

ARGO Bronte River

1300-1350 Bronte Road



Transportation Impact Study



ARGO Bronte River Transportation Impact Study

Prepared for:

ARGO Land Development
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Burlington, ON
L7M 0W7

Prepared by:



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PN: 2020-91

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1 Introduction

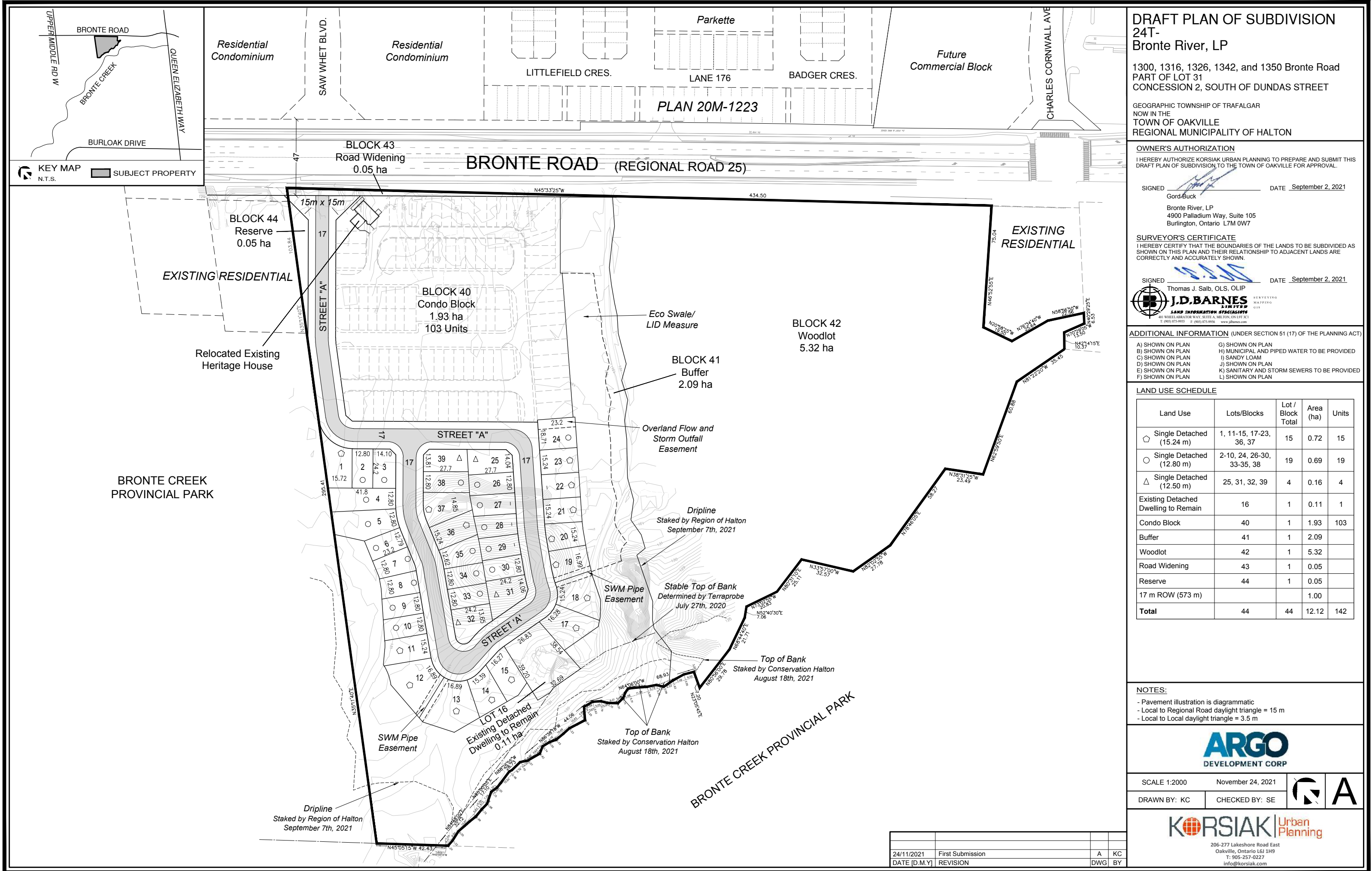
This Transportation Impact Study (TIS) has been prepared to support the ARGO Land Development properties located at 1300-1350 Bronte Road in Oakville, Ontario. Directly across from these properties is the Bronte Green development, which is currently under construction east of Bronte Road. The proposed ARGO Bronte River development includes 40 single detached units (including two existing houses) and 102 townhouses. Figure 1 illustrates the site context. Figure 2 illustrates the proposed development concept plan.

Figure 1: Site Context



The site is currently zoned as Existing Development (ED), Parkway Belt Complementary Use (PB2), Natural Area (N), and Greenbelt (GB). The subject property is bordered by and will have a primary access on Bronte Road. The scope of this TIS has been confirmed with transportation staff from the Town of Oakville and Halton Region as shown in Appendix A.

Figure 2: Concept Plan



2 Existing Conditions

2.1 Area Road Network

Bronte Road

Bronte Road is a Region of Halton arterial road with a four-lane and divided urban cross-section. The Halton Region Transportation Master Plan (TMP) protects a 47-metre right-of-way for class C4 arterial roads, which includes Bronte Road. Boulevard-separated sidewalks are provided on both sides of the road. Left turn lanes are included at major intersections. A 60 km/h posted speed limit applies. The Region's TMP includes the widening of Bronte Road to six lanes in the future from Speers Road to Highway 407 starting in 2025. Bronte Road will be designated as a transit corridor with two of the lanes implemented as HOV lanes.

Upper Middle Road

Upper Middle Road is a Region of Halton arterial road with a four-lane and divided urban cross-section. The Halton Region Transportation Master Plan protects a 47-metre right-of-way for class C4 arterial roads, which includes Upper Middle Road. Boulevard-separated sidewalks are provided on both sides of the road east of the intersection at Bronte Road and only on the north side west of the intersection. West of the intersection at Bronte Road, the road transitions to two lanes. Left turn lanes are included at major intersections. A 60 km/h posted speed limit applies. The Region's TMP includes the widening of Upper Middle Road to six lanes in the future from Bronte Road to Neyagawa Boulevard starting in 2027.

Charles Cornwall Road

Charles Cornwall Road is a Town of Oakville local road with a two-lane cross section. It provides access to the Woodlands Operations Centre. The right-of-way is measured to be 22 metres. A 20 km/h posted speed limit applies.

North Service Road West

North Service Road West is a Town of Oakville major collector with a two-lane cross-section. It serves the lands immediately north of the QEW and runs from Bronte Road east to Third Line, and continues easterly across Oakville to Dorval Drive and Kerr Street. The right-of-way is measured to be 30 metres. An unposted speed limit of 50 km/h is assumed.

Queen Elizabeth Way

The Queen Elizabeth Way (QEW) is a provincial highway with a six-lane plus two HOV lanes cross-section at this location. An interchange is located at Bronte Road. This highway provides connection to the east to Toronto and beyond and to the west to Hamilton and beyond. A 100 km/h posted speed limit applies to the QEW at this location.

2.2 Existing Intersections

Upper Middle Road at Bronte Road

The intersection of Upper Middle Road at Bronte Road is a signalized intersection with two auxiliary left turn lanes on the westbound approach and one auxiliary left turn lane on all other approaches. Right turn lanes are provided on all approaches. Crosswalks and associated pedestrian signal heads and call buttons are provided on the west, north, and east legs of the intersection. There is a multi-use pathway on the west side of Bronte Road and the north side of Upper Middle Road, alongside the sidewalks. Figure 3 illustrates the intersection of Upper Middle Road at Bronte Road.

Figure 3: Intersection of Upper Middle Road at Bronte Road



Charles Cornwall Road at Bronte Road

The signalized intersection to the Halton Regional Centre at Bronte Road includes auxiliary left turn lanes on the north and south approaches. The west approach is a driveway to a few residential properties adjacent to Bronte Road. An exclusive right turn lane and exclusive left turn lane are provided on the east approach. An exclusive right turn lane is provided on the south approach into the Halton Regional Centre Access. The only east-west crosswalk that is provided is present on the north leg of the intersection. Pedestrian signal heads and call buttons are present on the north, west, and east legs of the intersection. Figure 4 illustrates the signalized intersection at Charles Cornwall Road at Bronte Road.

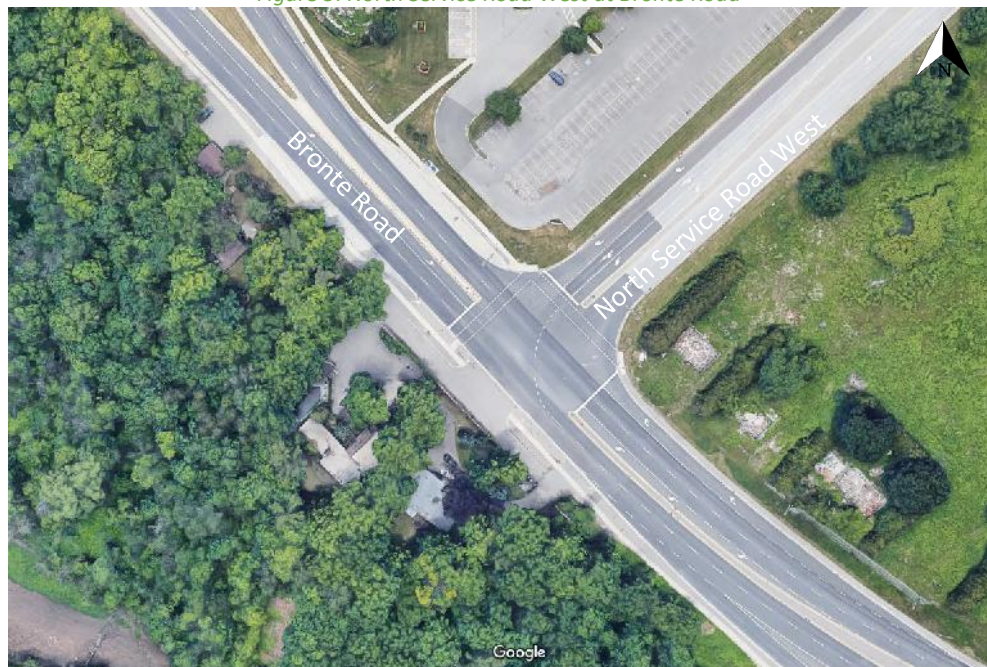
Figure 4: Charles Cornwall Road at Bronte Road



North Service Road West at Bronte Road

The signalized intersection of North Service Road West at Bronte Road includes auxiliary left turn lanes on the north, south, and east approaches. The west approach is a driveway to a few residential properties adjacent to Bronte Road. Exclusive right turn lanes are provided on the south and east approaches. The only east-west crosswalk that is provided is present on the north leg of the intersection. Pedestrian signal heads and call buttons are present on the north and west legs of the intersection. Figure 5 illustrates the signalized intersection at North Service Road West at Bronte Road.

Figure 5: North Service Road West at Bronte Road



QEW Westbound Off Ramp at Bronte Road

The signalized intersection the QEW Westbound Off Ramp at Bronte Road includes two left turn lanes and an auxiliary right turn lane on the west approach. The north and south approaches contain two through lanes each. There is no crosswalk provided at this intersection and no pedestrian signal heads and call buttons are present. However, pedestrians have been recorded to cross on the east leg of this intersection. Figure 6 illustrates the signalized intersection at the QEW Westbound Off Ramp at Bronte Road.

Figure 6: QEW WB Off Ramp at Bronte Road



QEW Eastbound Ramps at Bronte Road

The signalized intersection the QEW Eastbound Ramps at Bronte Road includes an auxiliary left turn lane, an auxiliary right turn lane, and a shared through/right/left lane on the west approach. An auxiliary left turn lane is provided on all approaches. An auxiliary right turn lane is also provided on the north approach. Pedestrian signal heads and crosswalks are present on the north, south, and west approaches with call buttons present on the north leg of the intersection. Figure 7 illustrates the signalized intersection at the QEW Eastbound Ramps at Bronte Road.

Figure 7: QEW EB Ramps at Bronte Road



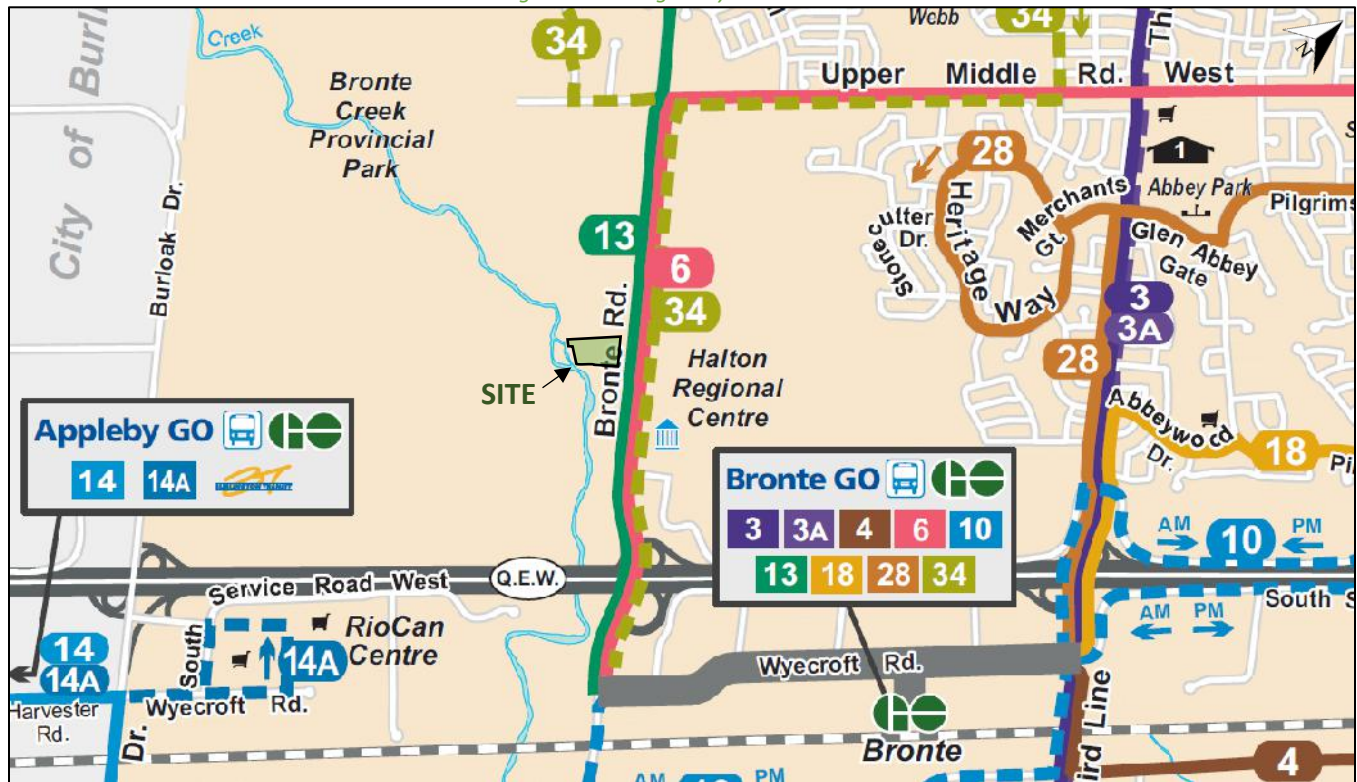
2.3 Cycling and Pedestrian Facilities

Cycling facilities in the Study Area are currently provided via a boulevard multi-use trail adjacent to the sidewalk along the west side of Bronte Road. Crosswalks are present at all the Study Area intersections except for the QEW Westbound Off Ramp at Bronte Road with sidewalks along both sides of Bronte Road from Upper Middle Road to North Service Road West. The sidewalk is boulevard-separated on the east side for these extents and on the west side from Upper Middle Road to Charles Cornwall Road. The Technical Appendix K in the Town of Oakville Active Transportation Master Plan (ATMP) refers to the Halton Region Active Transportation Network and Road Capital Projects. This document outlines proposed bike lanes along Bronte Road and Upper Middle Road as well as interchange improvements at the QEW intersections. Currently, no crosswalks exist at the QEW westbound off ramp. The Halton Region Transportation Development and Non-Development Capital Implementation plan as part of this Appendix notes that these infrastructure changes will have a start year of construction of 2025. For more information on cycling and pedestrian facilities, the Town of Oakville and Halton Region Active Transportation Maps are attached in Appendix B.

2.4 Existing Transit

As of September of 2021, Oakville Transit Route #13 runs along Bronte Road with an eastbound destination of Oakville GO station and a westbound destination of Bronte GO station. Routes #6 and #34 also run along Bronte Road as well as Upper Middle Road. The existing Study Area Oakville Transit service is presented in Figure 8.

Figure 8: Existing Study Area Transit



Source: www.oakvilletransit.ca

2.5 Existing Peak Hour Travel Demand

To understand the existing AM and PM peak hour traffic volumes, turning movement counts for the Study Area intersections have been acquired from Halton Region. Table 1 summarizes the dates of the most recent turning movement counts at each Study Area intersection.

Table 1: TMC Data Dates

Data Type	Location	Count Date
Turning Movement Counts (TMC)	QEW EB Ramps	December 4, 2019
	QEW WB Off Ramp	December 4, 2019
	North Service Road at Bronte Road	December 4, 2019
	Charles Cornwall Road at Bronte Road	December 4, 2019
	Upper Middle Road at Bronte Road	October 29, 2019

The turning movement counts were undertaken in 2019, approximately two years prior to the study horizon of 2021. To reflect a 2021 horizon, a compound annual growth rate (CAGR) has been applied to reflect growth outside of the Study Area. The Region proposes a 2% CAGR for Bronte Road to be applied to the Study Area Traffic Volumes. Turning movement count data is included in Appendix C. Figure 9 illustrates the existing 2021 traffic volumes. Figure 10 illustrates the existing pedestrian volumes. Cyclists are assumed to utilize the multi-use pathway along Bronte Road.

Figure 9: 2021 Existing Traffic Volumes

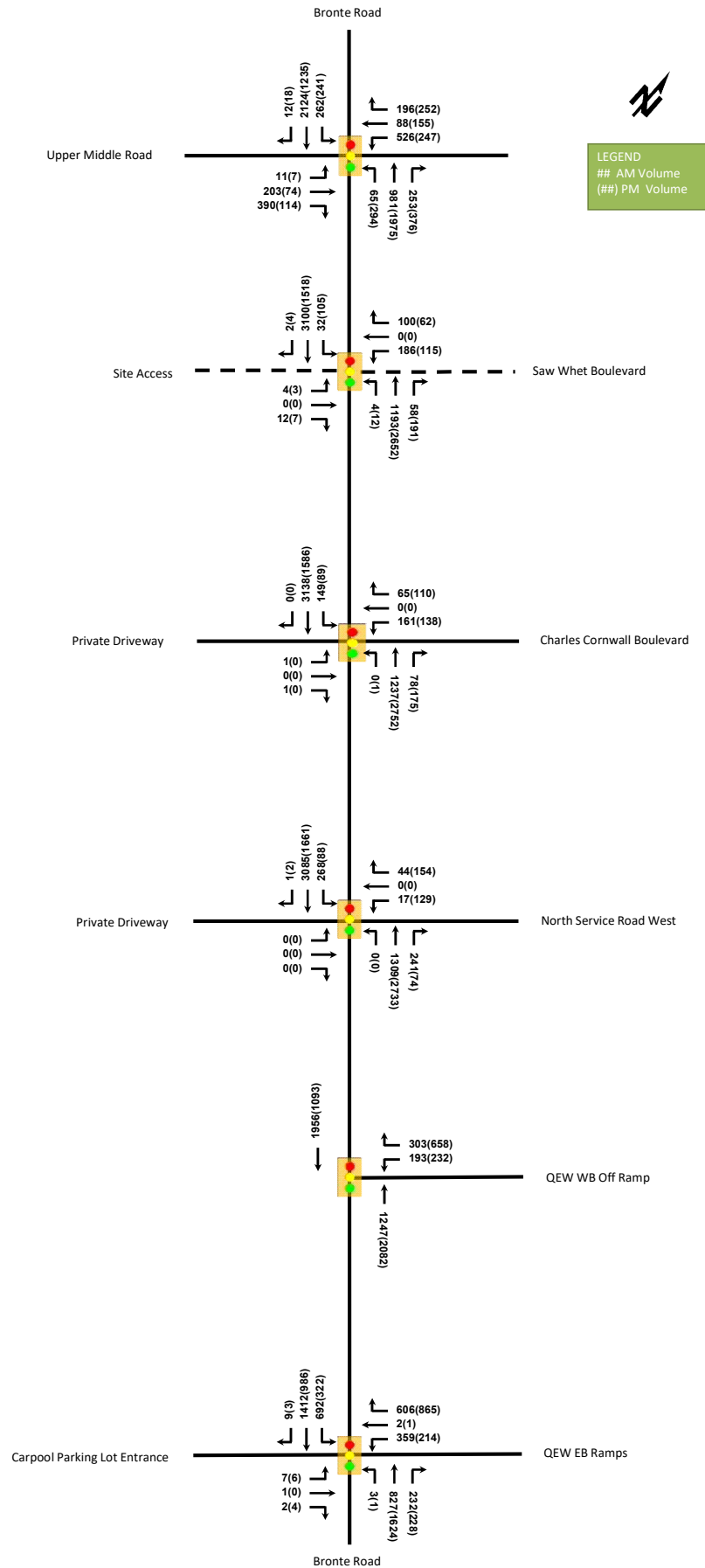
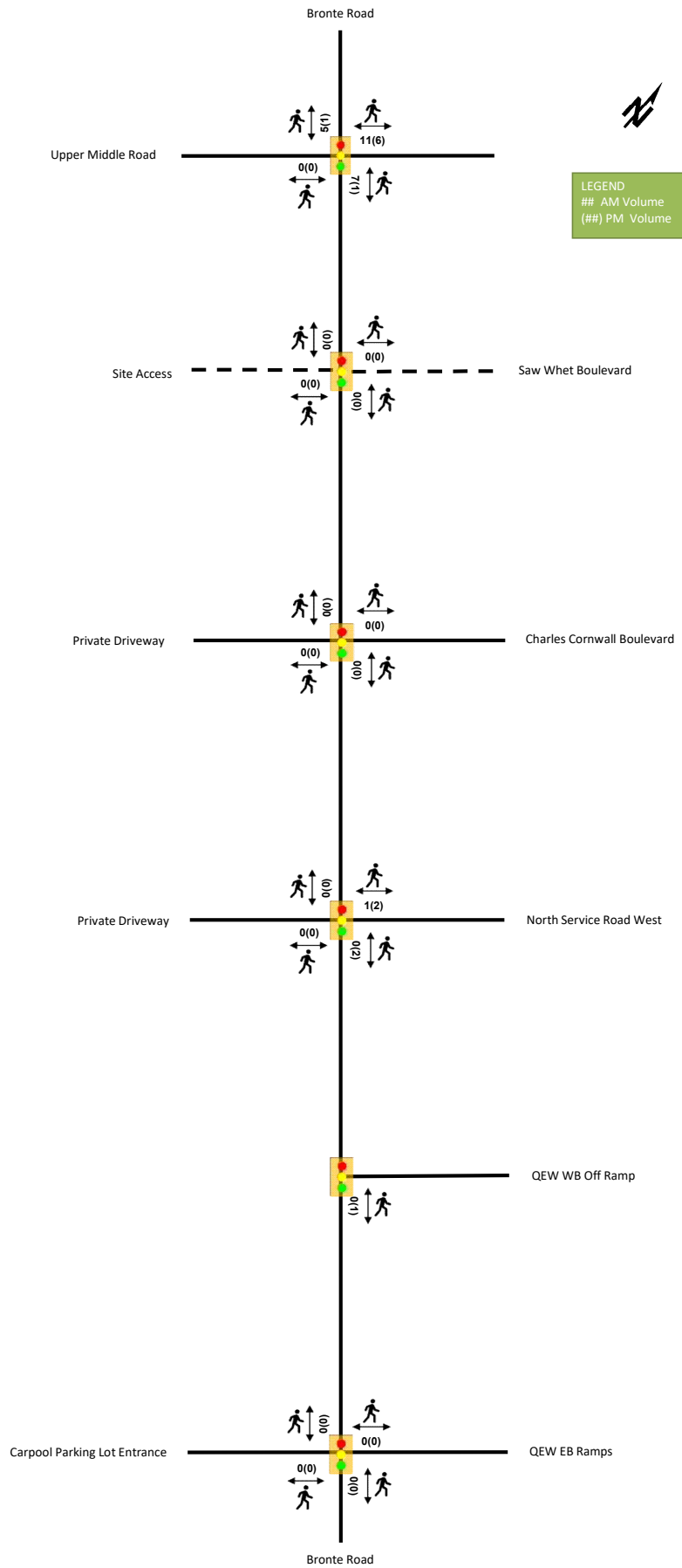


Figure 10: 2021 Pedestrian Volumes



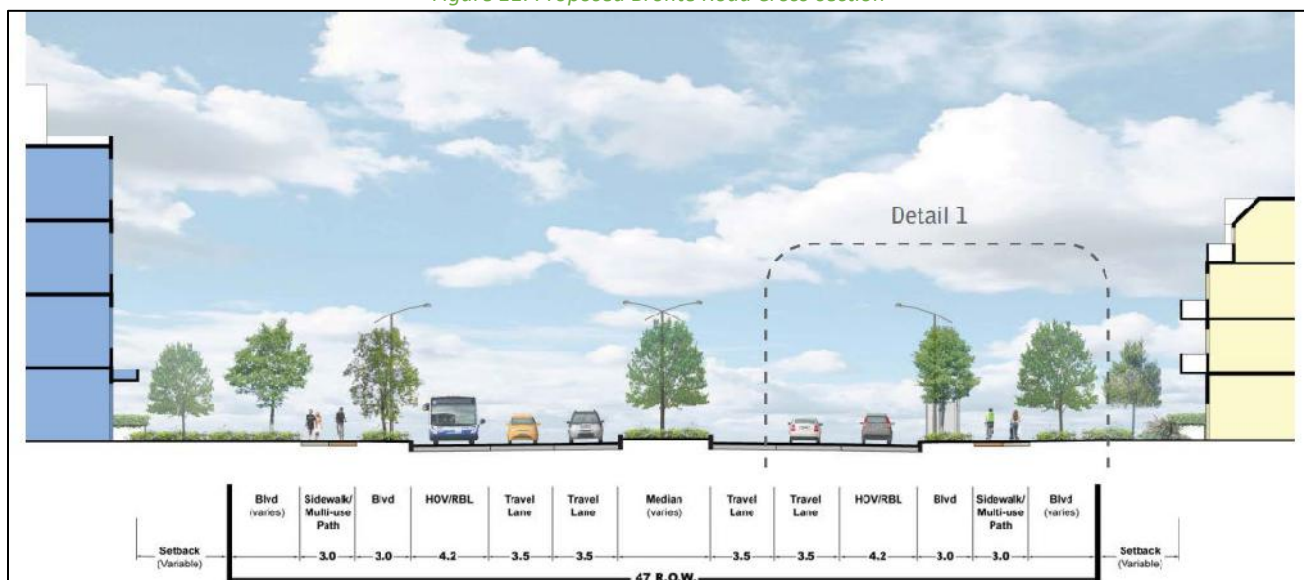
3 Future Background Conditions

3.1 Planned Conditions

3.1.1 Bronte Street HOV / RBL Lanes

Bronte Road is currently a two-lane road in each direction, with all lanes operating as general-purpose traffic lanes with no vehicle restrictions. The widening of Bronte Road from four to six lanes between Speers Road and Highway 407 is planned for 2025. Once widened, the two outer lanes of Bronte Road will be dedicated to high occupancy vehicles including transit as Bronte Road has been identified as a priority bus corridor as part of the Preliminary 2031 Halton Region Transit Priority Network. Additionally, Transit Signal Priority will be implemented throughout the entirety of Bronte Road within the study area. The cross-section for 47-metre-wide roadways, proposed as part of the Halton Region TMP, can be seen in Figure 11.

Figure 11: Proposed Bronte Road Cross-section



Source: Halton Region Transportation Master Plan (2011)

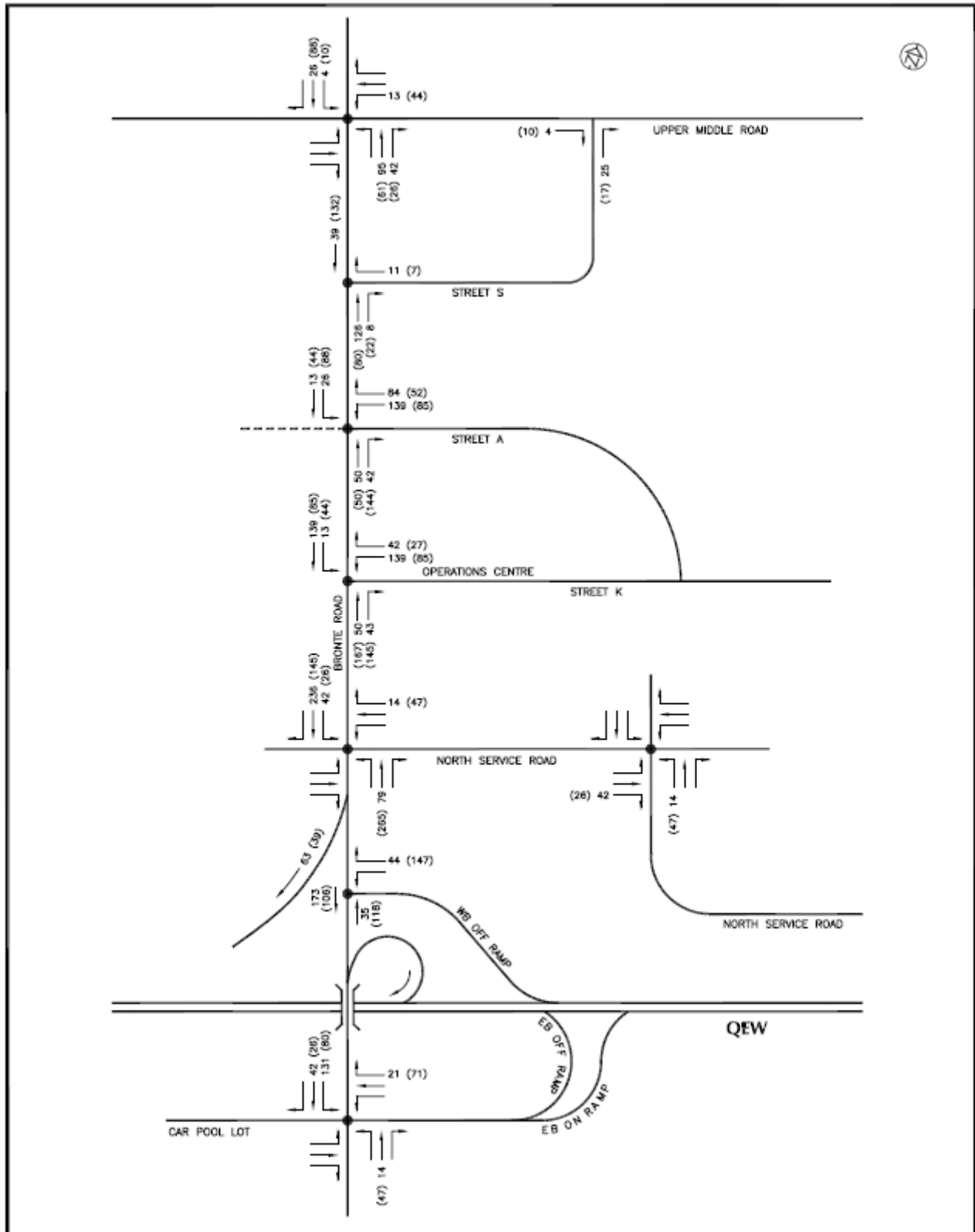
3.1.2 Other Study Area Developments

Adjacent to ARGO's Bronte River development are the Bronte Green and Valery 1354 Bronte Road developments, which will share a full-movement access with the subject property via a future signalized intersection along Bronte Road at Saw Whet Boulevard.

