.00	0.48	1.00	1.00	0.46	1.00	
Satd. Flow (perm)	872	2684	1103	923	3147	1192	774	2897	1440	709	2850	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	12	89	41	98	113	69	201	501	495	243	443	33
RTOR Reduction (vph)	0	0	32	0	0	53	0	0	315	0	4	0
Lane Group Flow (vph)	12	89	9	98	113	16	201	501	180	243	472	0
Confl. Peds. (#/hr)							1	1				
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	15.2	15.2	15.2	15.2	15.2	15.2	34.6	24.5	24.5	34.8	24.6	
Effective Green, g (s)	15.2	15.2	15.2	15.2	15.2	15.2	34.6	24.5	24.5	34.8	24.6	
Actuated g/C Ratio	0.23	0.23	0.23	0.23	0.23	0.23	0.51	0.36	0.36	0.52	0.36	
Clearance Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	196	605	248	208	709	268	511	1053	523	481	1040	
v/s Ratio Prot		0.03			0.04		0.06	0.17		c0.08	0.17	
v/s Ratio Perm	0.01		0.01	c0.11		0.01	0.14		0.12	c0.18		
v/c Ratio	0.06	0.15	0.04	0.47	0.16	0.06	0.39	0.48	0.34	0.51	0.45	
Uniform Delay, d1	20.5	20.9	20.4	22.6	21.0	20.5	9.2	16.5	15.6	9.4	16.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.2	0.1	3.5	0.2	0.2	0.5	0.7	0.8	0.8	0.7	
Delay (s)	20.8	21.1	20.5	26.1	21.2	20.7	9.7	17.2	16.4	10.3	16.9	
Level of Service	C	C	C	C	C	C	A	B	B	B	B	
Approach Delay (s)		20.9			22.8			15.6			14.7	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	67.4	Sum of lost time (s)	17.5
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

2023 FT - Phase 1 - AM Peak Hour

3: Boston Church Road & James Snow Parkway N

08-18-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↘	↔	↕	↘	↔	↕	↘	↔	↕	↘
Traffic Volume (vph)	75	565	127	14	218	156	28	5	11	59	32	126
Future Volume (vph)	75	565	127	14	218	156	28	5	11	59	32	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		0.0	70.0		0.0	60.0		25.0	60.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			70.0			90.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.972			0.937				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1508	3007	0	1415	2882	0	1113	3650	944	1534	3147	1498
Fit Permitted	0.436			0.360			0.732			0.570		
Satd. Flow (perm)	692	3007	0	536	2882	0	857	3650	944	920	3147	1498
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			135				90			140
Link Speed (k/h)		70			70				60			60
Link Distance (m)		358.9			547.4				792.9			198.3
Travel Time (s)		18.5			28.2				47.6			11.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%
Adj. Flow (vph)	83	628	141	16	242	173	31	6	12	66	36	140
Shared Lane Traffic (%)												
Lane Group Flow (vph)	83	769	0	16	415	0	31	6	12	66	36	140
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7				3.7			3.7
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		1.6			1.6				1.6			1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8	8	7	4	4
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0		7.0	20.0		7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	11.0	33.5		11.0	33.5		11.0	31.6	31.6	11.0	31.6	31.6

Lanes, Volumes, Timings

2023 FT - Phase 1 - AM Peak Hour

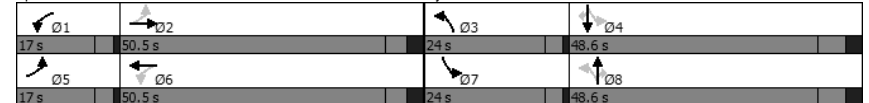
3: Boston Church Road & James Snow Parkway N

08-18-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	17.0	50.5		17.0	50.5		24.0	48.6	48.6	24.0	48.6	48.6
Total Split (%)	12.1%	36.0%		12.1%	36.0%		17.1%	34.7%	34.7%	17.1%	34.7%	34.7%
Maximum Green (s)	13.0	44.0		13.0	44.0		20.0	41.0	41.0	20.0	41.0	41.0
Yellow Time (s)	3.0	3.7		3.0	3.7		3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	1.0	2.8		1.0	2.8		1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		7.0			7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		20.0			20.0			17.0	17.0		17.0	17.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effect Green (s)	35.8	31.6		31.1	23.1		19.8	15.7	15.7	23.5	16.4	16.4
Actuated g/C Ratio	0.52	0.46		0.45	0.34		0.29	0.23	0.23	0.34	0.24	0.24
v/c Ratio	0.18	0.55		0.05	0.39		0.11	0.01	0.04	0.16	0.05	0.30
Control Delay	10.1	16.1		9.9	14.1		19.8	28.6	0.3	18.0	26.0	8.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.1	16.1		9.9	14.1		19.8	28.6	0.3	18.0	26.0	8.0
LOS	B	B		A	B		B	C	A	B	C	A
Approach Delay		15.5			14.0			16.1			13.4	
Approach LOS		B			B			B			B	
Intersection Summary												
Area Type:	Other											
Cycle Length:	140.1											
Actuated Cycle Length:	68.4											
Natural Cycle:	90											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.55											
Intersection Signal Delay:	14.8						Intersection LOS: B					
Intersection Capacity Utilization:	53.1%						ICU Level of Service A					
Analysis Period (min):	15											

Splits and Phases: 3: Boston Church Road & James Snow Parkway N



HCM Signalized Intersection Capacity Analysis  
3: Boston Church Road & James Snow Parkway N

2023 FT - Phase 1 - AM Peak Hour  
08-18-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	75	565	127	14	218	156	28	5	11	59	32	126
Future Volume (vph)	75	565	127	14	218	156	28	5	11	59	32	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.5	4.0	6.5	4.0	7.6	7.6	4.0	7.6	4.0	7.6	7.6
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Frt	1.00	0.97	1.00	0.94	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1508	3008	1415	2884	1113	3650	944	1534	3147	1498		
Fit Permitted	0.44	1.00	0.36	1.00	0.73	1.00	1.00	0.57	1.00	1.00		
Satd. Flow (perm)	692	3008	536	2884	858	3650	944	920	3147	1498		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	83	628	141	16	242	173	31	6	12	66	36	140
RTOR Reduction (vph)	0	12	0	0	89	0	0	0	10	0	0	108
Lane Group Flow (vph)	83	757	0	16	326	0	31	6	2	66	36	32
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	NA	Perm	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		4			4
Actuated Green, G (s)	36.6	31.6		26.6	25.6		15.1	12.4	12.4	23.9	17.2	17.2
Effective Green, g (s)	36.6	31.6		26.6	25.6		15.1	12.4	12.4	23.9	17.2	17.2
Actuated g/C Ratio	0.49	0.42		0.36	0.34		0.20	0.17	0.17	0.32	0.23	0.23
Clearance Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	416	1274		202	989		182	606	156	356	725	345
v/s Ratio Prot	c0.02	c0.25		0.00	0.11		0.01	0.00		c0.02	0.01	
v/s Ratio Perm	0.08			0.03			0.03		0.00	c0.04		0.02
v/c Ratio	0.20	0.59		0.08	0.33		0.17	0.01	0.01	0.19	0.05	0.09
Uniform Delay, d1	10.4	16.6		15.6	18.1		24.4	26.0	26.0	18.1	22.3	22.6
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	0.2	1.1		0.2	0.4		0.4	0.0	0.1	0.3	0.1	0.2
Delay (s)	10.6	17.7		15.8	18.6		24.9	26.0	26.1	18.4	22.4	22.8
Level of Service	B	B		B	B		C	C	C	B	C	C
Approach Delay (s)		17.0			18.5			25.3			21.5	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	74.6	Sum of lost time (s)	22.1
Intersection Capacity Utilization	53.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

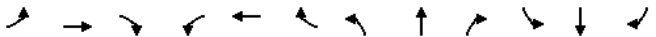
Lanes, Volumes, Timings  
4: Esquesing Line & James Snow Parkway N

2023 FT - Phase 1 - AM Peak Hour  
08-18-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	17	491	141	38	326	39	64	184	6	40	364	12
Future Volume (vph)	17	491	141	38	326	39	64	184	6	40	364	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		0.0	70.0		0.0	40.0		25.0	25.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			80.0			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.967			0.984				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1547	2933	0	1644	2861	0	1644	1731	1396	1615	1685	1396
Fit Permitted	0.509			0.271			0.377			0.627		
Satd. Flow (perm)	829	2933	0	469	2861	0	652	1731	1396	1066	1685	1396
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34			12				74			74
Link Speed (k/h)		70			70			60				60
Link Distance (m)		346.4			1421.7			292.4				1994.7
Travel Time (s)		17.8			73.1			17.5				119.7
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	17%	13%	14%	17%	17%
Adj. Flow (vph)	19	558	160	43	370	44	73	209	7	45	414	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	19	718	0	43	414	0	73	209	7	45	414	14
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7				3.7
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		1.6			1.6			1.6				1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8		2	2	2	6		6
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6		6
Switch Phase												
Minimum Initial (s)	7.0	15.0		7.0	15.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	11.0	30.6		11.0	30.6		33.5	33.5	33.5	33.5	33.5	33.5

Lanes, Volumes, Timings  
4: Esquesing Line & James Snow Parkway N

2023 FT - Phase 1 - AM Peak Hour  
08-18-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	19.0	41.6		19.0	41.6		51.5	51.5	51.5	51.5	51.5	51.5
Total Split (%)	16.9%	37.1%		16.9%	37.1%		45.9%	45.9%	45.9%	45.9%	45.9%	45.9%
Maximum Green (s)	15.0	35.0		15.0	35.0		45.0	45.0	45.0	45.0	45.0	45.0
Yellow Time (s)	3.0	4.2		3.0	4.2		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	2.4		1.0	2.4		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		17.0			17.0		20.0	20.0	20.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	32.8	26.4		34.0	28.7		28.5	28.5	28.5	28.5	28.5	28.5
Actuated g/C Ratio	0.44	0.35		0.45	0.38		0.38	0.38	0.38	0.38	0.38	0.38
v/c Ratio	0.04	0.68		0.13	0.38		0.29	0.32	0.01	0.11	0.65	0.02
Control Delay	12.2	25.1		12.6	18.9		23.4	20.3	0.0	19.1	26.7	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.2	25.1		12.6	18.9		23.4	20.3	0.0	19.1	26.7	0.1
LOS	B	C		B	B		C	C	A	B	C	A
Approach Delay		24.8			18.3			20.6			25.2	
Approach LOS		C			B			C			C	

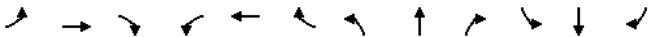
Intersection Summary	
Area Type:	Other
Cycle Length:	112.1
Actuated Cycle Length:	74.9
Natural Cycle:	80
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.68
Intersection Signal Delay:	22.7
Intersection Capacity Utilization:	79.4%
Analysis Period (min):	15
Intersection LOS:	C
ICU Level of Service:	D

Splits and Phases: 4: Esquesing Line & James Snow Parkway N

Phase 1: 51.5 s	Phase 2: 19 s	Phase 3: 41.6 s
Phase 4: 51.5 s	Phase 5: 19 s	Phase 6: 41.6 s

HCM Signalized Intersection Capacity Analysis  
4: Esquesing Line & James Snow Parkway N

2023 FT - Phase 1 - AM Peak Hour  
08-18-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	491	141	38	326	39	64	184	6	40	364	12
Future Volume (vph)	17	491	141	38	326	39	64	184	6	40	364	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1547	2932		1644	2861		1644	1731	1396	1615	1685	1396
Flt Permitted	0.51	1.00		0.27	1.00		0.38	1.00	1.00	0.63	1.00	1.00
Satd. Flow (perm)	829	2932		470	2861		652	1731	1396	1066	1685	1396
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	19	558	160	43	370	44	73	209	7	45	414	14
RTOR Reduction (vph)	0	22	0	0	7	0	0	0	4	0	0	9
Lane Group Flow (vph)	19	696	0	43	407	0	73	209	3	45	414	5
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	11%	17%	13%	14%	17%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		6		6	
Actuated Green, G (s)	29.3	27.1		32.5	28.7		28.5	28.5	28.5	28.5	28.5	28.5
Effective Green, g (s)	29.3	27.1		32.5	28.7		28.5	28.5	28.5	28.5	28.5	28.5
Actuated g/C Ratio	0.38	0.35		0.42	0.38		0.37	0.37	0.37	0.37	0.37	0.37
Clearance Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	338	1038		257	1073		242	644	520	397	627	520
v/s Ratio Prot	0.00	c0.24		c0.01	0.14			0.12			c0.25	
v/s Ratio Perm	0.02			0.06			0.11		0.00	0.04		0.00
v/c Ratio	0.06	0.67		0.17	0.38		0.30	0.32	0.01	0.11	0.66	0.01
Uniform Delay, d1	14.7	20.9		13.5	17.4		17.0	17.1	15.1	15.7	20.0	15.1
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	2.2		0.3	0.5		1.5	0.6	0.0	0.3	3.4	0.0
Delay (s)	14.8	23.2		13.8	17.9		18.4	17.7	15.1	16.0	23.4	15.1
Level of Service	B	C		B	B		B	B	B	B	C	B
Approach Delay (s)		22.9			17.5			17.9			22.5	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	20.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	76.5	Sum of lost time (s)	17.1
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings

2023 FT - Phase 1 - AM Peak Hour

5: James Snow Parkway N & Steeles Avenue East

08-18-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗	↖	↖↗	↖↗	↖	↖↗	↖↗	↖	↖↗	↖	↖↗
Traffic Volume (vph)	1	517	268	118	288	68	380	334	412	167	355	10
Future Volume (vph)	1	517	268	118	288	68	380	334	412	167	355	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	122.0		72.0	170.0		130.0	105.0		260.0	160.0		0.0
Storage Lanes	1		1	2		1	2		1	1		0
Taper Length (m)	60.0			70.0			80.0			80.0		
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	0.95
Friction			0.850			0.850			0.850		0.996	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3579	1601	3471	3579	1601	3471	3579	1601	1789	3564	0
Fit Permitted	0.562			0.950			0.950			0.535		
Satd. Flow (perm)	1058	3579	1601	3471	3579	1601	3471	3579	1601	1008	3564	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			291			82			381			2
Link Speed (k/h)		60			70			60			70	
Link Distance (m)		729.0			881.4			342.7			1421.7	
Travel Time (s)		43.7			45.3			20.6			73.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	562	291	128	313	74	413	363	448	182	386	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	562	291	128	313	74	413	363	448	182	397	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.0			4.0			4.0			4.0	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2		6		6		8	4		
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	7.0	22.0	22.0	7.0	22.0	22.0	7.0	15.0	15.0	7.0	15.0	
Minimum Split (s)	11.0	47.2	47.2	12.0	47.2	47.2	12.0	46.3	46.3	11.0	46.3	
Total Split (s)	15.0	55.2	55.2	26.0	66.2	66.2	29.0	59.0	59.0	24.0	54.0	

Lanes, Volumes, Timings

2023 FT - Phase 1 - AM Peak Hour

5: James Snow Parkway N & Steeles Avenue East

08-18-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	9.1%	33.6%	33.6%	15.8%	40.3%	40.3%	17.7%	35.9%	35.9%	14.6%	32.9%	
Maximum Green (s)	11.0	48.0	48.0	21.0	59.0	59.0	24.0	51.7	51.7	20.0	46.7	
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	4.2	4.2	3.0	4.2	
All-Red Time (s)	1.0	3.5	3.5	2.0	3.5	3.5	2.0	3.1	3.1	1.0	3.1	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	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	5.0	5.0	3.0	5.0	
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		33.0	33.0		33.0	33.0		32.0	32.0		32.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effect Green (s)	34.7	24.3	24.3	9.5	37.2	37.2	17.9	25.3	25.3	35.6	19.3	
Actuated g/C Ratio	0.36	0.25	0.25	0.10	0.39	0.39	0.19	0.26	0.26	0.37	0.20	
v/c Ratio	0.00	0.62	0.47	0.37	0.23	0.11	0.64	0.38	0.64	0.38	0.55	
Control Delay	18.0	36.4	6.6	46.0	22.3	5.6	41.9	31.0	10.6	18.2	38.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	18.0	36.4	6.6	46.0	22.3	5.6	41.9	31.0	10.6	18.2	38.5	
LOS	B	D	A	D	C	A	D	C	B	B	D	
Approach Delay		26.2			25.8			27.2			32.1	
Approach LOS		C			C			C			C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	164.2											
Actuated Cycle Length:	96											
Natural Cycle:	120											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.64											
Intersection Signal Delay:	27.6						Intersection LOS: C					
Intersection Capacity Utilization:	68.5%						ICU Level of Service C					
Analysis Period (min):	15											
Splits and Phases:	5: James Snow Parkway N & Steeles Avenue East											



HCM Signalized Intersection Capacity Analysis  
5: James Snow Parkway N & Steeles Avenue East

2023 FT - Phase 1 - AM Peak Hour  
08-18-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	1	517	268	118	288	68	380	334	412	167	355	10
Future Volume (vph)	1	517	268	118	288	68	380	334	412	167	355	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	
Fit	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	3579	1601	3471	3579	1601	3471	3579	1601	1789	3564	
Fit Permitted	0.56	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.54	1.00	
Satd. Flow (perm)	1058	3579	1601	3471	3579	1601	3471	3579	1601	1008	3564	
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)	1	562	291	128	313	74	413	363	448	182	386	11
RTOR Reduction (vph)	0	0	209	0	0	46	0	0	284	0	2	0
Lane Group Flow (vph)	1	562	82	128	313	28	413	363	164	182	395	0
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2			6			8		4	
Actuated Green, G (s)	28.9	27.8	27.8	9.5	37.2	37.2	17.9	25.3	25.3	32.2	19.3	
Effective Green, g (s)	28.9	27.8	27.8	9.5	37.2	37.2	17.9	25.3	25.3	32.2	19.3	
Actuated g/C Ratio	0.29	0.28	0.28	0.10	0.38	0.38	0.18	0.26	0.26	0.33	0.19	
Clearance Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	316	1005	449	333	1344	601	627	914	409	429	694	
v/s Ratio Prot	0.00	c0.16		c0.04	0.09		c0.12	0.10		0.06	c0.11	
v/s Ratio Perm	0.00		0.05			0.02			0.10		0.08	
v/c Ratio	0.00	0.56	0.18	0.38	0.23	0.05	0.66	0.40	0.40	0.42	0.57	
Uniform Delay, d1	24.8	30.4	27.0	42.0	21.1	19.6	37.7	30.5	30.6	25.1	36.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.7	0.2	0.7	0.1	0.0	2.5	0.6	1.4	0.7	1.8	
Delay (s)	24.8	31.1	27.2	42.7	21.2	19.7	40.2	31.1	31.9	25.8	37.9	
Level of Service	C	C	C	D	C	B	D	C	C	C	D	
Approach Delay (s)		29.7			26.4			34.5			34.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	31.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	99.0	Sum of lost time (s)	24.5
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