3.1.2.1 Bronte Green Development

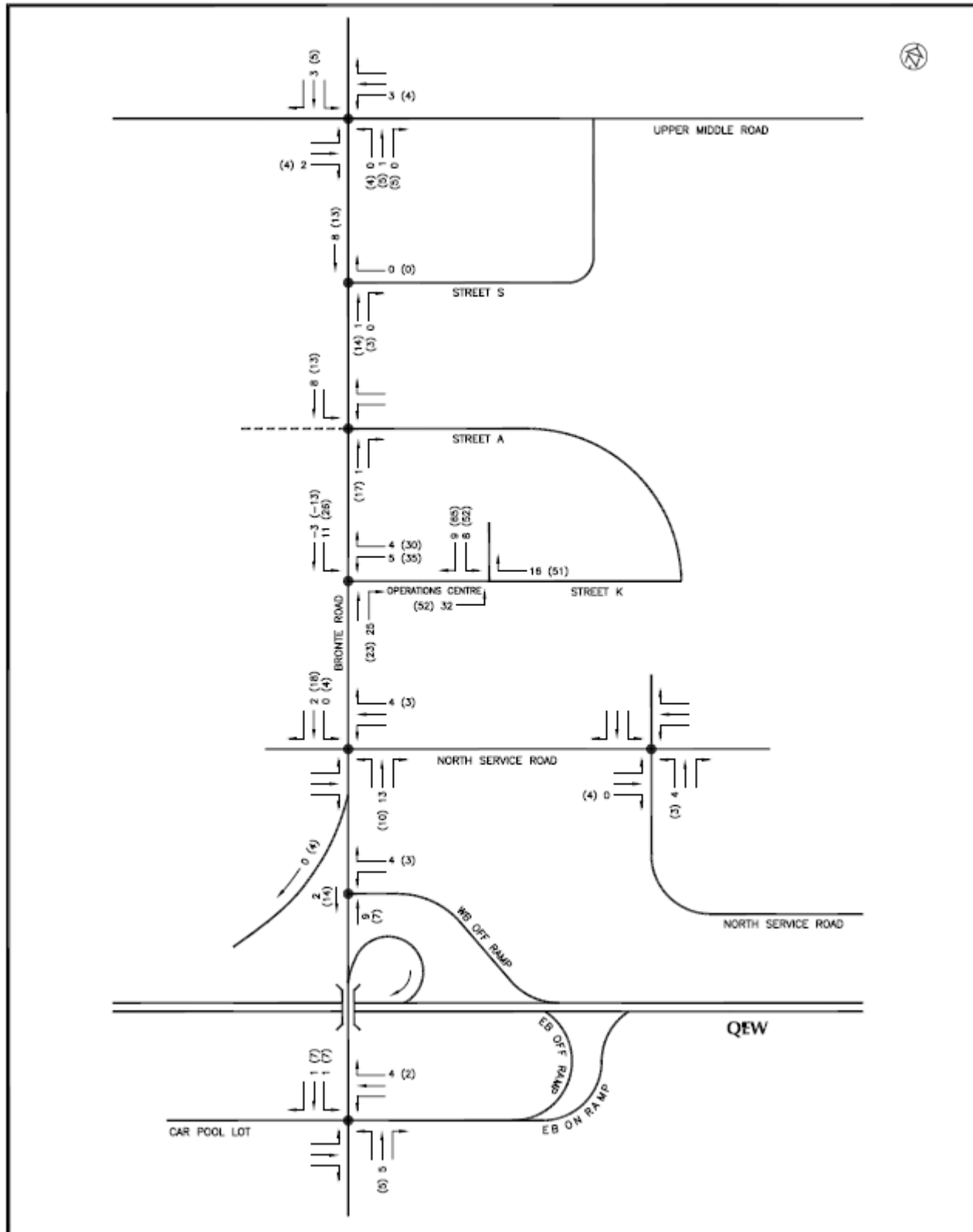
The Bronte Green subdivision is located on the former Saw Whet golf course lands, east of the proposed development. This development includes 164 freehold townhouse units, 443 detached units, 498 units in a residential condominium block, 76 units in a common elements condominium block, and some future commercial lands at the south end of the property. Adjacent to the central access at Saw Whet Boulevard are two mid-rise residential condominiums. The 2017 TIS update for Bronte Green assumes 270 units between the two condo blocks. One of these developments has since been updated with a new unit count, and as a result, 335 units have been considered for this block. Figure 12 and Figure 13 illustrate the residential and commercial components of traffic generation of Bronte Green Development in the 2017 update. Figure 14 illustrates the site trips generated in addition due to the updated unit count. That study is ongoing and the volumes below have not yet been approved by the Town of Oakville or Halton Region.

Figure 12: Bronte Green TIA Residential Traffic Generation



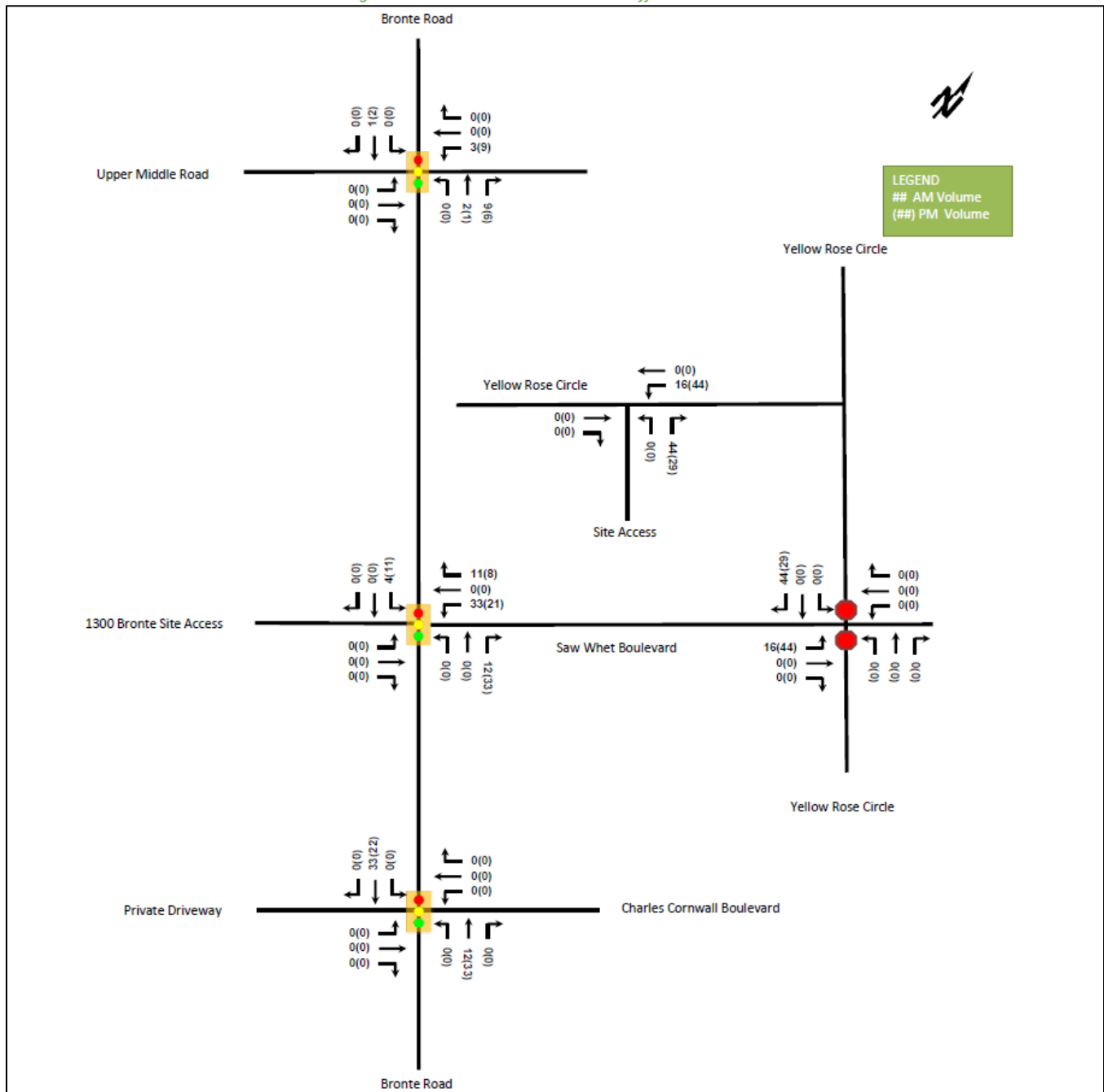
Source: Bronte Green Subdivision Traffic Impact Study; Read, Voorhees & Associates; April 2017

Figure 13: Bronte Green TIA Commercial Traffic Generation



Source: Bronte Green Subdivision Traffic Impact Study; Read, Voorhees & Associates; April 2017

Figure 14: Bronte Green Mid-Rise Traffic Generation



3.1.2.2 Valery 1534 Bronte Road

Valery Homes is proposing to develop a four-storey residential building at 1354 Bronte Road which includes 71 mid-rise units north of the Bronte River development. This development will utilize the Saw Whet Boulevard at Bronte Road intersection as its primary access. Figure 15 and Figure 16 illustrate the traffic generation figures for the Valery 1354 Bronte Road development for 2026 and 2031, respectively. That study is ongoing and the volumes below have not yet been approved by the Town of Oakville or Halton Region.

Figure 15: 1354 Bronte 2026 Site Generated Traffic Volumes

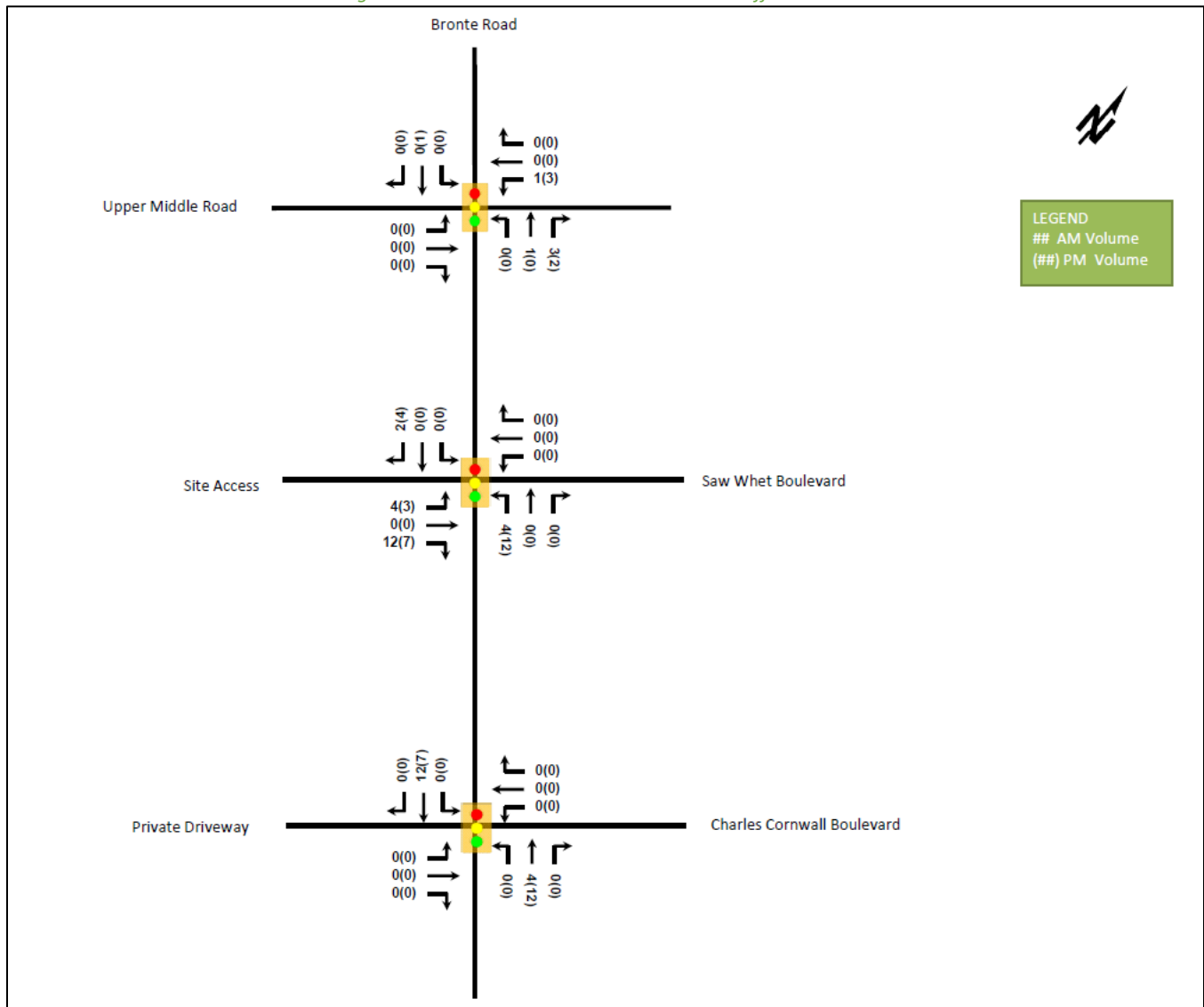
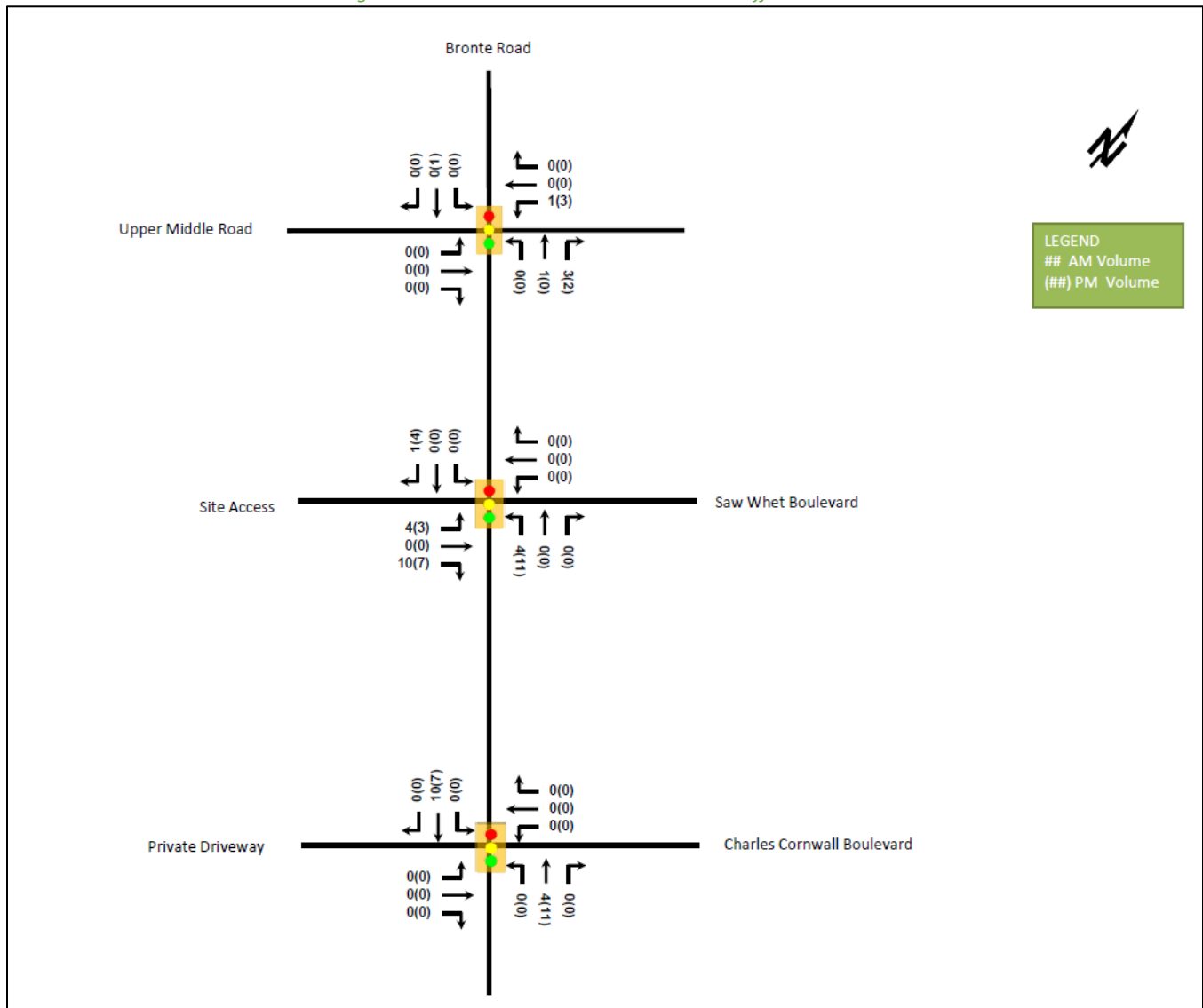


Figure 16: 1354 Bronte 2031 Site Generated Traffic Volumes



3.1.3 Background Growth

As discussed in Section 2.5 historical traffic counts have been reviewed to determine the historical growth rate. A 2% compound annual growth rate was selected.

3.1.4 Future Background Traffic Volumes

Combining the background development traffic, the background growth rate, and the existing traffic volumes, the Future Background traffic volumes were projected. Figure 17 illustrates the 2026 Future Background traffic volumes and Figure 18 illustrates the 2031 Future Background traffic volumes.

Figure 17: 2026 Future Background Traffic Volumes

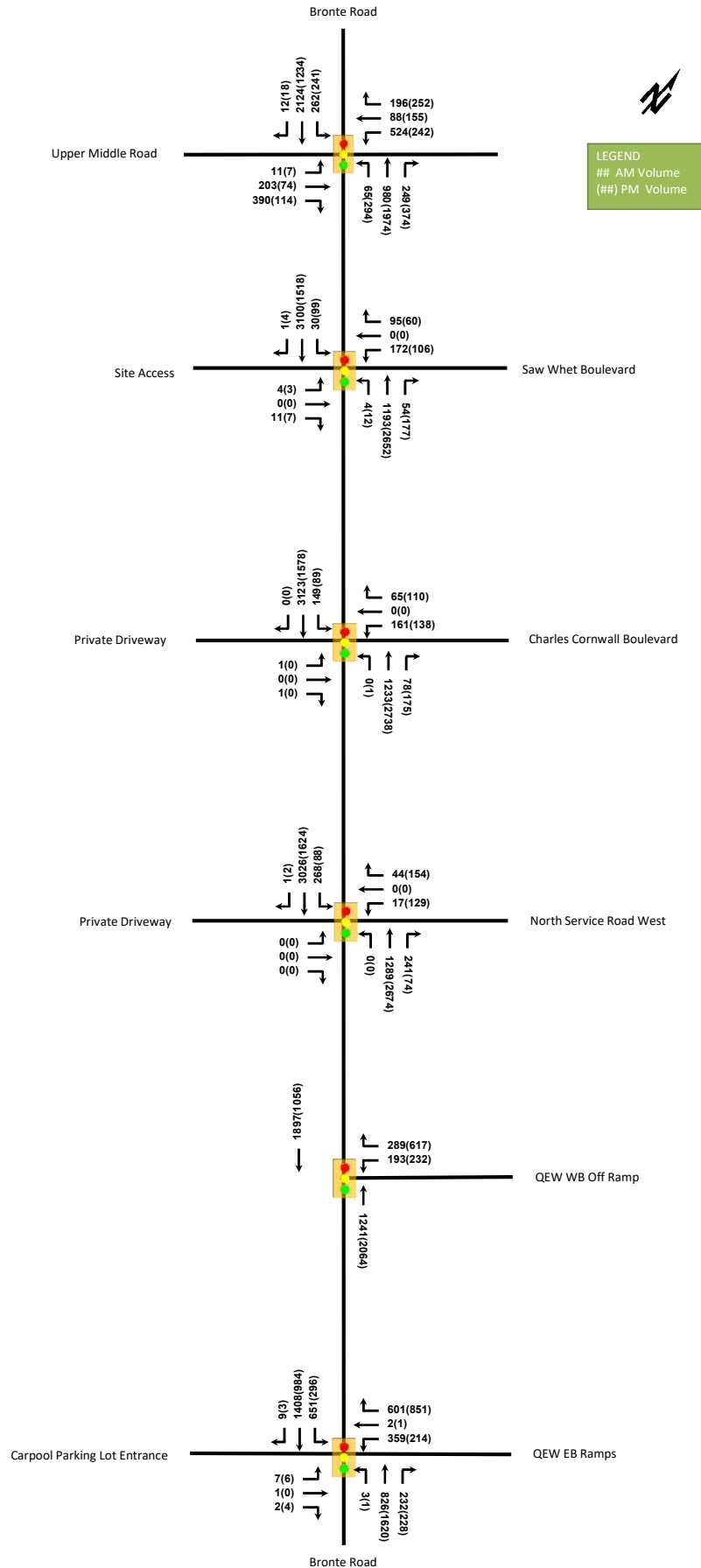
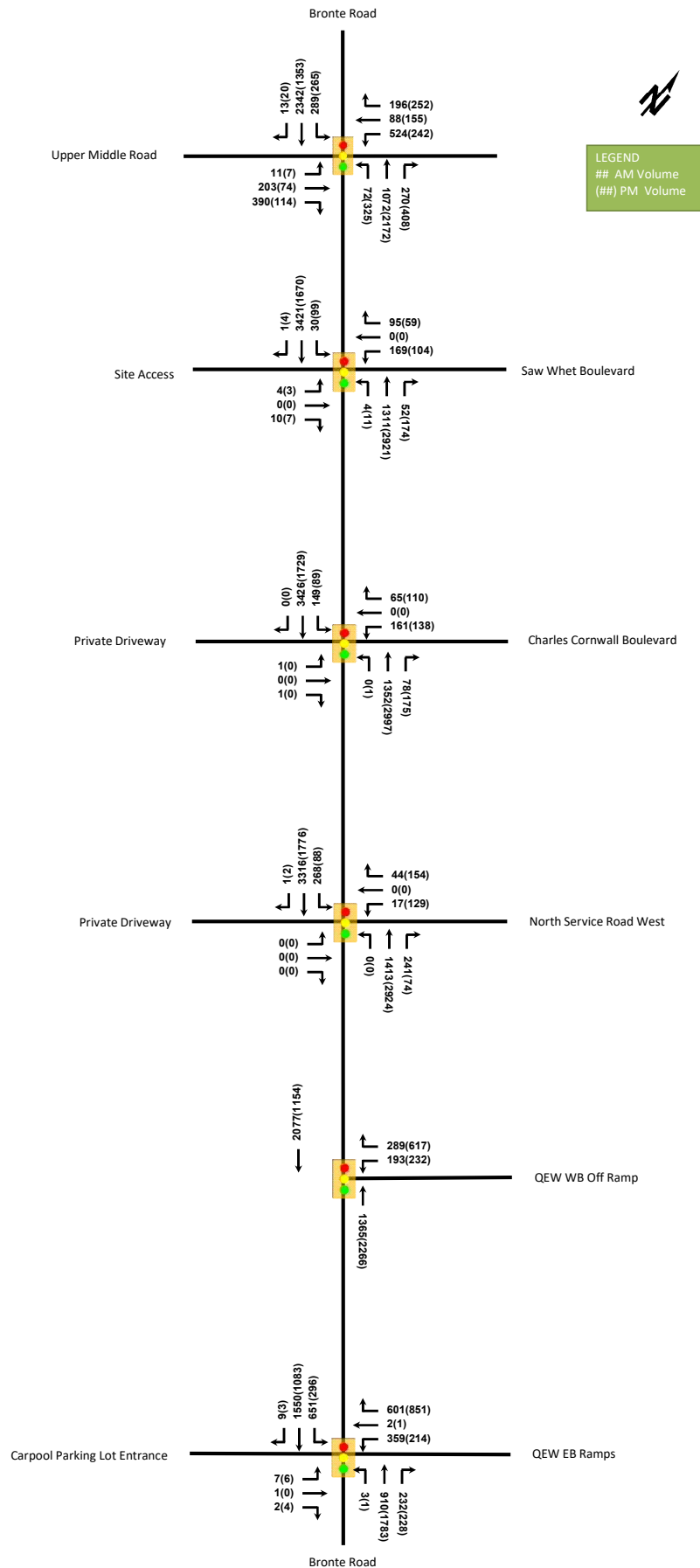


Figure 18: 2031 Future Background Traffic Volumes



4 Forecasting

4.1 Development-Generated Travel Demand

4.1.1 Trip Generation and Mode Shares

The ITE Trip Generation Manual 10th Edition has been reviewed to determine the appropriate trip generation rate equations for the proposed land uses. The rate equations were used to determine appropriate vehicle trip generation rates. The Multifamily Housing (Low-Rise) is used to estimate trips for townhouses and the Single Family Detached Housing is used to estimate trips for the detached houses. To estimate person trip generation, the calculated vehicle trip generation rates were multiplied by a factor of 1.28. Table 2 summarizes the person trip rates for the proposed land uses.

Table 2: ITE Trip Generation Person Trip Rates

Dwelling Type	ITE Land Use Code	Unit Count	Peak Hour	Vehicle Trip Rate	Person Trip Rates	Method
Single Family Detached	210	40	AM	0.83	1.06	Fitted Curve
			PM	1.05	1.34	Fitted Curve
Multifamily Housing (Low-Rise)	220	102	AM	0.48	0.61	Fitted Curve
			PM	0.59	0.76	Fitted Curve

Using the above person trip rates, the total person trip generation for the Bronte River development is summarized in Table 3. No synergy or pass-by trip reduction factors have been applied to the trip generation.

Table 3: Total Person Trip Generation

Land Use	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Total Person Trips	24	81	105	83	49	132

Mode share information for transit and active trips has been provided by Halton Region staff for 2026 and 2031. The total sum of auto and auto passenger mode shares has been calculated using these mode shares and split into two categories with slight distribution emphasis towards the auto passenger mode. The single occupant mode share in the Study Area indicates that the projected future auto mode is reasonable and errs on the conservative side. The increase in transit mode share from 11% in 2016 to 20% in 2031 is also expected as a result of the road widening along Bronte Road that will prioritize transit along the corridor and improve travel via the HOV lanes. An increase of transit mode from 11% to 15% in 2026 supports the mode shift towards transit in the future horizons. The existing active mode share of 13% indicates that the Regional active mode share projections of 5% are underestimated, especially considering higher density developments proposed along Bronte Road. However, to accommodate the inherent uncertainty in future travel patterns, and remain conservative, the active mode share of 5% specified by Halton Region staff has been carried forward in the analysis. The existing and projected mode shares are summarized in Table 4.

Table 4: Mode Share Assumptions

Travel Mode	2016 TTS Mode Share	2026 Mode Share	2031 Mode Share
Auto Driver	66%	65%	60%
Auto Passenger	10%	15%	15%
Transit	11%	15%	20%
Active Modes	13%	5%	5%
Total	100%	100%	100%

Using the above mode shares and person trip rates, the person trips by mode have been projected. Table 5 summarizes the 2026 trip generation by mode.

Table 5: 2026 Trip Generation by Mode

Travel Mode	Mode Share	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Auto Driver	65%	16	53	68	54	32	86
Auto Passenger	15%	4	12	15	12	7	20
Transit	15%	4	12	15	12	7	20
Non-Auto Modes	5%	2	4	5	4	2	7
Total	100%	24	81	105	83	49	132

Table 6 summarizes the 2031 trip generation by mode.

Table 6: 2031 Trip Generation by Mode

Travel Mode	Mode Share	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Auto Driver	60%	14	48	63	49	29	79
Auto Passenger	15%	4	12	15	12	7	20
Transit	20%	5	16	21	17	10	27
Non-Auto Modes	5%	2	4	5	4	2	7
Total	100%	24	81	105	83	49	132

As shown above, the site is projected to generate 68 AM and 86 PM peak hour two-way auto trips during the 2026 horizon. With the shift in mode share, it will generate 63 AM and 79 PM peak hour two-way vehicle trips in 2031.

4.1.2 Trip Distribution

To understand the travel patterns of the subject development, the Transportation Tomorrow Survey (TTS) has been reviewed to determine the existing travel patterns for Oakville. Table 7 below summarizes the distribution.

Table 7: 2016 TTS Trip Distribution

To/From	Percent of Trips
North	34%
South	14%
East	47%
West	5%
Total	100%

4.1.3 Trip Assignment

Using the distribution outlined above, turning movement splits, and access to major transportation infrastructure, the trips generated by the site have been assigned to the Study Area road network. The intersection at Saw Whet Boulevard and Bronte Road has been assumed to be actuated on the minor approach and coordinated along the Bronte corridor. The 2026 and 2031 trip generation are illustrated in Figure 19 and Figure 20, respectively.

4.1.4 Future Total Travel Demands

The site generated traffic has been combined with the 2026 and 2031 Future Background traffic volumes to estimate the Future Total traffic volumes. Figure 21 illustrates the 2026 Total Future traffic volumes and Figure 22 illustrates the 2031 Total Future traffic volumes.