Lanes, Volumes, Timings  
6: Boston Church Road/3 Line & 5 Sideroad

2023 FT - Phase 1 - AM Peak Hour  
08-18-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	8	435	50	62	130	3	11	22	20	7	95	24
Future Volume (vph)	8	435	50	62	130	3	11	22	20	7	95	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.998				0.998			0.949			0.974	
Fit Protected	0.999				0.984			0.989			0.997	
Satd. Flow (prot)	0	1654	0	0	1666	0	0	1578	0	0	1671	0
Fit Permitted	0.999				0.984			0.989			0.997	
Satd. Flow (perm)	0	1654	0	0	1666	0	0	1578	0	0	1671	0
Link Speed (k/h)		60			60			70			60	
Link Distance (m)		541.0			1343.2			780.7			496.0	
Travel Time (s)		32.5			80.6			40.2			29.8	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	13%	13%	27%	13%	13%	33%	13%	17%	12%	43%	9%	13%
Adj. Flow (vph)	9	500	57	71	149	3	13	25	23	8	109	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	566	0	0	223	0	0	61	0	0	145	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	54.1%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
6: Boston Church Road/3 Line & 5 Sideroad

2023 FT - Phase 1 - AM Peak Hour  
08-18-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	8	435	50	62	130	3	11	22	20	7	95	24
Future Volume (vph)	8	435	50	62	130	3	11	22	20	7	95	24
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	9	500	57	71	149	3	13	25	23	8	109	28
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	566	223	61	145								
Volume Left (vph)	9	71	13	8								
Volume Right (vph)	57	3	23	28								
Hadj (s)	0.19	0.28	0.06	0.09								
Departure Headway (s)	5.1	5.7	6.4	6.2								
Degree Utilization, x	0.80	0.35	0.11	0.25								
Capacity (veh/h)	689	599	506	529								
Control Delay (s)	25.6	11.7	10.2	11.3								
Approach Delay (s)	25.6	11.7	10.2	11.3								
Approach LOS	D	B	B	B								
<b>Intersection Summary</b>												
Delay	19.5											
Level of Service	C											
Intersection Capacity Utilization	54.1%		ICU Level of Service		A							
Analysis Period (min)	15											

Lanes, Volumes, Timings  
7: Esquesing Line/Fourth Line & 5 Sideroad

2023 FT - Phase 1 - AM Peak Hour  
08-18-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	7	438	16	80	156	3	10	120	110	63	320	36
Future Volume (vph)	7	438	16	80	156	3	10	120	110	63	320	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.995			0.999			0.938			0.988		
Fit Protected	0.999			0.983			0.998			0.993		
Satd. Flow (prot)	0	1701	0	0	1681	0	0	1647	0	0	1645	0
Fit Permitted	0.995			0.733			0.978			0.908		
Satd. Flow (perm)	0	1694	0	0	1254	0	0	1614	0	0	1504	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	3			1			62			7		
Link Speed (k/h)	60			60			60			70		
Link Distance (m)	1343.2			646.3			1994.7			464.9		
Travel Time (s)	80.6			38.8			119.7			23.9		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Adj. Flow (vph)	8	498	18	91	177	3	11	136	125	72	364	41
<b>Shared Lane Traffic (%)</b>												
Lane Group Flow (vph)	0	524	0	0	271	0	0	272	0	0	477	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0			3.7			3.7		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	1.6			1.6			1.6			1.6		
<b>Two way Left Turn Lane</b>												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
<b>Detector 1 Channel</b>												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	28.7			28.7			28.7			28.7		
Detector 2 Size(m)	1.8			1.8			1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
<b>Detector 2 Channel</b>												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	2			6			8			4		
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
<b>Switch Phase</b>												

Lanes, Volumes, Timings

2023 FT - Phase 1 - AM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

08-18-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	45.0	45.0		45.0	45.0		45.0	45.0		45.0	45.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	40.5	40.5		40.5	40.5		40.5	40.5		40.5	40.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		47.6			47.6			33.4			33.4	
Actuated g/C Ratio		0.53			0.53			0.37			0.37	
v/c Ratio		0.58			0.41			0.43			0.85	
Control Delay		19.4			16.9			17.0			39.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		19.4			16.9			17.0			39.6	
LOS		B			B			B			D	
Approach Delay		19.4			16.9			17.0			39.6	
Approach LOS		B			B			B			D	

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 50  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.85  
 Intersection Signal Delay: 24.8  
 Intersection Capacity Utilization 88.3%  
 Analysis Period (min) 15  
 Intersection LOS: C  
 ICU Level of Service E

Splits and Phases: 7: Esquesing Line/Fourth Line & 5 Sideroad

→ Ø2 (R)	↓ Ø4
← Ø6 (R)	↑ Ø8
45 s	45 s

HCM Signalized Intersection Capacity Analysis

2023 FT - Phase 1 - AM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

08-18-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	7	438	16	80	156	3	10	120	110	63	320	36
Future Volume (vph)	7	438	16	80	156	3	10	120	110	63	320	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		1.00			1.00			0.94			0.99	
Flt Protected		1.00			0.98			1.00			0.99	
Satd. Flow (prot)		1702			1681			1647			1645	
Flt Permitted		1.00			0.73			0.98			0.91	
Satd. Flow (perm)		1696			1254			1615			1504	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	8	498	18	91	177	3	11	136	125	72	364	41
RTOR Reduction (vph)	0	1	0	0	0	0	0	39	0	0	4	0
Lane Group Flow (vph)	0	523	0	0	271	0	0	233	0	0	473	0
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		47.6			47.6			33.4			33.4	
Effective Green, g (s)		47.6			47.6			33.4			33.4	
Actuated g/C Ratio		0.53			0.53			0.37			0.37	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		896			663			599			558	
v/s Ratio Prot												
v/s Ratio Perm		c0.31			0.22			0.14			c0.31	
v/c Ratio		0.58			0.41			0.39			0.85	
Uniform Delay, d1		14.4			12.7			20.8			26.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.8			1.9			0.4			11.4	
Delay (s)		17.2			14.6			21.2			37.4	
Level of Service		B			B			C			D	
Approach Delay (s)		17.2			14.6			21.2			37.4	
Approach LOS		B			B			C			D	

Intersection Summary

HCM 2000 Control Delay 23.7  
 HCM 2000 Volume to Capacity ratio 0.69  
 Actuated Cycle Length (s) 90.0  
 Intersection Capacity Utilization 88.3%  
 Analysis Period (min) 15  
 HCM 2000 Level of Service C  
 Sum of lost time (s) 9.0  
 ICU Level of Service E  
 Critical Lane Group

Lanes, Volumes, Timings  
101: Boston Church Road & East Access 1

2023 FT - Phase 1 - AM Peak Hour  
08-18-2021

	↙		↑		↘	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↙	↑	↘	↘	↑
Traffic Volume (vph)	56	6	47	189	46	161
Future Volume (vph)	56	6	47	189	46	161
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	15.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				75.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1674	1633	1642	1585	1825	1642
Fit Permitted	0.950				0.950	
Satd. Flow (perm)	1674	1633	1642	1585	1825	1642
Link Speed (k/h)	48		70			70
Link Distance (m)	173.1		269.9			780.7
Travel Time (s)	13.0		13.9			40.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	0%	17%	3%	0%	17%
Adj. Flow (vph)	61	7	51	205	50	175
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	7	51	205	50	175
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free		Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	21.7%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
101: Boston Church Road & East Access 1

2023 FT - Phase 1 - AM Peak Hour  
08-18-2021

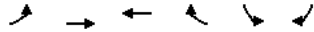
	↙		↑		↘	
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↙	↑	↘	↘	↑
Traffic Volume (veh/h)	56	6	47	189	46	161
Future Volume (Veh/h)	56	6	47	189	46	161
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	61	7	51	205	50	175
Pedestrians						
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	326	51			256	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	326	51			256	
tC, single (s)	6.5	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.3			2.2	
p0 queue free %	90	99			96	
cM capacity (veh/h)	629	1023			1321	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	61	7	51	205	50	175
Volume Left	61	0	0	0	50	0
Volume Right	0	7	0	205	0	0
cSH	629	1023	1700	1700	1321	1700
Volume to Capacity	0.10	0.01	0.03	0.12	0.04	0.10
Queue Length 95th (m)	2.4	0.2	0.0	0.0	0.9	0.0
Control Delay (s)	11.3	8.5	0.0	0.0	7.8	0.0
Lane LOS	B	A			A	
Approach Delay (s)	11.0		0.0		1.7	
Approach LOS	B					

Intersection Summary	
Average Delay	2.1
Intersection Capacity Utilization	21.7%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
102: James Snow Parkway N & East Access 2

2023 FT - Phase 1 - AM Peak Hour  
08-18-2021

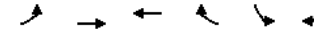


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↕↕	↕↕	↗	↘	↗
Traffic Volume (vph)	14	621	374	19	19	14
Future Volume (vph)	14	621	374	19	19	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0			80.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	100.0				2.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt				0.850	0.850	
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1106	3042	2920	816	913	892
Fit Permitted	0.950				0.950	
Satd. Flow (perm)	1106	3042	2920	816	913	892
Link Speed (k/h)		70	70		48	
Link Distance (m)		547.4	558.8		147.4	
Travel Time (s)		28.2	28.7		11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	65%	20%	25%	100%	100%	83%
Adj. Flow (vph)	15	675	407	21	21	15
Shared Lane Traffic (%)						
Lane Group Flow (vph)	15	675	407	21	21	15
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	27.2%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis  
102: James Snow Parkway N & East Access 2

2023 FT - Phase 1 - AM Peak Hour  
08-18-2021



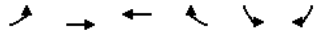
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↕↕	↕↕	↗	↘	↗
Traffic Volume (veh/h)	14	621	374	19	19	14
Future Volume (Veh/h)	14	621	374	19	19	14
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	675	407	21	21	15
Pedestrians						
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	428				774	204
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	428				774	204
tC, single (s)	5.4				8.8	8.6
tC, 2 stage (s)						
tF (s)	2.9				4.5	4.1
p0 queue free %	98				89	98
cM capacity (veh/h)	784				184	602

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	15	338	338	204	204	21	21	15
Volume Left	15	0	0	0	0	0	21	0
Volume Right	0	0	0	0	0	0	21	15
cSH	784	1700	1700	1700	1700	1700	184	602
Volume to Capacity	0.02	0.20	0.20	0.12	0.12	0.01	0.11	0.02
Queue Length 95th (m)	0.4	0.0	0.0	0.0	0.0	0.0	2.9	0.6
Control Delay (s)	9.7	0.0	0.0	0.0	0.0	0.0	27.0	11.1
Lane LOS	A						D	B
Approach Delay (s)	0.2			0.0			20.4	
Approach LOS							C	

Intersection Summary	
Average Delay	0.8
Intersection Capacity Utilization	27.2%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings  
103: James Snow Parkway N & East Access 3

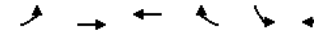
2023 FT - Phase 1 - AM Peak Hour  
08-18-2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕	↔	↔	↔
Traffic Volume (vph)	9	631	384	18	18	9
Future Volume (vph)	9	631	384	18	18	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0			80.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	100.0				2.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Friction				0.850	0.850	
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1217	3042	2920	1192	1074	816
Fit Permitted	0.508				0.950	
Satd. Flow (perm)	651	3042	2920	1192	1074	816
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				20		10
Link Speed (k/h)		70	70		48	
Link Distance (m)		558.8	346.4		152.7	
Travel Time (s)		28.7	17.8		11.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	50%	20%	25%	37%	70%	100%
Adj. Flow (vph)	10	686	417	20	20	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	10	686	417	20	20	10
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	6.1	30.5	30.5	6.1	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8	6.1	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			

Lanes, Volumes, Timings  
103: James Snow Parkway N & East Access 3

2023 FT - Phase 1 - AM Peak Hour  
08-18-2021

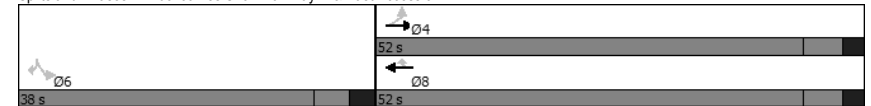


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.6	30.6	30.6	30.6	33.5	33.5
Total Split (s)	52.0	52.0	52.0	52.0	38.0	38.0
Total Split (%)	57.8%	57.8%	57.8%	57.8%	42.2%	42.2%
Maximum Green (s)	45.4	45.4	45.4	45.4	31.5	31.5
Yellow Time (s)	4.2	4.2	4.2	4.2	3.7	3.7
All-Red Time (s)	2.4	2.4	2.4	2.4	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	64.9	64.9	64.9	64.9	7.0	7.0
Actuated g/C Ratio	0.89	0.89	0.89	0.89	0.10	0.10
v/c Ratio	0.02	0.25	0.16	0.02	0.19	0.11
Control Delay	2.8	2.3	2.0	1.4	36.7	21.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.8	2.3	2.0	1.4	36.7	21.0
LOS	A	A	A	A	D	C
Approach Delay		2.3	2.0		31.5	
Approach LOS		A	A		C	

Intersection Summary

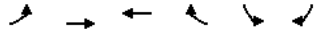
Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 72.7  
 Natural Cycle: 65  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.25  
 Intersection Signal Delay: 2.9  
 Intersection Capacity Utilization 32.5%  
 Analysis Period (min) 15  
 Intersection LOS: A  
 ICU Level of Service A

Splits and Phases: 103: James Snow Parkway N & East Access 3



HCM Signalized Intersection Capacity Analysis  
 103: James Snow Parkway N & East Access 3

2023 FT - Phase 1 - AM Peak Hour  
 08-18-2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↘↘	↘↘	↘	↘	↘
Traffic Volume (vph)	9	631	384	18	18	9
Future Volume (vph)	9	631	384	18	18	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1217	3042	2920	1192	1074	816
Fit Permitted	0.51	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	651	3042	2920	1192	1074	816
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	686	417	20	20	10
RTOR Reduction (vph)	0	0	0	4	0	10
Lane Group Flow (vph)	10	686	417	16	20	0
Heavy Vehicles (%)	50%	20%	25%	37%	70%	100%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			
Permitted Phases	4			8	6	6
Actuated Green, G (s)	60.6	60.6	60.6	60.6	3.1	3.1
Effective Green, g (s)	60.6	60.6	60.6	60.6	3.1	3.1
Actuated g/C Ratio	0.79	0.79	0.79	0.79	0.04	0.04
Clearance Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	513	2400	2304	940	43	32
v/s Ratio Prot		c0.23	0.14			
v/s Ratio Perm	0.02			0.01	c0.02	0.00
v/c Ratio	0.02	0.29	0.18	0.02	0.47	0.01
Uniform Delay, d1	1.7	2.2	2.0	1.7	36.0	35.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.3	0.2	0.0	7.8	0.2
Delay (s)	1.8	2.5	2.2	1.8	43.8	35.5
Level of Service	A	A	A	A	D	D
Approach Delay (s)		2.5	2.1		41.0	
Approach LOS		A	A		D	
<b>Intersection Summary</b>						
HCM 2000 Control Delay			3.4		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.29			
Actuated Cycle Length (s)			76.8		Sum of lost time (s)	13.1
Intersection Capacity Utilization			32.5%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings

2023 FT - Phase 1 - PM Peak Hour

1: Regional Road 25 & 5 Sideroad

08-18-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	119	113	75	265	46	191	667	86	11	308	66
Future Volume (vph)	91	119	113	75	265	46	191	667	86	11	308	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	70.0		0.0	75.0		70.0	35.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	100.0			100.0			75.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.927			0.978				0.850		0.974	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1601	1525	0	1342	1596	0	1225	2920	1338	1601	3031	0
Fit Permitted	0.270			0.606			0.428			0.382		
Satd. Flow (perm)	455	1525	0	856	1596	0	552	2920	1338	644	3031	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					8				91			23
Link Speed (k/h)		60			60				70			70
Link Distance (m)		573.6			536.0				986.0			203.5
Travel Time (s)		34.4			32.2				50.7			10.5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Adj. Flow (vph)	97	127	120	80	282	49	203	710	91	12	328	70
Shared Lane Traffic (%)												
Lane Group Flow (vph)	97	247	0	80	331	0	203	710	91	12	398	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7				3.7			3.7
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		1.6			1.6				1.6			1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1		1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0		8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0		-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0		-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0		9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA	Perm	Perm		NA
Protected Phases	3	8		4	4		5	2	2	6		6
Permitted Phases	8			4			2		2	6		
Detector Phase	3	8		4	4		5	2	2	6		6
Switch Phase												
Minimum Initial (s)	7.0	10.0		10.0	10.0		7.0	20.0	20.0	20.0		20.0
Minimum Split (s)	11.0	38.0		38.0	38.0		11.0	38.2	38.2	38.2		38.2

Lanes, Volumes, Timings

2023 FT - Phase 1 - PM Peak Hour

1: Regional Road 25 & 5 Sideroad

08-18-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	20.0	54.0		34.0	34.0		18.0	56.2	56.2	38.2	38.2	
Total Split (%)	18.1%	49.0%		30.9%	30.9%		16.3%	51.0%	51.0%	34.7%	34.7%	
Maximum Green (s)	16.0	48.0		28.0	28.0		14.0	50.0	50.0	32.0	32.0	
Yellow Time (s)	3.0	3.7		3.7	3.7		3.0	4.2	4.2	4.2	4.2	
All-Red Time (s)	1.0	2.3		2.3	2.3		1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0		6.0	6.0		4.0	6.2	6.2	6.2	6.2	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.7		3.7	3.7		3.0	3.6	3.6	4.2	4.2	
Recall Mode	None	None		None	None		None	Ped	Ped	Ped	Ped	
Walk Time (s)		7.0			7.0			7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		25.0			25.0			25.0	25.0	25.0	25.0	
Pedestrian Calls (#/hr)		0			0			0	0	0	0	
Act Effect Green (s)	36.7	34.7		24.1	24.1		52.0	49.8	49.8	32.6	32.6	
Actuated g/C Ratio	0.38	0.36		0.25	0.25		0.54	0.51	0.51	0.34	0.34	
v/c Ratio	0.34	0.45		0.38	0.82		0.53	0.47	0.12	0.06	0.38	
Control Delay	22.2	25.9		37.8	52.5		20.5	18.2	3.9	27.2	26.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	22.2	25.9		37.8	52.5		20.5	18.2	3.9	27.2	26.6	
LOS	C	C		D	D		C	B	A	C	C	
Approach Delay		24.9			49.6			17.4			26.6	
Approach LOS		C			D			B			C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	110.2											
Actuated Cycle Length:	96.9											
Natural Cycle:	100											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.82											
Intersection Signal Delay:	26.4						Intersection LOS: C					
Intersection Capacity Utilization:	76.9%						ICU Level of Service D					
Analysis Period (min):	15											
Splits and Phases:	1: Regional Road 25 & 5 Sideroad											



HCM Signalized Intersection Capacity Analysis  
1: Regional Road 25 & 5 Sideroad

2023 FT - Phase 1 - PM Peak Hour  
08-18-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	91	119	113	75	265	46	191	667	86	11	308	66
Future Volume (vph)	91	119	113	75	265	46	191	667	86	11	308	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	6.0	6.0	4.0	6.2	6.2	6.2	6.2	6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95
Frt	1.00	0.93	1.00	0.98	1.00	1.00	0.85	1.00	0.97	1.00	0.97	1.00
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1601	1525	1342	1595	1225	2920	1338	1601	3030	1601	3030	1601
Fit Permitted	0.27	1.00	0.61	1.00	0.43	1.00	1.00	0.38	1.00	0.27	1.00	0.27
Satd. Flow (perm)	455	1525	856	1595	551	2920	1338	643	3030	455	1525	856
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	97	127	120	80	282	49	203	710	91	12	328	70
RTOR Reduction (vph)	0	0	0	0	6	0	0	0	45	0	15	0
Lane Group Flow (vph)	97	247	0	80	325	0	203	710	46	12	383	0
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	Perm	Perm	NA	NA	NA	NA
Protected Phases	3	8		4		5	2				6	
Permitted Phases	8			4		2	2	6				
Actuated Green, G (s)	35.7	35.7	24.1	24.1	49.8	49.8	49.8	32.7	32.7			
Effective Green, g (s)	35.7	35.7	24.1	24.1	49.8	49.8	49.8	32.7	32.7			
Actuated g/C Ratio	0.37	0.37	0.25	0.25	0.51	0.51	0.51	0.33	0.33			
Clearance Time (s)	4.0	6.0	6.0	6.0	4.0	6.2	6.2	6.2	6.2			
Vehicle Extension (s)	3.0	3.7	3.7	3.7	3.0	3.6	3.6	4.2	4.2			
Lane Grp Cap (vph)	255	557	211	393	371	1488	682	215	1014			
v/s Ratio Prot	0.03	c0.16		c0.20		c0.07	0.24		0.13			
v/s Ratio Perm	0.11		0.09		c0.21		0.03	0.02				
v/c Ratio	0.38	0.44	0.38	0.83	0.55	0.48	0.07	0.06	0.38			
Uniform Delay, d1	22.2	23.5	30.6	34.8	14.4	15.5	12.2	22.0	24.7			
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	1.0	0.7	1.4	13.7	1.7	0.3	0.1	0.2	0.4			
Delay (s)	23.1	24.2	32.0	48.6	16.0	15.8	12.2	22.2	25.1			
Level of Service	C	C	C	D	B	B	B	C	C			
Approach Delay (s)		23.9		45.3		15.5		25.0				
Approach LOS		C		D		B		C				
<b>Intersection Summary</b>												
HCM 2000 Control Delay		24.3						C				
HCM 2000 Volume to Capacity ratio		0.65										
Actuated Cycle Length (s)		97.7		Sum of lost time (s)			20.2					
Intersection Capacity Utilization		76.9%		ICU Level of Service			D					
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings

2023 FT - Phase 1 - PM Peak Hour  
08-18-2021

2: Regional Road 25 & James Snow Parkway N

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	30	168	162	239	110	223	78	771	176	137	433	5
Future Volume (vph)	30	168	162	239	110	223	78	771	176	137	433	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		115.0	85.0		35.0	30.0		0.0	75.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	40.0			90.0			70.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor									0.99	1.00		
Frt			0.850			0.850			0.850		0.998	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1217	2684	1103	1259	3147	1192	1534	2897	1458	1472	2908	0
Fit Permitted	0.681			0.643			0.491			0.221		
Satd. Flow (perm)	872	2684	1103	852	3147	1192	793	2897	1439	342	2908	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			167			230			181			1
Link Speed (k/h)		60			60		70				70	
Link Distance (m)		452.4			1065.5		592.1				986.0	
Travel Time (s)		27.1			63.9		30.5				50.7	
Confl. Peds. (#/hr)								1		1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Adj. Flow (vph)	31	173	167	246	113	230	80	795	181	141	446	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	173	167	246	113	230	80	795	181	141	451	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
<b>Two way Left Turn Lane</b>												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
<b>Detector Template</b>												
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.2	9.0	9.0	9.0	9.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
<b>Detector 1 Channel</b>												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	NA
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	
<b>Switch Phase</b>												

Lanes, Volumes, Timings

2023 FT - Phase 1 - PM Peak Hour

2: Regional Road 25 & James Snow Parkway N

08-18-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	43.6	43.6	43.6	43.6	43.6	43.6	11.0	42.9	42.9	11.0	35.9	
Total Split (s)	55.6	55.6	55.6	55.6	55.6	55.6	15.0	76.9	76.9	15.0	76.9	
Total Split (%)	37.7%	37.7%	37.7%	37.7%	37.7%	37.7%	10.2%	52.1%	52.1%	10.2%	52.1%	
Maximum Green (s)	49.0	49.0	49.0	49.0	49.0	49.0	11.0	70.0	70.0	11.0	70.0	
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	4.2	4.2	3.0	4.2	
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	1.0	2.7	2.7	1.0	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	30.0	30.0	30.0	30.0	30.0	30.0		29.0	29.0		22.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0	0		0	
Act Effect Green (s)	39.9	39.9	39.9	39.9	39.9	39.9	53.4	41.4	41.4	57.0	45.9	
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.36	0.36	0.49	0.38	0.38	0.52	0.42	
v/c Ratio	0.10	0.18	0.33	0.80	0.10	0.40	0.18	0.73	0.28	0.50	0.37	
Control Delay	26.5	25.6	6.0	53.1	24.9	5.7	15.0	34.4	4.6	20.6	25.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.5	25.6	6.0	53.1	24.9	5.7	15.0	34.4	4.6	20.6	25.1	
LOS	C	C	A	D	C	A	B	C	A	C	C	
Approach Delay		16.8			29.2			27.8			24.0	
Approach LOS		B			C			C			C	

Intersection Summary

Area Type:	Other
Cycle Length:	147.5
Actuated Cycle Length:	109.8
Natural Cycle:	100
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.80
Intersection Signal Delay:	25.7
Intersection LOS:	C
Intersection Capacity Utilization:	70.8%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 2: Regional Road 25 & James Snow Parkway N

Ø1	Ø2	Ø4
15 s	76.9 s	55.6 s
Ø5	Ø6	Ø8
15 s	76.9 s	55.6 s

HCM Signalized Intersection Capacity Analysis

2023 FT - Phase 1 - PM Peak Hour

2: Regional Road 25 & James Snow Parkway N

08-18-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	30	168	162	239	110	223	78	771	176	137	433	5
Future Volume (vph)	30	168	162	239	110	223	78	771	176	137	433	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1217	2684	1103	1259	3147	1192	1534	2897	1439	1472	2909	
Fit Permitted	0.68	1.00	1.00	0.64	1.00	1.00	0.49	1.00	1.00	0.22	1.00	
Satd. Flow (perm)	872	2684	1103	851	3147	1192	793	2897	1439	343	2909	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	31	173	167	246	113	230	80	795	181	141	446	5
RTOR Reduction (vph)	0	0	107	0	0	147	0	0	111	0	1	0
Lane Group Flow (vph)	31	173	60	246	113	83	80	795	70	141	450	0
Conf. Peds. (#/hr)									1	1		
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	39.9	39.9	39.9	39.9	39.9	39.9	49.5	42.6	42.6	56.3	46.0	
Effective Green, g (s)	39.9	39.9	39.9	39.9	39.9	39.9	49.5	42.6	42.6	56.3	46.0	
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.36	0.36	0.45	0.39	0.39	0.51	0.42	
Clearance Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	4.0	6.9	6.9	4.0	6.9	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	315	970	399	307	1138	431	402	1118	555	280	1213	
v/s Ratio Prot		0.06			0.04		0.01	c0.27		c0.05	0.15	
v/s Ratio Perm	0.04		0.05	c0.29		0.07	0.08		0.05	0.21		
v/c Ratio	0.10	0.18	0.15	0.80	0.10	0.19	0.20	0.71	0.13	0.50	0.37	
Uniform Delay, d1	23.3	24.0	23.8	31.6	23.3	24.2	17.7	28.6	21.8	16.4	22.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.2	0.4	15.7	0.1	0.5	0.2	2.7	0.2	1.4	0.4	
Delay (s)	23.6	24.2	24.1	47.3	23.4	24.6	17.9	31.3	22.1	17.8	22.6	
Level of Service	C	C	C	D	C	C	B	C	C	B	C	
Approach Delay (s)		24.1			33.9			28.7			21.4	
Approach LOS		C			C			C			C	

Intersection Summary

HCM 2000 Control Delay	27.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	110.3	Sum of lost time (s)	17.5
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

2023 FT - Phase 1 - PM Peak Hour

3: Boston Church Road & James Snow Parkway N

08-18-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	119	320	73	29	359	63	145	45	28	157	29	84
Future Volume (vph)	119	320	73	29	359	63	145	45	28	157	29	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		0.0	70.0		0.0	60.0		25.0	60.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			70.0			90.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.972			0.978				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1508	3007	0	1415	2955	0	1113	3650	944	1534	3147	1498
Fit Permitted	0.370			0.498			0.680			0.723		
Satd. Flow (perm)	587	3007	0	742	2955	0	797	3650	944	1167	3147	1498
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			15				90			93
Link Speed (k/h)		70			70				60			60
Link Distance (m)		358.9			548.1				792.9			198.3
Travel Time (s)		18.5			28.2				47.6			11.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%
Adj. Flow (vph)	132	356	81	32	399	70	161	50	31	174	32	93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	437	0	32	469	0	161	50	31	174	32	93
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7				3.7			3.7
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		1.6			1.6				1.6			1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99		0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8	8	7	4	4
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0		7.0	20.0		7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	11.0	33.5		11.0	33.5		11.0	31.6	31.6	11.0	31.6	31.6

Lanes, Volumes, Timings

2023 FT - Phase 1 - PM Peak Hour

3: Boston Church Road & James Snow Parkway N

08-18-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	17.0	50.5		17.0	50.5		24.0	48.6	48.6	24.0	48.6	48.6
Total Split (%)	12.1%	36.0%		12.1%	36.0%		17.1%	34.7%	34.7%	17.1%	34.7%	34.7%
Maximum Green (s)	13.0	44.0		13.0	44.0		20.0	41.0	41.0	20.0	41.0	41.0
Yellow Time (s)	3.0	3.7		3.0	3.7		3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	1.0	2.8		1.0	2.8		1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		7.0			7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		20.0			20.0			17.0	17.0		17.0	17.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effect Green (s)	40.7	32.0		33.1	23.0		29.1	16.6	16.6	27.2	15.7	15.7
Actuated g/C Ratio	0.51	0.40		0.41	0.29		0.36	0.21	0.21	0.34	0.20	0.20
v/c Ratio	0.31	0.36		0.09	0.55		0.47	0.07	0.12	0.38	0.05	0.25
Control Delay	15.6	21.0		13.9	28.7		22.1	31.1	0.9	19.3	32.6	10.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.6	21.0		13.9	28.7		22.1	31.1	0.9	19.3	32.6	10.2
LOS	B	C		B	C		C	C	A	B	C	B
Approach Delay		19.8			27.7			21.2			17.9	
Approach LOS		B			C			C			B	
Intersection Summary												
Area Type:	Other											
Cycle Length:	140.1											
Actuated Cycle Length:	80.2											
Natural Cycle:	90											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.55											
Intersection Signal Delay:	22.1						Intersection LOS: C					
Intersection Capacity Utilization:	53.7%						ICU Level of Service A					
Analysis Period (min):	15											
Splits and Phases:	3: Boston Church Road & James Snow Parkway N											

HCM Signalized Intersection Capacity Analysis  
3: Boston Church Road & James Snow Parkway N

2023 FT - Phase 1 - PM Peak Hour  
08-18-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	119	320	73	29	359	63	145	45	28	157	29	84
Future Volume (vph)	119	320	73	29	359	63	145	45	28	157	29	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1508	3007		1415	2954		1113	3650	944	1534	3147	1498
Fit Permitted	0.37	1.00		0.50	1.00		0.68	1.00	1.00	0.72	1.00	1.00
Satd. Flow (perm)	587	3007		742	2954		797	3650	944	1167	3147	1498
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	132	356	81	32	399	70	161	50	31	174	32	93
RTOR Reduction (vph)	0	12	0	0	11	0	0	0	27	0	0	81
Lane Group Flow (vph)	132	425	0	32	458	0	161	50	4	174	32	12
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		4
Actuated Green, G (s)	40.0	32.0		29.0	25.0		26.4	12.1	12.1	24.6	11.2	11.2
Effective Green, g (s)	40.0	32.0		29.0	25.0		26.4	12.1	12.1	24.6	11.2	11.2
Actuated g/C Ratio	0.48	0.38		0.35	0.30		0.32	0.14	0.14	0.29	0.13	0.13
Clearance Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	402	1151		289	883		305	528	136	402	421	200
v/s Ratio Prot	c0.04	0.14		0.01	c0.16		c0.09	0.01		0.07	0.01	
v/s Ratio Perm	0.11			0.03			c0.08		0.00	0.06		0.01
v/c Ratio	0.33	0.37		0.11	0.52		0.53	0.09	0.03	0.43	0.08	0.06
Uniform Delay, d1	12.8	18.5		18.2	24.3		22.9	31.0	30.7	23.5	31.7	31.6
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	0.5	0.4		0.2	1.0		1.6	0.2	0.2	0.7	0.2	0.3
Delay (s)	13.3	19.0		18.4	25.3		24.5	31.2	30.9	24.2	31.8	31.9
Level of Service	B	B		B	C		C	C	C	C	C	C
Approach Delay (s)		17.6			24.9			26.7			27.4	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	83.6	Sum of lost time (s)	22.1
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		

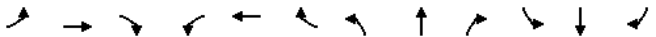
Lanes, Volumes, Timings  
4: Esquesing Line & James Snow Parkway N

2023 FT - Phase 1 - PM Peak Hour  
08-18-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	10	434	75	9	352	47	105	326	30	27	157	8
Future Volume (vph)	10	434	75	9	352	47	105	326	30	27	157	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		0.0	70.0		0.0	40.0		25.0	25.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			80.0			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.978			0.982			0.850			0.850	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1547	2961	0	1644	2860	0	1644	1731	1396	1615	1685	1396
Fit Permitted	0.491			0.393			0.645			0.462		
Satd. Flow (perm)	799	2961	0	680	2860	0	1116	1731	1396	785	1685	1396
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			13				74			74
Link Speed (k/h)		70			70			60				60
Link Distance (m)		346.4			1421.7			292.4				1994.7
Travel Time (s)		17.8			73.1			17.5				119.7
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	11%	17%	13%	14%	17%
Adj. Flow (vph)	11	493	85	10	400	53	119	370	34	31	178	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	578	0	10	453	0	119	370	34	31	178	9
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8		2	2	2	6		6
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6		6
Switch Phase												
Minimum Initial (s)	7.0	15.0		7.0	15.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	11.0	30.6		11.0	30.6		33.5	33.5	33.5	33.5	33.5	33.5

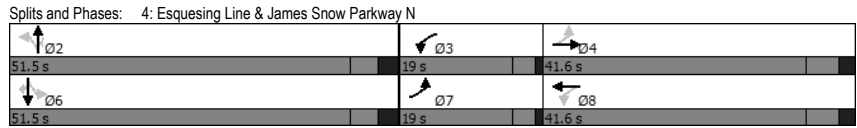
Lanes, Volumes, Timings  
4: Esquesing Line & James Snow Parkway N

2023 FT - Phase 1 - PM Peak Hour  
08-18-2021



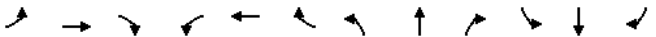
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	19.0	41.6		19.0	41.6		51.5	51.5	51.5	51.5	51.5	51.5
Total Split (%)	16.9%	37.1%		16.9%	37.1%		45.9%	45.9%	45.9%	45.9%	45.9%	45.9%
Maximum Green (s)	15.0	35.0		15.0	35.0		45.0	45.0	45.0	45.0	45.0	45.0
Yellow Time (s)	3.0	4.2		3.0	4.2		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	2.4		1.0	2.4		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		17.0			17.0		20.0	20.0	20.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	24.5	20.9		24.5	20.9		24.3	24.3	24.3	24.3	24.3	24.3
Actuated g/C Ratio	0.40	0.35		0.40	0.35		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.03	0.56		0.03	0.46		0.27	0.53	0.06	0.10	0.26	0.01
Control Delay	11.2	18.9		11.2	17.6		16.4	18.8	0.9	15.1	15.2	0.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.2	18.9		11.2	17.6		16.4	18.8	0.9	15.1	15.2	0.0
LOS	B	B		B	B		B	B	A	B	B	A
Approach Delay		18.7			17.4			17.1			14.6	
Approach LOS		B			B			B			B	

Intersection Summary	
Area Type:	Other
Cycle Length:	112.1
Actuated Cycle Length:	60.5
Natural Cycle:	80
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.56
Intersection Signal Delay:	17.4
Intersection Capacity Utilization:	64.5%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	C



HCM Signalized Intersection Capacity Analysis  
4: Esquesing Line & James Snow Parkway N