Figure 19: 2026 Site Trip Generation

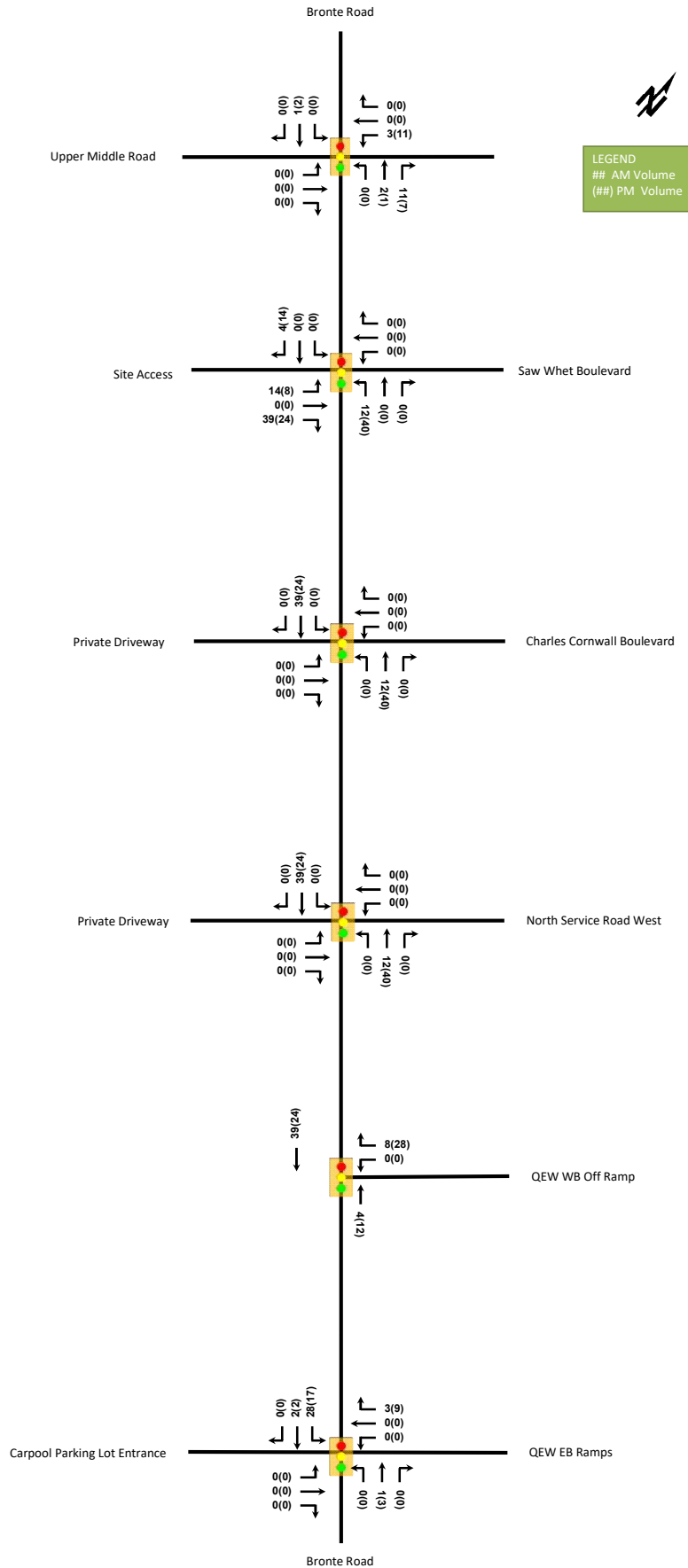


Figure 20: 2031 Site Trip Generation

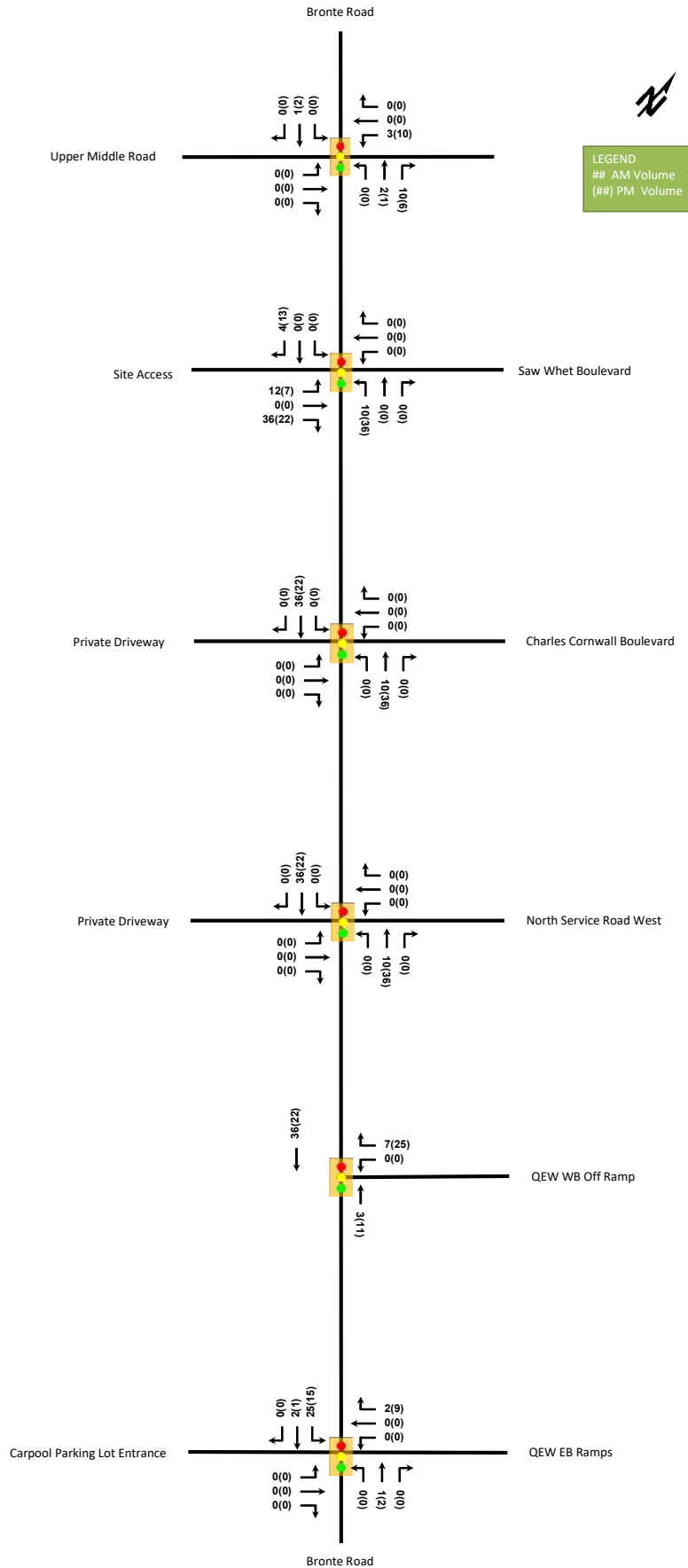


Figure 21: 2026 Future Total Traffic Volumes

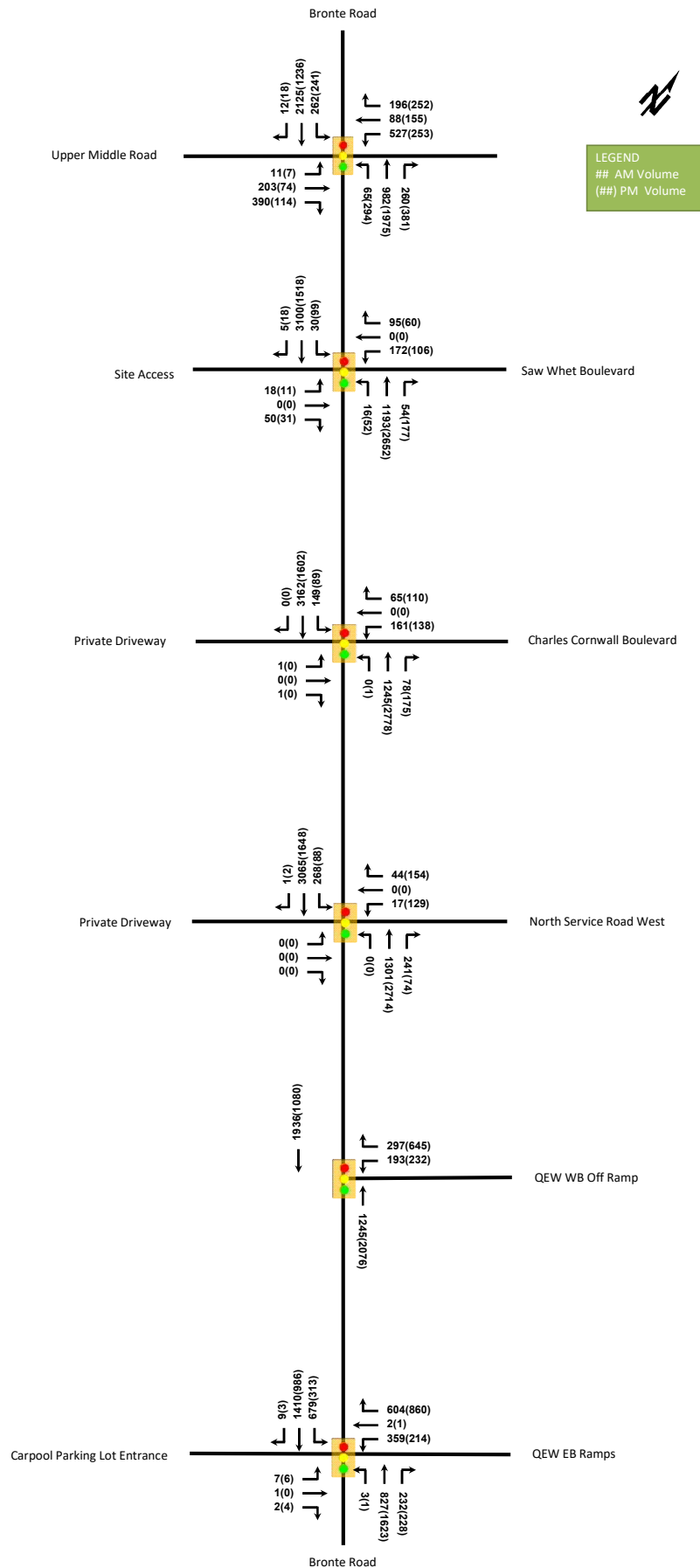
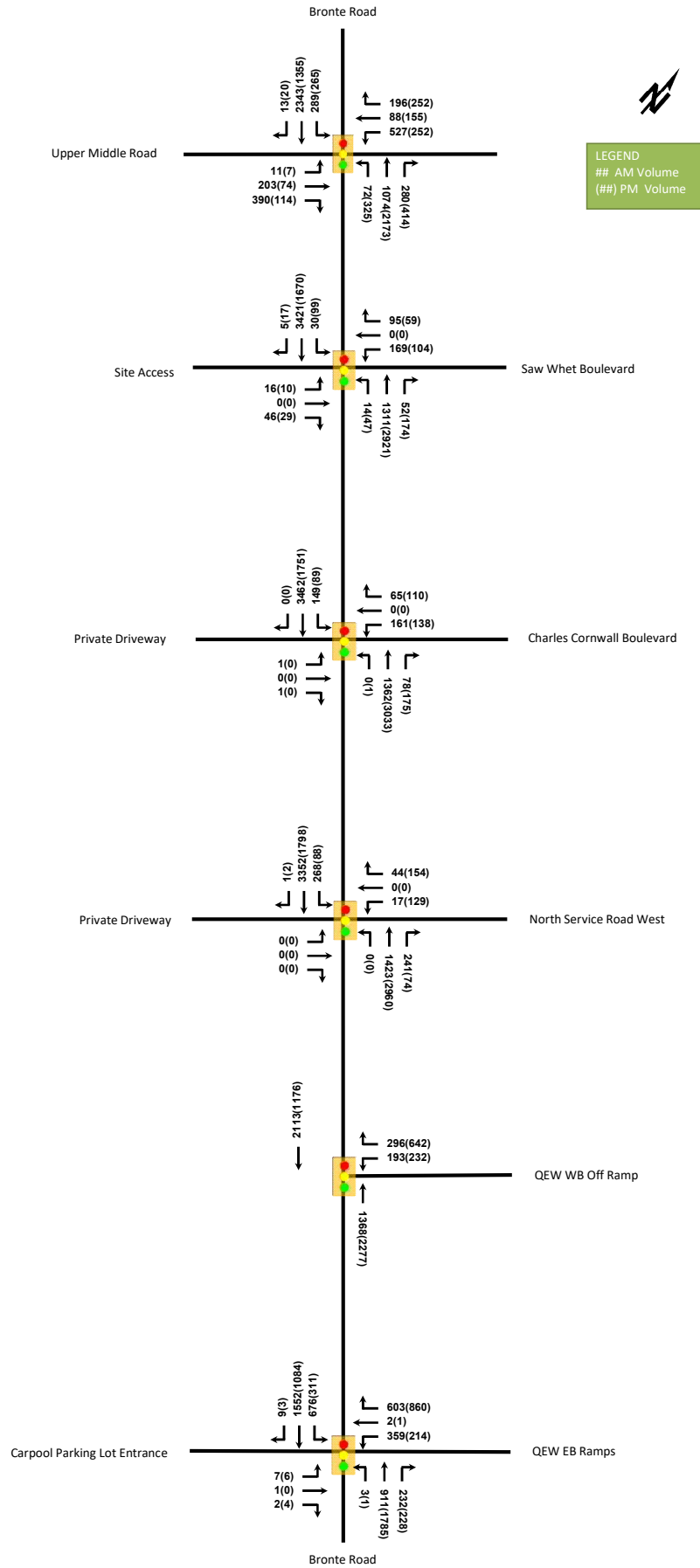


Figure 22: 2031 Total Future Traffic Volumes



5 Development Design

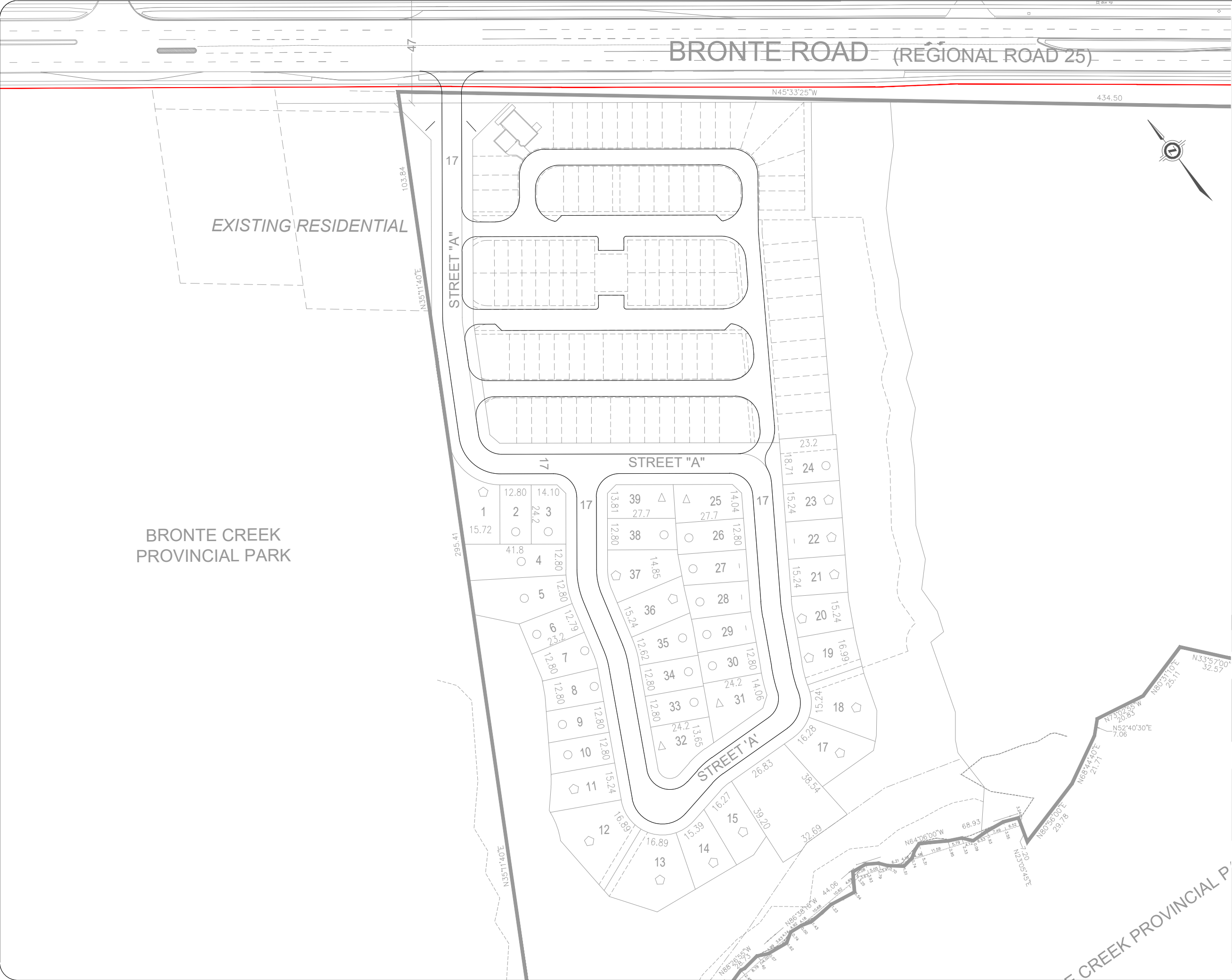
5.1.1 Transportation Demand Management

The proposed developments are residential units with a mix of unit types including detached single-family homes and townhouses. In these types of development, one of the most effective Transportation Demand Management (TDM) measures address access and usability of transit, cycling, and pedestrian facilities. To this end, the following plans have been created to illustrate the appropriate cycling (Figure 23), transit (Figure 24), and pedestrian (Figure 25) facilities. Transit stops have been assumed at the intersection of Saw Whet Boulevard and Bronte Road for transit along Bronte Road. As a result, the entire development is within a 400-metre walking distance of transit facilities. In addition, a multi-use pathway on the west side of Bronte Road provides residents with a cycling facility near the proposed development. Sidewalks are provided for site circulation and a direct connection to the Bronte Road corridor.

The following TDM Measures are anticipated to be provided, but the details will be confirmed through the final design and implementation of the site:

- Provide a multimodal travel option information package to new residents
- Provide visitor and resident bicycle parking in accordance with the Town of Oakville By-law 2014-014

Figure 23: Cycling Concept Plan



Notes:

LEGEND:

Multipurpose Pathway

02	Issued for Review	BB	2021-12-02
01	Issued for Review	BB	2021-10-25
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

CGH Transportation

628 Haines Road

Newmarket, ON

L3Y 6V5

(905) 251-4070

CLIENT:

ARGO Development Group

4900 Palladium Way, Suite 105

Burlington, Ontario

Canada, L7M 0W7

ARCHITECT:

SITE:

1300 Bronte Road

TITLE:

Cycling Facilities

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2021-12-02	BB	MC
PROJECT NO:	DRAWING NO:	REVISION:	
2020-91	001	02	

Figure 24: Transit Concept Plan

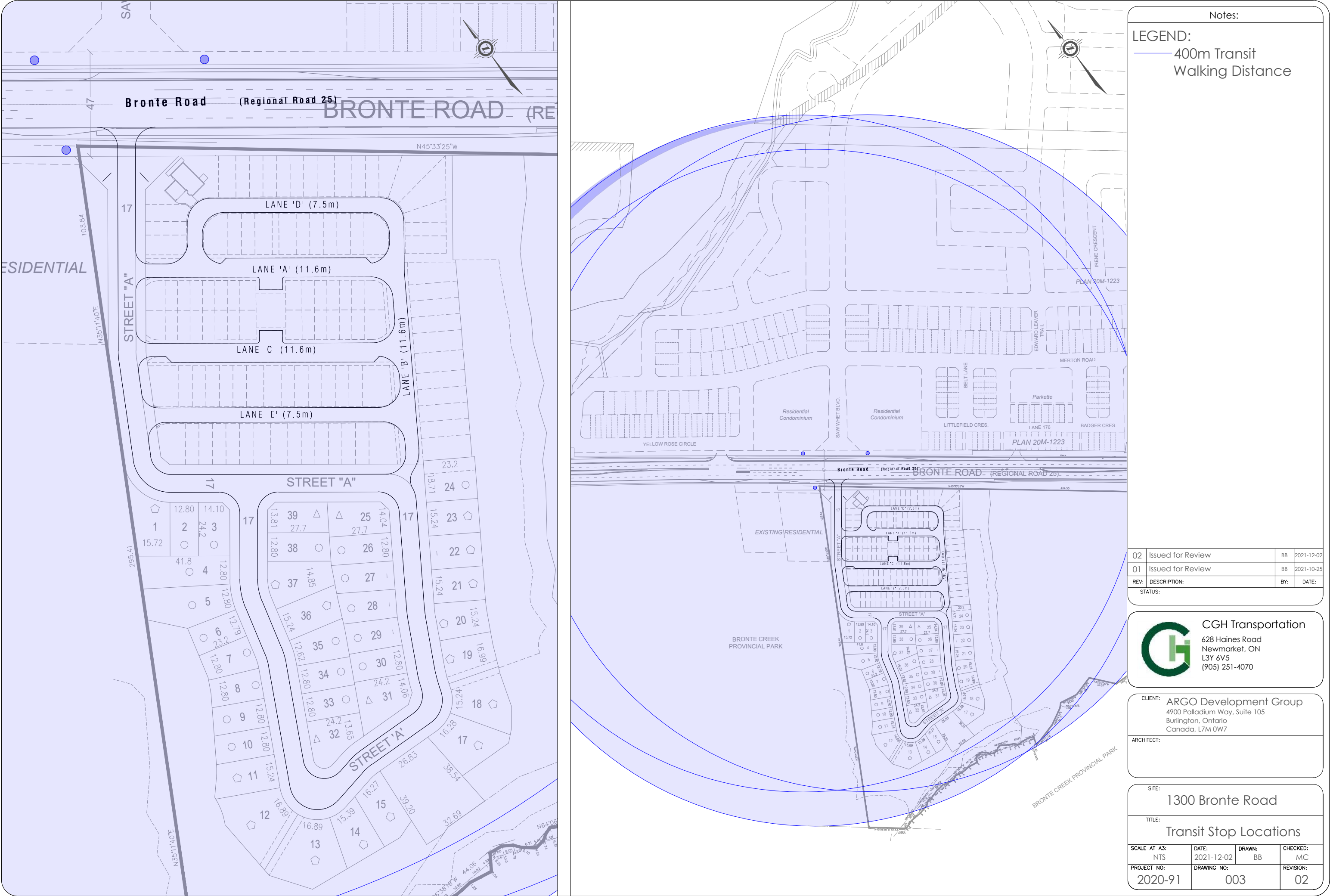
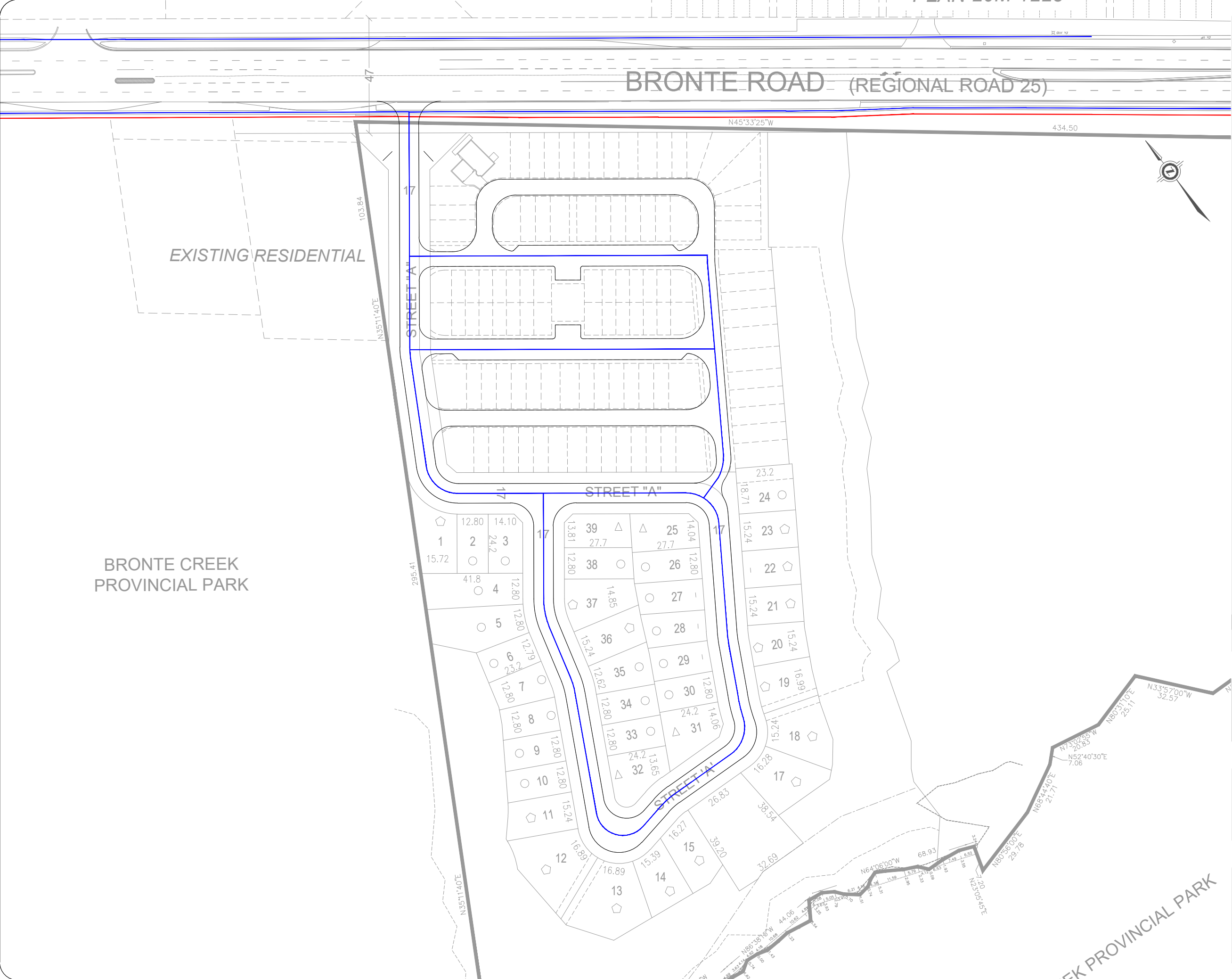


Figure 25: Pedestrian Concept Plan



Notes:

LEGEND:

Sidewalk Both Sides

Multipurpose Pathway

02	Issued for Review	BB	2021-12-02
01	Issued for Review	BB	2021-10-25
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

CGH Transportation

628 Haines Road
Newmarket, ON
L3Y 6V5
(905) 251-4070

CLIENT:

ARGO Development Group
4900 Palladium Way, Suite 105
Burlington, Ontario
Canada, L7M 0W7

ARCHITECT:

SITE:

1300 Bronte Road

TITLE:

Sidewalk Locations

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2021-12-02	BB	MC
PROJECT NO:	DRAWING NO:	REVISION:	
2020-91	002	02	

5.1.2 Parking

The parking provisions for the proposed development have been reviewed using the Town of Oakville By-law 2014-014. Table 8 documents the required parking along with the parking provisions.

Table 8: Vehicle Parking Requirements – Zoning By-Law Approach

Parking Classification	GFA (sq.m.)/ Units	Residential Parking Rate	Parking Spaces Required	Parking Spaces Provided
Single-Detached	40	2 spaces/unit	80	80
Townhouses	102	2 spaces/unit	204	174
Total			284	254
Visitor – Condo Block	103	0.25 of the parking spaces required per dwelling shall be designated as visitor parking spaces	26	30

As noted above, the resident parking space requirement for the proposed land uses at 1300-1350 Bronte Road is 284 resident parking spaces, whereas 254 resident parking spaces are provided. This is attributed to the parking reduction from 2 required parking spaces per unit to 1 parking space per unit for 30 back-to-back townhouses included in this development. With regards to visitor parking for the condo block, 26 spaces are required, whereas 30 spaces are provided. The parking requirements of the single-detached units within the development are satisfied. The ITE Parking Generation Manual (5th Edition) was employed to evaluate the parking demand of the townhouse units and compare it to the supply. Table 9 summarizes this analysis.

Table 9: ITE Parking Demand

Parking Classification	GFA (sq.m.)/ Units	ITE Parking Demand	Parking Spaces Provided	Parking Spaces in Excess of Demand
Townhouses	102	142 (Saturday – fitted curve method)	204	62

The Saturday time period for analysis was selected as it provides the greatest demand for comparison. It can be shown that despite the proposed parking reductions, 62 parking spaces are still provided in excess of demand for these units in this development. As a result, parking needs can be accommodated at this site.

5.1.3 Development Access

Access to the proposed development will be accommodated via a signalized intersection at Saw Whet Boulevard and Bronte Road. Given that access is required to the Valery 1354 Bronte Road development and the Bronte Green development on the opposing side of Bronte Road, and that these developments will generate considerable traffic, a full movement access is proposed.

Using OTM Book 12 Justification 7, and the volume projections herein, the traffic control signal warrant for this intersection has been assessed in Appendix D for the 2031 Future Total horizon. Although a signal is not warranted for this intersection using Justification 7, it has been proposed to address high V/C ratios and delays. A Left Turn Lane warrant has also been assessed for the access, which can be found in Appendix E. It has been found that a left turn lane is warranted for this access.

The proposed site plan and access configuration have been reviewed using a heavy single unit truck (HSU). The truck will enter through the site access at Saw Whet Boulevard and Bronte Road. Appendix F includes drawings illustrating the turning paths for the design vehicle. All turning paths are accommodated by the proposed curbs and driveways.

6 Operational Analysis

To understand the operational characteristics of the Study Area intersections, a Synchro model has been created using Trafficware's Synchro (Version 11). The Synchro model has been coded using the existing traffic signal timing, provided by Halton Region. The Heavy Vehicle percentage (HV %) has been calculated for each turning movement at the Study Area intersection. All Heavy Vehicle percentages calculated to be less than 2% were entered into the Synchro model as 2% in order to produce a conservative analysis. These calculations are shown in Appendix G. All other parameters have been coded using accepted best practices and default parameters where applicable.

6.1 2021 Existing Conditions

The existing intersection volumes have been analyzed to establish a baseline condition and determine the impact of the subject development as well as the surrounding background developments on the Study Area road network. Table 10 summarizes the operational analysis of the 2021 existing conditions. Appendix H contains the 2021 Existing Conditions Synchro Sheets.

Table 10: 2021 Existing Conditions Operational Analysis

Intersection	Mvmnt	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Del (s)	Q (95 th)	LOS	V/C	Del. (s)	Q (95 th)
Upper Middle Road and Bronte Road (Signalized)	EBL	D	0.06	50	8	D	0.05	54	6
	EBT	E	0.81	75	#111	E	0.38	58	38
	EBR	F	1.25	204	#171	E	0.08	56	18
	WBL	E	0.95	71	#86	D	0.34	44	33
	WBT	D	0.22	44	41	D	0.47	51	68
	WBR	D	0.13	43	23	D	0.40	50	52
	NBL	D	0.51	45	25	C	0.78	15	m#29
	NBT	B	0.48	19	91	C	0.98	32	#277
	NBR	E	0.13	57	35	A	0.28	18	m13
	SBL	B	0.59	16	38	E	0.84	47	#123
	SBT	E	1.03	60	#361	C	0.57	20	127
	SBR	B	0.01	14	0	B	0.01	14	0.0
	Overall	E	1.04	63	-	C	0.84	30	-
	Mitigation Measure: AM Peak Hour Signal Optimization								
	EBL	D	0.04	40	7	-	-	-	-
	EBT	D	0.50	48	82	-	-	-	-
	EBR	E	0.88	75	#150	-	-	-	-
	WBL	E	0.89	62	#93	-	-	-	-
	WBT	D	0.19	40	39	-	-	-	-
	WBR	D	0.13	40	21	-	-	-	-
	NBL	D	0.53	38	23	-	-	-	-
	NBT	B	0.53	18	92	-	-	-	-
	NBR	D	0.13	50	35	-	-	-	-
	SBL	B	0.61	19	43	-	-	-	-
	SBT	F	1.08	81	#379	-	-	-	-
	SBR	B	0.01	16	0	-	-	-	-
	Overall	E	1.03	58	-	-	-	-	-
Charles Cornwall Road and Bronte Road (Signalized)	EBL/T/R	E	0.00	64	0	-	-	-	-
	WBL	E	0.34	69	14	E	0.24	65	14
	WBR	E	0.02	64	0	E	0.04	62	14
	NBL	-	-	-	-	A	0.00	0	m0
	NBT	A	0.40	9	116	A	0.84	7	m25
	NBR	A	0.01	3	m0	A	0.01	3	m0
	SBL	A	0.29	2	m5	E	0.20	80	m1
	SBT/R	A	0.91	6	m189	A	0.46	2	33
	Overall	A	0.91	7	-	A	0.79	7	-
North Service Road and Bronte Road (Signalized)	EBL/T/R	-	-	-	-	-	-	-	-
	WBL	E	0.05	59	7	D	0.17	44	31
	WBT/L	E	0.06	59	8	D	0.17	44	31
	WBR	E	0.02	58	0	D	0.07	8	15
	NBL	-	-	-	-	-	-	-	-
	NBT	A	0.46	9	162	D	1.06	46	m#407
	NBR	A	0.17	9	19	A	0.05	1	m0
	SBL	A	0.51	2	m13	E	0.47	29	21
	SBT/R	A	0.91	6	#479	B	0.58	14	117
	Overall	A	0.90	7	-	C	0.85	35	-
QEW WB Off Ramp and Bronte Road (Signalized)	WBL	C	0.28	23	18	D	0.26	39	42
	WBR	C	0.66	30	46	F	1.12	129	#238
	NBT	B	0.58	18	m138	B	0.87	19	m49
	SBT	B	0.82	15	#225	B	0.42	16	59
	Overall	B	0.78	18	-	D	0.95	35	-
	Mitigation Measure: PM Peak Signal Optimization								
	WBL	-	-	-	-	C	0.23	34	39

Intersection	Mvmnt	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Del (s)	Q (95 th)	LOS	V/C	Del. (s)	Q (95 th)
	WBR	-	-	-	-	E	0.97	79	#217
	NBT	-	-	-	-	C	0.94	25	m66
	SBT	-	-	-	-	C	0.45	23	69
	Overall	-	-	-	-	C	0.95	33	-
QEW EB Ramps and Bronte Road (Signalized)	EBL	E	0.22	71	8	E	0.19	70	7
	EBT/R	E	0.09	68	4	E	0.12	70	5
	WBL	E	0.87	68	#141	E	0.70	61	84
	WBL/T/R	D	0.41	45	57	D	0.39	52	45
	WBR	D	0.23	43	27	D	0.32	51	35
	NBL	C	0.03	35	3	B	0.00	17	2
	NBT	D	0.78	50	131	D	0.87	37	#341
	NBR	D	0.16	36	20	C	0.22	20	44
	SBL	F	1.02	88	m#265	E	0.83	68	79
	SBT/R	B	0.66	15	152	B	0.40	12	80
	Overall	D	0.98	43	-	D	0.81	36	-
Notes:	# - 95% percentile exceeds capacity m - volume for the 95 th percentile queue is metered by an upstream signal								

The above table summarizes the intersection operational analysis of the 2021 projected volumes. Generally, the Study Area intersections are operating with good overall LOS and low delays. The exceptions to this include the eastbound through and right movements at Upper Middle Road and Bronte Road during the AM peak period and the westbound right turn movement at the QEW WB Off Ramp intersection at Bronte Road. Signal optimization was explored as a mitigation measure for these movements, and as a result, these movements have been improved. At the intersection of Upper Middle Road and Bronte Road the signal optimization improved operations, however, this mitigation was not sufficient to reduce the V/C ratio below one and decrease delays at all movements. Given the fact that both Upper Middle Road and Bronte Road are busy arterial roads with high traffic volumes in competing north-south and east-west directions, high delays during the peak hours may be expected at this intersection.

6.2 2026 Future Background Conditions

The 2026 Future Background conditions have been examined to determine the future traffic conditions without the addition of the proposed development. This will isolate the impact of the subject development on the traffic network. Table 11 summarizes the operational analysis of 2026 Future Background conditions. Synchro worksheets have been included in Appendix I.

Table 11: 2026 Future Background Conditions Operational Analysis

Intersection	Mvmnt	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Del (s)	Q (95 th)	LOS	V/C	Del. (s)	Q (95 th)
Upper Middle Road and Bronte Road (Signalized)	EBL	D	0.04	40	7	D	0.05	55	6
	EBT	D	0.50	48	82	E	0.38	59	39
	EBR	E	0.89	75	#151	E	0.08	56	19
	WBL	F	0.99	86	#112	D	0.42	45	43
	WBT	D	0.20	42	39	D	0.44	50	68
	WBR	D	0.13	41	22	D	0.39	50	54
	NBL	E	0.58	56	22	F	1.03	89	m#52
	NBT	C	0.66	32	153	E	1.12	79	m#344
	NBR	D	0.20	45	43	B	0.36	14	m19
	SBL	C	0.76	28	58	F	1.04	119	#145
	SBT	F	1.19	123	#446	C	0.71	27	165
	SBR	B	0.01	15	0	B	0.01	16	0
	Overall	F	1.14	81	-	E	0.95	59	-
Saw Whet Boulevard and Bronte Road (Signalized)	EBL	D	0.02	49	5	D	0.02	54	4
	EBT/R	D	0.01	49	4	D	0.01	54	0
	WBL	E	0.80	74	78	E	0.68	70	52
	WBT/R	D	0.09	49	18	E	0.26	57	26
	NBL	A	0.08	7	m1	A	0.07	1	m0
	NBT	A	0.49	7	126	C	1.02	25	m404
	NBR	A	0.04	4	m5	A	0.15	0	m0
	SBL	A	0.13	3	m2	F	2.08	569	m#80
	SBT	F	1.26	128	m#592	B	0.58	11	196
	SBR	A	0.00	4	m0	A	0.00	3	m0
	Overall	F	1.18	91	-	C	1.86	33	-
	Mitigation Measure: Protected and Permissive SBL Phase in PM Peak Hour								
	EBL	-	-	-	-	D	0.02	54	4
	EBT/R	-	-	-	-	D	0.01	54	0
	WBL	-	-	-	-	E	0.68	70	52
	WBT/R	-	-	-	-	D	0.06	55	15
	NBL	-	-	-	-	A	0.07	5	m1
	NBT	-	-	-	-	F	1.18	87	m#435
	NBR	-	-	-	-	A	0.16	4	m3
	SBL	-	-	-	-	D	0.57	42	m26
	SBT	-	-	-	-	B	0.58	17	256
	SBR	-	-	-	-	A	0.00	3	m0
	Overall	-	-	-	-	E	1.07	59	-
Charles Cornwall Road and Bronte Road (Signalized)	EBL/T/R	D	0.00	49	0	-	-	-	-
	WBL	E	0.82	79	72	E	0.73	71	61
	WBR	D	0.05	49	13	D	0.17	54	24
	NBL	-	-	-	-	A	0.01	1	m0
	NBT	C	0.57	21	165	F	1.18	89	m#362
	NBR	C	0.07	26	m21	A	0.18	0	m0
	SBL	A	0.49	5	m2	E	0.56	60	34
	SBT/R	F	1.24	114	m#432	A	0.60	8	129
	Overall	F	1.20	83	-	E	1.07	58	-

Intersection	Mvmnt	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Del (s)	Q (95 th)	LOS	V/C	Del. (s)	Q (95 th)
North Service Road and Bronte Road (Signalized)	EBL/T/R	-	-	-	-	-	-	-	-
	WBL	E	0.05	57	7	D	0.17	43	31
	WBT/L	E	0.05	57	8	D	0.17	43	31
	WBR	E	0.03	57	0	D	0.10	42	19
	NBL	-	-	-	-	-	-	-	-
	NBT	C	0.68	22	221	F	1.35	180	m#485
	NBR	C	0.19	21	30	A	0.05	7	m0
	SBL	C	0.53	31	m17	D	0.55	41	m29
	SBT/R	D	1.10	51	m#420	B	0.72	13	123
	Overall	D	1.07	41	-	F	1.09	109	-
QEW WB Off Ramp and Bronte Road (Signalized)	WBL	C	0.25	21	18	D	0.26	39	42
	WBR	C	0.74	31	58	F	1.50	286	#348
	NBT	C	0.70	24	190	D	1.02	35	m90
	SBT	D	1.06	46	m#258	B	0.52	13	60
	Overall	D	0.96	36	-	E	1.17	68	-
	Mitigation Measure: PM Peak Hour Signal Optimization								
	WBL	-	-	-	-	C	0.20	30	36
	WBR	-	-	-	-	F	1.13	123	#304
	NBT	-	-	-	-	F	1.20	108	m#396
	SBT	-	-	-	-	B	0.62	12	55
	Overall	-	-	-	-	E	1.17	80	-
QEW EB Ramps and Bronte Road (Signalized)	EBL	E	0.22	71	8	E	0.19	70	7
	EBT/R	E	0.09	68	4	E	0.12	69	5
	WBL	E	0.86	68	#141	E	0.68	59	82
	WBL/T/R	D	0.43	45	59	D	0.50	53	58
	WBR	D	0.24	43	27	D	0.47	52	52
	NBL	C	0.03	35	3	C	0.00	24	2
	NBT	E	0.88	57	152	F	1.19	132	#418
	NBR	D	0.16	37	20	C	0.26	28	50
	SBL	F	1.36	214	m#287	D	0.78	47	#138
	SBT/R	B	0.75	16	m149	B	0.47	16	126
	Overall	E	1.22	65	-	E	0.95	73	-
	Mitigation Measure: AM Peak Hour Signal Optimization								
	EBL	E	0.22	71	8	-	-	-	-
	EBT/R	E	0.09	68	4	-	-	-	-
	WBL	E	0.86	68	#141	-	-	-	-
	WBL/T/R	D	0.43	45	59	-	-	-	-
	WBR	D	0.24	43	27	-	-	-	-
	NBL	D	0.04	44	4	-	-	-	-
	NBT	F	1.18	150	#193	-	-	-	-
	NBR	D	0.20	45	27	-	-	-	-
	SBL	F	1.09	90	m#247	-	-	-	-
	SBT/R	C	0.75	22	m125	-	-	-	-
	Overall	E	1.03	67	-	-	-	-	-
Notes:	# - 95% percentile exceeds capacity								
	m - volume for the 95 th percentile queue is metered by an upstream signal								

With the addition of background traffic growth as well as the nearby background development traffic, the Study Area intersections are experiencing operational constraints. At the Upper Middle Road and Bronte Road intersection, the southbound through movement experiences a V/C ratio of 1.19. Given that the opposing westbound left phase is at capacity, providing more green time to the southbound through movement would increase the westbound left movement's V/C ratio, which would exceed 1. As previously mentioned, given the

nature of the two arterial roads at Upper Middle Road and Bronte Road, this high V/C can be expected. Conditions are expected to improve in future analysis horizons given additional lanes on Bronte Road.

At Saw Whet Boulevard and Bronte Road, the southbound through movement in the AM peak period experiences a V/C ratio of 1.26 with a high delay and a 95th percentile queue that exceeds capacity. At Charles Cornwall Road and Bronte Road, the southbound shared through/right movement in the AM peak period experiences a V/C ratio of 1.24 with a high delay and a 95th percentile queue that exceeds capacity. In the PM period at this intersection, the northbound through movement experiences a V/C ratio of 1.18 with a high delay and a 95th percentile queue that exceeds capacity. Similarly, the northbound through movement in the PM period at the North Service Road and Bronte Road intersection experiences a V/C ratio of 1.35 with a high delay and a 95th percentile queue that exceeds capacity. Although these movements are experiencing constraints, providing more green time to these movements will reduce the splits for opposing movements below the minimum splits. However, these conditions are expected to improve in the next future horizon given the additional lanes on Bronte Road.

At the Saw Whet Boulevard and Bronte Road intersection In the PM peak period, the southbound left movement experiences a V/C ratio of 2.08. To improve conditions, a permissive and protected southbound left turn phase has been proposed. The V/C ratio reduces to 0.57 with this implementation, but the northbound through movement experiences an increase in V/C ratio from 1.02 to 1.18. This trade-off is acceptable as through traffic conditions are expected to improve in the next future horizon given the additional lanes on Bronte Road.

At the QEW westbound off ramp and Bronte Road, the westbound right movement in the PM period experiences a V/C ratio of 1.50 with a high delay and a 95th percentile queue. Signal optimization has been implemented to improve this V/C ratio to 1.13, with an increase in V/C ratio from 1.02 to 1.20 for the northbound through movement at this location as well.

Lastly, at the QEW east bound ramps and Bronte Road intersection, several movements across both peak periods experience constraints. Signal optimization in the AM period has improved the southbound left movement's V/C ratio from 1.36 to 1.09. In the PM peak period, providing more green time to the northbound through movement, with a V/C ratio of 1.19, will reduce the splits for opposing movements below the minimum splits.

6.3 2026 Future Total Conditions

The analysis parameters used to analyze the 2026 Future Background conditions have been carried forward as part of the analysis of 2026 Total Future conditions. The 2026 trip generation volumes have been added. Table 12 summarizes the results of the Synchro Analysis. Synchro worksheets have been included in Appendix J.

Table 12: 2026 Total Future Conditions Operational Analysis

Intersection	Mvmnt	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Del (s)	Q (95 th)	LOS	V/C	Del. (s)	Q (95 th)
Upper Middle Road and Bronte Road (Signalized)	EBL	D	0.04	40	7	D	0.05	55	6
	EBT	D	0.50	48	82	E	0.38	59	39
	EBR	E	0.89	75	#151	E	0.08	56	19
	WBL	F	1.00	88	#113	D	0.43	45	44
	WBT	D	0.20	42	39	D	0.44	50	68
	WBR	D	0.13	41	22	D	0.39	49	54
	NBL	E	0.58	56	22	F	1.05	99	#116
	NBT	D	0.66	37	154	F	1.12	95	#400
	NBR	E	0.21	66	43	C	0.37	21	49
	SBL	C	0.76	28	58	F	1.06	123	#145
	SBT	F	1.19	123	#446	C	0.72	27	166
	SBR	B	0.01	15	0	B	0.01	16	0
	Overall	F	1.14	83	-	E	0.95	66	-
Saw Whet Boulevard and Bronte Road (Signalized)	EBL	D	0.10	49	12	E	0.08	59	10
	EBT/R	D	0.14	50	21	E	0.02	58	6
	WBL	E	0.82	76	79	E	0.71	77	55
	WBT/R	D	0.09	49	18	E	0.09	59	17
	NBL	C	0.32	24	m6	B	0.31	13	18
	NBT	B	0.49	14	139	F	1.16	101	#617
	NBR	A	0.05	8	m9	A	0.16	8	26
	SBL	A	0.13	3	m2	D	0.58	55	#42
	SBT	F	1.27	131	m#591	A	0.58	6	126
	SBR	A	0.00	2	m0	A	0.01	3	2
	Overall	F	1.18	94	-	E	1.06	63	-
	Overall	F	1.18	94	-	E	1.06	63	-
Charles Cornwall Road and Bronte Road (Signalized)	EBL/T/R	D	0.00	49	0	-	-	-	-
	WBL	E	0.82	79	72	E	0.73	71	61
	WBR	D	0.05	49	13	D	0.17	54	24
	NBL	-	-	-	-	A	0.01	1	m0
	NBT	B	0.58	14	96	F	1.20	97	m#363
	NBR	B	0.07	17	m11	A	0.18	0	m0
	SBL	A	0.50	5	m3	D	0.56	47	29
	SBT/R	F	1.26	121	m#442	A	0.61	8	144
	Overall	F	1.22	86	-	E	1.09	62	-
North Service Road and Bronte Road (Signalized)	EBL/T/R	-	-	-	-	-	-	-	-
	WBL	E	0.05	57	7	D	0.17	43	31
	WBT/L	E	0.05	57	8	D	0.17	43	31
	WBR	E	0.03	56	0	D	0.10	42	19
	NBL	-	-	-	-	-	-	-	-
	NBT	B	0.68	14	142	F	1.37	190	m#485
	NBR	A	0.22	7	m29	A	0.05	7	m0
	SBL	D	0.55	37	m30	D	0.55	49	m30
	SBT/R	E	1.12	65	m#421	B	0.73	13	129
	Overall	D	1.09	47	-	F	1.07	115	-
QEW WB Off Ramp and Bronte Road (Signalized)	WBL	C	0.27	22	20	D	0.26	39	42
	WBR	D	0.81	38	#74	F	1.57	317	#368
	NBT	C	0.67	20	m130	C	1.03	33	m68
	SBT	D	1.04	43	m243	A	0.54	10	60
	Overall	C	0.97	33	-	E	1.20	72	-
	Mitigation Measure: PM Peak Hour Signal Optimization								
	WBL	-	-	-	-	C	0.19	29	36
	WBR	-	-	-	-	F	1.16	133	#321
	NBT	-	-	-	-	F	1.23	119	m68
	SBT	-	-	-	-	C	0.64	21	126

Intersection	Mvmnt	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Del (s)	Q (95 th)	LOS	V/C	Del. (s)	Q (95 th)
	Overall	-	-	-	-	F	1.20	90	-
QEW EB Ramps and Bronte Road (Signalized)	EBL	E	0.22	71	8	E	0.19	70	7
	EBT/R	E	0.09	68	4	E	0.12	69	5
	WBL	E	0.83	62	133	E	0.68	60	83
	WBL/T/R	D	0.39	44	51	D	0.41	52	47
	WBR	D	0.24	42	26	D	0.32	50	34
	NBL	D	0.05	47	4	C	0.01	35	2
	NBT	F	1.35	223	#207	F	1.67	357	#453
	NBR	D	0.23	49	31	D	0.36	41	59
	SBL	F	1.08	84	m#279	C	0.54	28	116
	SBT/R	C	0.77	26	m208	B	0.46	18	156
	Overall	F	1.05	81	-	F	0.97	158	-
Notes:	# - 95% percentile exceeds capacity m - volume for the 95 th percentile queue is metered by an upstream signal								

The projected 2026 Total Future conditions are similar to those projected for 2026 Future Background conditions, with the north-south through volumes on Bronte Road projected to operate over capacity. At Upper Middle Road and Bronte Road in the AM peak period, the westbound left and southbound through movements are constrained, and given that they are in opposing directions, providing more green time to one movement to reduce its V/C ratio will increase the other movement's V/C ratio. These constraints are expected given the nature of the two arterial roads at this intersection. Applying signal timing adjustments at Saw Whet Boulevard, Charles Cornwall Road, and North Service Road will reduce splits below minimum splits for movements opposing those that are constrained. Similar to the 2026 Future Background horizon, the PM peak hour signal optimization mitigation measure at the QEW westbound off-ramp has been proposed to reduce the V/C ratio of the westbound right movement from 1.57 to 1.16. The signal timing at the QEW eastbound ramps at Bronte Road intersection cannot be improved without reducing the splits for some phases below minimum splits. However, conditions are expected to improve in the next future horizon.

6.4 2031 Future Background Traffic Conditions

The 2031 Future Background horizon has been examined to determine the future traffic conditions without the addition of the proposed development. This will isolate the impact of the subject development on the traffic network. By 2031 it is anticipated that the outer lanes of Bronte Road will be converted to an HOV / Transit lane. To reflect this, as instructed by Region Staff, a lane utilization factor of 0.80 has been used to estimate the impact of this reduction in north-south vehicle capacity along Bronte Road. Table 13 summarizes the operational analysis of 2031 Future Background conditions. Synchro worksheets are included as Appendix K.

Table 13: 2031 Future Background Conditions Operational Analysis

Intersection	Mvmnt	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Del (s)	Q (95 th)	LOS	V/C	Del. (s)	Q (95 th)
Upper Middle Road and Bronte Road (Signalized)	EBL	D	0.04	40	7	D	0.04	52	5
	EBT	D	0.50	48	82	E	0.33	56	35
	EBR	E	0.89	75	#151	D	0.08	54	17
	WBL	E	0.92	67	#99	D	0.53	50	41
	WBT	D	0.19	40	38	E	0.53	55	65
	WBR	D	0.13	39	21	D	0.17	50	25
	NBL	E	0.64	61	#27	E	0.86	60	m84
	NBT	D	0.62	39	129	E	1.08	67	m#329
	NBR	F	0.20	85	38	B	0.42	19	m28
	SBL	D	0.82	42	81	D	0.71	48	#147
	SBT	E	1.06	71	#354	C	0.67	29	183
	SBR	B	0.01	16	0	B	0.01	19	0
	Overall	E	1.04	61	-	D	0.92	50	-
Saw Whet Boulevard and Bronte Road (Signalized)	EBL	D	0.02	49	5	D	0.02	55	4
	EBT/R	D	0.01	49	4	D	0.01	54	0
	WBL	E	0.80	73	76	E	0.68	70	51
	WBT/R	D	0.16	50	24	D	0.05	55	14
	NBL	A	0.08	8	m1	A	0.12	3	m0
	NBT	B	0.42	12	120	A	0.97	8	m#401
	NBR	A	0.04	7	8	A	0.15	1	m1
	SBL	A	0.18	4	m3	F	0.93	121	m#56
	SBT	E	1.10	56	m#535	B	0.51	10	213
	SBR	A	0.00	4	m0	A	0.00	3	m0
	Overall	D	1.05	45	-	B	0.93	13	-
	Overall	D	1.05	45	-	B	0.93	13	-
Charles Cornwall Road and Bronte Road (Signalized)	EBL/T/R	D	0.00	49	0	-	-	-	-
	WBL	E	0.82	79	72	E	0.73	71	61
	WBR	D	0.05	49	13	D	0.27	55	31
	NBL	-	-	-	-	A	0.01	1	m0
	NBT	B	0.50	13	77	C	1.01	24	m340
	NBR	B	0.07	16	m12	A	0.17	1	m3
	SBL	B	0.58	13	m2	E	0.59	67	#35
	SBT/R	D	1.08	43	m#434	A	0.52	2	47
	Overall	D	1.06	35	-	B	0.94	18	-
North Service Road and Bronte Road (Signalized)	EBL/T/R	-	-	-	-	-	-	-	-
	WBL	E	0.05	57	7	D	0.16	42	30
	WBT/L	E	0.05	57	8	D	0.16	42	31
	WBR	E	0.03	56	0	D	0.10	41	19
	NBL	-	-	-	-	-	-	-	-
	NBT	B	0.58	11	92	F	1.19	103	m#394
	NBR	A	0.20	5	m15	A	0.05	7	m0
	SBL	D	0.58	40	m46	D	0.55	38	24
	SBT/R	A	0.96	8	m#412	B	0.63	13	167
	Overall	B	0.93	11	-	E	0.92	66	-
QEW WB Off Ramp and Bronte Road (Signalized)	WBL	C	0.27	22	20	C	0.19	28	35
	WBR	D	0.81	38	#73	F	1.09	107	#298
	NBT	B	0.58	17	m117	D	1.07	50	m48
	SBT	C	0.88	22	211	B	0.55	20	85
	Overall	C	0.86	21	-	D	1.08	49	-
QEW EB Ramps and Bronte Road (Signalized)	EBL	E	0.22	71	8	E	0.19	70	7
	EBT/R	E	0.09	68	4	E	0.12	69	5
	WBL	E	0.83	62	133	E	0.68	60	83
	WBL/T/R	D	0.39	44	51	D	0.41	52	46
	WBR	D	0.24	42	25	D	0.32	50	33

Intersection	Mvmnt	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Del (s)	Q (95 th)	LOS	V/C	Del. (s)	Q (95 th)
	NBL	D	0.06	48	4	C	0.01	34	2
	NBT	F	1.17	147	#162	F	1.40	231	#361
	NBR	D	0.16	48	23	D	0.32	39	53
	SBL	E	1.04	73	m#328	D	0.53	36	122
	SBT/R	C	0.67	22	150	C	0.40	23	130
	Overall	E	0.99	63	-	F	0.88	115	-
	Mitigation Measure: PM Peak Signal Optimization								
	EBL	-	-	-	-	E	0.19	70	7
	EBT/R	-	-	-	-	E	0.12	69	5
	WBL	-	-	-	-	E	0.71	62	88
	WBL/T/R	-	-	-	-	D	0.41	53	49
	WBR	-	-	-	-	D	0.33	51	37
	NBL	-	-	-	-	C	0.01	31	2
	NBT	-	-	-	-	F	1.28	178	#332
	NBR	-	-	-	-	D	0.28	35	44
	SBL	-	-	-	-	D	0.56	45	120
	SBT/R	-	-	-	-	B	0.40	13	91
	Overall	-	-	-	-	F	0.88	92	-
Notes:	# - 95% percentile exceeds capacity m - volume for the 95 th percentile queue is metered by an upstream signal								

With the addition of background growth to the 2026 Future Background horizon as well as additional lanes along Bronte Road to project the 2031 Future Background traffic volumes, the operational performance of the Study Area intersections increased, with lower delays and V/C ratios at movements that were previously constrained. Further, the LOS of all intersections either improved or stayed the same. Several movements exceeded capacity constraints and could not be improved using signal timing adjustments. For example, the northbound through movement at North Service Road West and Bronte Road in the PM period experiences a V/C ratio of 1.19. Despite this, providing this movement with more green time reduces the splits for other movements below the minimum splits. Moreover, the westbound right movement at the QEW westbound off ramp at Bronte Road experiences a V/C ratio of 1.09 in the PM peak period. The opposing northbound through movement at this intersection experiences a V/C ratio of 1.07. Providing more green time to the westbound right movement will increase this V/C ratio.

At the QEW eastbound ramps at Bronte Road in the AM period, the northbound through and the southbound left movements exceed capacity. Similar to the previously mentioned movements, adjusting the signal timing in favour of one movement exacerbates the other movement in terms of capacity constraints. In contrast, in the PM period at this intersection, only the northbound through movement is constrained. It experiences a V/C ratio of 1.40 with a high delay of 231 seconds and a 95th percentile queue that exceeds capacity. As a result, signal optimization is proposed for this peak period. This movement's V/C ratio can be improved to 1.28 with this improvement.

6.5 2031 Future Total Conditions

The analysis parameters used to analyze the 2031 Future Background conditions have been carried forward as part of the analysis of 2031 Total Future conditions. The 2031 site trip generation volumes were added. Table 14 summarizes the results of the Synchro Analysis. Synchro worksheets have been included in Appendix L.

Table 14: 2031 Total Future Conditions Operational Analysis

Intersection	Mvmnt	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Del (s)	Q (95 th)	LOS	V/C	Del. (s)	Q (95 th)
Upper Middle Road and Bronte Road (Signalized)	EBL	D	0.04	40	7	D	0.04	52	5
	EBT	D	0.50	48	82	E	0.33	56	35
	EBR	E	0.89	75	#151	D	0.08	54	17
	WBL	E	0.92	67	#99	D	0.55	51	43
	WBT	D	0.19	40	38	E	0.53	55	65
	WBR	D	0.13	39	21	D	0.17	50	25
	NBL	E	0.64	64	#27	E	0.86	56	#124
	NBT	D	0.63	40	145	F	1.08	82	#345
	NBR	E	0.21	75	47	C	0.43	26	66
	SBL	D	0.82	43	82	D	0.71	48	#147
	SBT	E	1.06	72	#354	C	0.68	29	184
Saw Whet Boulevard and Bronte Road (Signalized)	SBR	B	0.01	16	0	B	0.01	19	0
	Overall	E	1.04	61	-	E	0.93	56	-
	EBL	D	0.08	49	11	E	0.07	59	9
	EBT/R	D	0.13	50	19	E	0.02	58	5
	WBL	E	0.81	75	77	E	0.70	76	54
	WBT/R	D	0.16	50	24	E	0.09	59	17
	NBL	C	0.28	20	m3	C	0.44	22	24
	NBT	A	0.42	5	95	D	1.01	42	#482
	NBR	A	0.04	3	3	A	0.16	8	25
	SBL	A	0.19	5	m3	D	0.58	55	#41
	SBT	E	1.10	62	m#549	A	0.50	5	95
Charles Cornwall Road and Bronte Road (Signalized)	SBR	A	0.00	0	m0	A	0.01	3	2
	Overall	D	1.05	46	-	C	0.94	30	-
	EBL/T/R	D	0.00	49	0	-	-	-	-
	WBL	E	0.82	79	72	E	0.73	71	61
	WBR	D	0.05	49	13	D	0.27	55	31
	NBL	-	-	-	-	A	0.01	1	m0
	NBT	C	0.50	22	141	C	1.03	28	m341
	NBR	C	0.07	28	m22	A	0.17	1	m3
	SBL	B	0.59	14	m3	D	0.59	49	#33
	SBT/R	D	1.09	46	m#427	A	0.53	7	106
	Overall	D	1.07	39	-	C	0.95	22	-
North Service Road and Bronte Road (Signalized)	EBL/T/R	-	-	-	-	-	-	-	-
	WBL	E	0.05	57	7	D	0.16	42	30
	WBT/L	E	0.05	57	8	D	0.16	42	31
	WBR	E	0.03	57	0	D	0.10	41	19
	NBL	-	-	-	-	-	-	-	-
	NBT	C	0.62	20	160	F	1.20	108	m#390
	NBR	B	0.18	16	m9	A	0.05	7	m0
	SBL	D	0.54	35	m37	D	0.55	43	30
	SBT/R	A	0.97	4	m#419	B	0.64	14	150
	Overall	B	0.94	11	-	E	0.93	70	-
	QEW WB Off Ramp and Bronte Road (Signalized)	WBL	C	0.27	22	C	0.19	28	35
QEW WB Off Ramp and Bronte Road (Signalized)	WBR	D	0.82	39	#76	F	1.12	115	#312
	NBT	B	0.59	17	m114	E	1.10	64	m#351
	SBT	B	0.90	17	204	C	0.57	22	128

Intersection	Mvmnt	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Del (s)	Q (95 th)	LOS	V/C	Del. (s)	Q (95 th)
	Overall	B	0.88	19	-	E	1.10	58	-
QEW EB Ramps and Bronte Road (Signalized)	EBL	E	0.22	71	8	E	0.19	70	7
	EBT/R	E	0.09	68	4	E	0.12	69	5
	WBL	E	0.83	62	133	E	0.67	59	81
	WBL/T/R	D	0.39	44	51	D	0.52	53	61
	WBR	D	0.24	42	25	D	0.48	52	54
	NBL	D	0.06	48	4	C	0.01	25	2
	NBT	F	1.22	166	#166	F	1.08	90	#336
	NBR	D	0.16	49	24	C	0.25	29	45
	SBL	F	1.06	81	m#333	E	0.76	56	#150
	SBT/R	C	0.67	24	160	B	0.41	15	97
	Overall	E	1.00	70	-	E	0.88	58	-
Notes:	# - 95% percentile exceeds capacity m - volume for the 95 th percentile queue is metered by an upstream signal								

The addition of the site generated traffic to the 2031 Future Background volumes at the Study Area intersections along Bronte Road resulted in lower level of service at Upper Middle Road, Saw Whet Boulevard, Charles Cornwall Road, and the QEW westbound off ramp during the PM peak period. This is expected given the 2021 Existing and 2031 Future Background operational performances along the Bronte Road corridor. It should be noted, however, that the proposed development only contributes to slight increases in V/C ratio to previously constrained intersections throughout the corridor. This horizon includes existing traffic volumes, background development trips, and growth. At the QEW eastbound ramps at Bronte Road during the PM peak period, the intersection LOS improved from F to E with the previously implemented signal optimization. At the QEW westbound off ramp at Bronte Road during the AM peak period, the LOS improved from C to B.

With the addition of the HOV lanes northbound and southbound on Bronte Road, the southbound and northbound movements continue to operate at or above a V/C ratio of 1.0 in the AM and PM peak periods, respectively. However, the active mode share used in this study is a projection of average expected travel behaviour in Oakville. Within the Study Area, the active mode share in 2016 was 13%, where the Regional projection for future horizons is 5%. As the lands along Bronte Road develop, walking and cycling trips are expected to increase further, as more destinations will be available within one-to-five-kilometer radius. Considering the foregoing, it is likely that the number of active mode trips generated by future phases of the proposed development has been underestimated, resulting in a conservative analysis.

It is important to note that although conservative assumptions were used throughout this report, it is evident from existing conditions operational analysis, and the trips generated by the background developments that the Study Area will experience capacity constraints northbound and southbound along Bronte Road. In locations with low transit accessibility and where surplus of right-of-way exists, the capacity can be increased to allow the continued growth in single occupant vehicles. However, given the lack of ROW along Bronte Road, as well as the planned intensification, and the Town's initiative to increase high occupancy vehicle trips along this corridor, the two inner lanes are expected to operate at capacity. Any additional auto trips resulting in a V/C ratio above one will be further incentivized to transfer to alternative routes or modes. As policy around transportation planning transformed in the recent decade, with key performance indicator shifting from vehicle to person trips per hour per kilometer, this trade-off is considered acceptable.

7 Recommendations

The proposed development will fit into the existing road network. The Saw Whet Boulevard access will support the proposed development as well as the surrounding background developments. However, it is noted that, due to the large existing volume northbound in the PM peak hour and southbound in the AM peak hour, the north and south movements through along Bronte Road are projected to operate with capacity constraints. This will be partially alleviated by the proposed widening of Bronte Road that will accommodate HOV lanes. This will also provide additional transit capacity, promoting further transit usage along this corridor as commuters may choose transit or seek out carpooling opportunities to avoid congestion. The proposed intersection of Saw Whet Boulevard at Bronte Road will be a signalized intersection, with auxiliary turn lanes on all approaches, and with a southbound protected/permissive left turn phase.

8 Conclusions

This Transportation Impact Study has examined the trip generation, access requirements, and Study Area road network impact of the proposed Bronte River residential development. The TIS has shown the following:

- a) The proposed development analyzed herein will include 40 single detached units (including two existing houses) and 102 townhouses.
- b) The proposed development will have one access via signalized intersection at Saw Whet Boulevard and Bronte Road. Additionally, the adjacent developments will be connected by internal local and collector streets.
- c) It was found that the adjacent developments of Bronte Green, Bronte Green Mid-Rise, and Valery 1354 Bronte Road, with direct connections between the developments, should be included in the background traffic projections.
- d) Parking requirements for the single-detached units in this development are satisfied as 80 resident parking spaces are provided. With a demand of 142 parking spaces for the townhouse units, 204 parking spaces are provided. As a result, parking needs can be accommodated at this site.
- e) The Region of Halton proposed a compound annual growth rate of 2% along Bronte Road. This conservative estimate of traffic growth was applied to the Study Area turning movement counts and traffic volumes.
- f) To estimate the impact of the subject development on the Study Area, a person trip generation exercise has been undertaken. The subject development is anticipated to generate 68 AM and 86 PM peak hour two-way auto trips during the 2026 horizon. With the shift in mode share projected to occur by 2031, the development will generate 63 AM and 79 PM peak hour two-way auto trips in 2031.
- g) Using the existing traffic volumes, projected to 2021, an operational analysis of existing conditions was undertaken. Through this analysis, it was determined that the Study Area intersections generally operate with acceptable overall LOS. All intersections operate at level of service E or better. Several movements experienced V/C ratios above one. Signal optimization was explored as a mitigation measure, which improved conditions for several critical movements. Some movements at the intersection of Upper Middle Road and Bronte Road still experienced capacity constraints and considerable delays after this implementation, but this is expected at an intersection of two arterial roads with high traffic volumes.
- h) The 2026 Future Background traffic volumes, including background growth and the nearby background developments, were analysed. It was found that traffic volumes exceeded theoretical capacity for many movements, especially for through movements along Bronte Road. A protective and permissive phase was assigned to the southbound left-turn movement at Saw Whet Boulevard and Bronte Road during the PM peak period, which resulted in a significant operational improvement for this movement while

constraining the northbound through movement. Where applicable, signal optimization was implemented to improve conditions. Where volumes exceeded capacity, improvements were expected in the future horizon given additional lanes on Bronte Road.