2023 FT - Phase 1 - PM Peak Hour  
08-18-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	434	75	9	352	47	105	326	30	27	157	8
Future Volume (vph)	10	434	75	9	352	47	105	326	30	27	157	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1547	2961		1644	2862		1644	1731	1396	1615	1685	1396
Flt Permitted	0.49	1.00		0.39	1.00		0.64	1.00	1.00	0.46	1.00	1.00
Satd. Flow (perm)	799	2961		680	2862		1116	1731	1396	785	1685	1396
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	493	85	10	400	53	119	370	34	31	178	9
RTOR Reduction (vph)	0	12	0	0	9	0	0	0	21	0	0	6
Lane Group Flow (vph)	11	566	0	10	444	0	119	370	13	31	178	3
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	11%	17%	13%	14%	17%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		6		6	
Actuated Green, G (s)	21.8	20.9		21.8	20.9		24.3	24.3	24.3	24.3	24.3	24.3
Effective Green, g (s)	21.8	20.9		21.8	20.9		24.3	24.3	24.3	24.3	24.3	24.3
Actuated g/C Ratio	0.34	0.33		0.34	0.33		0.38	0.38	0.38	0.38	0.38	0.38
Clearance Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	286	979		248	946		429	665	536	301	647	536
v/s Ratio Prot	0.00	c0.19		c0.00	0.16			c0.21			0.11	
v/s Ratio Perm	0.01			0.01			0.11		0.01	0.04		0.00
v/c Ratio	0.04	0.58		0.04	0.47		0.28	0.56	0.02	0.10	0.28	0.01
Uniform Delay, d1	13.7	17.5		13.7	16.8		13.4	15.2	12.1	12.5	13.4	12.0
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	1.3		0.1	0.8		0.7	1.7	0.0	0.3	0.5	0.0
Delay (s)	13.7	18.8		13.7	17.5		14.1	16.9	12.1	12.8	13.9	12.0
Level of Service	B	B		B	B		B	B	B	B	B	B
Approach Delay (s)		18.7			17.4			16.0			13.6	
Approach LOS		B			B			B			B	

Intersection Summary	
HCM 2000 Control Delay	17.0
HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56
Actuated Cycle Length (s)	63.2
Sum of lost time (s)	17.1
Intersection Capacity Utilization	64.5%
ICU Level of Service	C
Analysis Period (min)	15
c Critical Lane Group	

Lanes, Volumes, Timings

2023 FT - Phase 1 - PM Peak Hour

5: James Snow Parkway N & Steeles Avenue East

08-18-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	384	423	363	678	128	387	269	167	94	389	13
Future Volume (vph)	11	384	423	363	678	128	387	269	167	94	389	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	122.0		72.0	170.0		130.0	105.0		260.0	160.0		0.0
Storage Lanes	1		1	2		1	2		1	1		0
Taper Length (m)	60.0			70.0			80.0			80.0		
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	0.95
Fit			0.850			0.850			0.850		0.995	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3579	1601	3471	3579	1601	3471	3579	1601	1789	3561	0
Fit Permitted	0.372			0.950			0.950			0.573		
Satd. Flow (perm)	701	3579	1601	3471	3579	1601	3471	3579	1601	1079	3561	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			350			139			182			2
Link Speed (k/h)		60			70			60			70	
Link Distance (m)		729.0			881.4			342.7			1421.7	
Travel Time (s)		43.7			45.3			20.6			73.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	417	460	395	737	139	421	292	182	102	423	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	417	460	395	737	139	421	292	182	102	437	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.0			4.0			4.0			4.0	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2		6		6		8	4		
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	7.0	22.0	22.0	7.0	22.0	22.0	7.0	15.0	15.0	7.0	15.0	
Minimum Split (s)	11.0	47.2	47.2	12.0	47.2	47.2	12.0	46.3	46.3	11.0	46.3	
Total Split (s)	15.0	55.2	55.2	26.0	66.2	66.2	29.0	59.0	59.0	24.0	54.0	

Lanes, Volumes, Timings

2023 FT - Phase 1 - PM Peak Hour

5: James Snow Parkway N & Steeles Avenue East

08-18-2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	9.1%	33.6%	33.6%	15.8%	40.3%	40.3%	17.7%	35.9%	14.6%	32.9%		
Maximum Green (s)	11.0	48.0	48.0	21.0	59.0	59.0	24.0	51.7	51.7	20.0	46.7	
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	4.2	4.2	3.0	4.2	
All-Red Time (s)	1.0	3.5	3.5	2.0	3.5	3.5	2.0	3.1	3.1	1.0	3.1	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	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	5.0	5.0	3.0	5.0	
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		33.0	33.0		33.0	33.0		32.0	32.0		32.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effect Green (s)	34.3	23.9	23.9	18.5	45.7	45.7	19.0	31.6	31.6	34.4	21.4	
Actuated g/C Ratio	0.32	0.22	0.22	0.17	0.42	0.42	0.18	0.29	0.29	0.32	0.20	
v/c Ratio	0.04	0.52	0.73	0.66	0.49	0.18	0.69	0.28	0.30	0.25	0.62	
Control Delay	19.2	40.9	18.2	49.0	25.4	4.8	49.1	30.6	5.9	20.3	44.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	19.2	40.9	18.2	49.0	25.4	4.8	49.1	30.6	5.9	20.3	44.3	
LOS	B	D	B	D	C	A	D	C	A	C	D	
Approach Delay		28.9			30.5			34.3			39.7	
Approach LOS		C			C			C			D	
Intersection Summary												
Area Type:	Other											
Cycle Length:	164.2											
Actuated Cycle Length:	107.7											
Natural Cycle:	130											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.73											
Intersection Signal Delay:	32.4						Intersection LOS: C					
Intersection Capacity Utilization:	72.6%						ICU Level of Service C					
Analysis Period (min):	15											
Splits and Phases:	5: James Snow Parkway N & Steeles Avenue East											

HCM Signalized Intersection Capacity Analysis  
5: James Snow Parkway N & Steeles Avenue East

2023 FT - Phase 1 - PM Peak Hour  
08-18-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	11	384	423	363	678	128	387	269	167	94	389	13
Future Volume (vph)	11	384	423	363	678	128	387	269	167	94	389	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	
Fit	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	3579	1601	3471	3579	1601	3471	3579	1601	1789	3561	
Fit Permitted	0.37	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.57	1.00	
Satd. Flow (perm)	700	3579	1601	3471	3579	1601	3471	3579	1601	1080	3561	
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)	12	417	460	395	737	139	421	292	182	102	423	14
RTOR Reduction (vph)	0	0	263	0	0	82	0	0	130	0	2	0
Lane Group Flow (vph)	12	417	197	395	737	57	421	292	52	102	435	0
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2			6			8		4	
Actuated Green, G (s)	28.6	27.4	27.4	18.5	45.7	45.7	19.0	31.7	31.7	31.1	21.4	
Effective Green, g (s)	28.6	27.4	27.4	18.5	45.7	45.7	19.0	31.7	31.7	31.1	21.4	
Actuated g/C Ratio	0.26	0.25	0.25	0.17	0.41	0.41	0.17	0.29	0.29	0.28	0.19	
Clearance Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	192	885	395	579	1476	660	595	1023	458	365	687	
v/s Ratio Prot	0.00	0.12		c0.11	c0.21		c0.12	0.08		0.02	c0.12	
v/s Ratio Perm	0.02		0.12			0.04			0.03		0.05	
v/c Ratio	0.06	0.47	0.50	0.68	0.50	0.09	0.71	0.29	0.11	0.28	0.63	
Uniform Delay, d1	30.7	35.5	35.8	43.4	24.1	19.8	43.3	30.7	29.2	30.4	41.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.4	1.0	3.3	0.3	0.1	3.8	0.3	0.2	0.4	2.7	
Delay (s)	30.8	35.9	36.8	46.7	24.4	19.9	47.1	31.1	29.4	30.8	43.8	
Level of Service	C	D	D	D	C	B	D	C	C	C	D	
Approach Delay (s)		36.3			30.8			38.3			41.3	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	35.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	110.8	Sum of lost time (s)	24.5
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
6: Boston Church Road/3 Line & 5 Sideroad

2023 FT - Phase 1 - PM Peak Hour  
08-18-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	23	179	22	32	303	2	47	71	98	5	34	6
Future Volume (vph)	23	179	22	32	303	2	47	71	98	5	34	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit		0.987			0.999			0.939			0.982	
Fit Protected		0.995			0.995			0.989			0.994	
Satd. Flow (prot)	0	1650	0	0	1688	0	0	1567	0	0	1653	0
Fit Permitted		0.995			0.995			0.989			0.994	
Satd. Flow (perm)	0	1650	0	0	1688	0	0	1567	0	0	1653	0
Link Speed (k/h)		60			60			70			60	
Link Distance (m)		541.0			1343.2			780.7			496.0	
Travel Time (s)		32.5			80.6			40.2			29.8	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	13%	13%	27%	13%	13%	33%	13%	17%	12%	43%	9%	13%
Adj. Flow (vph)	26	206	25	37	348	2	54	82	113	6	39	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	257	0	0	387	0	0	249	0	0	52	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 48.8%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
6: Boston Church Road/3 Line & 5 Sideroad

2023 FT - Phase 1 - PM Peak Hour  
08-18-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	23	179	22	32	303	2	47	71	98	5	34	6
Future Volume (vph)	23	179	22	32	303	2	47	71	98	5	34	6
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	26	206	25	37	348	2	54	82	113	6	39	7
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	257	387	249	52								
Volume Left (vph)	26	37	54	6								
Volume Right (vph)	25	2	113	7								
Hadj (s)	0.21	0.24	0.01	0.17								
Departure Headway (s)	5.7	5.5	5.8	6.4								
Degree Utilization, x	0.40	0.59	0.40	0.09								
Capacity (veh/h)	593	628	567	461								
Control Delay (s)	12.5	16.1	12.6	10.1								
Approach Delay (s)	12.5	16.1	12.6	10.1								
Approach LOS	B	C	B	B								
<b>Intersection Summary</b>												
Delay	13.9											
Level of Service	B											
Intersection Capacity Utilization	48.8%		ICU Level of Service		A							
Analysis Period (min)	15											

Lanes, Volumes, Timings  
7: Esquesing Line/Fourth Line & 5 Sideroad

2023 FT - Phase 1 - PM Peak Hour  
08-18-2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	42	231	11	65	280	18	23	282	78	4	116	39
Future Volume (vph)	42	231	11	65	280	18	23	282	78	4	116	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.995			0.993			0.972			0.967		
Fit Protected	0.993			0.991			0.997			0.999		
Satd. Flow (prot)	0	1631	0	0	1667	0	0	1682	0	0	1624	0
Fit Permitted	0.901			0.885			0.976			0.989		
Satd. Flow (perm)	0	1480	0	0	1488	0	0	1647	0	0	1608	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	3			4			18			22		
Link Speed (k/h)	60			60			60			70		
Link Distance (m)	1343.2			646.3			1994.7			464.9		
Travel Time (s)	80.6			38.8			119.7			23.9		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Adj. Flow (vph)	48	263	13	74	318	20	26	320	89	5	132	44
<b>Shared Lane Traffic (%)</b>												
Lane Group Flow (vph)	0	324	0	0	412	0	0	435	0	0	181	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0			3.7			3.7		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	1.6			1.6			1.6			1.6		
<b>Two way Left Turn Lane</b>												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
<b>Detector 1 Channel</b>												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
<b>Detector 2 Channel</b>												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
<b>Switch Phase</b>												



Lanes, Volumes, Timings

2023 FT - Phase 1 - PM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

08-18-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	48.0	48.0		48.0	48.0		42.0	42.0		42.0	42.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%		46.7%	46.7%		46.7%	46.7%	
Maximum Green (s)	43.5	43.5		43.5	43.5		37.5	37.5		37.5	37.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		52.4			52.4			28.6			28.6	
Actuated g/C Ratio		0.58			0.58			0.32			0.32	
v/c Ratio		0.38			0.48			0.81			0.34	
Control Delay		13.1			14.7			38.8			20.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		13.1			14.7			38.8			20.8	
LOS		B			B			D			C	
Approach Delay		13.1			14.7			38.8			20.8	
Approach LOS		B			B			D			C	

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 45  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.81  
 Intersection Signal Delay: 22.9 Intersection LOS: C  
 Intersection Capacity Utilization 66.1% ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 7: Esquesing Line/Fourth Line & 5 Sideroad

← Ø2 (R) 48 s	↓ Ø4 42 s
← Ø6 (R) 48 s	↑ Ø8 42 s

HCM Signalized Intersection Capacity Analysis

2023 FT - Phase 1 - PM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

08-18-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	42	231	11	65	280	18	23	282	78	4	116	39
Future Volume (vph)	42	231	11	65	280	18	23	282	78	4	116	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.97			0.97	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		1630			1668			1683			1624	
Flt Permitted		0.90			0.89			0.98			0.99	
Satd. Flow (perm)		1479			1489			1647			1608	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	48	262	12	74	318	20	26	320	89	5	132	44
RTOR Reduction (vph)	0	1	0	0	2	0	0	12	0	0	15	0
Lane Group Flow (vph)	0	323	0	0	410	0	0	423	0	0	166	0
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		52.4			52.4			28.6			28.6	
Effective Green, g (s)		52.4			52.4			28.6			28.6	
Actuated g/C Ratio		0.58			0.58			0.32			0.32	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		861			866			523			510	
v/s Ratio Prot												
v/s Ratio Perm		0.22			0.28			0.26			0.10	
v/c Ratio		0.37			0.47			0.81			0.33	
Uniform Delay, d1		10.0			10.8			28.2			23.4	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.2			1.9			8.9			0.4	
Delay (s)		11.3			12.7			37.1			23.7	
Level of Service		B			B			D			C	
Approach Delay (s)		11.3			12.7			37.1			23.7	
Approach LOS		B			B			D			C	

Intersection Summary

HCM 2000 Control Delay 21.7 HCM 2000 Level of Service C  
 HCM 2000 Volume to Capacity ratio 0.59  
 Actuated Cycle Length (s) 90.0 Sum of lost time (s) 9.0  
 Intersection Capacity Utilization 66.1% ICU Level of Service C  
 Analysis Period (min) 15  
 c Critical Lane Group

Lanes, Volumes, Timings  
101: Boston Church Road & East Access 1

2023 FT - Phase 1 - PM Peak Hour  
08-18-2021

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	196	48	168	59	14	74
Future Volume (vph)	196	48	168	59	14	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	15.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				75.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1772	1633	1642	1498	1825	1642
Fit Permitted	0.950				0.950	
Satd. Flow (perm)	1772	1633	1642	1498	1825	1642
Link Speed (k/h)	48		70			70
Link Distance (m)	169.5		269.9			780.7
Travel Time (s)	12.7		13.9			40.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	0%	17%	9%	0%	17%
Adj. Flow (vph)	213	52	183	64	15	80
Shared Lane Traffic (%)						
Lane Group Flow (vph)	213	52	183	64	15	80
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7		3.7	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free		Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	29.2%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
101: Boston Church Road & East Access 1

2023 FT - Phase 1 - PM Peak Hour  
08-18-2021

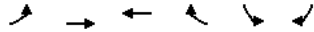
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	196	48	168	59	14	74
Future Volume (Veh/h)	196	48	168	59	14	74
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	213	52	183	64	15	80
Pedestrians						
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	293	183			247	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	293	183			247	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	69	94			99	
cM capacity (veh/h)	688	865			1331	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	213	52	183	64	15	80
Volume Left	213	0	0	0	15	0
Volume Right	0	52	0	64	0	0
cSH	688	865	1700	1700	1331	1700
Volume to Capacity	0.31	0.06	0.11	0.04	0.01	0.05
Queue Length 95th (m)	10.0	1.5	0.0	0.0	0.3	0.0
Control Delay (s)	12.6	9.4	0.0	0.0	7.7	0.0
Lane LOS	B	A			A	
Approach Delay (s)	11.9		0.0		1.2	
Approach LOS	B					

Intersection Summary			
Average Delay		5.4	
Intersection Capacity Utilization	29.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings  
102: James Snow Parkway N & East Access 2

2023 FT - Phase 1 - PM Peak Hour  
08-18-2021

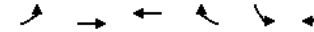


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↗↗	↗↗	↗	↘	↗
Traffic Volume (vph)	14	491	437	19	19	14
Future Volume (vph)	14	491	437	19	19	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0			80.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	100.0				2.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt				0.850		0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	997	3042	2920	816	913	933
Fit Permitted	0.950				0.950	
Satd. Flow (perm)	997	3042	2920	816	913	933
Link Speed (k/h)		70	70			48
Link Distance (m)		548.1	558.1			147.4
Travel Time (s)		28.2	28.7			11.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	83%	20%	25%	100%	100%	75%
Adj. Flow (vph)	15	534	475	21	21	15
Shared Lane Traffic (%)						
Lane Group Flow (vph)	15	534	475	21	21	15
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		24		14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	23.6%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis  
102: James Snow Parkway N & East Access 2

2023 FT - Phase 1 - PM Peak Hour  
08-18-2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↗↗	↗↗	↗	↘	↗
Traffic Volume (veh/h)	14	491	437	19	19	14
Future Volume (Veh/h)	14	491	437	19	19	14
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	534	475	21	21	15
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	496				772	238
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	496				772	238
tC, single (s)	5.8				8.8	8.4
tC, 2 stage (s)						
tF (s)	3.0				4.5	4.0
p0 queue free %	98				89	97
cM capacity (veh/h)	657				185	582

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	15	267	267	238	238	21	21	15
Volume Left	15	0	0	0	0	0	21	0
Volume Right	0	0	0	0	0	0	21	0
cSH	657	1700	1700	1700	1700	1700	185	582
Volume to Capacity	0.02	0.16	0.16	0.14	0.14	0.01	0.11	0.03
Queue Length 95th (m)	0.5	0.0	0.0	0.0	0.0	0.0	2.9	0.6
Control Delay (s)	10.6	0.0	0.0	0.0	0.0	0.0	27.0	11.3
Lane LOS	B						D	B
Approach Delay (s)	0.3			0.0			20.5	
Approach LOS							C	

Intersection Summary	
Average Delay	0.8
Intersection Capacity Utilization	23.6%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
103: James Snow Parkway N & East Access 3

2023 FT - Phase 1 - PM Peak Hour  
08-18-2021

	↖	→	←	↗	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↖↗	↖↗	↖	↖	↖
Traffic Volume (vph)	9	501	447	18	18	9
Future Volume (vph)	9	501	447	18	18	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0			80.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	100.0				2.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt				0.850	0.850	
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1055	3042	2920	955	1332	1134
Fit Permitted	0.475				0.950	
Satd. Flow (perm)	527	3042	2920	955	1332	1134
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				20		10
Link Speed (k/h)		70	70		48	
Link Distance (m)		558.1	346.4		152.7	
Travel Time (s)		28.7	17.8		11.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	73%	20%	25%	71%	37%	44%
Adj. Flow (vph)	10	545	486	20	20	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	10	545	486	20	20	10
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	6.1	30.5	30.5	6.1	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8	6.1	6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			