- i) The 2026 Future Total horizon operates similarly to the 2026 Future Background horizon. Signal optimization was applied where applicable to improve conditions. Many intersections could not be improved through signal timing adjustments due to opposing movements being constrained while already operating at minimum splits. The future road widening at Bronte Road is anticipated to provide extra capacity to relieve the experienced congestion along this corridor.
- j) The traffic operations within the Study Area improve in the 2031 Future Background horizon with the additional capacity along Bronte Road provided by the two additional lanes in the urban cross-section despite an additional five years of 2% compounding annual growth. The level of service of all intersections either improved or stayed the same compared to the 2026 Future Background scenario. Some movements still experienced capacity constraints that could not be improved by implementing signal timing adjustments.
- k) In the 2031 Future Total horizon, several study intersections experienced lower level of services in the PM peak period. The proposed development only contributed to slight increases in V/C ratio to previously constrained intersection movements. With the addition of the HOV lanes in this horizon northbound and southbound on Bronte Road, the northbound and southbound movements continue to operate at or above a V/C ratio of one. Despite this, walking and cycling trips are expected to increase in the future, and it is likely that the number of active mode trips generated by future phases of the proposed development has been underestimated, resulting in a conservative analysis.
- l) Given the lack of ROW along Bronte Road, planned intensification, and the Town's initiative to increase high occupancy vehicle trips along this corridor, the two inner lanes of Bronte Road are expected to operate at capacity. Any additional auto trips resulting in a V/C ratio above one will be further incentivized to transfer to alternative routes or modes. As policy around transportation planning transformed in the recent decade, with key performance indicators shifting from vehicle to person trips per hour per kilometer, this trade-off is considered favourable.
- m) TDM measures are proposed to further encourage commuters to shift away from single occupant vehicle trips. For this development, which primarily consists of low-rise residential units, the most effective measures involve access and usability of transit, cycling and pedestrian facilities. To ensure that the transit, cycling, and pedestrian modes are served appropriately by the proposed development, concept plans have been prepared.

The Bronte River development will have a minor impact on the Study Area road network. The proposed access will operate with reasonable LOS and delays on the turning movements into and out of the site. The concept plan prepared will provide a good pedestrian and cycling network along with good access to transit throughout the development. It is recommended that, from a transportation perspective, the proposed development application proceed.

Prepared By:



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Appendix A

Scope Confirmation

From: [Krusto, Matt](#)
To: [Nasteha Abdullahi](#)
Subject: RE: Bronte Green TIS and 1300-1350 Bronte Enns TIS - Terms of Reference
Date: August 24, 2021 2:43:56 PM
Attachments: [image001.png](#)

Hi Nasteha,

I am so sorry, that was in my notes but I didn't include it in my email.

You had stated in your terms of reference:

ATR counts for Bronte Road between QEW Westbound Offramp and Upper Middle Road have been examined for 2019, 2018, and 2017. The AM and PM peak hours were summed, and the compound annual growth rate (CAGR) was examined. Between 2017 and 2019 a CAGR of 3.20% was calculated. Despite this, Halton Region growth rates will be requested for Bronte Road.

Our modeler reviewed and had the following comments:

The growth rate is calculated to be 1% based on the model forecast volume in 2026 and 2031. I also checked ATR count at this location in 2017, 2018 and 2019. The existing volumes are similar to the forecasted volume in 2026 and 2031. Therefore, 3.2% suggested by the consultant maybe high.

There seems to be some differences here and, considering the future growth in the Bronte Road/Dundas Street (Palermo) area (and to the east/west of this intersection (Tremaine to Third Line), as well as in-fill high rise developments in the south (Bronte/Lakeshore Road, other), I would be more comfortable using a 2% growth rate.

Are you supportive of this recommendation?

Thank you for following up in that part!

Matt

From: Nasteha Abdullahi <nasteha.abdullahi@cghtransportation.com>
Sent: Tuesday, August 24, 2021 2:30 PM
To: Krusto, Matt <Matt.Krusto@halton.ca>
Subject: RE: Bronte Green TIS and 1300-1350 Bronte Enns TIS - Terms of Reference

CAUTION: This email originated from outside the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe. If you are unsure or need assistance please contact the IT Service Desk.

Good afternoon Matt,

Thank you kindly for your response on the terms of references for these developments. To follow-

up, I would like to request growth rates for Bronte Road between Upper Middle Road and the QEW from the Region. Please advise.

Thank you,
Nasteha Abdullahi



Nasteha Abdullahi
CGH Transportation Inc.
P: 647-965-2835
E: nasteha.abdullahi@CGHTransportation.com

From: Krusto, Matt <Matt.Krusto@halton.ca>
Sent: August 20, 2021 12:40 PM
To: Nasteha Abdullahi <nasteha.abdullahi@cghtransportation.com>
Cc: Pasquini-Smith, Alessandria <Alex.Pasquini-Smith@halton.ca>; Steiger, Bernie <Bernie.Steiger@halton.ca>; Mark Crockford <mark.crockford@cghtransportation.com>; Syed Rizvi <syed.rizvi@oakville.ca>
Subject: Bronte Green TIS and 1300-1350 Bronte Enns TIS - Terms of Reference

Hello Nasteha,

I have reviewed the terms of references together and have the following overall Transportation Planning comments from Halton Region:

Plans should be included with the terms of reference to ensure the locations of the development sites are understood by all reviewers. Additionally, terms of references should ideally be submitted separately for review by Halton and the Town of Oakville. As a result, this may lead to additional comments when the TIS is submitted for review.

The Study must be in accordance to Halton Region's Transportation Impact Study Guidelines (2015), Halton's Access By-Law 32-17 and Halton's Access Management Guidelines (2015). Any proposed development access to a Regional road **will only be reviewed as part of the Transportation Impact Study.**

As stated, a comparison of the proposed density versus the approved density will be prepared.

As noted in the terms of references, the following intersections will be analyzed:

Caivan and Doracin properties:

- Upper Middle Road at Bronte Road
- Saw Whet Boulevard at Bronte Road
- Site Access at Yellow Rose Circle
- Saw Whet Boulevard at Yellow Rose Circle
- Charles Cornwall Road at Bronte Road (signalized access to Woodlands Operations Centre)

ARGO Land Development properties:

- Upper Middle Road at Bronte Road
- Charles Cornwall Road at Bronte Road (signalized access to Woodlands Operations Centre)
- Saw Whet Boulevard at Bronte Road (access to Bronte Green)
- Site Access on Bronte Road

Note: The intersection of Bronte Road at the North Service Road, and the QEW ramps should be included in the analysis (for the ARGO Bronte Enns TIS only).

Terms of reference state the following analysis assumptions:

- Horizon years: 2021, 2026 (Buildout), and 2031 (+ 5 years).
- Bronte Road will be analyzed as four general purpose lanes for year 2021 (based on existing conditions), and four lanes plus HOV lane (with assumption that 20% of the lane capacity is assigned to HOV usage by using a 0.8 lane utilization factor) for years 2026 and 2031.

Note: Currently Bronte Road is scheduled for start of construction for the widening from 4 to 6 lanes in 2025 (Speers Road to Highway 407). As the Municipal Class Environmental Assessment (MCEA) Study has not started to date, the Year 2026 analysis must assume Bronte Road at the existing 4 lanes.

For the traffic volume counts and traffic signal timing (from Halton Region), information can be requested from our Road Operations group at trafficdatarequests@halton.ca.

The Background Developments must be confirmed and approved by the Town of Oakville.

Transit Mode Splits:

Halton's Transportation Master Plan 2011 utilizes a transit mode split of 10% for 2021, 15% for 2026 and 20% for 2031. Assumption of travel via other modes (active transportation i.e.: walk, cycle) should utilize a 5% mode split for 2031. Transportation Demand Management (TDM) assumptions of 3% for 2031 would also be acceptable. **Transit mode splits will need to be adjusted from the 2011 TMP assumptions to reasonable percentages based on current year (2021), 2026 and 2031 planned and proposed mode splits (based on existing facilities and service in the area to date (planned &/or proposed). Reasonable assumptions and rationale must be clearly outlined in the Study.**

All other items in the terms of references appear acceptable.

Thank you for the submission Nasteha. Let me know if there are any questions.

Matt

Matt Krusto

Supervisor, Transportation Development Review
Infrastructure Planning & Policy

Public Works
Halton Region
905-825-6000, ext. 7225 | 1-866-442-5866

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From: Nasteha Abdullahi <nasteha.abdullahi@cghtransportation.com>
Sent: Friday, August 13, 2021 4:07 PM
To: Pasquini-Smith, Alexandria <Alex.Pasquini-Smith@halton.ca>; syed.rizvi@oakville.ca
Cc: Mark Crockford <mark.crockford@cghtransportation.com>
Subject: Bronte Green TIS and 1300-1350 Bronte Enns TIS - Terms of Reference

CAUTION: This email originated from outside the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe. If you are unsure or need assistance please contact the IT Service Desk.

Good afternoon Alexandria and Syed,

CGH Transportation has been retained by Caivan and Doracin to undertake a Transportation Impact Study for their Bronte Green development at Saw Whet Boulevard at Bronte Road in Oakville. CGH Transportation has also been retained by ARGO Development Corp to undertake a Transportation Impact Study for their Bronte Enns development at 1300-1350 Bronte Road in Oakville. We have drafted the attached terms of references for both developments for your review.

Syed – please review the Bronte Green TIS terms of reference as you have already reviewed the Bronte Enns development terms of reference.

Alexsandria – in addition to the review of both terms of references, we would like to request the growth rates for Bronte Road between Upper Middle Road and the QEW from the Region.

Please let us know if you have any comments or questions.

Thank you,
Nasteha

Nasteha Abdullahi
CGH Transportation Inc.
P: 647-965-2835



E:nasteha.abdullahi@CGHTransportation.com

From: [Syed Rizvi](#)
To: [Nasteha Abdullahi](#); Alexsandria.Pasquini@halton.ca
Cc: [Mark Crockford](#)
Subject: RE: Bronte Green TIS and 1300-1350 Bronte Enns TIS - Terms of Reference
Date: August 20, 2021 2:14:26 PM
Attachments: [image001.png](#)

Hi Nasteha,

Thanks for providing opportunity to comment on the TOR for the Bronte Enns TIS study.

Please confirm that the increase in the apartment unit count is permitted in zoning of the area development. In addition you are required to include a comparison table of the net increase in the vehicle trips due to addition of up to 200 additional units.

Thanks,
Syed

Syed Rizvi, M.Sc., P. Eng
Transportation Engineer
Transportation and Engineering
Town of Oakville | 905-845-6601, ext.3981 | www.oakville.ca

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<http://www.oakville.ca/privacy.html>

From: Nasteha Abdullahi <nasteha.abdullahi@cghtransportation.com>
Sent: August 13, 2021 4:07 PM
To: Alexsandria.Pasquini@halton.ca; Syed Rizvi <syed.rizvi@oakville.ca>
Cc: Mark Crockford <mark.crockford@cghtransportation.com>
Subject: Bronte Green TIS and 1300-1350 Bronte Enns TIS - Terms of Reference

SECURITY CAUTION: This email originated from outside of The Town of Oakville. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good afternoon Alexsandria and Syed,

CGH Transportation has been retained by Caivan and Doracin to undertake a Transportation Impact Study for their Bronte Green development at Saw Whet Boulevard at Bronte Road in Oakville. CGH Transportation has also been retained by ARGO Development Corp to undertake a Transportation Impact Study for their Bronte Enns development at 1300-1350 Bronte Road in Oakville. We have

drafted the attached terms of references for both developments for your review.

Syed – please review the Bronte Green TIS terms of reference as you have already reviewed the Bronte Enns development terms of reference.

Alexsandria – in addition to the review of both terms of references, we would like to request the growth rates for Bronte Road between Upper Middle Road and the QEW from the Region.

Please let us know if you have any comments or questions.

Thank you,
Nasteha



Nasteha Abdullahi

CGH Transportation Inc.

P: 647-965-2835

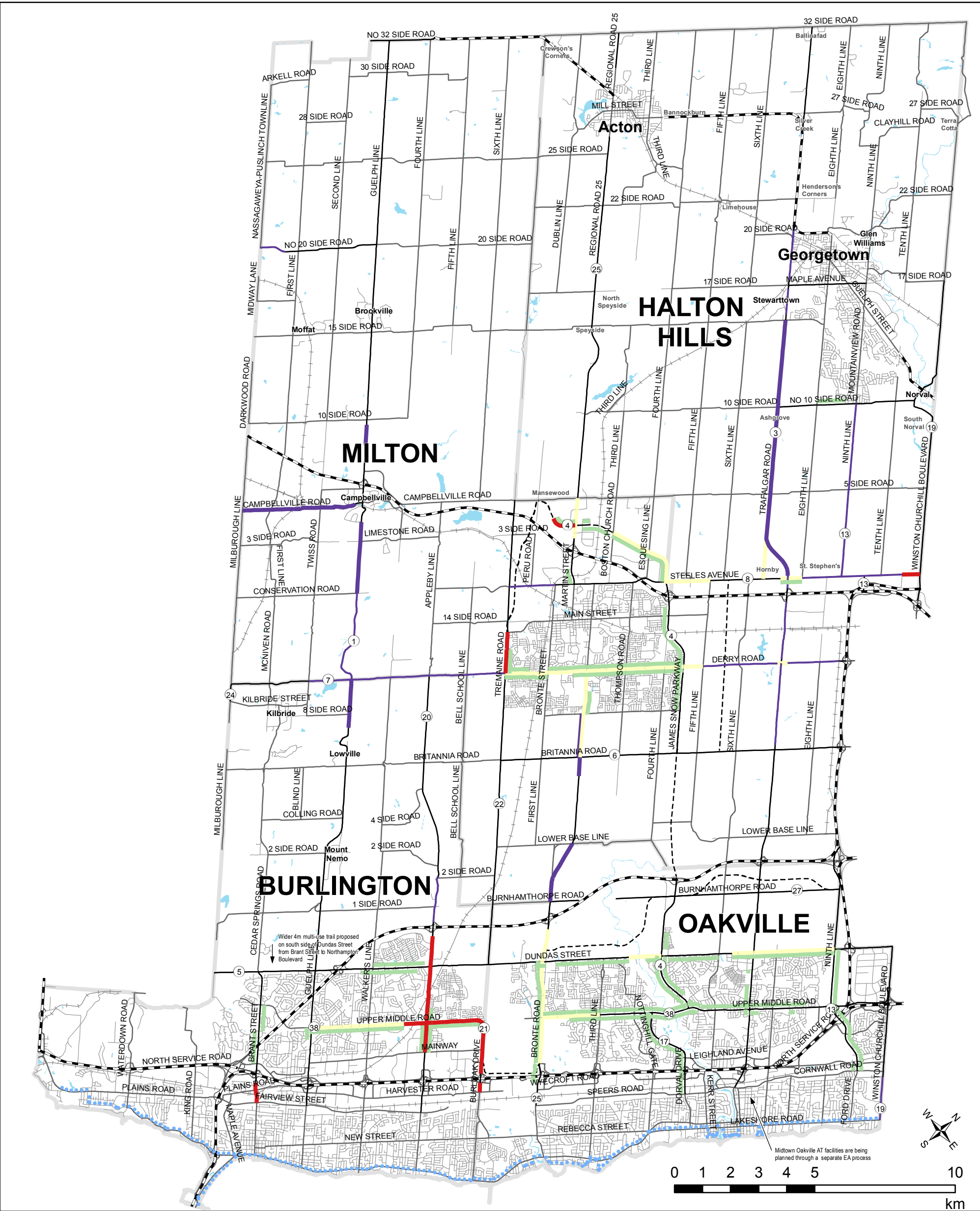
E: nasteha.abdullahi@CGHTransportation.com

Appendix B

Town of Oakville and Halton Region Active Transportation Maps

Appendix H

Existing and Proposed Regional Cycling & Walking Network Maps



Legend

Existing Regional Cycling Network*

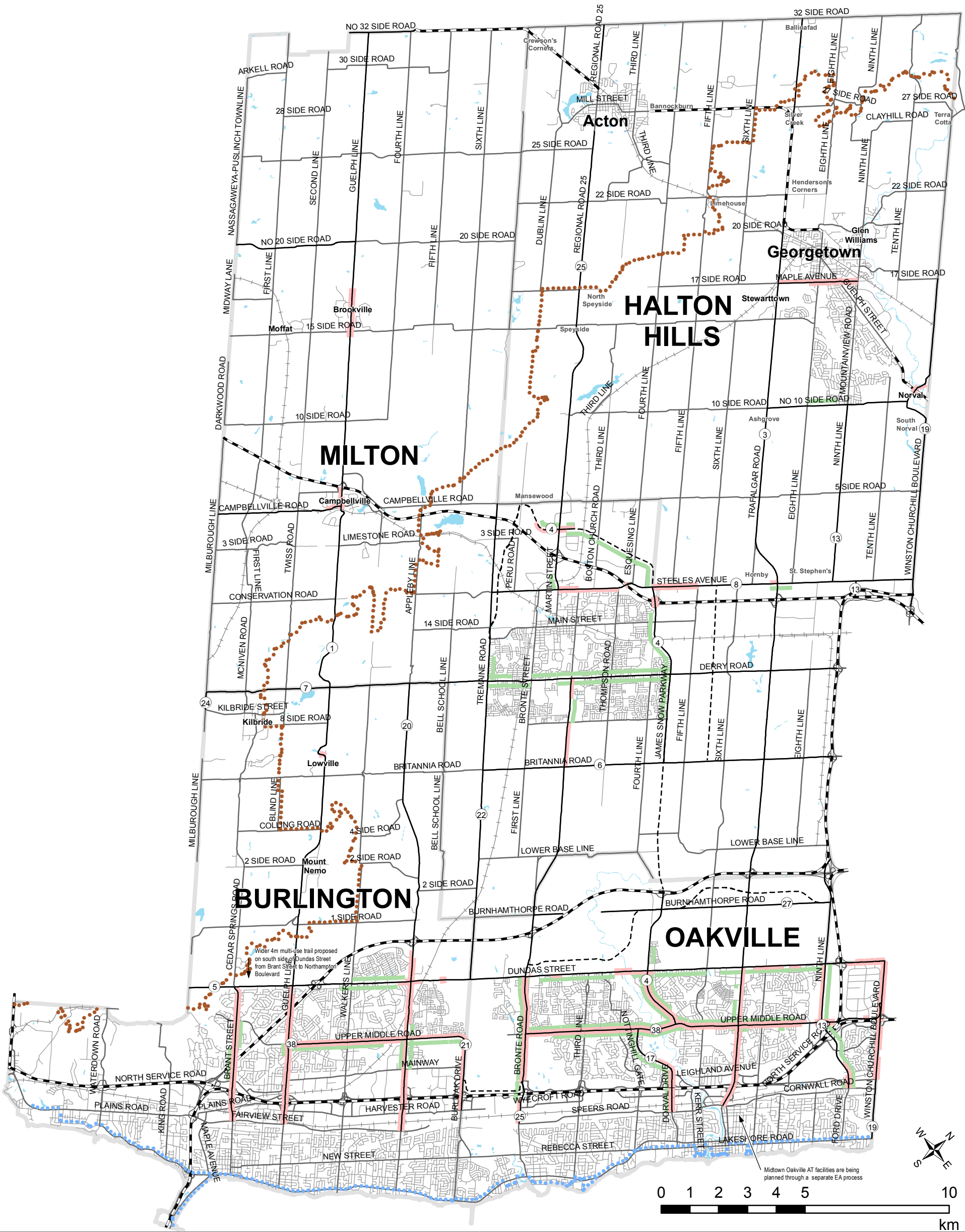
- Bike Lanes
- Boulevard Multi-Use Trail
- Wide Shared Use Lane
- Paved Shoulders
- Partially Paved Shoulders
- Waterfront Trail

Regional Road Network*

- Existing Regional Road
- Proposed Regional Road

Active Transportation Master Plan
MAP 1
Existing Regional Cycling Network

*Note: Existing cycling facilities are shown only for Regional Roads, which are shown in black on the map



Legend

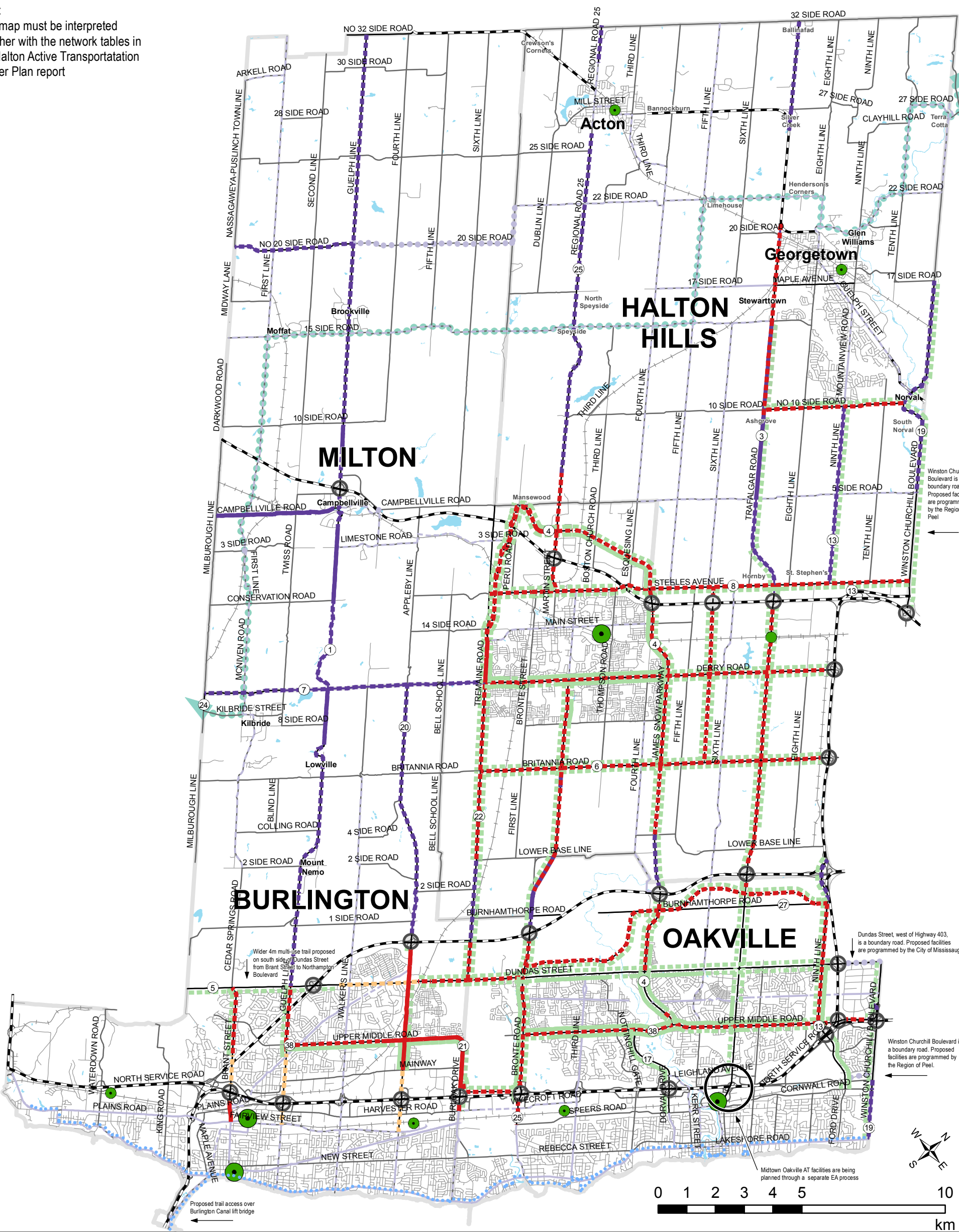
- Existing Regional Walk Network**
- Sidewalk
 - Boulevard Multi-Use Trail
 - Bruce Trail
 - Waterfront Trail

- Regional Road Network**
- Existing Regional Road
 - Proposed Regional Road

Active Transportation Master Plan
MAP 2
Existing Regional Walking Network

Note: Existing walking facilities are shown only for Regional Roads, which are shown in black on the map.

Note:
This map must be interpreted
together with the network tables in
the Halton Active Transportation
Master Plan report



Legend

Proposed Regional Bike Network

- Buffered Bike Lanes
- Bike Lanes
- Boulevard Multi-Use Trail
- Paved Shoulders
- Interchange Improvement*

Routes not on Regional Roads

- Existing Routes that are Regionally Significant
- Planned Routes that are Regionally Significant
- Proposed Routes that are Regionally Significant
- Greenbelt Cycling Route

Existing Regional Bike Network

- Bike Lane
- Boulevard Trail
- Waterfront Trail

Existing and Proposed Major Transit Stations**

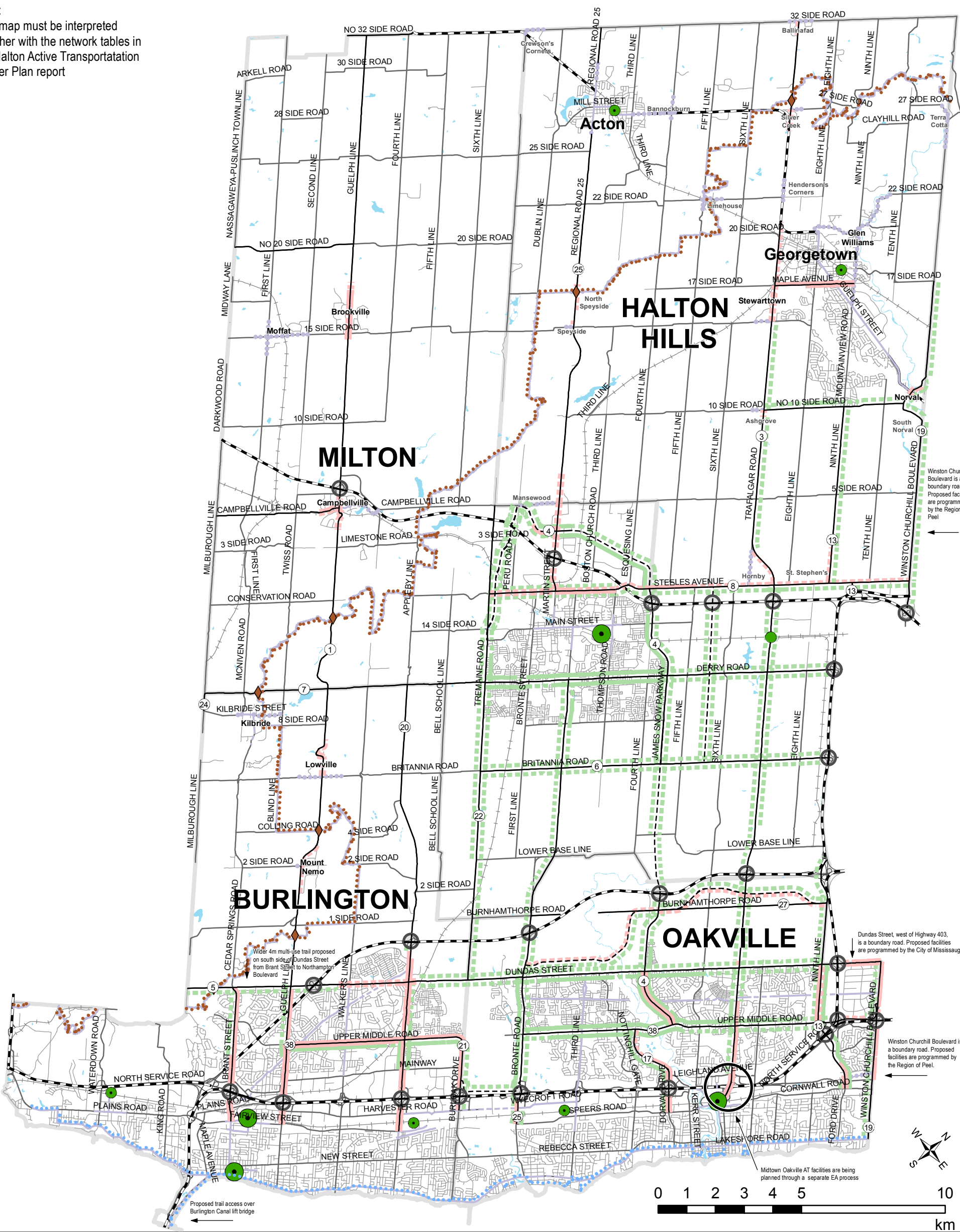
- Mobility Hub
- Major Transit Stations
- Proposed GO Stations

Active Transportation Master Plan

MAP 3 Proposed Regional Cycling Network

*Note active transportation facilities at interchanges to be determined in consultation with the MTO.
**Note that some Routes that are Regionally Significant are located near transit stations. Connections to transit are an important part of the Regional Cycling and Walking Network. Transit stations are shown on the map to provide contextual information.

Note:
This map must be interpreted
together with the network tables in
the Halton Active Transportation
Master Plan report



Legend

Proposed Regional Walk Network

- Sidewalk
- Boulevard Multi-Use Trail
- Interchange Improvement*
- Bruce Trail Crossing

Routes not on Regional Roads

- Existing Routes that are Regionally Significant
- Planned Routes that are Regionally Significant
- Proposed Routes that are Regionally Significant

Existing Regional Walk Network

- Sidewalk
- Boulevard Multi-Use Trail
- Bruce Trail
- Waterfront Trail

Existing and Proposed Major Transit Stations**

- Mobility Hub
- Existing GO Stations
- Proposed GO Stations

Active Transportation Master Plan
MAP 4
Proposed Regional Walking Network

*Note active transportation facilities at interchanges to be determined in consultation with the MTO.
**Note that some Routes that are Regionally Significant are located near transit stations. Connections to transit are an important part of the Regional Cycling and Walking Network. Transit stations are shown on the map to provide contextual information.