Lanes, Volumes, Timings  
103: James Snow Parkway N & East Access 3

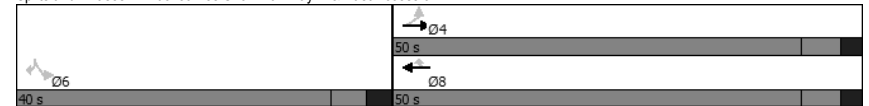
2023 FT - Phase 1 - PM Peak Hour  
08-18-2021

	↖	→	←	↗	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.6	30.6	30.6	30.6	33.5	33.5
Total Split (s)	50.0	50.0	50.0	50.0	40.0	40.0
Total Split (%)	55.6%	55.6%	55.6%	55.6%	44.4%	44.4%
Maximum Green (s)	43.4	43.4	43.4	43.4	33.5	33.5
Yellow Time (s)	4.2	4.2	4.2	4.2	3.7	3.7
All-Red Time (s)	2.4	2.4	2.4	2.4	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	62.8	62.8	62.8	62.8	6.7	6.7
Actuated g/C Ratio	0.89	0.89	0.89	0.89	0.10	0.10
v/c Ratio	0.02	0.20	0.19	0.02	0.16	0.09
Control Delay	2.7	2.1	2.0	1.4	34.2	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.7	2.1	2.0	1.4	34.2	19.6
LOS	A	A	A	A	C	B
Approach Delay		2.1	2.0		29.3	
Approach LOS		A	A		C	

Intersection Summary

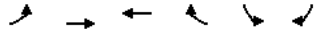
Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 70.4  
 Natural Cycle: 65  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.20  
 Intersection Signal Delay: 2.8  
 Intersection Capacity Utilization 28.9%  
 Analysis Period (min) 15  
 Intersection LOS: A  
 ICU Level of Service A

Splits and Phases: 103: James Snow Parkway N & East Access 3



HCM Signalized Intersection Capacity Analysis  
103: James Snow Parkway N & East Access 3

2023 FT - Phase 1 - PM Peak Hour  
08-18-2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↗	↗	↘	↘	↗
Traffic Volume (vph)	9	501	447	18	18	9
Future Volume (vph)	9	501	447	18	18	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1055	3042	2920	955	1332	1134
Fit Permitted	0.48	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	528	3042	2920	955	1332	1134
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	545	486	20	20	10
RTOR Reduction (vph)	0	0	0	4	0	10
Lane Group Flow (vph)	10	545	486	16	20	0
Heavy Vehicles (%)	73%	20%	25%	71%	37%	44%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4		8		
Permitted Phases	4			8	6	6
Actuated Green, G (s)	58.5	58.5	58.5	58.5	2.9	2.9
Effective Green, g (s)	58.5	58.5	58.5	58.5	2.9	2.9
Actuated g/C Ratio	0.79	0.79	0.79	0.79	0.04	0.04
Clearance Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	414	2388	2292	749	51	44
v/s Ratio Prot		c0.18	0.17			
v/s Ratio Perm	0.02			0.02	c0.02	0.00
v/c Ratio	0.02	0.23	0.21	0.02	0.39	0.01
Uniform Delay, d1	1.8	2.1	2.1	1.7	34.9	34.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.2	0.2	0.1	4.9	0.1
Delay (s)	1.9	2.3	2.3	1.8	39.9	34.5
Level of Service	A	A	A	A	D	C
Approach Delay (s)		2.3	2.3		38.1	
Approach LOS		A	A		D	
<b>Intersection Summary</b>						
HCM 2000 Control Delay			3.3		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.24			
Actuated Cycle Length (s)			74.5		Sum of lost time (s)	13.1
Intersection Capacity Utilization			28.9%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

## **APPENDIX K**

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### **SimTraffic Queueing Analysis**

Queuing and Blocking Report

<2021 Existing> AM Peak Hour  
08-14-2021

Intersection: 1: Regional Road 25 & 5 Sideroad

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (m)	77.5	161.5	48.9	40.8	48.7	42.2	50.0	35.5	41.0	98.8	82.5
Average Queue (m)	15.7	86.0	17.3	16.0	19.6	16.6	21.4	9.9	16.2	49.4	35.8
95th Queue (m)	54.1	144.7	38.8	34.7	39.7	35.9	43.3	24.8	33.4	82.4	68.6
Link Distance (m)		561.6		516.8		961.6	961.6			194.5	194.5
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	80.0		70.0		75.0			70.0	35.0		
Storage Blk Time (%)		12	0						1	17	
Queuing Penalty (veh)		9	0						3	15	

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	22.5	34.6	22.9	24.7	52.8	29.4	30.1	27.2	46.9	59.3	56.5	48.1
Average Queue (m)	3.5	11.4	3.9	9.0	18.7	8.0	12.6	10.3	22.0	28.7	24.2	21.6
95th Queue (m)	13.6	26.5	14.4	21.0	40.8	20.9	25.2	22.7	40.4	52.3	48.5	39.5
Link Distance (m)		439.6	439.6			1046.6	1046.6			576.0	576.0	576.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0			115.0	85.0				35.0	30.0		
Storage Blk Time (%)								0	0	3	6	
Queuing Penalty (veh)								0	0	8	11	

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (m)	61.7	49.1	59.8
Average Queue (m)	26.1	16.7	23.2
95th Queue (m)	48.9	37.2	46.0
Link Distance (m)		961.6	961.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	75.0		
Storage Blk Time (%)	0		
Queuing Penalty (veh)	0		

Queuing and Blocking Report

<2021 Existing> AM Peak Hour  
08-14-2021

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	L	T	T
Maximum Queue (m)	15.5	44.0	52.4	15.9	28.7	25.5	26.5	7.2	19.3	19.7	9.6
Average Queue (m)	2.8	16.6	22.2	2.3	6.8	6.5	6.4	0.9	3.0	5.3	1.0
95th Queue (m)	10.0	35.9	42.9	9.3	20.1	18.3	19.0	4.6	10.7	14.0	5.8
Link Distance (m)		337.6	337.6		1424.1	1424.1		776.6		176.9	176.9
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	70.0			70.0			60.0		60.0		
Storage Blk Time (%)		0									0
Queuing Penalty (veh)		0									0

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	L	T	R
Maximum Queue (m)	14.3	55.4	67.9	23.1	36.2	37.9	32.7	45.9	26.1	74.0	7.5
Average Queue (m)	2.6	26.4	33.7	8.0	11.6	13.1	11.6	19.5	6.5	40.5	0.2
95th Queue (m)	9.3	49.3	58.4	19.2	27.9	28.7	24.8	37.9	18.5	65.9	7.4
Link Distance (m)		1424.1	1424.1		1392.0	1392.0		279.6		1974.3	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	85.0			70.0			40.0		25.0		25.0
Storage Blk Time (%)							0	5	0	18	
Queuing Penalty (veh)							0	3	2	9	

Queuing and Blocking Report

<2021 Existing> AM Peak Hour  
08-14-2021

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	L	T
Maximum Queue (m)	1.4	65.8	64.8	35.8	23.8	29.2	31.6	31.8	13.2	70.7	77.8	31.9
Average Queue (m)	0.1	37.8	37.3	18.4	8.7	14.0	16.1	14.8	3.5	36.8	50.0	13.8
95th Queue (m)	1.1	57.9	58.0	31.3	20.0	25.6	27.3	27.5	9.0	64.9	70.5	27.1
Link Distance (m)		714.5	714.5				859.9	859.9				324.5
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	122.0			72.0	170.0	170.0			130.0	105.0	105.0	
Storage Blk Time (%)			0									
Queuing Penalty (veh)			0									

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	NB	NB	SB	SB	SB
Directions Served	T	R	L	T	TR
Maximum Queue (m)	28.4	78.7	46.2	40.4	39.5
Average Queue (m)	9.7	34.7	20.8	18.0	19.7
95th Queue (m)	22.2	62.1	38.9	33.2	34.8
Link Distance (m)	324.5			1392.0	1392.0
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		260.0	160.0		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Boston Church Road/3 Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	57.8	27.8	20.1	25.4
Average Queue (m)	30.4	15.5	7.7	11.9
95th Queue (m)	47.5	23.9	16.4	20.4
Link Distance (m)	529.6	1328.5	1039.2	489.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

<2021 Existing> AM Peak Hour  
08-14-2021

Intersection: 7: Esquesing Line/Fourth Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	104.2	44.6	48.9	77.4
Average Queue (m)	47.1	20.4	24.1	33.0
95th Queue (m)	85.2	34.3	40.5	61.4
Link Distance (m)	1328.5	638.0	1974.3	458.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 61



Queuing and Blocking Report

<2021 Existing> PM Peak Hour  
08-14-2021

Intersection: 1: Regional Road 25 & 5 Sideroad

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (m)	43.6	72.4	50.3	102.6	83.6	81.8	89.6	22.6	10.4	63.6	45.0
Average Queue (m)	18.4	33.5	19.1	50.1	38.0	34.7	40.5	6.3	1.5	32.1	16.2
95th Queue (m)	35.9	60.5	39.2	86.6	71.0	71.4	76.6	16.5	6.5	54.2	36.7
Link Distance (m)	561.6		516.8		961.6		961.6		194.5		194.5
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	80.0		70.0		75.0		70.0		35.0		
Storage Blk Time (%)	0		0		3		1		1		7
Queuing Penalty (veh)	0		0		2		2		1		1

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	28.4	50.7	41.9	50.1	95.0	19.8	38.1	66.0	55.8	114.3	107.7	26.6
Average Queue (m)	8.3	20.9	11.4	20.6	46.8	5.2	11.2	29.2	15.0	61.7	55.8	9.4
95th Queue (m)	22.6	41.8	31.0	38.7	81.5	15.3	27.8	53.6	40.1	98.8	92.3	20.1
Link Distance (m)	439.6		439.6		1046.6		1046.6		576.0		576.0	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0		115.0		85.0		35.0		30.0			
Storage Blk Time (%)			1		0		5		1		28	
Queuing Penalty (veh)			0		0		2		3		22	

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (m)	55.4	59.0	59.6
Average Queue (m)	23.7	26.0	27.6
95th Queue (m)	46.9	49.1	52.4
Link Distance (m)	961.6		961.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	75.0		
Storage Blk Time (%)	0		0
Queuing Penalty (veh)	0		0

Queuing and Blocking Report

<2021 Existing> PM Peak Hour  
08-14-2021

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	T	L	T	T
Maximum Queue (m)	37.8	36.8	42.6	21.8	46.3	51.8	68.9	15.1	7.4	12.7	16.2	14.4
Average Queue (m)	13.8	12.2	17.3	5.5	17.3	20.7	27.9	5.2	0.4	1.6	5.1	2.0
95th Queue (m)	28.9	27.6	35.0	16.1	37.1	42.7	54.0	12.8	3.5	7.0	12.4	8.9
Link Distance (m)	337.6		337.6		1424.1		1424.1		776.6		776.6	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	70.0		70.0		60.0		60.0					
Storage Blk Time (%)			1								0	
Queuing Penalty (veh)			0								0	

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB		
Directions Served	L	T	TR	L	T	TR	L	T	L	T		
Maximum Queue (m)	15.1	42.2	51.9	12.0	45.8	43.7	39.6	59.4	21.0	47.0		
Average Queue (m)	2.0	13.7	19.6	1.9	18.7	20.1	15.2	29.4	4.1	17.1		
95th Queue (m)	8.4	30.6	40.3	7.8	36.9	36.3	31.4	50.5	13.8	35.4		
Link Distance (m)	1424.1		1424.1		1392.0		1392.0		279.6		1974.3	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	85.0		70.0		40.0		25.0					
Storage Blk Time (%)			0		9		0		3			
Queuing Penalty (veh)			1		12		0		1			

Queuing and Blocking Report

<2021 Existing> PM Peak Hour  
08-14-2021

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	L	T
Maximum Queue (m)	9.8	47.8	48.3	71.8	60.6	62.8	58.5	60.5	18.4	69.7	79.7	35.8
Average Queue (m)	2.1	28.4	27.0	35.5	35.4	37.5	31.1	32.8	6.1	37.6	50.3	17.4
95th Queue (m)	7.7	43.6	43.9	61.3	54.3	55.8	50.8	53.3	14.4	65.0	70.9	31.8
Link Distance (m)		714.5	714.5				859.9	859.9				324.5
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	122.0			72.0	170.0	170.0			130.0	105.0	105.0	
Storage Blk Time (%)				0								
Queuing Penalty (veh)				1								

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	NB	NB	SB	SB	SB
Directions Served	T	R	L	T	TR
Maximum Queue (m)	32.5	31.0	36.3	35.4	37.7
Average Queue (m)	13.5	13.7	12.7	15.9	16.1
95th Queue (m)	28.0	24.2	28.4	29.6	31.2
Link Distance (m)	324.5			1392.0	1392.0
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		260.0	160.0		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Boston Church Road/3 Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	36.1	37.4	31.3	19.4
Average Queue (m)	18.4	20.5	14.9	7.6
95th Queue (m)	29.6	30.7	25.2	16.0
Link Distance (m)	529.6	1328.5	1039.2	489.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

<2021 Existing> PM Peak Hour  
08-14-2021

Intersection: 7: Esquesing Line/Fourth Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	45.9	61.4	67.2	27.5
Average Queue (m)	23.3	24.8	32.6	13.2
95th Queue (m)	38.3	46.5	54.2	22.6
Link Distance (m)	1328.5	638.0	1974.3	458.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 50
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Queuing and Blocking Report

2023 FB AM Peak Hour  
08-15-2021

Intersection: 1: Regional Road 25 & 5 Sideroad

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR	
Maximum Queue (m)	92.6	186.7	49.9	50.1	50.6	50.1	55.8	30.3	56.5	97.0	84.8	
Average Queue (m)	14.6	92.4	19.3	15.9	20.0	18.8	23.4	9.9	17.8	52.7	40.4	
95th Queue (m)	52.8	156.1	41.1	36.8	41.1	41.0	46.6	23.4	39.6	83.8	72.5	
Link Distance (m)	561.6		516.8		961.6		961.6		194.5		194.5	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0		70.0		75.0		70.0		35.0			
Storage Blk Time (%)			14		0		0		2		22	
Queuing Penalty (veh)			11		0		0		5		19	

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	19.6	36.7	25.7	25.4	48.0	25.3	28.3	25.6	46.1	60.3	61.0	51.9
Average Queue (m)	3.7	14.5	4.4	9.1	17.9	8.7	12.1	9.9	21.8	28.9	25.8	21.3
95th Queue (m)	13.3	29.3	15.8	21.8	38.2	20.6	23.9	21.9	39.4	51.3	48.5	38.5
Link Distance (m)	439.6		439.6		1046.6		1046.6		576.0		576.0	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0		115.0		85.0		35.0		30.0			
Storage Blk Time (%)					0		0		3		7	
Queuing Penalty (veh)					0		0		7		13	

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (m)	70.4	58.6	64.3
Average Queue (m)	29.3	19.7	26.1
95th Queue (m)	56.2	43.7	51.2
Link Distance (m)	961.6		961.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	75.0		
Storage Blk Time (%)	0		0
Queuing Penalty (veh)	0		0

Queuing and Blocking Report

2023 FB AM Peak Hour  
08-15-2021

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	
Directions Served	L	T	TR	L	T	TR	L	T	L	T	T	
Maximum Queue (m)	17.6	47.5	58.5	15.5	25.3	26.9	26.9	7.1	17.3	15.9	12.2	
Average Queue (m)	3.6	16.9	23.4	2.4	6.6	6.8	6.9	0.9	3.2	4.6	1.5	
95th Queue (m)	12.1	38.4	46.8	9.7	18.5	20.1	19.4	4.6	10.6	12.1	8.0	
Link Distance (m)	337.6		337.6		544.6		544.6		776.5		176.9	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	70.0		70.0		60.0		60.0					
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	
Directions Served	L	T	TR	L	T	TR	L	T	L	T	R	
Maximum Queue (m)	16.0	63.9	73.0	23.6	35.0	35.1	30.7	50.3	29.6	107.7	15.0	
Average Queue (m)	2.4	28.2	36.8	8.2	12.9	13.2	11.5	21.3	6.2	46.3	0.7	
95th Queue (m)	9.5	52.2	63.4	19.2	29.1	26.9	24.4	41.2	21.0	86.0	12.9	
Link Distance (m)	329.4		329.4		1392.0		1392.0		279.6		1973.8	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	85.0		70.0		40.0		25.0		25.0			
Storage Blk Time (%)	0				0		5		0		20	
Queuing Penalty (veh)	0				0		4		0		11	

Queuing and Blocking Report

2023 FB AM Peak Hour  
08-15-2021

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	L	T
Maximum Queue (m)	3.0	73.8	72.4	40.1	25.5	30.3	33.9	36.6	12.4	72.1	83.0	33.7
Average Queue (m)	0.1	40.4	39.9	18.7	9.1	14.3	15.9	14.8	3.4	35.8	49.5	15.2
95th Queue (m)	1.5	62.9	62.8	32.7	20.0	25.9	28.5	29.4	9.0	64.9	72.7	29.4
Link Distance (m)		714.5	714.5				859.9	859.9				324.5
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	122.0			72.0	170.0	170.0			130.0	105.0	105.0	
Storage Blk Time (%)			0									0
Queuing Penalty (veh)			1									0

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	NB	NB	SB	SB	SB
Directions Served	T	R	L	T	TR
Maximum Queue (m)	28.2	69.3	40.4	40.6	42.5
Average Queue (m)	10.3	32.4	19.8	19.3	20.2
95th Queue (m)	22.5	55.8	36.9	35.2	37.1
Link Distance (m)	324.5			1392.0	1392.0
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		260.0	160.0		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Boston Church Road/3 Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	58.4	37.8	19.3	25.2
Average Queue (m)	30.9	17.5	7.8	11.6
95th Queue (m)	49.3	29.2	16.5	19.8
Link Distance (m)	155.5	1328.5	207.8	489.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

2023 FB AM Peak Hour  
08-15-2021

Intersection: 7: Esquesing Line/Fourth Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	101.8	79.5	75.4	140.1
Average Queue (m)	49.0	32.3	30.8	67.2
95th Queue (m)	88.5	62.7	59.7	114.8
Link Distance (m)	1328.5	638.0	1973.8	458.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 71
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Queuing and Blocking Report

2023 FB PM Peak Hour  
08-15-2021

Intersection: 1: Regional Road 25 & 5 Sideroad

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR	
Maximum Queue (m)	42.8	70.8	54.1	118.9	87.3	97.0	100.5	25.7	10.6	63.3	48.5	
Average Queue (m)	16.6	32.8	19.8	54.0	38.9	36.1	42.1	7.4	1.4	33.6	18.4	
95th Queue (m)	32.4	60.4	41.6	95.3	73.7	76.6	82.4	19.2	6.6	55.8	41.0	
Link Distance (m)	561.6		516.8		961.6		961.6		194.5		194.5	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0		70.0		75.0		70.0		35.0			
Storage Blk Time (%)	0		0		4		1		1		2	
Queuing Penalty (veh)	0		0		3		4		1		2	