Appendix C

Turning Movement Count Data

Upper Middle Rd W @ Bronte Rd

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:45:00

To: 8:45:00

Municipality: Halton Region

Site #: 0000003289

Intersection: Bronte Rd & Upper Middle Rd W

TFR File #: 11

Count date: 29-Oct-2019

Weather conditions:

Cloudy/Dry

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Bronte Rd runs N/S

North Leg Total: 3033

North Entering: 2059

North Peds: 11

Peds Cross: $\times$

Heavys	2	88	2	92
Trucks	0	19	1	20
Cars	9	1716	222	1947
Totals	11	1823	225	

Heavys 44

Trucks 26

Cars 904

Totals 974

East Leg Total: 1386

East Entering: 788

East Peds: 7

Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
9	1	146	156



Upper Middle Rd W

Heavys	Trucks	Cars	Totals
1	0	10	11
0	2	201	203
0	0	388	388
1	2	599	

Peds Cross: $\times$

West Peds: 5

West Entering: 602

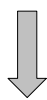
West Leg Total: 758

Cars 2598

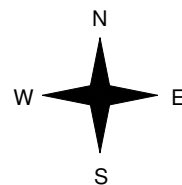
Trucks 22

Heavys 95

Totals 2715



Bronte Rd



Bronte Rd

Bronte Rd

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Bronte Rd

Cars	Trucks	Heavys	Totals
188	1	7	196
83	0	5	88
494	3	7	504
765	4	19	

Upper Middle Rd W



Cars	Trucks	Heavys	Totals
581	8	9	598

Peds Cross: $\times$

South Peds: 0

South Entering: 994

South Leg Total: 3709

Comments

Upper Middle Rd W @ Bronte Rd

Mid-day Peak Diagram

Specified Period

From: 11:00:00

To: 14:00:00

One Hour Peak

From: 12:30:00

To: 13:30:00

Municipality: Halton Region

Site #: 0000003289

Intersection: Bronte Rd & Upper Middle Rd W

TFR File #: 11

Count date: 29-Oct-2019

Weather conditions:

Cloudy/Dry

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Bronte Rd runs N/S

North Leg Total: 1932

North Entering: 968

North Peds: 2

Peds Cross: $\times$

Heavys	0	71	1	72
Trucks	1	19	3	23
Cars	7	745	121	873
Totals	8	835	125	

Heavys 73

Trucks 17

Cars 874

Totals 964

East Leg Total: 651

East Entering: 349

East Peds: 0

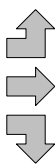
Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
0	4	134	138

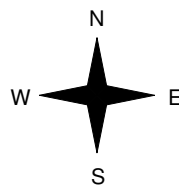


Upper Middle Rd W

Heavys	Trucks	Cars	Totals
0	1	5	6
1	2	33	36
1	1	86	88
2	4	124	



Bronte Rd



Cars	Trucks	Heavys	Totals
154	4	4	162
43	1	0	44
141	0	2	143
338	5	6	

Upper Middle Rd W



Cars	Trucks	Heavys	Totals
282	8	12	302

Peds Cross: $\times$

West Peds: 2

West Entering: 130

West Leg Total: 268

Cars	972	Cars	84	715	128	927
Trucks	20	Trucks	2	12	3	17
Heavys	74	Heavys	0	69	10	79
Totals	1066	Totals	86	796	141	



Peds Cross: $\times$

South Peds: 0

South Entering: 1023

South Leg Total: 2089

Comments

Upper Middle Rd W @ Bronte Rd

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:45:00

To: 17:45:00

Municipality: Halton Region

Site #: 0000003289

Intersection: Bronte Rd & Upper Middle Rd W

TFR File #: 11

Count date: 29-Oct-2019

Weather conditions:

Cloudy/Dry

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Bronte Rd runs N/S

North Leg Total: 3126

North Entering: 1207

North Peds: 6

Peds Cross: $\nlessgtr$

Heavys	0	31	1	32
Trucks	1	8	0	9
Cars	14	952	200	1166
Totals	15	991	201	

Heavys 30

Trucks 9

Cars 1880

Totals 1919

East Leg Total: 1155

East Entering: 589

East Peds: 1

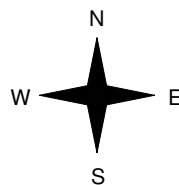
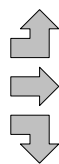
Peds Cross: $\nlessgtr$

Heavys	Trucks	Cars	Totals
3	1	419	423



Upper Middle Rd W

Heavys	Trucks	Cars	Totals
0	0	7	7
0	1	73	74
1	0	109	110
1	1	189	



Bronte Rd

Cars	Trucks	Heavys	Totals
249	2	1	252
154	0	1	155
176	0	6	182
579	2	8	

Upper Middle Rd W



Cars	Trucks	Heavys	Totals
560	1	5	566

Peds Cross: $\nlessgtr$

West Peds: 1

West Entering: 191

West Leg Total: 614

Cars	1237
Trucks	8
Heavys	38
Totals	1283



Cars	251	1624	287	2162
Trucks	0	7	0	7
Heavys	2	29	4	35
Totals	253	1660	291	

Peds Cross: $\nlessgtr$

South Peds: 0

South Entering: 2204

South Leg Total: 3487

Comments

Upper Middle Rd W @ Bronte Rd

Total Count Diagram

Municipality: Halton Region

Site #: 0000003289

Intersection: Bronte Rd & Upper Middle Rd W

TFR File #: 11

Count date: 29-Oct-2019

Weather conditions:

Cloudy/Dry

Person(s) who counted:

Cam

**** Signalized Intersection ****

Major Road: Bronte Rd runs N/S

North Leg Total: 19991

North Entering: 10291

North Peds: 36

Peds Cross: $\times$

Heavys	6	511	32	549
Trucks	4	148	13	165
Cars	74	8178	1325	9577
Totals	84	8837	1370	



Heavys 450

Trucks 140

Cars 9110

Totals 9700

East Leg Total: 7615

East Entering: 4183

East Peds: 14

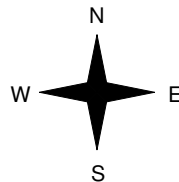
Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
43	12	1609	1664



Upper Middle Rd W

Heavys	Trucks	Cars	Totals
2	3	61	66
9	5	600	614
10	5	1206	1221
21	13	1867	



Bronte Rd

Cars	Trucks	Heavys	Totals
1567	15	44	1626
622	3	19	644
1837	17	59	1913
4026	35	122	

Upper Middle Rd W



Cars	Trucks	Heavys	Totals
3317	35	80	3432

Peds Cross: $\times$

West Peds: 23

West Entering: 1901

West Leg Total: 3565

Cars	11221
Trucks	170
Heavys	580
Totals	11971



Cars	913	7482	1392	9787
Trucks	5	122	17	144
Heavys	18	404	39	461
Totals	936	8008	1448	

Peds Cross: $\times$

South Peds: 3

South Entering: 10392

South Leg Total: 22363

Comments

Bronte Rd @ QEW EB Ramps

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 #: 0000003335

Intersection: Bronte Rd & QEW EB Ramp

TFR File #: 13

Count date: 4-Dec-2019

Weather conditions:

Overcast/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Bronte Rd runs N/S

North Leg Total: 3002

North Entering: 1716

North Peds: 0

Peds Cross: $\nlessgtr$

Heavys	0	36	1	37
Trucks	0	9	3	12
Cars	9	1143	515	1667
Totals	9	1188	519	

Heavys 62

Trucks 16

Cars 1208

Totals 1286

East Leg Total: 1689

East Entering: 937

East Peds: 0

Peds Cross: $\nlessgtr$

Heavys	Trucks	Cars	Totals
0	0	14	14

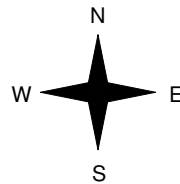


Car Pool

Heavys	Trucks	Cars	Totals
0	0	7	7
0	0	1	1
0	0	2	2
0	0	10	



Bronte Rd



Bronte Rd

Cars	Trucks	Heavys	Totals
550	7	19	576
2	0	0	2
347	4	8	359
899	11	27	

QEW EB On/Off Ramp



Cars	Trucks	Heavys	Totals
745	4	3	752

Peds Cross: $\nlessgtr$

West Peds: 0

West Entering: 10

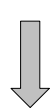
West Leg Total: 24

Cars 1492

Trucks 13

Heavys 44

Totals 1549



Cars	3	651	229	883
Trucks	0	9	1	10
Heavys	0	43	2	45
Totals	3	703	232	

Peds Cross: $\nlessgtr$

South Peds: 0

South Entering: 938

South Leg Total: 2487

Comments

Bronte Rd @ QEW EB Ramps

Mid-day Peak Diagram

Specified Period

From: 11:00:00

To: 14:00:00

One Hour Peak

From: 11:30:00

To: 12:30:00

Municipality: Halton Region

Site #: 0000003335

Intersection: Bronte Rd & QEW EB Ramp

TFR File #: 13

Count date: 4-Dec-2019

Weather conditions:

Overcast/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Bronte Rd runs N/S

North Leg Total: 1911

North Entering: 833

North Peds: 1

Peds Cross: $\times$

Heavys	0	24	11	35
Trucks	0	14	1	15
Cars	1	526	256	783
Totals	1	564	268	



Heavys 88

Trucks 40

Cars 950

Totals 1078

East Leg Total: 1271

East Entering: 737

East Peds: 0

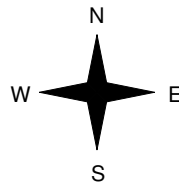
Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
0	0	7	7



Car Pool

Heavys	Trucks	Cars	Totals
0	0	3	3
0	0	2	2
0	1	1	2
0	1	6	



Bronte Rd



Cars	Trucks	Heavys	Totals
326	16	50	392
3	0	0	3
310	13	19	342
639	29	69	

QEW EB On/Off Ramp



Cars	Trucks	Heavys	Totals
513	6	15	534

Peds Cross: $\times$

West Peds: 1

West Entering: 7

West Leg Total: 14

Cars	837	Cars	3	621	255	879
Trucks	28	Trucks	0	24	5	29
Heavys	43	Heavys	0	38	4	42
Totals	908	Totals	3	683	264	



Peds Cross: $\times$

South Peds: 0

South Entering: 950

South Leg Total: 1858

Comments

Bronte Rd @ QEW EB Ramps

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 17:00:00

To: 18:00:00

Municipality: Halton Region

Site #: 0000003335

Intersection: Bronte Rd & QEW EB Ramp

TFR File #: 13

Count date: 4-Dec-2019

Weather conditions:

Overcast/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Bronte Rd runs N/S

North Leg Total: 3189

North Entering: 1040

North Peds: 0

Peds Cross: $\nless$

Heavys	0	17	0	17
Trucks	0	3	0	3
Cars	3	808	209	1020
Totals	3	828	209	

Heavys 52

Trucks 10

Cars 2087

Totals 2149

East Leg Total: 1430

East Entering: 993

East Peds: 0

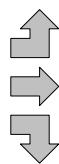
Peds Cross: $\nless$

Heavys	Trucks	Cars	Totals
0	0	5	5

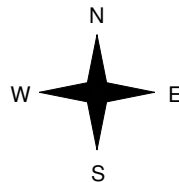


Car Pool

Heavys	Trucks	Cars	Totals
0	0	6	6
0	0	0	0
0	0	4	4
0	0	10	



Bronte Rd



Bronte Rd

Cars	Trucks	Heavys	Totals
744	7	27	778
1	0	0	1
209	1	4	214
954	8	31	

QEW EB On/Off Ramp



Cars	Trucks	Heavys	Totals
433	1	3	437

Peds Cross: $\nless$

West Peds: 0

West Entering: 10

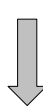
West Leg Total: 15

Cars 1021

Trucks 4

Heavys 21

Totals 1046



Cars	1	1337	224	1562
Trucks	0	3	1	4
Heavys	0	25	3	28
Totals	1	1365	228	

Peds Cross: $\nless$

South Peds: 0

South Entering: 1594

South Leg Total: 2640

Comments

Bronte Rd @ QEW EB Ramps

Total Count Diagram

Municipality: Halton Region
Site #: 0000003335
Intersection: Bronte Rd & QEW EB Ramp
TFR File #: 13
Count date: 4-Dec-2019

Weather conditions:
 Overcast/Wet
Person(s) who counted:
 Cam

**** Signalized Intersection ****

Major Road: Bronte Rd runs N/S

North Leg Total: 19715
 North Entering: 8527
 North Peds: 1
 Peds Cross: ∇

	Heavys	0	194	47	241
Trucks	0	83	24	107	
Cars	33	5789	2357	8179	
Totals	33	6066	2428		

	Heavys	570
Trucks	172	
Cars	10446	
Totals	11188	

East Leg Total: 11170
 East Entering: 6787
 East Peds: 2
 Peds Cross: ∇

Heavys	Trucks	Cars	Totals
0	0	62	62

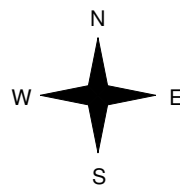


Car Pool

Heavys	Trucks	Cars	Totals
0	0	37	37
0	0	17	17
0	1	17	18
0	1	71	



Bronte Rd



Bronte Rd



Cars	Trucks	Heavys	Totals
4057	78	284	4419
18	0	0	18
2179	69	102	2350
6254	147	386	

QEW EB On/Off Ramp



Cars	Trucks	Heavys	Totals
4246	57	80	4383

Peds Cross: ∇
 West Peds: 2
 West Entering: 72
 West Leg Total: 134

Cars	7985
Trucks	153
Heavys	296
Totals	8434



Cars	11	6352	1872	8235
Trucks	0	94	33	127
Heavys	0	286	33	319
Totals	11	6732	1938	

Peds Cross: ∇
 South Peds: 0
 South Entering: 8681
 South Leg Total: 17115

Comments

Bronte Rd @ QEW WB Off Ramp

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 #: 0000003337

Intersection: Bronte Rd & QEW WB Off Ramp

TFR File #: 14

Count date: 4-Dec-2019

Weather conditions:

Overcast/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Bronte Rd runs N/S

North Leg Total: 2782

North Entering: 1499

North Peds: 0

Peds Cross: $\nlessgtr$

Heavys	34	0	34
Trucks	7	0	7
Cars	1458	0	1458
Totals	1499	0	

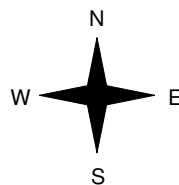
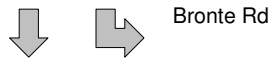
Heavys	39
Trucks	13
Cars	1231
Totals	1283

East Leg Total: 434

East Entering: 434

East Peds: 0

Peds Cross: $\nlessgtr$



Cars	Trucks	Heavys	Totals
233	3	5	241
183	5	5	193
416	8	10	

QEW WB Off Ramp



Bronte Rd

Cars	1641	Cars	998	0	998
Trucks	12	Trucks	10	0	10
Heavys	39	Heavys	34	0	34
Totals	1692	Totals	1042	0	

Peds Cross: $\nlessgtr$

South Peds: 0

South Entering: 1042

South Leg Total: 2734

Comments

Bronte Rd @ QEW WB Off Ramp

Mid-day Peak Diagram

Specified Period

From: 11:00:00

To: 14:00:00

One Hour Peak

From: 12:30:00

To: 13:30:00

Municipality: Halton Region

Site #: 0000003337

Intersection: Bronte Rd & QEW WB Off Ramp

TFR File #: 14

Count date: 4-Dec-2019

Weather conditions:

Overcast/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Bronte Rd runs N/S

North Leg Total: 1621

North Entering: 591

North Peds: 0

Peds Cross: $\nlessgtr$

Heavys	33	0	33
Trucks	11	0	11
Cars	547	0	547
Totals	591	0	



Heavys	80
Trucks	25
Cars	925
Totals	1030

East Leg Total: 474

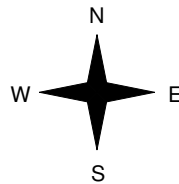
East Entering: 474

East Peds: 1

Peds Cross: $\nlessgtr$



Bronte Rd



Cars	Trucks	Heavys	Totals
240	5	14	259
203	8	4	215
443	13	18	



QEW WB Off Ramp



Cars	Trucks	Heavys	Totals
0	0	0	0

Bronte Rd



Cars	750	Cars	685	0	685
Trucks	19	Trucks	20	0	20
Heavys	37	Heavys	66	0	66
Totals	806	Totals	771	0	



Peds Cross: $\nlessgtr$

South Peds: 0

South Entering: 771

South Leg Total: 1577

Comments

Bronte Rd @ QEW WB Off Ramp

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:45:00

To: 17:45:00

Municipality: Halton Region

Site #: 0000003337

Intersection: Bronte Rd & QEW WB Off Ramp

TFR File #: 14

Count date: 4-Dec-2019

Weather conditions:

Overcast/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Bronte Rd runs N/S

North Leg Total: 2970

North Entering: 815

North Peds: 0

Peds Cross: $\nlessgtr$

Heavys	15	0	15
Trucks	6	0	6
Cars	794	0	794
Totals	815	0	

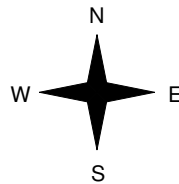
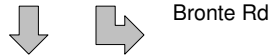
Heavys	46
Trucks	6
Cars	2103
Totals	2155

East Leg Total: 699

East Entering: 699

East Peds: 1

Peds Cross: $\nlessgtr$



Cars	Trucks	Heavys	Totals
465	0	2	467
228	1	3	232
693	1	5	

QEW WB Off Ramp



Cars	Trucks	Heavys	Totals
0	0	0	0

Cars	1022	Cars	1638	0	1638
Trucks	7	Trucks	6	0	6
Heavys	18	Heavys	44	0	44
Totals	1047	Totals	1688	0	

Peds Cross: $\nlessgtr$

South Peds: 0

South Entering: 1688

South Leg Total: 2735

Comments

Bronte Rd @ QEW WB Off Ramp

Total Count Diagram

Municipality: Halton Region

Site #: 0000003337

Intersection: Bronte Rd & QEW WB Off Ramp

TFR File #: 14

Count date: 4-Dec-2019

Weather conditions:

Overcast/Wet

Person(s) who counted:

Cam

**** Signalized Intersection ****

Major Road: Bronte Rd runs N/S

North Leg Total: 17637

North Entering: 6746

North Peds: 0

Peds Cross: ∇

Heavys	208	0	208
Trucks	77	0	77
Cars	6461	0	6461
Totals	6746	0	

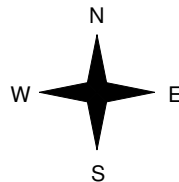
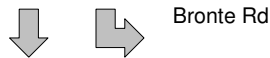
Heavys	473
Trucks	136
Cars	10282
Totals	10891

East Leg Total: 4144

East Entering: 4144

East Peds: 3

Peds Cross: ∇



Cars	Trucks	Heavys	Totals
2325	23	52	2400
1678	32	34	1744
4003	55	86	

QEW WB Off Ramp



Cars	Trucks	Heavys	Totals
0	0	0	0

Cars	8139	Cars	7957	0	7957
Trucks	109	Trucks	113	0	113
Heavys	242	Heavys	421	0	421
Totals	8490	Totals	8491	0	

Peds Cross: ∇

South Peds: 0

South Entering: 8491

South Leg Total: 16981

Comments

Bronte Rd @ North Service Rd W

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 #: 0000003338

Intersection: Bronte Rd & North Service Rd W

TFR File #: 15

Count date: 4-Dec-2019

Weather conditions:

Overcast/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Bronte Rd runs N/S

North Leg Total: 3722

North Entering: 2654

North Peds: 1

Peds Cross: $\bowtie$

Heavys	0	78	1	79
Trucks	0	24	0	24
Cars	1	2325	225	2551
Totals	1	2427	226	

Heavys	41
Trucks	14
Cars	1013
Totals	1068

East Leg Total: 510

East Entering: 43

East Peds: 0

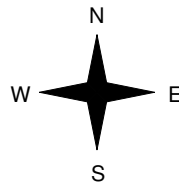
Peds Cross: $\bowtie$

Heavys	Trucks	Cars	Totals
0	0	1	1



Driveway

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



Bronte Rd

Cars	Trucks	Heavys	Totals
26	0	0	26
0	0	0	0
17	0	0	17
43	0	0	

North Service Rd W



Cars	Trucks	Heavys	Totals
465	0	2	467

Peds Cross: $\bowtie$

West Peds: 0

West Entering: 0

West Leg Total: 1

Cars	2342	Cars	0	987	240	1227
Trucks	24	Trucks	0	14	0	14
Heavys	78	Heavys	0	41	1	42
Totals	2444	Totals	0	1042	241	



Peds Cross: $\bowtie$

South Peds: 0

South Entering: 1283

South Leg Total: 3727

Comments

Bronte Rd @ North Service Rd W

Mid-day Peak Diagram

Specified Period

From: 11:00:00

To: 14:00:00

One Hour Peak

From: 12:15:00

To: 13:15:00

Municipality: Halton Region

Site #: 0000003338

Intersection: Bronte Rd & North Service Rd W

TFR File #: 15

Count date: 4-Dec-2019

Weather conditions:

Overcast/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Bronte Rd runs N/S

North Leg Total: 2094

North Entering: 1103

North Peds: 1

Peds Cross: $\times$

Heavys	0	102	0	102
Trucks	0	31	2	33
Cars	1	920	47	968
Totals	1	1053	49	

Heavys 69

Trucks 23

Cars 899

Totals 991

East Leg Total: 304

East Entering: 176

East Peds: 0

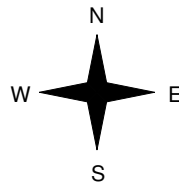
Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
0	0	1	1



Driveway

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



Bronte Rd

Cars	Trucks	Heavys	Totals
70	0	0	70
0	0	0	0
104	1	1	106
174	1	1	

North Service Rd W



Cars	Trucks	Heavys	Totals
124	2	2	128

Peds Cross: $\times$

West Peds: 0

West Entering: 0

West Leg Total: 1

Cars	1024	Cars	0	829	77	906
Trucks	32	Trucks	0	23	0	23
Heavys	103	Heavys	0	69	2	71
Totals	1159	Totals	0	921	79	

Peds Cross: $\times$

South Peds: 0

South Entering: 1000

South Leg Total: 2159

Comments

Bronte Rd @ North Service Rd W

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:45:00

To: 17:45:00

Municipality: Halton Region

Site #: 0000003338

Intersection: Bronte Rd & North Service Rd W

TFR File #: 15

Count date: 4-Dec-2019

Weather conditions:

Overcast/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Bronte Rd runs N/S

North Leg Total: 3525

North Entering: 1332

North Peds: 2

Peds Cross: $\nlessgtr$

Heavys	0	42	0	42
Trucks	0	11	0	11
Cars	2	1219	58	1279
Totals	2	1272	58	

Heavys 48

Trucks 5

Cars 2140

Totals 2193

East Leg Total: 365

East Entering: 233

East Peds: 2

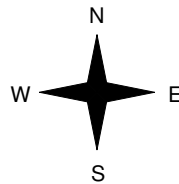
Peds Cross: $\nlessgtr$

Heavys	Trucks	Cars	Totals
0	0	2	2



Driveway

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



Bronte Rd

Cars	Trucks	Heavys	Totals
104	0	0	104
0	0	0	0
128	0	1	129
232	0	1	

North Service Rd W



Cars	Trucks	Heavys	Totals
132	0	0	132

Peds Cross: $\nlessgtr$

West Peds: 0

West Entering: 0

West Leg Total: 2

Cars	1347	Cars	0	2036	74	2110
Trucks	11	Trucks	0	5	0	5
Heavys	43	Heavys	0	48	0	48
Totals	1401	Totals	0	2089	74	

Peds Cross: $\nlessgtr$

South Peds: 0

South Entering: 2163

South Leg Total: 3564

Comments

Bronte Rd @ North Service Rd W

Total Count Diagram

Municipality: Halton Region

Site #: 0000003338

Intersection: Bronte Rd & North Service Rd W

TFR File #: 15

Count date: 4-Dec-2019

Weather conditions:

Overcast/Wet

Person(s) who counted:

Cam

**** Signalized Intersection ****

Major Road: Bronte Rd runs N/S

North Leg Total: 22334

North Entering: 11723

North Peds: 4

Peds Cross: $\times$

	Heavys	Trucks	Cars	Totals
North	0	576	2	578
East	0	182	6	188
South	4	10345	608	10957
Totals	4	11103	616	

	Heavys	Trucks	Cars	Totals
South	471	137	10003	10611
West	0	0	0	0
North	0	0	0	0
Totals	471	137	10003	

East Leg Total: 2777

East Entering: 1423

East Peds: 4

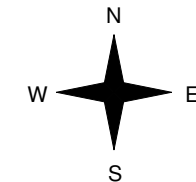
Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
0	0	4	4



Driveway

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



Bronte Rd



Cars	Trucks	Heavys	Totals
554	6	2	562
0	0	0	0
849	5	7	861
1403	11	9	

North Service Rd W



Cars	Trucks	Heavys	Totals
1334	9	11	1354

Peds Cross: $\times$

West Peds: 0

West Entering: 0

West Leg Total: 4

Cars	Trucks	Heavys	Totals
11194	187	583	11964

Cars	Trucks	Heavys	Totals
0	0	0	0
9449	131	469	10049
726	3	9	738
10175	134	478	

Peds Cross: $\times$

South Peds: 0

South Entering: 10787

South Leg Total: 22751

Comments

Bronte Rd @ Woodlands Entrance

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:45:00

To: 8:45:00

Municipality: Halton Region

Site #: 0000003340

Intersection: Bronte Rd & Woodlands Entrance

TFR File #: 16

Count date: 4-Dec-2019

Weather conditions:

Overcast/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Bronte Rd runs N/S

North Leg Total: 3723

North Entering: 2687

North Peds: 0

Peds Cross: $\nlessgtr$

Heavys	0	72	0	72
Trucks	0	29	0	29
Cars	0	2461	125	2586
Totals	0	2562	125	

Heavys	49
Trucks	15
Cars	972
Totals	1036

East Leg Total: 171

East Entering: 36

East Peds: 0

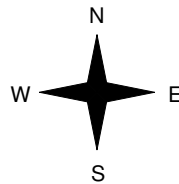
Peds Cross: $\nlessgtr$

Heavys	Trucks	Cars	Totals
0	0	0	0



Driveway

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



Bronte Rd



Cars	Trucks	Heavys	Totals
16	2	1	19
0	0	0	0
14	2	1	17
30	4	2	

Woodlands Entrance



Cars	Trucks	Heavys	Totals
134	1	0	135

Peds Cross: $\nlessgtr$

West Peds: 0

West Entering: 2

West Leg Total: 2

Cars	2476
Trucks	31
Heavys	73
Totals	2580



Cars	0	955	9	964
Trucks	0	13	1	14
Heavys	0	48	0	48
Totals	0	1016	10	

Peds Cross: $\nlessgtr$

South Peds: 0

South Entering: 1026

South Leg Total: 3606

Comments

Bronte Rd @ Woodlands Entrance

Mid-day Peak Diagram

Specified Period

From: 11:00:00

To: 14:00:00

One Hour Peak

From: 11:45:00

To: 12:45:00

Municipality: Halton Region

Site #: 0000003340

Intersection: Bronte Rd & Woodlands Entrance

TFR File #: 16

Count date: 4-Dec-2019

Weather conditions:

Overcast/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Bronte Rd runs N/S

North Leg Total: 2106

North Entering: 1137

North Peds: 0

Peds Cross: $\nlessgtr$

Heavys	0	101	0	101
Trucks	0	26	0	26
Cars	1	990	19	1010
Totals	1	1117	19	

Heavys 74

Trucks 27

Cars 868

Totals 969

East Leg Total: 73

East Entering: 44

East Peds: 8

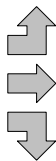
Peds Cross: $\nlessgtr$

Heavys	Trucks	Cars	Totals
0	0	2	2

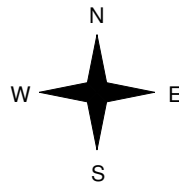


Driveway

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



Bronte Rd



Bronte Rd



Cars	Trucks	Heavys	Totals
25	0	0	25
0	0	0	0
16	2	1	19
41	2	1	

Woodlands Entrance



Cars	Trucks	Heavys	Totals
29	0	0	29

Peds Cross: $\nlessgtr$

West Peds: 1

West Entering: 1

West Leg Total: 3

Cars 1006

Trucks 28

Heavys 102

Totals 1136



Cars 1 842 10 853

Trucks 0 27 0 27

Heavys 0 74 0 74

Totals 1 943 10

Peds Cross: $\nlessgtr$

South Peds: 0

South Entering: 954

South Leg Total: 2090

Comments

Bronte Rd @ Woodlands Entrance

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:45:00

To: 17:45:00

Municipality: Halton Region

Site #: 0000003340

Intersection: Bronte Rd & Woodlands Entrance

TFR File #: 16

Count date: 4-Dec-2019

Weather conditions:

Overcast/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Bronte Rd runs N/S

North Leg Total: 3557

North Entering: 1305

North Peds: 0

Peds Cross: $\nless$

Heavys	0	44	0	44
Trucks	0	7	0	7
Cars	0	1235	19	1254
Totals	0	1286	19	

Heavys 52

Trucks 5

Cars 2195

Totals 2252

East Leg Total: 97

East Entering: 71

East Peds: 0

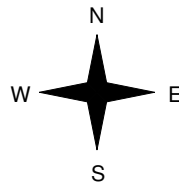
Peds Cross: $\nless$

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



Driveway

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



Bronte Rd

Cars	53	0	0	53
Trucks	0	0	0	0
Heavys	18	0	0	18
Totals	71	0	0	

Woodlands Entrance



Cars	25	1	0	26
Trucks	0	0	0	0
Heavys	0	0	0	0
Totals	25	1	0	26

Peds Cross: $\nless$

West Peds: 0

West Entering: 0

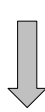
West Leg Total: 1

Cars 1253

Trucks 7

Heavys 44

Totals 1304



Cars	1	2142	6	2149
Trucks	0	5	1	6
Heavys	0	52	0	52
Totals	1	2199	7	

Peds Cross: $\nless$

South Peds: 0

South Entering: 2207

South Leg Total: 3511

Comments

Bronte Rd @ Woodlands Entrance

Total Count Diagram

Municipality: Halton Region
Site #: 0000003340
Intersection: Bronte Rd & Woodlands Entrance
TFR File #: 16
Count date: 4-Dec-2019

Weather conditions:
 Overcast/Wet
Person(s) who counted:
 Cam

**** Signalized Intersection ****

Major Road: Bronte Rd runs N/S

North Leg Total: 22341
 North Entering: 11704
 North Peds: 1
 Peds Cross: $\bowtie$

	Heavys	0	585	1	586
Trucks	0	179	0	179	
Cars	1	10637	301	10939	
Totals	1	11401	302		

	Heavys	472
Trucks	136	
Cars	10029	
Totals	10637	

East Leg Total: 769
 East Entering: 364
 East Peds: 21
 Peds Cross: $\bowtie$

Heavys	Trucks	Cars	Totals
0	0	7	7

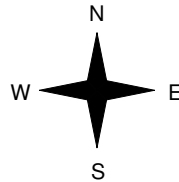


Driveway

Heavys	Trucks	Cars	Totals
0	0	3	3
0	0	0	0
0	0	2	2
0	0	5	



Bronte Rd



Bronte Rd



Cars	Trucks	Heavys	Totals
216	3	1	220
0	0	0	0
137	5	2	144
353	8	3	

Woodlands Entrance



Cars	Trucks	Heavys	Totals
396	7	2	405

Peds Cross: $\bowtie$
 West Peds: 2
 West Entering: 5
 West Leg Total: 12

	Cars	10776
Trucks	184	
Heavys	587	
Totals	11547	

	Cars	6	9810	95	9911
Trucks	0	133	7	140	
Heavys	0	471	1	472	
Totals	6	10414	103		

Peds Cross: $\bowtie$
 South Peds: 0
 South Entering: 10523
 South Leg Total: 22070

Comments

Appendix D

Traffic Control Signal Warrant

Saw Whet Boulevard @ Bronte Road
2031 Future Total

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	2572	286%	78%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	132	78%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	2440	271%	121%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	91	121%		

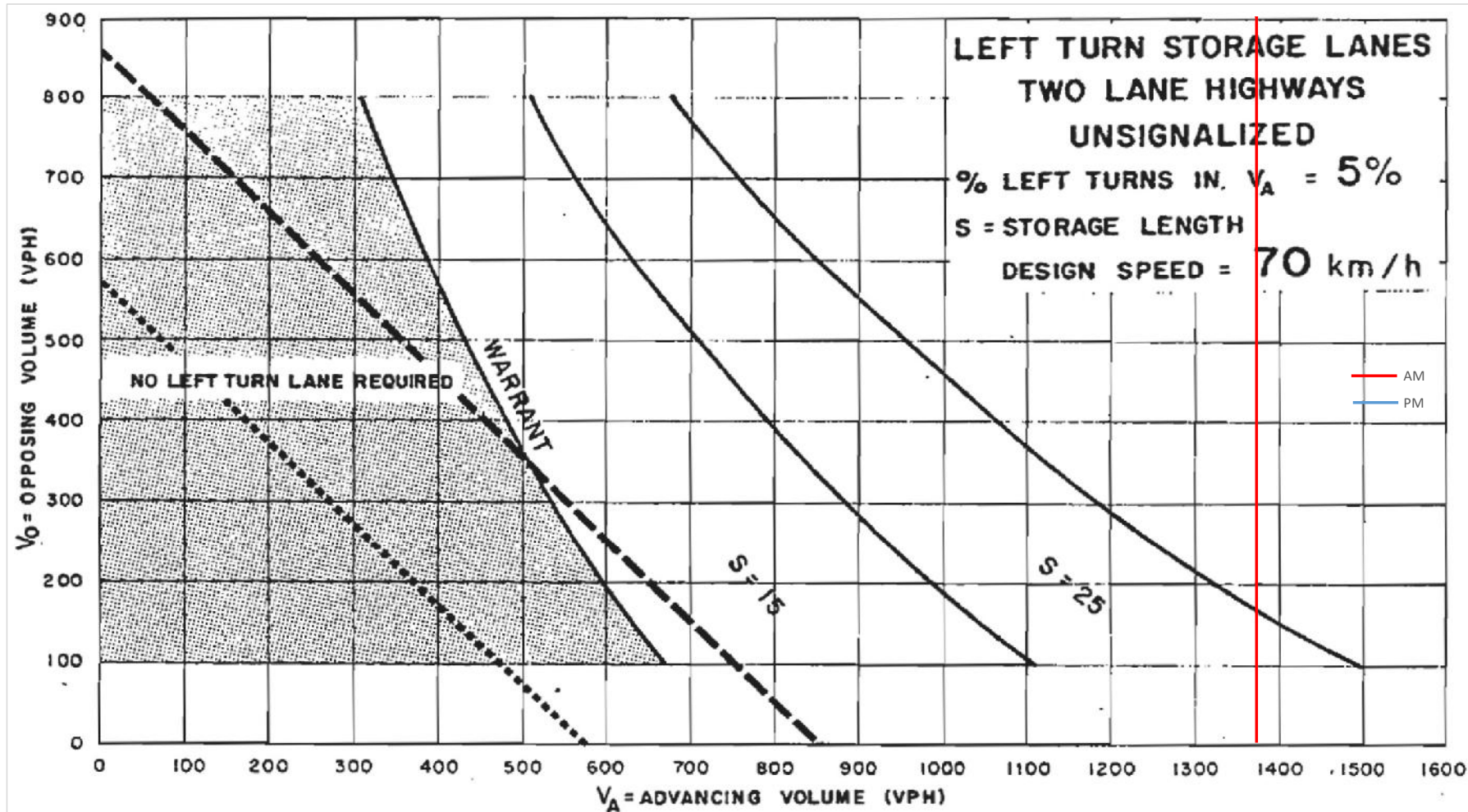
Notes

1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$, including amplification factors
4. T-intersection factor corrected, applies only to 1B