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	30.4	52.2	45.7	52.3	119.0	29.2	49.9	75.0	71.6	131.8	123.1	24.9
Average Queue (m)	8.8	23.3	13.6	21.7	51.7	7.4	13.3	30.6	15.7	69.2	62.2	9.5
95th Queue (m)	23.8	43.6	35.2	40.7	92.6	20.4	33.5	59.2	45.6	109.2	103.5	19.8
Link Distance (m)	439.6		439.6		1046.6		1046.6		576.0		576.0	576.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0		115.0		85.0		35.0		30.0			
Storage Blk Time (%)	0		0		2		0		6		1	
Queuing Penalty (veh)	0		0		1		0		3		4	

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (m)	61.3	62.4	66.8
Average Queue (m)	23.9	26.9	28.6
95th Queue (m)	46.9	51.6	55.2
Link Distance (m)	961.6		961.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	75.0		
Storage Blk Time (%)	0		0
Queuing Penalty (veh)	0		0

Queuing and Blocking Report

2023 FB PM Peak Hour  
08-15-2021

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	T	L	T	T
Maximum Queue (m)	33.9	36.8	42.8	20.8	45.7	46.6	65.4	25.5	7.8	11.6	16.9	11.7
Average Queue (m)	13.2	12.9	18.6	4.5	18.1	20.2	28.5	5.8	0.5	1.4	4.9	1.4
95th Queue (m)	28.4	28.6	36.4	13.9	37.6	39.9	53.5	16.4	4.2	6.3	12.9	6.9
Link Distance (m)	337.6		337.6		544.6		544.6		776.5		776.5	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	70.0		70.0		60.0		60.0		60.0			
Storage Blk Time (%)	0		0		1		0		0		0	
Queuing Penalty (veh)	0		0		0		0		0		0	

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	
Directions Served	L	T	TR	L	T	TR	L	T	R	L	T	
Maximum Queue (m)	13.6	39.8	48.7	10.2	46.0	49.4	34.5	65.9	7.5	22.2	51.0	
Average Queue (m)	1.6	14.0	19.9	1.5	19.7	20.8	14.5	30.3	0.2	5.1	17.9	
95th Queue (m)	7.8	30.5	39.5	7.0	38.5	39.9	28.7	54.0	7.4	14.7	38.1	
Link Distance (m)	329.4		329.4		1392.0		1392.0		279.6		1973.8	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	85.0		70.0		40.0		25.0		25.0			
Storage Blk Time (%)	0		10		0		4		0		4	
Queuing Penalty (veh)	1		14		0		1		0		1	

Queuing and Blocking Report

2023 FB PM Peak Hour  
08-15-2021

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	L	T
Maximum Queue (m)	10.6	60.2	57.2	81.8	62.9	64.8	64.7	66.8	17.5	70.4	79.3	41.8
Average Queue (m)	2.4	31.1	29.9	36.6	34.3	37.0	34.8	36.3	5.2	39.4	51.9	18.4
95th Queue (m)	8.5	50.0	49.5	66.2	55.5	56.7	54.5	57.5	12.2	66.6	73.1	34.8
Link Distance (m)		714.5	714.5				859.9	859.9				324.5
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	122.0			72.0	170.0	170.0			130.0	105.0	105.0	
Storage Blk Time (%)				1								
Queuing Penalty (veh)				2								

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	NB	NB	SB	SB	SB
Directions Served	T	R	L	T	TR
Maximum Queue (m)	37.6	32.3	36.4	38.3	41.8
Average Queue (m)	15.6	13.6	14.0	17.7	18.6
95th Queue (m)	30.4	24.8	29.2	32.6	34.9
Link Distance (m)	324.5			1392.0	1392.0
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		260.0	160.0		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Boston Church Road/3 Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	35.5	48.0	27.8	17.6
Average Queue (m)	18.7	24.5	14.7	7.3
95th Queue (m)	29.6	38.6	23.8	15.2
Link Distance (m)	155.5	1328.5	207.8	489.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

2023 FB PM Peak Hour  
08-15-2021

Intersection: 7: Esquesing Line/Fourth Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	59.0	79.7	119.9	57.1
Average Queue (m)	23.6	32.5	62.1	24.0
95th Queue (m)	48.0	64.7	102.2	46.6
Link Distance (m)	1328.5	638.0	1973.8	458.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 63
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Queuing and Blocking Report

2023 FT AM Peak Hour  
09-09-2021

Intersection: 1: Regional Road 25 & 5 Sideroad

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR	
Maximum Queue (m)	79.0	194.5	49.8	38.8	55.0	56.5	148.4	34.2	61.2	93.7	80.2	
Average Queue (m)	16.0	97.1	19.2	15.7	21.1	22.1	29.5	11.8	22.8	54.0	39.6	
95th Queue (m)	57.2	167.1	42.0	33.4	43.9	45.4	123.4	26.1	48.0	84.7	69.8	
Link Distance (m)	561.6		516.8		961.6		961.6		194.5		194.5	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0		70.0		75.0		70.0		35.0			
Storage Blk Time (%)	16		0		0		0		4		22	
Queuing Penalty (veh)	13		0		0		0		10		24	

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	21.2	38.0	30.3	23.9	80.5	32.9	33.0	31.9	61.8	72.1	66.6	73.5
Average Queue (m)	3.8	16.1	5.4	8.3	33.2	7.9	13.1	11.1	24.7	34.2	31.2	28.7
95th Queue (m)	14.0	32.3	19.2	20.6	64.6	21.5	27.1	24.7	46.0	61.9	56.8	54.4
Link Distance (m)	439.6		439.6		1046.6		1046.6		576.0		576.0	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0		115.0		85.0		35.0		30.0			
Storage Blk Time (%)			0		0		0		5		10	
Queuing Penalty (veh)			0		0		0		12		20	

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (m)	86.1	60.4	64.8
Average Queue (m)	36.1	25.2	32.1
95th Queue (m)	69.1	50.6	57.9
Link Distance (m)	961.6		961.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	75.0		
Storage Blk Time (%)	1		
Queuing Penalty (veh)	2		

Queuing and Blocking Report

2023 FT AM Peak Hour  
09-09-2021

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	
Directions Served	L	T	TR	L	T	TR	L	T	L	T	T	
Maximum Queue (m)	32.6	48.7	56.0	17.1	42.3	69.0	27.5	7.9	41.5	16.4	14.9	
Average Queue (m)	11.7	20.0	26.0	2.6	13.6	22.9	6.9	1.1	15.8	4.1	1.6	
95th Queue (m)	26.1	41.1	47.3	10.4	32.9	51.1	19.9	5.2	33.7	11.8	7.9	
Link Distance (m)	337.6		337.6		523.2		523.2		776.5		176.9	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	70.0		70.0		60.0		60.0		0		0	
Storage Blk Time (%)			0		0		0		0		0	
Queuing Penalty (veh)			0		0		0		0		0	

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	
Directions Served	L	T	TR	L	T	TR	L	T	L	T	R	
Maximum Queue (m)	15.9	73.9	80.0	25.2	75.4	83.5	28.7	52.4	21.7	97.3	37.3	
Average Queue (m)	2.7	35.3	42.4	7.2	32.5	36.2	11.8	22.2	6.2	46.9	1.5	
95th Queue (m)	9.9	63.4	69.9	18.1	64.4	70.2	23.7	41.5	16.8	85.7	18.6	
Link Distance (m)	324.4		324.4		1392.0		1392.0		279.6		1973.8	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	85.0		70.0		40.0		25.0		25.0			
Storage Blk Time (%)	0		0		0		6		0		19	
Queuing Penalty (veh)	0		0		0		4		1		11	

Queuing and Blocking Report

2023 FT AM Peak Hour  
09-09-2021

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	L	T
Maximum Queue (m)	2.3	72.0	76.4	52.4	25.0	30.7	36.2	38.5	15.0	65.8	76.0	67.4
Average Queue (m)	0.1	43.7	43.8	20.5	9.5	14.4	17.4	16.0	3.9	36.9	49.9	38.4
95th Queue (m)	1.3	65.2	67.9	39.0	21.2	26.3	31.2	31.3	10.7	63.6	70.9	59.6
Link Distance (m)		714.5	714.5				859.9	859.9				324.5
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	122.0			72.0	170.0	170.0			130.0	105.0	105.0	
Storage Blk Time (%)			0	0								
Queuing Penalty (veh)			1	0								

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	NB	NB	SB	SB	SB
Directions Served	T	R	L	T	TR
Maximum Queue (m)	58.6	81.7	51.1	54.8	57.4
Average Queue (m)	32.9	34.7	21.5	29.1	29.8
95th Queue (m)	54.3	63.4	41.0	49.8	51.5
Link Distance (m)	324.5			1392.0	1392.0
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		260.0	160.0		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Boston Church Road/3 Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	77.5	42.0	24.5	25.5
Average Queue (m)	35.8	20.5	11.3	12.3
95th Queue (m)	60.9	33.5	20.3	20.9
Link Distance (m)	156.8	1328.5	205.8	489.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

2023 FT AM Peak Hour  
09-09-2021

Intersection: 7: Esquesing Line/Fourth Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	88.0	78.0	71.0	136.4
Average Queue (m)	46.9	35.8	30.4	67.6
95th Queue (m)	80.3	66.4	58.0	114.3
Link Distance (m)	1328.5	638.0	1973.8	458.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 101: Boston Church Road & East Access 1

Movement	WB	WB	SB
Directions Served	L	R	L
Maximum Queue (m)	20.5	6.2	11.5
Average Queue (m)	7.4	1.0	1.9
95th Queue (m)	15.3	4.5	7.9
Link Distance (m)	161.9	161.9	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			15.0
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 102: James Snow Parkway N & East Access 2

Movement	EB	WB	WB	SB	SB
Directions Served	L	T	T	L	R
Maximum Queue (m)	21.1	1.4	0.7	28.0	22.3
Average Queue (m)	3.5	0.0	0.0	8.2	6.8
95th Queue (m)	14.2	1.4	0.7	22.5	19.3
Link Distance (m)		540.6	540.6	133.1	133.1
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	90.0				
Storage Blk Time (%)					
Queuing Penalty (veh)					



Queuing and Blocking Report

2023 FT AM Peak Hour  
09-09-2021

Intersection: 103: James Snow Parkway N & East Access 3

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	R	L	R
Maximum Queue (m)	20.0	34.0	37.2	38.8	44.9	18.0	28.1	19.8
Average Queue (m)	3.9	6.9	10.5	8.2	9.7	2.3	9.0	4.1
95th Queue (m)	14.3	23.0	29.6	27.0	32.3	10.9	22.7	14.8
Link Distance (m)		540.6	540.6	324.4	324.4		138.6	138.6
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	90.0					80.0		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 201: West Access 1 & 5 Sideroad

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	20.9	9.2
Average Queue (m)	2.6	2.0
95th Queue (m)	11.6	8.1
Link Distance (m)	164.7	84.1
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 202: West Access 2 & 5 Sideroad

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	14.1	9.8
Average Queue (m)	2.5	2.1
95th Queue (m)	9.8	8.3
Link Distance (m)	156.8	85.7
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report

2023 FT AM Peak Hour  
09-09-2021

Intersection: 203: Boston Church Road & West Access 3

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (m)	20.3	18.4
Average Queue (m)	5.0	1.6
95th Queue (m)	17.1	9.3
Link Distance (m)	92.1	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	40.0	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 204: Boston Church Road & West Access 4

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (m)	10.0	12.2
Average Queue (m)	5.0	4.0
95th Queue (m)	12.3	11.4
Link Distance (m)	94.3	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	15.0	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 205: Boston Church Road & West Access 5

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (m)	16.1	7.7
Average Queue (m)	1.3	0.5
95th Queue (m)	8.6	4.9
Link Distance (m)	93.1	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	40.0	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 98
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Queuing and Blocking Report

2023 FT PM Peak Hour  
09-09-2021

Intersection: 1: Regional Road 25 & 5 Sideroad

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (m)	35.0	81.6	59.0	120.9	97.4	98.6	101.6	24.3	16.9	69.1	56.6
Average Queue (m)	15.7	37.4	23.4	60.9	41.3	39.6	44.4	7.4	2.8	34.6	19.5
95th Queue (m)	29.5	66.8	47.4	102.6	80.0	80.9	85.4	19.2	10.6	60.9	46.2
Link Distance (m)	561.6		516.8		961.6		961.6		194.5		194.5
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	80.0		70.0		75.0		70.0		35.0		
Storage Blk Time (%)	0		0		8		2		1		2
Queuing Penalty (veh)	0		0		7		6		2		2

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	37.7	54.8	45.9	45.7	169.8	132.0	77.5	72.7	88.3	129.2	118.0	32.4
Average Queue (m)	9.6	24.0	12.5	21.1	105.4	26.3	14.1	31.1	17.0	75.5	68.5	12.7
95th Queue (m)	26.6	46.5	33.6	38.7	178.8	132.8	46.2	59.9	49.5	114.1	104.5	24.6
Link Distance (m)	439.6		439.6		1046.6		1046.6		576.0		576.0	576.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0		115.0		85.0		35.0		30.0			
Storage Blk Time (%)					31		1		7		1	
Queuing Penalty (veh)					18		1		4		4	

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (m)	62.6	65.7	71.5
Average Queue (m)	27.6	30.9	34.1
95th Queue (m)	52.1	55.6	59.1
Link Distance (m)	961.6		961.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	75.0		
Storage Blk Time (%)	0		0
Queuing Penalty (veh)	0		0

Queuing and Blocking Report

2023 FT PM Peak Hour  
09-09-2021

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	T	L	T	T
Maximum Queue (m)	49.4	42.5	54.1	22.0	66.1	73.2	77.0	26.3	11.2	103.3	19.5	15.0
Average Queue (m)	20.8	16.8	20.7	5.2	28.3	34.7	33.1	7.4	1.0	45.9	4.6	2.7
95th Queue (m)	40.4	35.2	41.4	15.9	54.0	62.4	65.2	17.8	6.1	83.7	13.8	10.1
Link Distance (m)	337.6		337.6		524.0		524.0		776.6		776.6	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	70.0		70.0		60.0		60.0		60.0		60.0	
Storage Blk Time (%)	0		0		2		0		6		0	
Queuing Penalty (veh)	0		0		0		0		1		0	

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	SB
Directions Served	R
Maximum Queue (m)	3.8
Average Queue (m)	0.1
95th Queue (m)	3.8
Link Distance (m)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	25.0
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	
Directions Served	L	T	TR	L	T	TR	L	T	L	T	
Maximum Queue (m)	18.4	61.4	70.6	10.4	60.3	68.2	38.7	77.5	21.9	49.8	
Average Queue (m)	2.9	29.7	34.5	1.8	25.4	30.0	14.5	35.3	5.5	20.6	
95th Queue (m)	10.5	54.1	61.5	7.4	49.9	55.6	29.6	63.0	15.8	43.0	
Link Distance (m)	324.4		324.4		1392.0		1392.0		279.6		1973.8
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	85.0		70.0		40.0		25.0		6		
Storage Blk Time (%)	0		0		0		14		0		
Queuing Penalty (veh)	0		0		1		19		0		

Queuing and Blocking Report

2023 FT PM Peak Hour  
09-09-2021

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	L	T
Maximum Queue (m)	10.0	68.5	71.7	110.5	67.8	71.4	77.8	83.7	22.2	76.5	86.1	53.5
Average Queue (m)	2.4	36.8	35.2	51.9	39.4	42.0	44.4	47.4	6.8	45.5	56.3	28.4
95th Queue (m)	8.4	57.8	58.7	90.8	61.7	64.1	70.9	74.4	15.6	71.3	79.0	48.5
Link Distance (m)		714.5	714.5				859.9	859.9				324.5
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	122.0			72.0	170.0	170.0			130.0	105.0	105.0	
Storage Blk Time (%)			0	4								
Queuing Penalty (veh)			0	7								

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	NB	NB	SB	SB	SB
Directions Served	T	R	L	T	TR
Maximum Queue (m)	47.6	31.7	34.8	78.3	213.3
Average Queue (m)	23.6	13.2	13.4	47.7	53.5
95th Queue (m)	42.0	24.0	29.1	73.2	184.5
Link Distance (m)	324.5			1392.0	1392.0
Upstream Blk Time (%)					0
Queuing Penalty (veh)					0
Storage Bay Dist (m)		260.0	160.0		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Boston Church Road/3 Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	51.2	54.1	30.6	17.8
Average Queue (m)	21.9	26.9	16.9	7.3
95th Queue (m)	36.3	43.8	26.5	15.4
Link Distance (m)	156.8	1328.5	205.8	489.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

2023 FT PM Peak Hour  
09-09-2021

Intersection: 7: Esquesing Line/Fourth Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	75.9	83.1	142.4	66.4
Average Queue (m)	31.4	35.4	66.8	23.7
95th Queue (m)	61.8	67.6	115.3	50.3
Link Distance (m)	1328.5	638.0	1973.8	458.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 101: Boston Church Road & East Access 1

Movement	WB	WB	SB
Directions Served	L	R	L
Maximum Queue (m)	33.5	9.3	8.3
Average Queue (m)	13.1	4.1	0.7
95th Queue (m)	24.3	7.9	4.5
Link Distance (m)	157.5	157.5	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			15.0
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 102: James Snow Parkway N & East Access 2

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	L	R
Maximum Queue (m)	20.2	52.4	52.8	1.4	1.4	29.2	21.6
Average Queue (m)	3.0	1.7	1.8	0.0	0.1	8.2	7.1
95th Queue (m)	13.4	51.6	52.0	1.4	1.2	22.9	19.2
Link Distance (m)		524.0	524.0	540.0	540.0	133.2	133.2
Upstream Blk Time (%)		0	0				
Queuing Penalty (veh)		0	0				
Storage Bay Dist (m)	90.0						
Storage Blk Time (%)							
Queuing Penalty (veh)							

Queuing and Blocking Report

2023 FT PM Peak Hour  
09-09-2021

Intersection: 103: James Snow Parkway N & East Access 3

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	R	L	R
Maximum Queue (m)	22.6	37.4	46.1	42.3	48.2	17.6	42.8	20.0
Average Queue (m)	3.9	9.9	15.0	10.8	11.0	2.3	14.9	5.5
95th Queue (m)	15.3	27.1	35.9	30.0	32.2	11.4	33.1	16.1
Link Distance (m)		540.0	540.0	324.4	324.4		138.6	138.6
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	90.0					80.0		
Storage Blk Time (%)					0			
Queuing Penalty (veh)					0			

Intersection: 201: West Access 1 & 5 Sideroad

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	5.0	14.6
Average Queue (m)	0.2	6.5
95th Queue (m)	2.2	13.7
Link Distance (m)	164.7	84.1
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 202: West Access 2 & 5 Sideroad

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	10.6	13.0
Average Queue (m)	0.5	6.1
95th Queue (m)	4.8	13.4
Link Distance (m)	156.8	85.7
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report

2023 FT PM Peak Hour  
09-09-2021

Intersection: 203: Boston Church Road & West Access 3

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (m)	26.0	11.3
Average Queue (m)	7.7	0.8
95th Queue (m)	21.0	5.3
Link Distance (m)	92.1	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	40.0	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 204: Boston Church Road & West Access 4

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (m)	17.8	8.6
Average Queue (m)	10.3	1.0
95th Queue (m)	15.8	5.5
Link Distance (m)	94.3	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	15.0	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 205: Boston Church Road & West Access 5

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (m)	22.3	12.4
Average Queue (m)	2.8	0.6
95th Queue (m)	13.8	5.7
Link Distance (m)	93.1	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	40.0	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 104

Queuing and Blocking Report

2028 FT AM Peak Hour  
09-09-2021

Intersection: 1: Regional Road 25 & 5 Sideroad

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	R	L	T	T
Maximum Queue (m)	109.4	215.3	49.6	48.6	64.4	42.5	48.5	55.0	44.9	55.3	97.2	86.4
Average Queue (m)	17.8	117.6	16.5	19.4	22.3	15.8	19.5	22.0	12.4	23.3	56.5	41.3
95th Queue (m)	72.1	199.1	36.8	40.5	50.1	34.8	39.7	45.2	30.6	45.0	86.9	74.7
Link Distance (m)		557.9		513.0		960.9	960.9	960.9			194.0	194.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0		70.0		75.0				75.0	35.0		
Storage Blk Time (%)		24	0		0					3	25	
Queuing Penalty (veh)		19	0		0					5	27	

Intersection: 1: Regional Road 25 & 5 Sideroad

Movement	SB
Directions Served	TR
Maximum Queue (m)	50.7
Average Queue (m)	15.5
95th Queue (m)	38.5
Link Distance (m)	194.0
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report

2028 FT AM Peak Hour  
09-09-2021

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	T
Maximum Queue (m)	21.4	53.2	46.1	26.1	79.8	32.1	32.7	26.8	57.2	65.8	62.3	51.8
Average Queue (m)	3.7	23.6	11.7	8.4	34.8	10.2	14.9	10.5	24.5	33.3	25.0	17.4
95th Queue (m)	14.3	44.0	32.0	21.2	66.5	24.6	28.8	22.7	46.9	56.3	49.6	39.1
Link Distance (m)		435.9	435.9		1042.8	1042.8			575.6	575.6	575.6	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0			115.0	85.0			35.0	30.0			
Storage Blk Time (%)				0			1	0	6	11		2
Queuing Penalty (veh)				0			0	0	10	22		10

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	T	T	TR
Maximum Queue (m)	71.0	85.8	42.9	51.7	55.5
Average Queue (m)	30.8	36.9	14.4	20.3	24.9
95th Queue (m)	58.0	69.7	34.7	42.6	48.9
Link Distance (m)			960.9	960.9	960.9
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	30.0	75.0			
Storage Blk Time (%)	8	1			
Queuing Penalty (veh)	14	2			

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	T	L	T	T
Maximum Queue (m)	29.8	58.5	61.5	19.1	48.0	78.0	32.2	8.5	0.8	37.8	18.3	17.2
Average Queue (m)	10.9	25.4	30.9	3.3	16.1	26.9	8.3	1.5	0.0	13.5	5.1	2.8
95th Queue (m)	23.9	48.8	53.6	11.9	36.9	57.8	23.5	6.1	0.8	29.6	13.0	11.0
Link Distance (m)		337.6	337.6		522.4	522.4		776.7	776.7		176.9	176.9
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	70.0			70.0			60.0			60.0		
Storage Blk Time (%)		0			0					0		0
Queuing Penalty (veh)		0			0					0		0

Queuing and Blocking Report

2028 FT AM Peak Hour  
09-09-2021

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	L	T	R
Maximum Queue (m)	16.3	85.4	90.4	25.7	76.9	77.0	32.8	54.4	24.7	114.7	37.4
Average Queue (m)	3.4	40.6	47.4	7.7	35.6	39.6	13.6	23.1	6.6	50.4	1.7
95th Queue (m)	11.4	72.3	78.7	18.7	67.2	70.0	28.3	44.5	17.7	94.1	20.4
Link Distance (m)		324.4	324.4		1388.2	1388.2		279.6		1973.8	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	85.0			70.0			40.0		25.0		25.0
Storage Blk Time (%)		0			1		0	7	0	23	
Queuing Penalty (veh)		0			0		1	5	2	13	

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	NB
Directions Served	L	T	T	T	R	L	L	T	T	T	R
Maximum Queue (m)	3.6	64.6	65.3	55.0	56.3	26.5	30.3	33.6	35.4	20.0	13.5
Average Queue (m)	0.1	41.6	41.1	25.7	22.2	9.8	14.3	17.9	15.7	4.4	3.1
95th Queue (m)	1.8	58.5	59.4	52.4	42.9	20.8	26.1	30.0	29.1	13.6	9.0
Link Distance (m)		714.6	714.6	714.6				859.4	859.4	859.4	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	122.0				72.0	170.0	170.0			130.0	105.0
Storage Blk Time (%)					0						
Queuing Penalty (veh)					0						

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	T	R	L	T	TR
Maximum Queue (m)	78.7	69.1	64.9	55.9	48.9	63.7	72.8
Average Queue (m)	50.8	41.4	36.2	27.4	21.5	34.3	35.9
95th Queue (m)	71.6	64.5	59.3	48.2	40.0	55.9	59.9
Link Distance (m)		320.8	320.8		1388.2	1388.2	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)	105.0			260.0	160.0		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Queuing and Blocking Report

2028 FT AM Peak Hour  
09-09-2021

Intersection: 6: Boston Church Road/3 Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	88.4	59.0	47.4	56.9
Average Queue (m)	31.6	18.5	20.1	24.3
95th Queue (m)	69.5	42.5	39.3	47.0
Link Distance (m)	156.8	1328.5	205.8	489.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Esquesing Line/Fourth Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	108.4	86.9	80.0	149.6
Average Queue (m)	43.8	40.6	31.9	80.8
95th Queue (m)	84.6	76.5	65.4	139.6
Link Distance (m)	1328.5	638.0	1973.8	458.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 101: Boston Church Road & East Access 1

Movement	WB	WB	SB
Directions Served	L	R	L
Maximum Queue (m)	19.5	6.0	9.5
Average Queue (m)	7.4	1.3	2.1
95th Queue (m)	14.8	5.1	8.1
Link Distance (m)	157.8	157.8	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)		15.0	
Storage Blk Time (%)		0	
Queuing Penalty (veh)		0	

Queuing and Blocking Report

2028 FT AM Peak Hour  
09-09-2021

Intersection: 102: James Snow Parkway N & East Access 2

Movement	EB	SB	SB
Directions Served	L	L	R
Maximum Queue (m)	22.8	25.7	21.7
Average Queue (m)	4.1	8.2	6.0
95th Queue (m)	15.7	21.9	17.8
Link Distance (m)		133.3	133.3
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	90.0		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 103: James Snow Parkway N & East Access 3

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	R	L	R
Maximum Queue (m)	18.3	41.9	44.2	41.2	78.5	20.0	29.7	19.7
Average Queue (m)	3.8	8.8	12.3	7.4	9.6	2.1	9.7	4.3
95th Queue (m)	13.8	27.7	33.9	27.0	47.7	10.8	23.6	15.5
Link Distance (m)		541.8	541.8	324.4	324.4		138.6	138.6
Upstream Blk Time (%)					0			
Queuing Penalty (veh)					0			
Storage Bay Dist (m)	90.0					80.0		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 201: West Access 1 & 5 Sideroad

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	23.2	9.9
Average Queue (m)	2.9	2.1
95th Queue (m)	12.9	8.3
Link Distance (m)	164.7	84.1
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report

2028 FT AM Peak Hour  
09-09-2021

Intersection: 202: West Access 2 & 5 Sideroad

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	19.7	9.9
Average Queue (m)	3.0	2.3
95th Queue (m)	12.2	8.7
Link Distance (m)	156.8	85.7
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 203: Boston Church Road & West Access 3

Movement	EB	NB	SB
Directions Served	LR	L	TR
Maximum Queue (m)	23.2	16.4	1.2
Average Queue (m)	5.3	1.3	0.0
95th Queue (m)	18.1	8.3	0.9
Link Distance (m)	92.1		205.8
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)		40.0	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 204: Boston Church Road & West Access 4

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (m)	10.5	13.8
Average Queue (m)	5.2	3.5
95th Queue (m)	12.4	11.0
Link Distance (m)	94.3	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		15.0
Storage Blk Time (%)		0
Queuing Penalty (veh)		0

Queuing and Blocking Report

2028 FT AM Peak Hour  
09-09-2021

Intersection: 205: Boston Church Road & West Access5

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (m)	15.1	6.0
Average Queue (m)	1.4	0.2
95th Queue (m)	9.1	3.4
Link Distance (m)	93.1	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	40.0	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 132



Queuing and Blocking Report

2028 FT PM Peak Hour  
09-09-2021

Intersection: 1: Regional Road 25 & 5 Sideroad

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	R	L	T	T
Maximum Queue (m)	41.2	86.9	72.0	139.7	97.2	75.8	88.8	91.3	26.8	13.9	68.5	53.2
Average Queue (m)	17.1	40.5	25.5	77.4	43.9	25.3	34.2	37.4	7.5	2.9	36.8	19.7
95th Queue (m)	32.6	72.3	62.5	142.3	82.6	60.1	71.6	74.9	19.9	9.8	60.5	47.6
Link Distance (m)		557.9		513.0		960.9	960.9	960.9			194.0	194.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0		70.0		75.0				75.0	35.0		
Storage Blk Time (%)		1	0	17	2	0		1			10	
Queuing Penalty (veh)		0	1	15	6	0		1			1	

Intersection: 1: Regional Road 25 & 5 Sideroad

Movement	SB
Directions Served	TR
Maximum Queue (m)	25.7
Average Queue (m)	7.2
95th Queue (m)	18.8
Link Distance (m)	194.0
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report

2028 FT PM Peak Hour  
09-09-2021

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	B16	B16	NB	NB
Directions Served	L	T	T	R	L	T	T	R	T	T	L	T
Maximum Queue (m)	35.4	56.1	48.6	47.9	171.3	287.9	196.8	60.8	1.7	34.1	49.8	107.3
Average Queue (m)	9.6	26.5	15.7	19.3	129.8	120.8	31.1	25.6	0.1	1.1	14.7	67.2
95th Queue (m)	26.5	46.9	37.6	35.6	208.4	353.7	139.1	48.5	1.6	33.6	35.4	99.4
Link Distance (m)		435.9	435.9		1042.8	1042.8		337.6	337.6			575.6
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0			115.0	85.0			35.0			30.0	
Storage Blk Time (%)				51		1	4				1	36
Queuing Penalty (veh)				37		2	3				3	28

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	NB	NB	NB	SB	SB	SB	SB
Directions Served	T	T	R	L	T	T	TR
Maximum Queue (m)	98.8	78.2	29.2	61.0	51.2	51.2	55.4
Average Queue (m)	58.0	39.6	12.1	25.1	23.6	25.8	24.7
95th Queue (m)	89.9	70.2	23.9	49.9	43.8	45.2	47.1
Link Distance (m)	575.6	575.6		960.9	960.9	960.9	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)			30.0	75.0			
Storage Blk Time (%)		11	0	0			
Queuing Penalty (veh)		22	1	0			

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	T	L	T	T
Maximum Queue (m)	45.2	50.8	55.4	22.5	73.1	78.6	86.2	32.8	14.0	102.7	30.9	20.2
Average Queue (m)	18.5	20.6	23.7	5.2	34.2	37.7	32.6	8.8	1.2	46.6	5.2	3.7
95th Queue (m)	36.6	41.6	44.7	15.1	61.9	66.2	64.6	21.4	7.0	83.8	20.6	12.6
Link Distance (m)		337.6	337.6		522.0	522.0		776.5	776.5		176.9	176.9
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	70.0			70.0			60.0			60.0		
Storage Blk Time (%)		0			0		2			5		0
Queuing Penalty (veh)		0			0		0			1		0

Queuing and Blocking Report

2028 FT PM Peak Hour  
09-09-2021

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	L	T
Maximum Queue (m)	14.6	75.9	74.0	12.8	74.1	81.9	38.0	85.0	21.2	59.2
Average Queue (m)	2.8	33.2	38.5	1.7	30.0	35.6	16.3	40.4	5.6	24.0
95th Queue (m)	9.9	59.7	64.4	7.9	57.2	65.9	31.2	69.7	16.0	48.4
Link Distance (m)		324.4	324.4		1388.2	1388.2		279.6		1973.8
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	85.0			70.0			40.0		25.0	
Storage Blk Time (%)		0			0		0	17	0	8
Queuing Penalty (veh)		0			0		1	23	1	3

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	NB
Directions Served	L	T	T	T	R	L	L	T	T	T	R	L
Maximum Queue (m)	10.5	59.3	58.6	51.7	109.6	75.1	75.9	61.2	65.1	59.6	24.1	74.1
Average Queue (m)	2.2	37.4	35.9	18.8	53.1	42.6	45.6	36.2	36.8	30.2	6.2	46.0
95th Queue (m)	8.0	53.7	52.9	45.2	93.3	67.2	68.8	55.0	56.5	53.3	16.8	70.2
Link Distance (m)		714.6	714.6	714.6				859.4	859.4	859.4		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	122.0				72.0	170.0	170.0				130.0	105.0
Storage Blk Time (%)					5							
Queuing Penalty (veh)					7							

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	T	R	L	T	TR
Maximum Queue (m)	83.9	58.4	55.4	24.9	33.2	99.4	101.4
Average Queue (m)	57.5	30.6	28.1	12.0	13.0	54.8	57.5
95th Queue (m)	77.2	52.3	49.2	20.5	27.2	86.8	90.9
Link Distance (m)		320.8	320.8		1388.2	1388.2	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)	105.0			260.0	160.0		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Queuing and Blocking Report

2028 FT PM Peak Hour  
09-09-2021

Intersection: 6: Boston Church Road/3 Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	61.2	89.0	83.8	28.7
Average Queue (m)	21.0	36.4	42.0	8.2
95th Queue (m)	47.5	74.8	71.8	21.0
Link Distance (m)	156.8	1328.5	205.8	489.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Esquesing Line/Fourth Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	88.4	96.0	135.4	74.1
Average Queue (m)	36.1	41.6	68.5	27.0
95th Queue (m)	70.6	77.7	115.0	55.8
Link Distance (m)	1328.5	638.0	1973.8	458.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 101: Boston Church Road & East Access 1

Movement	WB	WB	NB	SB
Directions Served	L	R	T	L
Maximum Queue (m)	31.4	8.4	0.6	8.2
Average Queue (m)	14.6	4.2	0.0	0.7
95th Queue (m)	26.0	8.5	0.6	4.4
Link Distance (m)	157.4	157.4	253.6	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				15.0
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

2028 FT PM Peak Hour  
09-09-2021

Intersection: 102: James Snow Parkway N & East Access 2

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	T	L	R
Maximum Queue (m)	23.9	52.3	1.2	2.4	27.3	21.0
Average Queue (m)	3.5	1.7	0.1	0.1	8.6	6.1
95th Queue (m)	15.0	51.5	1.4	1.9	22.5	17.6
Link Distance (m)		522.0	541.7	541.7	133.1	133.1
Upstream Blk Time (%)		0				
Queuing Penalty (veh)		0				
Storage Bay Dist (m)	90.0					
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 103: James Snow Parkway N & East Access 3

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	R	L	R
Maximum Queue (m)	21.4	35.1	41.4	46.3	48.0	21.0	37.9	20.3
Average Queue (m)	4.1	10.7	17.3	11.6	12.7	3.3	14.3	5.4
95th Queue (m)	15.6	28.6	36.4	31.6	34.6	13.8	29.7	15.6
Link Distance (m)		541.7	541.7	324.4	324.4		138.6	138.6
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	90.0					80.0		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 201: West Access 1 & 5 Sideroad

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	17.1	15.4
Average Queue (m)	0.8	6.3
95th Queue (m)	7.5	13.5
Link Distance (m)	164.7	84.1
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report

2028 FT PM Peak Hour  
09-09-2021

Intersection: 202: West Access 2 & 5 Sideroad

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	11.2	12.4
Average Queue (m)	0.5	6.1
95th Queue (m)	4.8	13.3
Link Distance (m)	156.8	85.7
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 203: Boston Church Road & West Access 3

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (m)	21.1	18.4
Average Queue (m)	7.1	1.8
95th Queue (m)	19.8	10.1
Link Distance (m)	92.1	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	40.0	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 204: Boston Church Road & West Access 4

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (m)	17.7	8.4
Average Queue (m)	10.1	1.0
95th Queue (m)	15.2	5.4
Link Distance (m)	94.3	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	15.0	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report

2028 FT PM Peak Hour  
09-09-2021

Intersection: 205: Boston Church Road & West Access 5

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (m)	19.2	11.0
Average Queue (m)	2.7	0.6
95th Queue (m)	12.8	5.8
Link Distance (m)	93.1	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	40.0	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 156

Queuing and Blocking Report

2033 FT AM Peak Hour  
09-09-2021

Intersection: 1: Regional Road 25 & 5 Sideroad

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	R	L	T	T
Maximum Queue (m)	165.4	331.1	75.9	71.0	64.4	49.4	52.0	60.6	42.2	53.3	98.2	88.5
Average Queue (m)	51.7	216.7	33.7	24.1	23.9	19.2	22.7	25.9	13.5	23.6	59.1	45.4
95th Queue (m)	168.9	462.1	82.6	59.2	50.5	41.4	46.9	52.2	31.5	45.4	88.4	74.7
Link Distance (m)		557.9		513.0		957.2	957.2	957.2			194.0	194.0
Upstream Blk Time (%)	5											
Queuing Penalty (veh)	0											
Storage Bay Dist (m)	80.0		70.0		75.0		75.0		35.0			
Storage Blk Time (%)	40		7		0		0		5		30	
Queuing Penalty (veh)	31		9		0		0		11		33	

Intersection: 1: Regional Road 25 & 5 Sideroad

Movement	SB
Directions Served	TR
Maximum Queue (m)	55.8
Average Queue (m)	19.5
95th Queue (m)	45.3
Link Distance (m)	194.0
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report