Appendix E

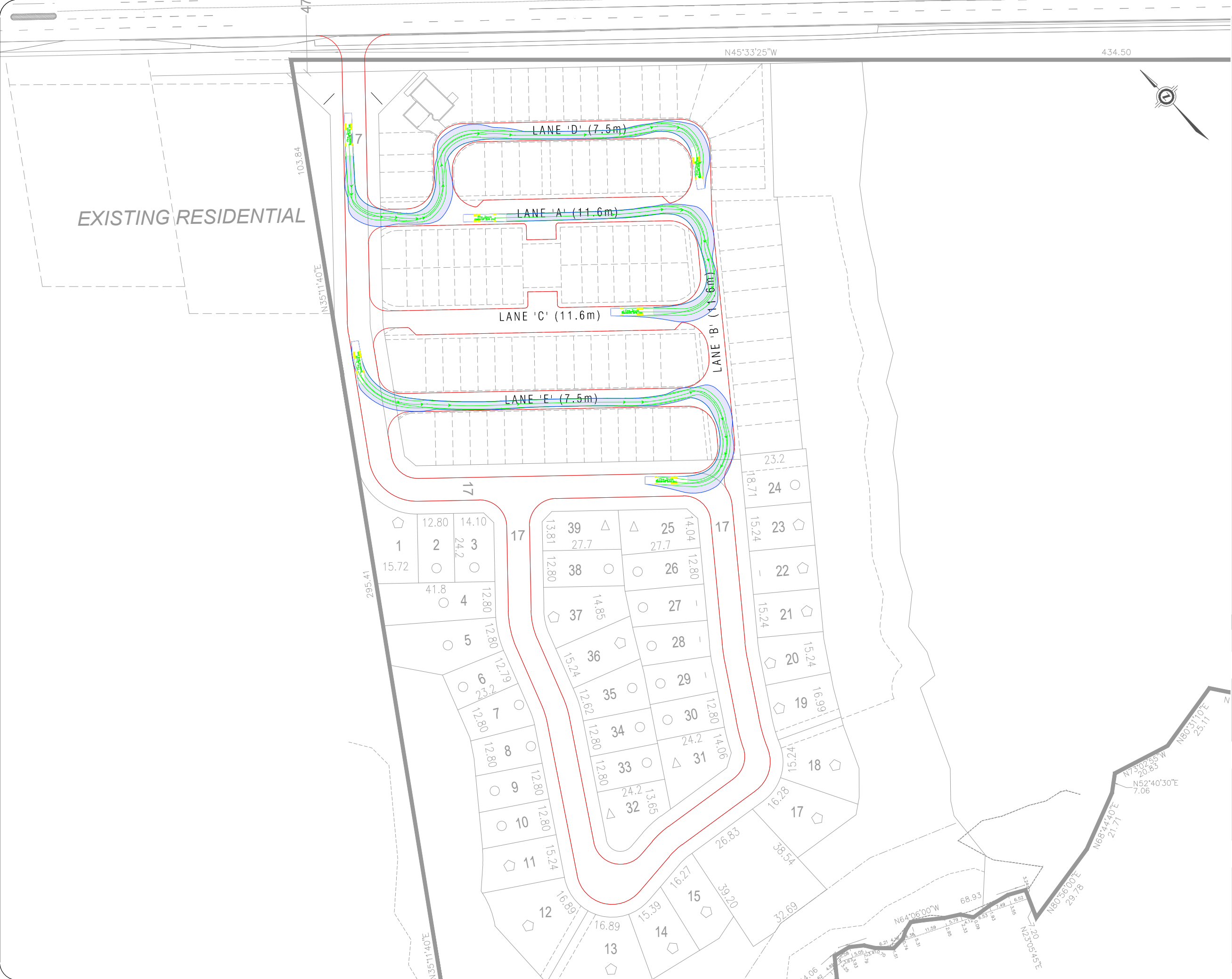
Left Turn Lane Warrant

Design Speed 70 km/h	Northbound Left							Yes							%Left Turn	Volume Advancing	Volume Opposing		
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR							
	AM	16	0	46	169	0	95	14	1311	52	30	3421	5	1.0%				1377	3456
	PM	10	0	29	104	0	59	47	2921	174	99	1670	17	1.5%				3142	1786

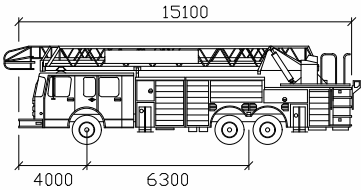


Appendix F

Turning Template Drawings



Notes:



Fire Truck

	mm
Width	: 2600
Track	: 2600
Lock to Lock Time	: 6.0
Steering Angle	: 32.6

02	Issued for Review	BB	2021-12-02
01	Issued for Review	BB	2021-08-24
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			



CGH Transportation

628 Haines Road
Newmarket, ON
L3Y 6V5
(905) 251-4070

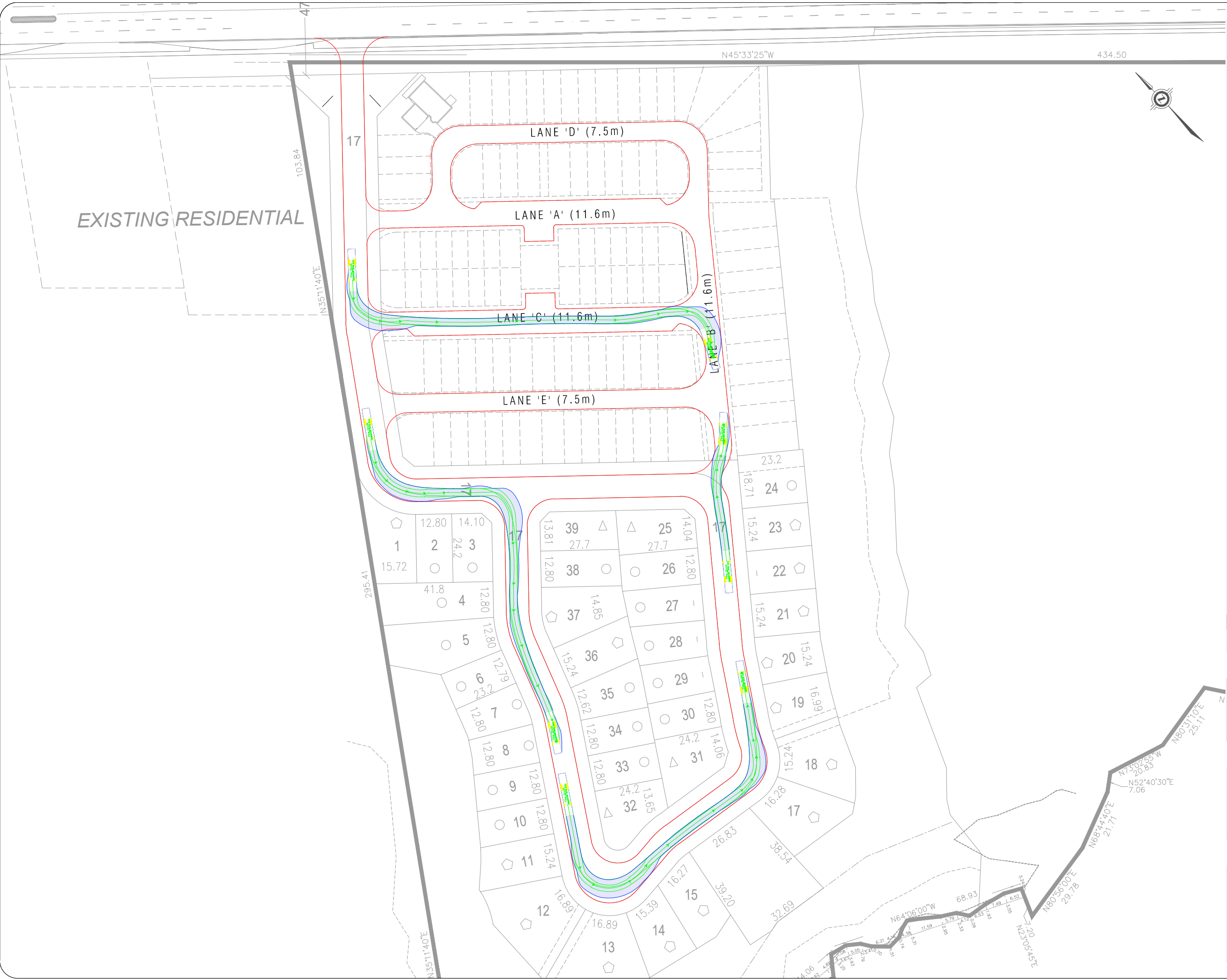
CLIENT: ARGO Development Group
4900 Palladium Way, Suite 105
Burlington, Ontario
Canada, L7M 0W7

ARCHITECT:

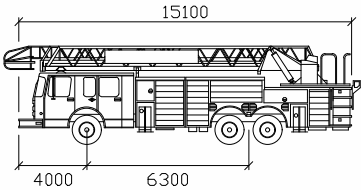
SITE:
1300 Bronte Road

TITLE: Turning Movement Analysis
Fire Turck Movements 1

SCALE AT A3: NTS	DATE: 2021-12-02	DRAWN: BB	CHECKED: MC
PROJECT NO: 2020-091	DRAWING NO: 001	REVISION: 02	



Notes:



Fire Truck

	mm
Width	: 2600
Track	: 2600
Lock to Lock Time	: 6.0
Steering Angle	: 32.6

02	Issued for Review	BB	2021-12-02
01	Issued for Review	BB	2021-08-24
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			



CGH Transportation
628 Haines Road
Newmarket, ON
L3Y 6V5
(905) 251-4070

CLIENT: ARGO Development Group
4900 Palladium Way, Suite 105
Burlington, Ontario
Canada, L7M 0W7

ARCHITECT:

SITE:
1300 Bronte Road

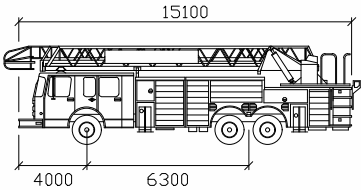
TITLE:
Turning Movement Analysis
Fire Truck Movements 2

SCALE AT A3: NTS	DATE: 2021-12-02	DRAWN: BB	CHECKED: MC
PROJECT NO: 2020-091	DRAWING NO: 002	REVISION:	02

EXISTING RESIDENTIAL



Notes:



Fire Truck

	mm
Width	: 2600
Track	: 2600
Lock to Lock Time	: 6.0
Steering Angle	: 32.6

02	Issued for Review	BB	2021-12-02
01	Issued for Review	BB	2021-08-24
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			



CGH Transportation

628 Haines Road
Newmarket, ON
L3Y 6V5
(905) 251-4070

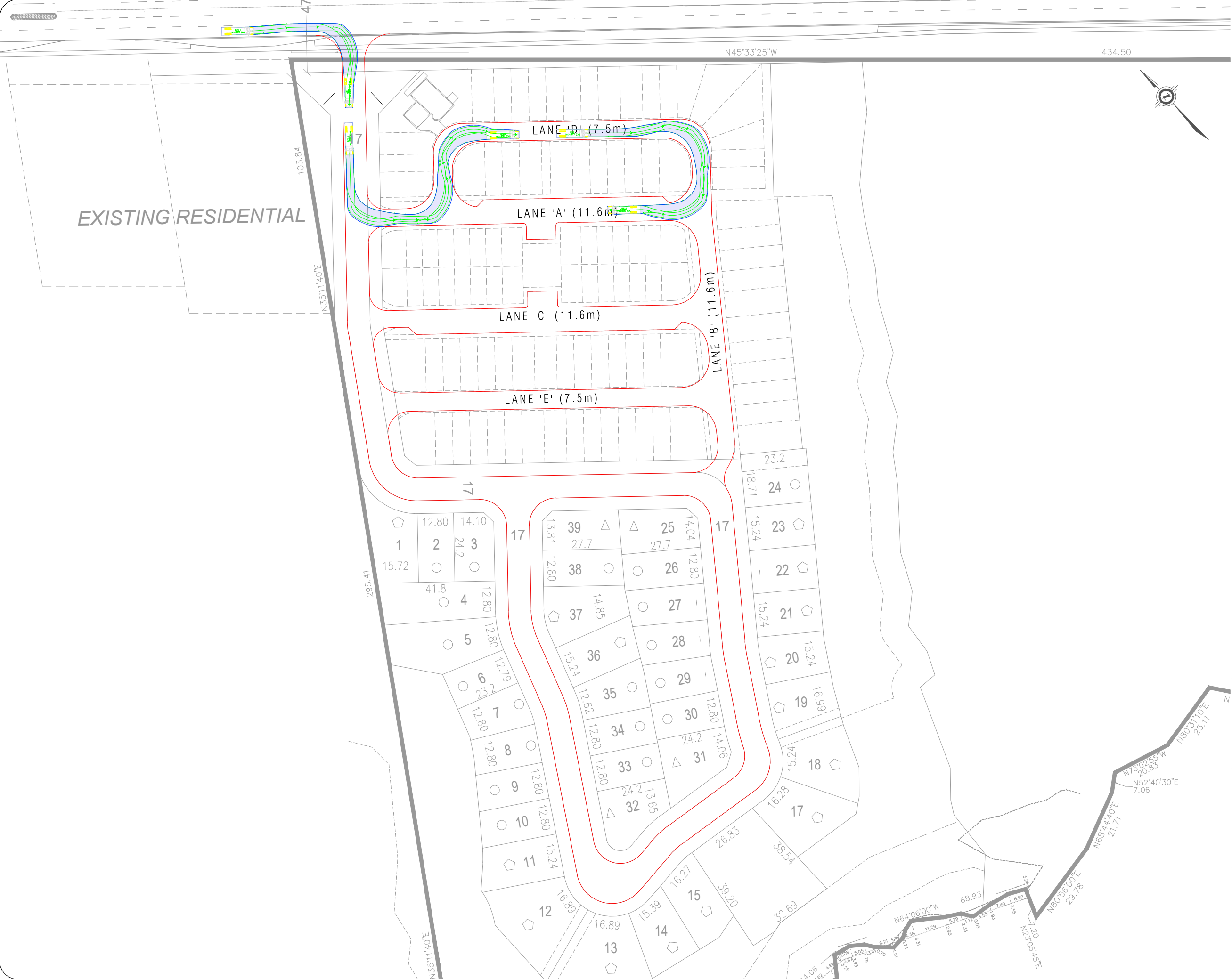
CLIENT: ARGO Development Group
4900 Palladium Way, Suite 105
Burlington, Ontario
Canada, L7M 0W7

ARCHITECT:

SITE:
1300 Bronte Road

TITLE: Turning Movement Analysis
Fire Truck Movements 3

SCALE AT A3: NTS	DATE: 2021-12-02	DRAWN: BB	CHECKED: MC
PROJECT NO: 2020-091	DRAWING NO: 003	REVISION: 02	



Notes:

11500

800 8400

HSU

mm

Width : 2600

Track : 2600

Lock to Lock Time : 6.0

Steering Angle : 40.0

02	Issued for Review	BB	2021-12-02
01	Issued for Review	BB	2021-08-24
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			



CGH Transportation

628 Haines Road
Newmarket, ON
L3Y 6V5
(905) 251-4070

CLIENT:

ARGO Development Group

4900 Palladium Way, Suite 105
Burlington, Ontario
Canada, L7M 0W7

ARCHITECT:

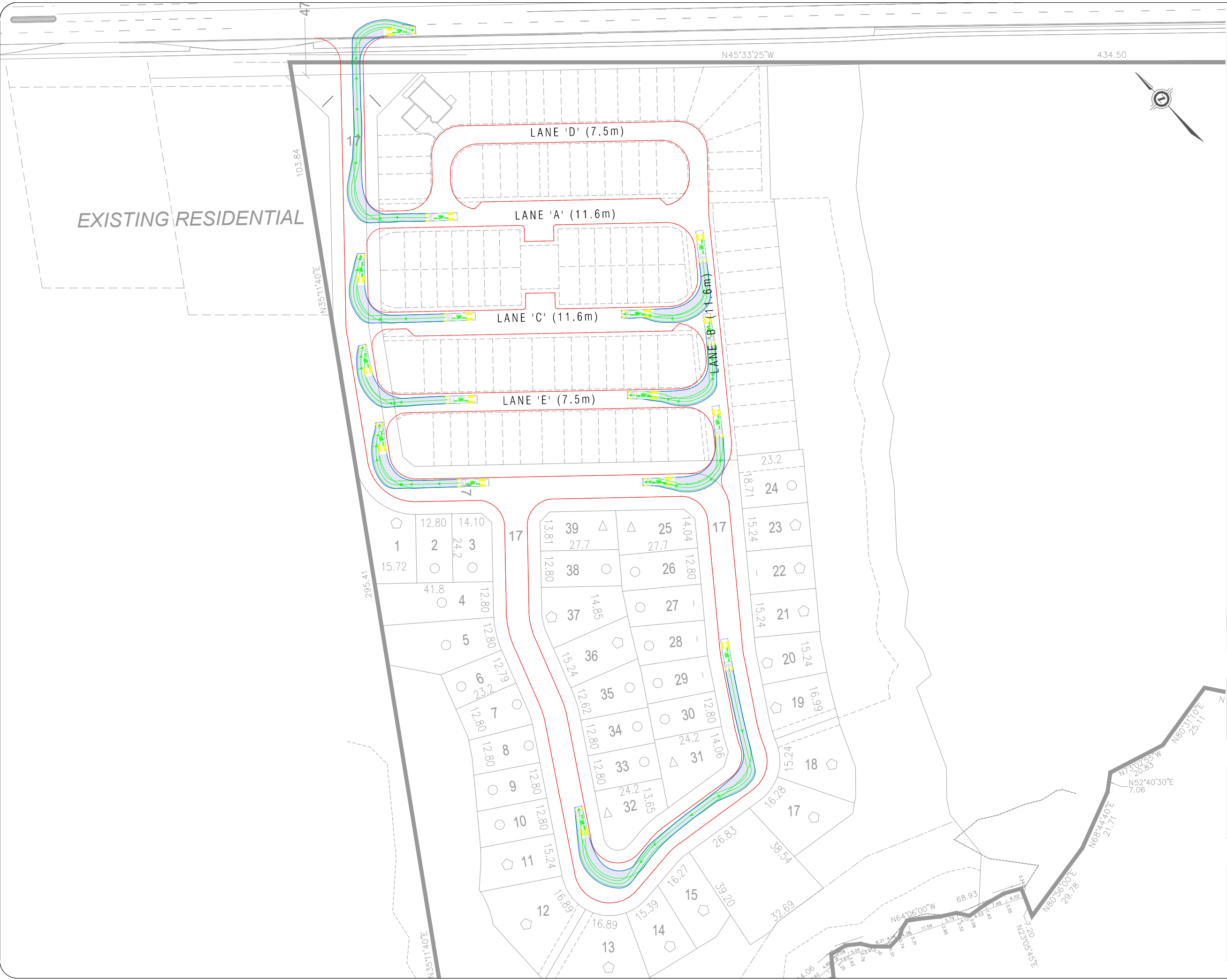
SITE:

1300 Bronte Road

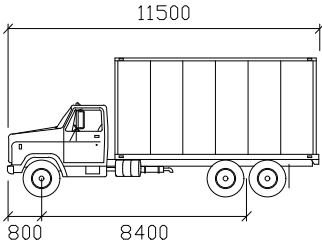
TITLE:

Turning Movement Analysis
HSU Movements 1

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2021-12-02	BB	MC
PROJECT NO:	DRAWING NO:	REVISION:	
2020-091	004	02	



Notes:



HSU

	mm
Width	: 2600
Track	: 2600
Lock to Lock Time	: 6.0
Steering Angle	: 40.0

02	Issued for Review	BB	2021-12-02
01	Issued for Review	BB	2021-08-24
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			



CGH Transportation

628 Haines Road
Newmarket, ON
L3Y 6V5
(905) 251-4070

CLIENT: ARGO Development Group
4900 Palladium Way, Suite 105
Burlington, Ontario
Canada, L7M 0W7

ARCHITECT:

SITE:
1300 Bronte Road

TITLE: Turning Movement Analysis
HSU Movements 3

SCALE AT A3: NTS	DATE: 2021-12-02	DRAWN: BB	CHECKED: MC
PROJECT NO: 2020-091	DRAWING NO: 006	REVISION: 02	

Appendix G

Heavy Vehicle % Calculations

AM/PM Intersection

1 Upper Middle Road/Bronte Road

its after output

its after output

	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM	3	61	12	10	5	8	3	107	2	1	2	0
PM	2	36	4	6	1	3	1	39	1	0	1	1
SAT												
	5%(2%)	8%(2%)	7%(2%)	2%(3%)	6%(2%)	4%(2%)	2%(2%)	6%(4%)	18%(7%)	9%(2%)	2%(2%)	2%(2%)

2 Saw Whet Boulevard Road/Bronte Road

	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM												
PM												
SAT												
	2%(2%)	2%(2%)	2%(2%)	2%(2%)	2%(2%)	2%(2%)	2%(2%)	2%(2%)	2%(2%)	2%(2%)	2%(2%)	2%(2%)

3 Charles Cornwall Road/Bronte Road

	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM	0	61	1	3	0	3	0	101	0	0	0	0
PM	0	57	1	0	0	0	0	51	0	0	0	0
SAT												
	2%(2%)	6%(3%)	10%(14%)	18%(2%)	2%(2%)	16%(2%)	2%(2%)	4%(4%)	2%(2%)	2%(2%)	2%(2%)	2%(2%)

4 North Service Road/Bronte Road

	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM	0	55	1	0	0	0	1	102	0	0	0	0
PM	0	53	0	1	0	0	0	53	0	0	0	0
SAT												
	2%(2%)	5%(3%)	2%(2%)	2%(2%)	2%(2%)	2%(2%)	2%(2%)	4%(4%)	2%(2%)	2%(2%)	2%(2%)	2%(2%)

5 QEW WB Off Ramp

	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM	0	44	0	10	0	8	0	41	0	0	0	0
PM	0	50	0	4	0	2	0	21	0	0	0	0
SAT												
	2%(2%)	4%(3%)	2%(2%)	5%(2%)	2%(2%)	3%(2%)	2%(2%)	3%(3%)	2%(2%)	2%(2%)	2%(2%)	2%(2%)

6 QEW EB Ramps

	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM	0	52	3	12	0	26	4	45	0	0	0	0
PM	0	28	4	5	0	34	0	20	0	0	0	0
SAT												
	2%(2%)	7%(2%)	2%(2%)	3%(2%)	2%(2%)	5%(4%)	2%(2%)	4%(2%)	2%(2%)	2%(2%)	2%(2%)	2%(2%)

Appendix H

2021 Existing Conditions Synchro Worksheets

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2021 Existing AM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	203	388	504	88	196	59	798	177	234	1897	11
Future Volume (vph)	11	203	388	504	88	196	59	798	177	234	1897	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	140.0		0.0	135.0		80.0	180.0		50.0
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (m)	65.0			100.0			70.0			70.0		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99		0.98			0.97			0.96	1.00		0.97
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1656	1863	1583	3433	1792	1553	1719	3343	1485	1770	3406	1336
Flt Permitted	0.698			0.277			0.056			0.255		
Satd. Flow (perm)	1200	1863	1550	1001	1792	1502	101	3343	1427	473	3406	1289
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			152			202			182			122
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		296.6			291.2			1189.9			120.4	
Travel Time (s)		17.8			17.5			71.4			7.2	
Confl. Peds. (#/hr)	11					11	5		7	7		5
Confl. Bikes (#/hr)			5			5			5			5
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 (%)	9%	2%	2%	2%	6%	4%	5%	8%	7%	2%	6%	18%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Adj. Flow (vph)	11	209	400	520	91	202	61	823	182	241	1956	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	209	400	520	91	202	61	823	182	241	1956	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)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.00	1.00	1.03
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2021 Existing AM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0	10.0	6.0	20.0	20.0	6.0	20.0	20.0
Minimum Split (s)	10.5	36.7	36.7	10.5	36.7	36.7	10.5	36.5	36.5	10.5	36.5	36.5
Total Split (s)	11.2	23.8	23.8	19.6	32.2	32.2	11.2	79.8	79.8	16.8	85.4	85.4
Total Split (%)	8.0%	17.0%	17.0%	14.0%	23.0%	23.0%	8.0%	57.0%	57.0%	12.0%	61.0%	61.0%
Maximum Green (s)	7.2	17.1	17.1	15.6	25.5	25.5	7.2	73.3	73.3	12.8	78.9	78.9
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	2.8	2.8	1.0	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	0.0	0.0
Total Lost Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
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	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)					7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)					23.0	23.0		23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)					11	11		7	7		5	5
Act Effct Green (s)	26.2	17.1	17.1	39.4	32.3	32.3	83.6	74.2	74.2	92.6	81.3	81.3
Actuated g/C Ratio	0.19	0.12	0.12	0.28	0.23	0.23	0.60	0.53	0.53	0.66	0.58	0.58
v/c Ratio	0.04	0.92	1.24	0.94	0.22	0.40	0.44	0.46	0.22	0.57	0.99	0.01
Control Delay	37.6	102.6	162.9	70.4	47.3	8.8	27.9	18.2	7.8	14.9	47.4	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.6	102.6	162.9	70.4	47.3	8.8	27.9	18.2	7.8	14.9	47.4	0.0
LOS	D	F	F	E	D	A	C	B	A	B	D	A
Approach Delay		140.3			52.5			17.0			43.6	
Approach LOS		F			D			B			D	
Queue Length 50th (m)	2.3	61.1	~103.5	66.4	20.8	0.0	6.5	47.5	7.9	25.7	~317.0	0.0
Queue Length 95th (m)	7.5	#110.8	#170.9	#85.9	40.6	22.7	24.7	91.4	34.9	37.7	#360.6	0.0
Internal Link Dist (m)		272.6			267.2			1165.9			96.4	
Turn Bay Length (m)	70.0		70.0	140.0			135.0		80.0	180.0		50.0
Base Capacity (vph)	254	227	322	552	413	501	144	1772	841	431	1977	799
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.92	1.24	0.94	0.22	0.40	0.42	0.46	0.22	0.56	0.99	0.01

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 82.6 (59%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

1: Bronte Road & Upper Middle Road

2021 Existing AM Peak Hour
1300 Bronte Enns

Maximum v/c Ratio: 1.24

Intersection Signal Delay: 51.8

Intersection LOS: D

Intersection Capacity Utilization 105.2%

ICU Level of Service G

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Bronte Road & Upper Middle Road

 Ø1	 Ø2 (R)	 Ø3	 Ø4
16.8 s	79.8 s	19.6 s	23.8 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
11.2 s	85.4 s	11.2 s	32.2 s

HCM Signalized Intersection Capacity Analysis

1: Bronte Road & Upper Middle Road

2021 Existing AM Peak Hour

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	203	388	504	88	196	59	798	177	234	1897	11
Future Volume (vph)	11	203	388	504	88	196	59	798	177	234	1897	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00	0.97
Flpb, ped/bikes	0.99	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	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	1863	1552	3433	1792	1504	1719	3343	1426	1768	3406	1289
Flt Permitted	0.70	1.00	1.00	0.28	1.00	1.00	0.06	1.00	1.00	0.26	1.00	1.00
Satd. Flow (perm)	1205	1863	1552	1000	1792	1504	101	3343	1426	475	3406	1289
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)	11	209	400	520	91	202	61	823	182	241	1956	11
RTOR Reduction (vph)	0	0	131	0	0	155	0	0	89	0	0	5
Lane Group Flow (vph)	11	209	269	520	91	47	61	823	93	241	1956	6
Confl. Peds. (#/hr)	11						11	5		7	7	5
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	9%	2%	2%	2%	6%	4%	5%	8%	7%	2%	6%	18%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	22.3	19.5	19.5	39.1	32.3	32.3	77.4	71.8	71.8	87.7	78.1	78.1
Effective Green, g (s)	22.3	19.5	19.5	39.1	32.3	32.3	77.4	71.8	71.8	87.7	78.1	78.1
Actuated g/C Ratio	0.16	0.14	0.14	0.28	0.23	0.23	0.55	0.51	0.51	0.63	0.56	0.56
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	200	259	216	550	413	346	120	1714	731	407	1900	719
v/s Ratio Prot	0.00	0.11		c0.11	0.05		0.02	0.25		c0.05	c0.57	
v/s Ratio Perm	0.01		c0.17	0.16		0.03	0.26		0.07	0.32		0.00
v/c Ratio	0.06	0.81	1.25	0.95	0.22	0.13	0.51	0.48	0.13	0.59	1.03	0.01
Uniform Delay, d1	49.8	58.4	60.2	45.4	43.6	42.8	31.5	22.0	17.8	13.4	31.0	13.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.32	0.83	3.17	1.00	1.00	1.00
Incremental Delay, d2	0.1	16.6	143.4	25.3	0.3	0.2	3.2	0.9	0.3	2.3	28.6	0.0
Delay (s)	49.9	75.0	203.6	70.6	43.9	42.9	44.7	19.3	56.7	15.7	59.6	13.8
Level of Service	D	E	F	E	D	D	D	B	E	B	E	B
Approach Delay (s)		157.5			60.8			27.1			54.5	
Approach LOS		F			E			C			D	
Intersection Summary												
HCM 2000 Control Delay			63.0									
HCM 2000 Volume to Capacity ratio			1.04									
Actuated Cycle Length (s)			140.0									
Intersection Capacity Utilization			105.2%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2021 Existing AM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	17	0	19	0	1057	10	125	2666	0
Future Volume (vph)	1	0	1	17	0	19	0	1057	10	125	2666	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		40.0	35.0		30.0	70.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			20.0			60.0		
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
Ped Bike Factor		0.99				0.98			0.98			
Frt		0.932				0.850			0.850			
Flt Protected		0.976		0.950						0.950		
Satd. Flow (prot)	0	1680	0	1530	0	1392	1863	3406	1439	1770	3471	0
Flt Permitted		0.976		0.757						0.235		
Satd. Flow (perm)	0	1680	0	1219	0	1369	1863	3406	1406	438	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		54				54			56			
Link Speed (k/h)		20			20			60			60	
Link Distance (m)		78.7			109.0			435.9			1189.9	
Travel Time (s)		14.2			19.6			26.2			71.4	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	18%	2%	16%	2%	6%	10%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Adj. Flow (vph)	1	0	1	18	0	20	0	1090	10	129	2748	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2	0	18	0	20	0	1090	10	129	2748	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.03	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1		1	1	2	1	1	2	
Detector Template	Left	Thru		Left		Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0		2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0		2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4						9.4			9.4	
Detector 2 Size(m)		0.6						0.6			0.6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2021 Existing AM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA		Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8		8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0		10.0	15.0	15.0	15.0	5.0	15.0	
Minimum Split (s)	24.2	24.2		35.2		35.2	34.9	34.9	34.9	9.5	34.9	
Total Split (s)	40.6	40.6		40.6		40.6	88.2	88.2	88.2	11.2	99.4	
Total Split (%)	29.0%	29.0%		29.0%		29.0%	63.0%	63.0%	63.0%	8.0%	71.0%	
Maximum Green (s)	34.4	34.4		34.4		34.4	82.3	82.3	82.3	7.2	93.5	
Yellow Time (s)	3.1	3.1		3.1		3.1	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.1	3.1		3.1		3.1	2.2	2.2	2.2	1.0	2.2	
Lost Time Adjust (s)		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.2		6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.6	3.6	3.6	3.0	3.6	
Recall Mode	None	None		None		None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0		7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				22.0		22.0	22.0	22.0	22.0		22.0	
Pedestrian Calls (#/hr)				0		0	0	0	0		0	
Act Effect Green (s)		10.1		10.1		10.1		113.5	113.5	126.2	126.6	
Actuated g/C Ratio		0.07		0.07		0.07		0.81	0.81	0.90	0.90	
v/c Ratio		0.01		0.20		0.14		0.39	0.01	0.28	0.88	
Control Delay		0.0		66.9		1.9		9.0	1.6	1.6	7.5	
Queue Delay		0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay		0.0		66.9		1.9		9.0	1.6	1.6	7.5	
LOS		A		E		A		A	A	A	A	
Approach Delay					32.7			9.0			7.2	
Approach LOS					C			A			A	
Queue Length 50th (m)		0.0		5.1		0.0		50.1	0.0	5.2	192.8	
Queue Length 95th (m)		0.0		13.7		0.0		116.2	m0.2	m5.2	m188.6	
Internal Link Dist (m)		54.7			85.0			411.9			1165.9	
Turn Bay Length (m)						40.0			30.0	70.0		
Base Capacity (vph)		453		299		377		2761	1150	465	3139	
Starvation Cap Reductn		0		0		0		0	0	0	0	
Spillback Cap Reductn		0		0		0		0	0	0	0	
Storage Cap Reductn		0		0		0		0	0	0	0	
Reduced v/c Ratio		0.00		0.06		0.05		0.39	0.01	0.28	0.88	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 128.8 (92%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Lanes, Volumes, Timings 3: Bronte Road & Driveway/Charles Cornwall Road