2033 FT AM Peak Hour  
09-09-2021

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB		
Directions Served	L	T	T	T	R	L	T	T	T	R	L	T		
Maximum Queue (m)	23.5	63.4	60.8	45.6	25.6	92.0	27.2	33.3	37.4	30.4	68.0	83.2		
Average Queue (m)	4.1	32.1	23.5	4.4	8.3	37.9	8.0	12.1	15.7	11.0	30.0	42.0		
95th Queue (m)	15.7	55.8	51.4	22.9	21.4	73.1	21.4	26.6	31.2	24.5	54.8	68.8		
Link Distance (m)		435.5	435.5	435.5			1043.2	1043.2	1043.2			571.9		
Upstream Blk Time (%)														
Queuing Penalty (veh)														
Storage Bay Dist (m)	80.0				115.0		85.0				35.0		30.0	
Storage Blk Time (%)	0				1		1		1		0		18	
Queuing Penalty (veh)	0				1		0		0		22		35	

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	NB	NB	NB	SB	SB	SB	SB
Directions Served	T	T	R	L	T	T	TR
Maximum Queue (m)	78.6	56.2	64.7	84.4	53.9	62.4	76.4
Average Queue (m)	34.1	23.6	26.8	39.9	20.3	27.0	34.4
95th Queue (m)	61.7	48.2	49.4	73.5	45.1	53.7	63.4
Link Distance (m)	571.9	571.9		957.2	957.2	957.2	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)			30.0		75.0		
Storage Blk Time (%)	4		5		2		
Queuing Penalty (veh)	23		11		3		

Queuing and Blocking Report

2033 FT AM Peak Hour  
09-09-2021

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	
Directions Served	L	T	T	TR	L	T	T	TR	L	T	T	L	
Maximum Queue (m)	32.4	42.4	45.9	52.9	12.6	33.2	35.6	66.7	31.7	10.5	1.7	42.7	
Average Queue (m)	10.9	12.1	16.7	23.3	2.2	9.7	9.7	20.8	8.5	1.6	0.1	14.5	
95th Queue (m)	25.2	30.0	35.1	43.8	8.3	25.9	25.7	48.3	23.3	6.7	1.7	32.3	
Link Distance (m)		335.9	335.9	335.9		519.3	519.3	519.3		772.4	772.4		
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)	70.0				70.0				60.0				60.0
Storage Blk Time (%)													
Queuing Penalty (veh)													

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	SB	SB
Directions Served	T	T
Maximum Queue (m)	20.8	22.8
Average Queue (m)	6.2	4.2
95th Queue (m)	15.1	14.5
Link Distance (m)	172.8	172.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Queuing and Blocking Report

2033 FT AM Peak Hour  
09-09-2021

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	
Directions Served	L	T	T	TR	L	T	T	TR	L	T	L	T	
Maximum Queue (m)	14.9	61.9	66.1	77.6	22.8	58.7	65.0	73.4	42.2	61.3	38.0	122.9	
Average Queue (m)	2.1	27.7	30.8	36.8	6.9	25.7	27.4	34.0	14.4	27.3	7.9	59.6	
95th Queue (m)	8.4	51.2	56.8	65.6	17.0	48.0	53.0	63.2	32.1	51.2	24.2	107.1	
Link Distance (m)		323.0	323.0	323.0		1387.0	1387.0	1387.0		275.8		1969.7	
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)	85.0				70.0				40.0				25.0
Storage Blk Time (%)													
Queuing Penalty (veh)													

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	SB
Directions Served	R
Maximum Queue (m)	37.3
Average Queue (m)	2.5
95th Queue (m)	24.4
Link Distance (m)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	25.0
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report

2033 FT AM Peak Hour  
09-09-2021

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	NB	
Directions Served	L	T	T	T	R	L	L	T	T	T	R	L	
Maximum Queue (m)	1.6	70.8	67.3	60.0	40.2	26.6	32.5	36.5	37.8	28.5	11.6	76.0	
Average Queue (m)	0.1	45.9	45.3	33.2	16.6	8.9	16.1	21.0	19.9	6.8	2.9	39.5	
95th Queue (m)	1.2	63.3	62.4	58.7	33.3	20.2	27.8	33.5	33.4	19.5	8.0	69.0	
Link Distance (m)		707.2	707.2	707.2			855.6	855.6	855.6				
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)	122.0				72.0	170.0	170.0				130.0	105.0	
Storage Blk Time (%)				0									0
Queuing Penalty (veh)				0									0

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	NB	NB	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	L	T	T	T	R	L	T	T	T	R
Maximum Queue (m)	84.9	66.1	61.5	48.3	57.0	60.1	46.8	186.7	54.0	3.3
Average Queue (m)	52.4	38.2	34.3	17.1	28.5	23.9	24.7	32.8	29.9	0.4
95th Queue (m)	76.5	58.7	55.1	40.2	49.5	46.9	41.6	163.0	50.2	2.0
Link Distance (m)		320.2	320.2	320.2			1387.0	1387.0	1387.0	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	105.0				260.0	160.0				70.0
Storage Blk Time (%)	0									0
Queuing Penalty (veh)	0									0

Intersection: 6: Boston Church Road/3 Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	81.5	66.4	50.9	54.2
Average Queue (m)	31.9	21.6	20.6	26.3
95th Queue (m)	66.3	48.7	40.4	47.1
Link Distance (m)	156.8	1328.5	205.8	489.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

2033 FT AM Peak Hour  
09-09-2021

Intersection: 7: Esquesing Line/Fourth Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	115.4	157.4	107.0	200.9
Average Queue (m)	52.3	74.1	41.1	102.5
95th Queue (m)	98.8	149.6	83.7	182.9
Link Distance (m)	1328.5	638.0	1969.7	458.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 101: Boston Church Road & East Access 1

Movement	WB	WB	SB
Directions Served	L	R	L
Maximum Queue (m)	20.6	6.2	9.7
Average Queue (m)	7.5	1.0	1.9
95th Queue (m)	16.1	4.5	7.7
Link Distance (m)	106.4	106.4	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			15.0
Storage Blk Time (%)	0		
Queuing Penalty (veh)	0		

Intersection: 102: James Snow Parkway N & East Access 2

Movement	EB	EB	EB	EB	WB	WB	WB	WB	SB	SB	
Directions Served	L	T	T	T	T	T	T	R	L	R	
Maximum Queue (m)	24.9	27.8	33.5	39.9	30.8	30.9	41.2	18.4	26.0	19.8	
Average Queue (m)	4.9	5.4	7.8	9.9	4.0	5.2	8.4	1.4	8.4	6.5	
95th Queue (m)	17.1	19.3	24.2	28.5	17.2	19.9	27.8	9.3	22.5	17.9	
Link Distance (m)		519.3	519.3	519.3	542.6	542.6	542.6		129.4	129.4	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	90.0								80.0		
Storage Blk Time (%)											
Queuing Penalty (veh)											

Queuing and Blocking Report

2033 FT AM Peak Hour  
09-09-2021

Intersection: 103: James Snow Parkway N & East Access 3

Movement	EB	EB	EB	EB	WB	WB	WB	WB	SB	SB	
Directions Served	L	T	T	T	T	T	T	R	L	R	
Maximum Queue (m)	19.4	27.8	33.2	40.0	39.8	35.8	39.5	21.5	28.3	18.4	
Average Queue (m)	3.4	5.6	7.8	10.6	5.5	6.4	7.0	2.8	9.5	3.6	
95th Queue (m)	13.9	19.3	24.5	30.1	22.9	23.9	26.3	12.6	23.7	13.8	
Link Distance (m)		542.6	542.6	542.6	323.0	323.0	323.0		134.9	134.9	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	90.0								80.0		
Storage Blk Time (%)											
Queuing Penalty (veh)											

Intersection: 201: West Access 1 & 5 Sideroad

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (m)	0.7	20.4	9.8
Average Queue (m)	0.0	3.2	2.0
95th Queue (m)	0.7	12.8	8.1
Link Distance (m)	186.5	164.7	84.1
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 202: West Access 2 & 5 Sideroad

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	21.6	9.1
Average Queue (m)	3.7	2.1
95th Queue (m)	14.5	8.2
Link Distance (m)	156.8	85.7
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report

2033 FT AM Peak Hour  
09-09-2021

Intersection: 203: Boston Church Road & West Access 3

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (m)	21.3	16.7
Average Queue (m)	5.9	1.8
95th Queue (m)	18.6	9.8
Link Distance (m)	92.1	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	40.0	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 204: Boston Church Road & West Access 4

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (m)	11.3	12.5
Average Queue (m)	5.4	3.9
95th Queue (m)	12.7	11.4
Link Distance (m)	94.3	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	15.0	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 205: Boston Church Road & West Access 5

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (m)	18.8	9.5
Average Queue (m)	1.7	0.5
95th Queue (m)	10.1	5.5
Link Distance (m)	93.1	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	40.0	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 206



Queuing and Blocking Report

2033 FT PM Peak Hour  
09-09-2021

Intersection: 1: Regional Road 25 & 5 Sideroad

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	T	R	L	T	T
Maximum Queue (m)	41.4	83.9	99.9	194.6	95.9	83.2	92.1	98.4	25.1	14.4	81.4	66.0
Average Queue (m)	17.5	42.2	32.6	102.7	45.2	30.5	39.2	44.7	7.2	2.7	43.5	25.9
95th Queue (m)	34.2	72.6	94.2	193.5	81.6	70.7	82.7	88.6	18.4	11.0	69.8	57.0
Link Distance (m)	557.9		513.0		957.2		957.2		957.2		194.0	194.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0		70.0		75.0		75.0		35.0			
Storage Blk Time (%)	0		0		30		2		0		15	
Queuing Penalty (veh)	0		1		27		7		1		2	

Intersection: 1: Regional Road 25 & 5 Sideroad

Movement	SB
Directions Served	TR
Maximum Queue (m)	35.2
Average Queue (m)	9.1
95th Queue (m)	24.0
Link Distance (m)	194.0
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report

2033 FT PM Peak Hour  
09-09-2021

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	B16	B16
Directions Served	L	T	T	T	R	L	T	T	T	R	T	T
Maximum Queue (m)	33.0	65.4	60.7	39.9	53.7	146.2	82.7	31.1	36.9	65.8	33.6	34.2
Average Queue (m)	8.7	36.1	26.9	5.5	22.9	79.5	13.9	11.2	14.6	27.9	1.1	1.1
95th Queue (m)	24.0	58.3	52.6	23.2	41.7	144.5	73.9	24.9	31.0	52.5	33.0	33.6
Link Distance (m)	435.5		435.5		435.5		1043.2		1043.2		1043.2	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0		115.0		85.0		14		0		35.0	
Storage Blk Time (%)	0		0		14		0		4		4	
Queuing Penalty (veh)	0		10		1		3					

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	NB	NB	NB	NB	NB	SB	SB	SB	SB	
Directions Served	L	T	T	T	R	L	T	T	TR	
Maximum Queue (m)	81.2	127.3	119.4	101.3	41.1	70.4	63.5	60.9	61.2	
Average Queue (m)	18.8	82.4	74.8	55.8	12.5	29.5	28.4	30.4	28.6	
95th Queue (m)	54.4	117.1	109.5	90.7	30.4	55.2	50.8	53.5	54.1	
Link Distance (m)	571.9		571.9		571.9		957.2		957.2	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	30.0		30.0		75.0					
Storage Blk Time (%)	2		46		20		0		0	
Queuing Penalty (veh)	5		36		38		0		1	

Queuing and Blocking Report

2033 FT PM Peak Hour  
09-09-2021

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	
Directions Served	L	T	T	TR	L	T	T	TR	L	T	T	L	
Maximum Queue (m)	47.2	38.8	41.2	47.4	25.6	51.0	49.9	63.2	73.0	31.1	12.1	92.2	
Average Queue (m)	17.8	11.8	15.0	19.0	5.3	20.6	21.1	26.0	32.3	9.9	1.3	43.6	
95th Queue (m)	36.9	28.4	32.8	40.3	17.0	41.5	42.7	50.9	60.9	22.0	6.7	76.5	
Link Distance (m)		335.9	335.9	335.9		519.8	519.8	519.8		772.4	772.4		
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)	70.0				70.0				60.0				60.0
Storage Blk Time (%)									1	0		4	
Queuing Penalty (veh)									0	0		1	

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	SB	SB
Directions Served	T	T
Maximum Queue (m)	20.1	18.7
Average Queue (m)	5.6	3.5
95th Queue (m)	14.5	12.8
Link Distance (m)	172.8	172.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		0
Queuing Penalty (veh)		0

Queuing and Blocking Report

2033 FT PM Peak Hour  
09-09-2021

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	L	
Maximum Queue (m)	14.9	44.1	52.1	64.7	9.7	54.6	49.5	56.6	41.8	78.5	7.5	20.8	
Average Queue (m)	2.4	21.2	25.3	29.9	1.4	23.3	22.3	26.4	15.2	40.5	0.2	5.3	
95th Queue (m)	9.2	38.4	46.5	55.4	6.4	44.2	42.8	49.9	31.5	69.4	7.4	14.8	
Link Distance (m)		323.0	323.0	323.0		1387.0	1387.0	1387.0		275.8			
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)	85.0				70.0				40.0				25.0
Storage Blk Time (%)									0	1	17	0	
Queuing Penalty (veh)									0	2	23	0	

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	SB
Directions Served	T
Maximum Queue (m)	52.4
Average Queue (m)	22.3
95th Queue (m)	44.0
Link Distance (m)	1969.7
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	6
Queuing Penalty (veh)	2

Queuing and Blocking Report

2033 FT PM Peak Hour  
09-09-2021

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	NB
Directions Served	L	T	T	T	R	L	L	T	T	T	R	L
Maximum Queue (m)	9.2	59.6	57.9	49.2	85.4	61.8	66.7	67.7	66.1	63.3	16.5	71.5
Average Queue (m)	1.8	38.2	36.6	20.7	38.2	35.1	39.9	40.2	41.4	35.7	5.1	40.7
95th Queue (m)	6.4	54.8	54.5	46.8	68.9	56.3	59.9	60.1	61.4	58.8	12.3	66.8
Link Distance (m)		707.2	707.2	707.2			855.6	855.6	855.6			
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	122.0				72.0	170.0	170.0				130.0	105.0
Storage Blk Time (%)	1											
Queuing Penalty (veh)	2											

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	NB	NB	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	L	T	T	T	R	L	T	T	T	R
Maximum Queue (m)	79.9	56.2	51.6	38.8	26.1	32.5	56.8	63.8	65.8	4.2
Average Queue (m)	52.7	30.4	27.9	10.6	12.5	13.1	32.6	35.8	37.4	0.6
95th Queue (m)	73.7	50.8	46.6	28.9	21.7	27.1	52.0	56.7	59.6	2.7
Link Distance (m)		320.2	320.2	320.2			1387.0	1387.0	1387.0	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	105.0				260.0	160.0				70.0
Storage Blk Time (%)	0									
Queuing Penalty (veh)	0									

Intersection: 6: Boston Church Road/3 Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	70.0	49.0	88.3	32.8
Average Queue (m)	21.9	16.4	43.5	10.2
95th Queue (m)	51.1	39.1	75.9	24.7
Link Distance (m)	156.8	1328.5	205.8	489.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

2033 FT PM Peak Hour  
09-09-2021

Intersection: 7: Esquesing Line/Fourth Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	92.2	114.4	144.2	70.3
Average Queue (m)	40.8	50.9	75.7	27.9
95th Queue (m)	76.5	94.3	122.7	54.5
Link Distance (m)	1328.5	638.0	1969.7	458.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 101: Boston Church Road & East Access 1

Movement	WB	WB	SB
Directions Served	L	R	L
Maximum Queue (m)	40.0	10.5	8.2
Average Queue (m)	15.2	4.4	0.7
95th Queue (m)	30.4	9.0	4.6
Link Distance (m)	106.4	106.4	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)		15.0	
Storage Blk Time (%)	0		
Queuing Penalty (veh)	0		

Intersection: 102: James Snow Parkway N & East Access 2

Movement	EB	EB	EB	EB	WB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	T	T	R	L	R
Maximum Queue (m)	25.2	26.5	28.0	28.8	28.3	27.5	29.5	14.2	32.6	22.9
Average Queue (m)	4.8	5.2	7.0	7.6	5.0	5.0	5.7	0.9	8.2	5.7
95th Queue (m)	17.9	17.9	21.2	22.7	18.0	18.4	20.1	6.7	23.9	17.7
Link Distance (m)		519.8	519.8	519.8	542.0	542.0	542.0		129.5	129.5
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	90.0							80.0		
Storage Blk Time (%)										
Queuing Penalty (veh)										

Queuing and Blocking Report

2033 FT PM Peak Hour  
09-09-2021

Intersection: 103: James Snow Parkway N & East Access 3

Movement	EB	EB	EB	EB	WB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	T	T	R	L	R
Maximum Queue (m)	22.9	22.4	32.7	36.9	35.5	39.9	38.5	18.2	39.2	18.8
Average Queue (m)	4.5	6.1	10.8	12.9	9.1	9.1	8.7	2.4	15.1	5.4
95th Queue (m)	16.6	17.4	26.4	30.7	25.7	28.3	27.2	11.4	32.0	15.4
Link Distance (m)		542.0	542.0	542.0	323.0	323.0	323.0		134.9	134.9
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	90.0							80.0		
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 201: West Access 1 & 5 Sideroad

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	10.2	13.8
Average Queue (m)	0.4	6.0
95th Queue (m)	4.5	13.5
Link Distance (m)	164.7	84.1
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 202: West Access 2 & 5 Sideroad

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	10.6	13.2
Average Queue (m)	0.5	6.4
95th Queue (m)	6.3	13.5
Link Distance (m)	156.8	85.7
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report

2033 FT PM Peak Hour  
09-09-2021

Intersection: 203: Boston Church Road & West Access 3

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (m)	20.2	16.1
Average Queue (m)	7.8	1.2
95th Queue (m)	20.1	8.0
Link Distance (m)	92.1	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	40.0	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 204: Boston Church Road & West Access 4

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (m)	17.6	7.4
Average Queue (m)	9.9	0.7
95th Queue (m)	15.9	4.2
Link Distance (m)	94.3	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	15.0	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 205: Boston Church Road & West Access 5

Movement	EB	NB	SB
Directions Served	LR	L	TR
Maximum Queue (m)	17.9	8.9	0.6
Average Queue (m)	2.0	0.5	0.0
95th Queue (m)	10.8	5.5	0.6
Link Distance (m)	93.1	160.4	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	40.0		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 165