2021 Existing AM Peak Hour
1300 Bronte Enns

Intersection Signal Delay: 7.9 Intersection LOS: A
Intersection Capacity Utilization 109.5% ICU Level of Service H
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Bronte Road & Driveway/Charles Cornwall Road

 Ø1	 Ø2 (R)	 Ø4
11.2 s	88.2 s	40.6 s
 Ø6 (R)		 Ø8
99.4 s		40.6 s

HCM Signalized Intersection Capacity Analysis

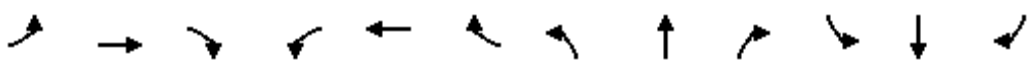
3: Bronte Road & Driveway/Charles Cornwall Road

2021 Existing AM Peak Hour
1300 Bronte Enns

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔		↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	1	0	1	17	0	19	0	1057	10	125	2666	0
Future Volume (vph)	1	0	1	17	0	19	0	1057	10	125	2666	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.2		6.2		6.2		5.9	5.9	4.0	5.9	
Lane Util. Factor		1.00		1.00		1.00		0.95	1.00	1.00	0.95	
Frpb, ped/bikes		0.98		1.00		0.96		1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Frt		0.93		1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected		0.98		0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1663		1530		1340		3406	1407	1770	3471	
Flt Permitted		0.98		0.76		1.00		1.00	1.00	0.24	1.00	
Satd. Flow (perm)		1663		1218		1340		3406	1407	439	3471	
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)	1	0	1	18	0	20	0	1090	10	129	2748	0
RTOR Reduction (vph)	0	2	0	0	0	19	0	0	2	0	0	0
Lane Group Flow (vph)	0	0	0	18	0	1	0	1090	8	129	2748	0
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	18%	2%	16%	2%	6%	10%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Turn Type	Perm	NA		Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		6.1		6.1		6.1		111.0	111.0	121.8	121.8	
Effective Green, g (s)		6.1		6.1		6.1		111.0	111.0	121.8	121.8	
Actuated g/C Ratio		0.04		0.04		0.04		0.79	0.79	0.87	0.87	
Clearance Time (s)		6.2		6.2		6.2		5.9	5.9	4.0	5.9	
Vehicle Extension (s)		3.0		3.0		3.0		3.6	3.6	3.0	3.6	
Lane Grp Cap (vph)		72		53		58		2700	1115	446	3019	
v/s Ratio Prot								0.32		0.01	c0.79	
v/s Ratio Perm		0.00		c0.01		0.00			0.01	0.24		
v/c Ratio		0.00		0.34		0.02		0.40	0.01	0.29	0.91	
Uniform Delay, d1		64.0		65.0		64.1		4.4	3.0	1.9	5.7	
Progression Factor		1.00		1.00		1.00		1.89	1.00	1.14	1.01	
Incremental Delay, d2		0.0		3.8		0.1		0.4	0.0	0.0	0.5	
Delay (s)		64.0		68.8		64.2		8.8	3.0	2.2	6.3	
Level of Service		E		E		E		A	A	A	A	
Approach Delay (s)		64.0			66.4			8.7			6.1	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.4									
HCM 2000 Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			140.0							16.1		
Intersection Capacity Utilization			109.5%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Bronte Road & Driveway/North Service Road West

2021 Existing AM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	0	0	0	17	0	26	0	1084	241	226	2525	1
Future Volume (vph)	0	0	0	17	0	26	0	1084	241	226	2525	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	45.0		0.0	35.0		70.0	115.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			50.0			65.0			65.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor						0.98			0.98		1.00	
Frt						0.850			0.850			
Flt Protected				0.950	0.950					0.950		
Satd. Flow (prot)	0	1863	0	1681	1681	1583	1863	3438	1583	1770	3471	0
Flt Permitted				0.950	0.950					0.214		
Satd. Flow (perm)	0	1863	0	1681	1681	1555	1863	3438	1546	399	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						112			213			
Link Speed (k/h)		20			50			60			60	
Link Distance (m)		52.6			84.3			299.0			435.9	
Travel Time (s)		9.5			6.1			17.9			26.2	
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	4%	2%
Adj. Flow (vph)	0	0	0	17	0	27	0	1106	246	231	2577	1
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	8	9	27	0	1106	246	231	2578	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
4: Bronte Road & Driveway/North Service Road West

2021 Existing AM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		8			4			2		1	6	
Permitted Phases	8			4		4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	15.0	15.0	15.0	6.0	15.0	
Minimum Split (s)	24.7	24.7		36.9	36.9	36.9	41.7	41.7	41.7	10.5	24.7	
Total Split (s)	13.0	13.0		39.0	39.0	39.0	77.0	77.0	77.0	11.0	88.0	
Total Split (%)	9.3%	9.3%		27.9%	27.9%	27.9%	55.0%	55.0%	55.0%	7.9%	62.9%	
Maximum Green (s)	6.3	6.3		33.1	33.1	33.1	70.3	70.3	70.3	7.0	81.3	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		2.2	2.2	2.2	3.0	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)		6.7		5.9	5.9	5.9	6.7	6.7	6.7	4.0	6.7	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		0.0	
Flash Dont Walk (s)				24.0	24.0	24.0	28.0	28.0	28.0		0.0	
Pedestrian Calls (#/hr)				1	1	1	0	0	0		0	
Act Effect Green (s)				16.5	16.5	16.5		100.2	100.2	120.0	119.9	
Actuated g/C Ratio				0.12	0.12	0.12		0.72	0.72	0.86	0.86	
v/c Ratio				0.04	0.05	0.10		0.45	0.21	0.49	0.87	
Control Delay				49.1	49.3	0.7		10.3	3.4	2.7	7.5	
Queue Delay				0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay				49.1	49.3	0.7		10.3	3.4	2.7	7.5	
LOS				D	D	A		B	A	A	A	
Approach Delay					19.4			9.1			7.1	
Approach LOS					B			A			A	
Queue Length 50th (m)				2.3	2.5	0.0		41.5	1.0	0.2	1.3	
Queue Length 95th (m)				7.1	7.5	0.0		162.2	19.0	m13.1	#478.9	
Internal Link Dist (m)		28.6			60.3			275.0			411.9	
Turn Bay Length (m)				45.0					70.0	115.0		
Base Capacity (vph)				397	397	453		2460	1166	469	2973	
Starvation Cap Reductn				0	0	0		0	0	0	0	
Spillback Cap Reductn				0	0	0		0	0	0	0	
Storage Cap Reductn				0	0	0		0	0	0	0	
Reduced v/c Ratio				0.02	0.02	0.06		0.45	0.21	0.49	0.87	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 27 (19%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 7.9

Intersection LOS: A

Intersection Capacity Utilization 107.3%

ICU Level of Service G

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 4: Bronte Road & Driveway/North Service Road West



HCM Signalized Intersection Capacity Analysis

4: Bronte Road & Driveway/North Service Road West

2021 Existing AM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	17	0	26	0	1084	241	226	2525	1
Future Volume (vph)	0	0	0	17	0	26	0	1084	241	226	2525	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Lane Util. Factor				0.95	0.95	1.00		0.95	1.00	1.00	0.95	
Frpb, ped/bikes				1.00	1.00	0.97		1.00	0.98	1.00	1.00	
Flpb, ped/bikes				1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt				1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected				0.95	0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1681	1681	1543		3438	1547	1770	3471	
Flt Permitted				0.95	0.95	1.00		1.00	1.00	0.21	1.00	
Satd. Flow (perm)				1681	1681	1543		3438	1547	398	3471	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	17	0	27	0	1106	246	231	2577	1
RTOR Reduction (vph)	0	0	0	0	0	25	0	0	64	0	0	0
Lane Group Flow (vph)	0	0	0	8	9	2	0	1106	182	231	2578	0
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	4%	2%
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		8			4			2		1	6	
Permitted Phases	8			4		4	2		2	6		
Actuated Green, G (s)				12.5	12.5	12.5		97.8	97.8	114.9	114.9	
Effective Green, g (s)				12.5	12.5	12.5		97.8	97.8	114.9	114.9	
Actuated g/C Ratio				0.09	0.09	0.09		0.70	0.70	0.82	0.82	
Clearance Time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Vehicle Extension (s)				5.0	5.0	5.0		5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)				150	150	137		2401	1080	455	2848	
v/s Ratio Prot								0.32		0.05	c0.74	
v/s Ratio Perm				0.00	0.01	0.00			0.12	0.37		
v/c Ratio				0.05	0.06	0.02		0.46	0.17	0.51	0.91	
Uniform Delay, d1				58.3	58.4	58.1		9.4	7.2	4.7	8.8	
Progression Factor				1.00	1.00	1.00		0.86	1.18	0.26	0.35	
Incremental Delay, d2				0.3	0.4	0.1		0.5	0.3	0.4	2.8	
Delay (s)				58.6	58.7	58.3		8.6	8.8	1.7	5.8	
Level of Service				E	E	E		A	A	A	A	
Approach Delay (s)		0.0			58.4			8.6			5.5	
Approach LOS		A			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.0		HCM 2000 Level of Service					A		
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			140.0		Sum of lost time (s)					23.3		
Intersection Capacity Utilization			107.3%		ICU Level of Service					G		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2021 Existing AM Peak Hour

1300 Bronte Enns

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	193	241	1084	0	0	1560
Future Volume (vph)	193	241	1084	0	0	1560
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	90.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	1.00	0.95	1.00	1.00	0.95
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3335	1568	3471	0	0	3505
Flt Permitted	0.950					
Satd. Flow (perm)	3335	1568	3471	0	0	3505
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		40				
Link Speed (k/h)	60		60			60
Link Distance (m)	65.9		376.8			299.0
Travel Time (s)	4.0		22.6			17.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	3%	4%	2%	2%	3%
Adj. Flow (vph)	210	262	1178	0	0	1696
Shared Lane Traffic (%)						
Lane Group Flow (vph)	210	262	1178	0	0	1696
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2021 Existing AM Peak Hour
1300 Bronte Enns

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8					
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.7	24.7	36.5			26.5
Total Split (s)	30.0	30.0	40.0			40.0
Total Split (%)	42.9%	42.9%	57.1%			57.1%
Maximum Green (s)	23.3	23.3	33.5			33.5
Yellow Time (s)	3.7	3.7	3.7			3.7
All-Red Time (s)	3.0	3.0	2.8			2.8
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	6.7	6.7	6.5			6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	C-Max			C-Max
Act Effct Green (s)	15.6	15.6	41.2			41.2
Actuated g/C Ratio	0.22	0.22	0.59			0.59
v/c Ratio	0.28	0.69	0.58			0.82
Control Delay	22.3	29.9	19.7			16.8
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	22.3	29.9	19.7			16.8
LOS	C	C	B			B
Approach Delay	26.5		19.7			16.8
Approach LOS	C		B			B
Queue Length 50th (m)	12.4	28.1	118.8			114.1
Queue Length 95th (m)	18.4	45.8	159.3			#225.4
Internal Link Dist (m)	41.9		352.8			275.0
Turn Bay Length (m)		90.0				
Base Capacity (vph)	1110	548	2040			2060
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.19	0.48	0.58			0.82
Intersection Summary						
Area Type:	Other					
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 14 (20%), Referenced to phase 2:NBT and 6:SBT, Start of Green						
Natural Cycle: 65						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.82						
Intersection Signal Delay: 19.2			Intersection LOS: B			
Intersection Capacity Utilization 62.5%			ICU Level of Service B			
Analysis Period (min) 15						
# 95th percentile volume exceeds capacity, queue may be longer.						
Queue shown is maximum after two cycles.						

Splits and Phases: 5: Bronte Road & QEW WB Off Ramp



HCM Signalized Intersection Capacity Analysis

5: Bronte Road & QEW WB Off Ramp

2021 Existing AM Peak Hour
1300 Bronte Enns

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	193	241	1084	0	0	1560
Future Volume (vph)	193	241	1084	0	0	1560
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7	6.5			6.5
Lane Util. Factor	0.97	1.00	0.95			0.95
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3335	1568	3471			3505
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3335	1568	3471			3505
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	210	262	1178	0	0	1696
RTOR Reduction (vph)	0	31	0	0	0	0
Lane Group Flow (vph)	210	231	1178	0	0	1696
Heavy Vehicles (%)	5%	3%	4%	2%	2%	3%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	15.6	15.6	41.2			41.2
Effective Green, g (s)	15.6	15.6	41.2			41.2
Actuated g/C Ratio	0.22	0.22	0.59			0.59
Clearance Time (s)	6.7	6.7	6.5			6.5
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	743	349	2042			2062
v/s Ratio Prot	0.06		0.34			c0.48
v/s Ratio Perm		c0.15				
v/c Ratio	0.28	0.66	0.58			0.82
Uniform Delay, d1	22.6	24.8	9.0			11.5
Progression Factor	1.00	1.00	1.92			1.15
Incremental Delay, d2	0.2	4.7	0.9			1.9
Delay (s)	22.8	29.5	18.1			15.1
Level of Service	C	C	B			B
Approach Delay (s)	26.5		18.1			15.1
Approach LOS	C		B			B
Intersection Summary						
HCM 2000 Control Delay			17.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.78			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	13.2
Intersection Capacity Utilization			62.5%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1	2	359	2	576	3	731	232	519	1236	9
Future Volume (vph)	7	1	2	359	2	576	3	731	232	519	1236	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	10.0		0.0	130.0		125.0	120.0		95.0	255.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			65.0			95.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.91	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor									0.97		1.00	
Frt		0.900			0.868	0.850			0.850		0.999	
Flt Protected	0.950			0.950	0.994		0.950			0.950		
Satd. Flow (prot)	1770	1676	0	1665	1424	1461	1770	3374	1583	1770	3468	0
Flt Permitted	0.950			0.950	0.994		0.201			0.147		
Satd. Flow (perm)	1770	1676	0	1665	1424	1461	374	3374	1543	274	3468	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					254	332			252		1	
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		53.2			37.5			215.0			376.8	
Travel Time (s)		4.8			3.4			12.9			22.6	
Confl. Bikes (#/hr)									5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	3%	2%	5%	2%	7%	2%	2%	4%	2%
Adj. Flow (vph)	8	1	2	390	2	626	3	795	252	564	1343	10
Shared Lane Traffic (%)				10%		47%						
Lane Group Flow (vph)	8	3	0	351	335	332	3	795	252	564	1353	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
6: Bronte Road & Parking Lot Access/QEW EB Ramps

2021 Existing AM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	36.7	36.7		36.7	36.7	36.7	36.5	36.5	36.5	11.5	36.5	
Total Split (s)	18.0	18.0		45.0	45.0	45.0	53.0	53.0	53.0	24.0	77.0	
Total Split (%)	12.9%	12.9%		32.1%	32.1%	32.1%	37.9%	37.9%	37.9%	17.1%	55.0%	
Maximum Green (s)	11.3	11.3		38.3	38.3	38.3	46.5	46.5	46.5	20.0	70.5	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.8	2.8	2.8	1.0	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)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				23.0	23.0	23.0	23.0	23.0	23.0		23.0	
Pedestrian Calls (#/hr)				0	0	0	0	0	0		0	
Act Effect Green (s)	7.1	7.1		34.1	34.1	34.1	46.5	46.5	46.5	89.6	87.1	
Actuated g/C Ratio	0.05	0.05		0.24	0.24	0.24	0.33	0.33	0.33	0.64	0.62	
v/c Ratio	0.09	0.04		0.86	0.62	0.55	0.02	0.71	0.37	1.00	0.63	
Control Delay	65.6	64.0		71.5	16.7	7.6	32.3	45.1	5.4	71.8	14.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	65.6	64.0		71.5	16.7	7.6	32.3	45.1	5.4	71.8	14.8	
LOS	E	E		E	B	A	C	D	A	E	B	
Approach Delay		65.1			32.6			35.5			31.5	
Approach LOS		E			C			D			C	
Queue Length 50th (m)	2.3	0.9		101.5	20.4	0.0	0.6	106.5	0.0	142.4	88.8	
Queue Length 95th (m)	8.3	4.3		#140.9	57.2	26.6	3.0	130.8	19.5 m#	264.6	152.2	
Internal Link Dist (m)		29.2			13.5			191.0			352.8	
Turn Bay Length (m)	10.0			130.0		125.0	120.0		95.0	255.0		
Base Capacity (vph)	142	135		455	574	640	124	1120	680	566	2157	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.06	0.02		0.77	0.58	0.52	0.02	0.71	0.37	1.00	0.63	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 88 (63%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.00
 Intersection Signal Delay: 32.9
 Intersection LOS: C

Lanes, Volumes, Timings 6: Bronte Road & Parking Lot Access/QEW EB Ramps

2021 Existing AM Peak Hour
1300 Bronte Enns

Intersection Capacity Utilization 90.1% ICU Level of Service E

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 6: Bronte Road & Parking Lot Access/QEW EB Ramps



HCM Signalized Intersection Capacity Analysis

6: Bronte Road & Parking Lot Access/QEW EB Ramps

2021 Existing AM Peak Hour

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1	2	359	2	576	3	731	232	519	1236	9
Future Volume (vph)	7	1	2	359	2	576	3	731	232	519	1236	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lane Util. Factor	1.00	1.00		0.95	0.91	0.95	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97	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	
Frt	1.00	0.90		1.00	0.87	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1676		1665	1425	1461	1770	3374	1542	1770	3467	
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.20	1.00	1.00	0.15	1.00	
Satd. Flow (perm)	1770	1676		1665	1425	1461	375	3374	1542	274	3467	
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)	8	1	2	390	2	626	3	795	252	564	1343	10
RTOR Reduction (vph)	0	0	0	0	192	251	0	0	176	0	0	0
Lane Group Flow (vph)	8	3	0	351	143	81	3	795	77	564	1353	0
Confl. Bikes (#/hr)									5			5
Heavy Vehicles (%)	2%	2%	2%	3%	2%	5%	2%	7%	2%	2%	4%	2%
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Actuated Green, G (s)	2.9	2.9		34.1	34.1	34.1	42.5	42.5	42.5	83.1	83.1	
Effective Green, g (s)	2.9	2.9		34.1	34.1	34.1	42.5	42.5	42.5	83.1	83.1	
Actuated g/C Ratio	0.02	0.02		0.24	0.24	0.24	0.30	0.30	0.30	0.59	0.59	
Clearance Time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	36	34		405	347	355	113	1024	468	553	2057	
v/s Ratio Prot	c0.00	0.00		c0.21	0.10			0.24		c0.27	0.39	
v/s Ratio Perm						0.06	0.01		0.05	c0.34		
v/c Ratio	0.22	0.09		0.87	0.41	0.23	0.03	0.78	0.16	1.02	0.66	
Uniform Delay, d1	67.4	67.3		50.8	44.5	42.4	34.2	44.4	35.7	37.7	19.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.39	0.75	
Incremental Delay, d2	3.1	1.1		17.4	0.8	0.3	0.4	5.8	0.8	35.8	1.1	
Delay (s)	70.6	68.4		68.2	45.3	42.7	34.7	50.2	36.5	88.1	15.2	
Level of Service	E	E		E	D	D	C	D	D	F	B	
Approach Delay (s)		70.0			52.3			46.9			36.6	
Approach LOS		E			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			43.4			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			23.9			
Intersection Capacity Utilization			90.1%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2021 Existing - MM - AM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	203	388	504	88	196	59	798	177	234	1897	11
Future Volume (vph)	11	203	388	504	88	196	59	798	177	234	1897	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	140.0		0.0	135.0		80.0	180.0		50.0
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (m)	65.0			100.0			70.0			70.0		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99		0.98			0.97			0.96	1.00		0.97
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1656	1863	1583	3433	1792	1553	1719	3343	1485	1770	3406	1336
Flt Permitted	0.698			0.421			0.061			0.238		
Satd. Flow (perm)	1200	1863	1556	1521	1792	1503	110	3343	1426	442	3406	1289
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			121			202			182			91
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		296.6			291.2			1189.9			120.4	
Travel Time (s)		17.8			17.5			71.4			7.2	
Confl. Peds. (#/hr)	11					11	5		7	7		5
Confl. Bikes (#/hr)			5			5			5			5
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 (%)	9%	2%	2%	2%	6%	4%	5%	8%	7%	2%	6%	18%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Adj. Flow (vph)	11	209	400	520	91	202	61	823	182	241	1956	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	209	400	520	91	202	61	823	182	241	1956	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)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.00	1.00	1.03
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

10-04-2021

NA

CGH Transportation

Page 1

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2021 Existing - MM - AM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0	10.0	6.0	20.0	20.0	6.0	20.0	20.0
Minimum Split (s)	10.5	36.7	36.7	10.5	36.7	36.7	10.5	36.5	36.5	10.5	36.5	36.5
Total Split (s)	10.8	36.7	36.7	12.1	38.0	38.0	10.5	69.0	69.0	22.2	80.7	80.7
Total Split (%)	7.7%	26.2%	26.2%	8.6%	27.1%	27.1%	7.5%	49.3%	49.3%	15.9%	57.6%	57.6%
Maximum Green (s)	6.8	30.0	30.0	8.1	31.3	31.3	6.5	62.5	62.5	18.2	74.2	74.2
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	2.8	2.8	1.0	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	0.0	0.0
Total Lost Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
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	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)					7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)					23.0	23.0		23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)					11	11		7	7		5	5
Act Effct Green (s)	37.9	28.9	28.9	42.7	36.7	36.7	76.9	68.0	68.0	88.3	77.4	77.4
Actuated g/C Ratio	0.27	0.21	0.21	0.30	0.26	0.26	0.55	0.49	0.49	0.63	0.55	0.55
v/c Ratio	0.03	0.54	0.96	0.91	0.19	0.37	0.46	0.51	0.23	0.59	1.04	0.01
Control Delay	33.1	55.2	72.9	63.6	42.7	7.7	28.3	17.1	7.8	17.5	63.2	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.1	55.2	72.9	63.6	42.7	7.7	28.3	17.1	7.8	17.5	63.2	0.0
LOS	C	E	E	E	D	A	C	B	A	B	E	A
Approach Delay		66.2			47.3			16.2			57.9	
Approach LOS		E			D			B			E	
Queue Length 50th (m)	2.2	54.4	84.6	62.5	19.6	0.0	6.9	47.5	7.9	29.1	~335.2	0.0
Queue Length 95th (m)	7.1	81.7	#150.0	#93.3	38.5	21.2	22.8	91.7	34.9	42.7	#378.8	0.0
Internal Link Dist (m)		272.6			267.2			1165.9			96.4	
Turn Bay Length (m)	70.0		70.0	140.0			135.0		80.0	180.0		50.0
Base Capacity (vph)	351	399	428	574	470	543	135	1622	785	450	1882	752
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.52	0.93	0.91	0.19	0.37	0.45	0.51	0.23	0.54	1.04	0.01

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 82.6 (59%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

1: Bronte Road & Upper Middle Road

2021 Existing - MM - AM Peak Hour
1300 Bronte Enns

Maximum v/c Ratio: 1.04

Intersection Signal Delay: 47.7

Intersection LOS: D

Intersection Capacity Utilization 105.2%

ICU Level of Service G

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Bronte Road & Upper Middle Road

 Ø1 22.2 s		 Ø2 (R) 69 s		 Ø3 12.1 s		 Ø4 36.7 s	
 Ø5 10.5 s		 Ø6 (R) 80.7 s		 Ø7 10.8 s		 Ø8 38 s	

HCM Signalized Intersection Capacity Analysis

1: Bronte Road & Upper Middle Road

2021 Existing - MM - AM Peak Hour

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	203	388	504	88	196	59	798	177	234	1897	11
Future Volume (vph)	11	203	388	504	88	196	59	798	177	234	1897	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00	0.97
Flpb, ped/bikes	0.99	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	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	1863	1556	3433	1792	1504	1719	3343	1426	1768	3406	1289
Flt Permitted	0.70	1.00	1.00	0.42	1.00	1.00	0.06	1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)	1205	1863	1556	1523	1792	1504	110	3343	1426	443	3406	1289
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)	11	209	400	520	91	202	61	823	182	241	1956	11
RTOR Reduction (vph)	0	0	94	0	0	149	0	0	97	0	0	5
Lane Group Flow (vph)	11	209	306	520	91	53	61	823	85	241	1956	6
Confl. Peds. (#/hr)	11					11	5		7	7		5
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	9%	2%	2%	2%	6%	4%	5%	8%	7%	2%	6%	18%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	34.0	31.3	31.3	43.4	36.7	36.7	70.8	65.6	65.6	83.4	74.2	74.2
Effective Green, g (s)	34.0	31.3	31.3	43.4	36.7	36.7	70.8	65.6	65.6	83.4	74.2	74.2
Actuated g/C Ratio	0.24	0.22	0.22	0.31	0.26	0.26	0.51	0.47	0.47	0.60	0.53	0.53
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	301	416	347	582	469	394	115	1566	668	394	1805	683
v/s Ratio Prot	0.00	0.11		c0.05	0.05		0.02	0.25		c0.06	c0.57	
v/s Ratio Perm	0.01		0.20	c0.23		0.04	0.25		0.06	0.30		0.00
v/c Ratio	0.04	0.50	0.88	0.89	0.19	0.13	0.53	0.53	0.13	0.61	1.08	0.01
Uniform Delay, d1	40.4	47.5	52.6	46.5	40.2	39.5	31.8	26.2	21.0	15.8	32.9	15.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.07	0.63	2.36	1.00	1.00	1.00
Incremental Delay, d2	0.0	1.0	22.1	16.0	0.2	0.2	4.4	1.2	0.4	2.8	47.8	0.0
Delay (s)	40.4	48.5	74.7	62.5	40.4	39.7	38.4	17.7	49.9	18.6	80.7	15.6
Level of Service	D	D	E	E	D	D	D	B	D	B	F	B
Approach Delay (s)		65.2			54.4			24.4			73.6	
Approach LOS		E			D			C			E	
Intersection Summary												
HCM 2000 Control Delay			58.0									
HCM 2000 Volume to Capacity ratio			1.03									
Actuated Cycle Length (s)			140.0									
Intersection Capacity Utilization			105.2%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2021 Existing - MM - AM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	17	0	19	0	1057	10	125	2666	0
Future Volume (vph)	1	0	1	17	0	19	0	1057	10	125	2666	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		40.0	35.0		30.0	70.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			20.0			60.0		
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
Ped Bike Factor		0.99				0.98			0.98			
Frt		0.932				0.850			0.850			
Flt Protected		0.976		0.950						0.950		
Satd. Flow (prot)	0	1680	0	1530	0	1392	1863	3406	1439	1770	3471	0
Flt Permitted		0.976		0.757						0.235		
Satd. Flow (perm)	0	1680	0	1219	0	1369	1863	3406	1406	438	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		54				54			56			
Link Speed (k/h)		20			20			60			60	
Link Distance (m)		78.7			109.0			435.9			1189.9	
Travel Time (s)		14.2			19.6			26.2			71.4	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	18%	2%	16%	2%	6%	10%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Adj. Flow (vph)	1	0	1	18	0	20	0	1090	10	129	2748	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2	0	18	0	20	0	1090	10	129	2748	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.03	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1		1	1	2	1	1	2	
Detector Template	Left	Thru		Left		Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0		2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0		2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4						9.4			9.4	
Detector 2 Size(m)		0.6						0.6			0.6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2021 Existing - MM - AM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA		Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8		8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0		10.0	15.0	15.0	15.0	5.0	15.0	
Minimum Split (s)	24.2	24.2		35.2		35.2	34.9	34.9	34.9	9.5	34.9	
Total Split (s)	40.6	40.6		40.6		40.6	88.2	88.2	88.2	11.2	99.4	
Total Split (%)	29.0%	29.0%		29.0%		29.0%	63.0%	63.0%	63.0%	8.0%	71.0%	
Maximum Green (s)	34.4	34.4		34.4		34.4	82.3	82.3	82.3	7.2	93.5	
Yellow Time (s)	3.1	3.1		3.1		3.1	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.1	3.1		3.1		3.1	2.2	2.2	2.2	1.0	2.2	
Lost Time Adjust (s)		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.2		6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.6	3.6	3.6	3.0	3.6	
Recall Mode	None	None		None		None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0		7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				22.0		22.0	22.0	22.0	22.0		22.0	
Pedestrian Calls (#/hr)				0		0	0	0	0		0	
Act Effect Green (s)		10.1		10.1		10.1		113.5	113.5	126.2	126.6	
Actuated g/C Ratio		0.07		0.07		0.07		0.81	0.81	0.90	0.90	
v/c Ratio		0.01		0.20		0.14		0.39	0.01	0.28	0.88	
Control Delay		0.0		66.9		1.9		9.0	1.6	1.2	7.9	
Queue Delay		0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay		0.0		66.9		1.9		9.0	1.6	1.2	7.9	
LOS		A		E		A		A	A	A	A	
Approach Delay					32.7			9.0			7.6	
Approach LOS					C			A			A	
Queue Length 50th (m)		0.0		5.1		0.0		50.1	0.0	3.2	169.1	
Queue Length 95th (m)		0.0		13.7		0.0		116.2	m0.2	m3.2	m163.7	
Internal Link Dist (m)		54.7			85.0			411.9			1165.9	
Turn Bay Length (m)						40.0			30.0	70.0		
Base Capacity (vph)		453		299		377		2761	1150	465	3139	
Starvation Cap Reductn		0		0		0		0	0	0	0	
Spillback Cap Reductn		0		0		0		0	0	0	0	
Storage Cap Reductn		0		0		0		0	0	0	0	
Reduced v/c Ratio		0.00		0.06		0.05		0.39	0.01	0.28	0.88	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 128.8 (92%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Lanes, Volumes, Timings
 3: Bronte Road & Driveway/Charles Cornwall Road

2021 Existing - MM - AM Peak Hour

1300 Bronte Enns

Intersection Signal Delay: 8.2

Intersection LOS: A

Intersection Capacity Utilization 109.5%

ICU Level of Service H

Analysis Period (min) 15

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

Splits and Phases: 3: Bronte Road & Driveway/Charles Cornwall Road



HCM Signalized Intersection Capacity Analysis

3: Bronte Road & Driveway/Charles Cornwall Road

2021 Existing - MM - AM Peak Hour

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	17	0	19	0	1057	10	125	2666	0
Future Volume (vph)	1	0	1	17	0	19	0	1057	10	125	2666	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.2		6.2		6.2		5.9	5.9	4.0	5.9	
Lane Util. Factor		1.00		1.00		1.00		0.95	1.00	1.00	0.95	
Frpb, ped/bikes		0.98		1.00		0.96		1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Frt		0.93		1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected		0.98		0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1663		1530		1340		3406	1407	1770	3471	
Flt Permitted		0.98		0.76		1.00		1.00	1.00	0.24	1.00	
Satd. Flow (perm)		1663		1218		1340		3406	1407	439	3471	
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)	1	0	1	18	0	20	0	1090	10	129	2748	0
RTOR Reduction (vph)	0	2	0	0	0	19	0	0	2	0	0	0
Lane Group Flow (vph)	0	0	0	18	0	1	0	1090	8	129	2748	0
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	18%	2%	16%	2%	6%	10%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Turn Type	Perm	NA		Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		6.1		6.1		6.1		111.0	111.0	121.8	121.8	
Effective Green, g (s)		6.1		6.1		6.1		111.0	111.0	121.8	121.8	
Actuated g/C Ratio		0.04		0.04		0.04		0.79	0.79	0.87	0.87	
Clearance Time (s)		6.2		6.2		6.2		5.9	5.9	4.0	5.9	
Vehicle Extension (s)		3.0		3.0		3.0		3.6	3.6	3.0	3.6	
Lane Grp Cap (vph)		72		53		58		2700	1115	446	3019	
v/s Ratio Prot								0.32		0.01	c0.79	
v/s Ratio Perm		0.00		c0.01		0.00			0.01	0.24		
v/c Ratio		0.00		0.34		0.02		0.40	0.01	0.29	0.91	
Uniform Delay, d1		64.0		65.0		64.1		4.4	3.0	1.9	5.7	
Progression Factor		1.00		1.00		1.00		1.89	1.00	0.70	0.99	
Incremental Delay, d2		0.0		3.8		0.1		0.4	0.0	0.1	1.3	
Delay (s)		64.0		68.8		64.2		8.8	3.0	1.4	6.9	
Level of Service		E		E		E		A	A	A	A	
Approach Delay (s)		64.0			66.4			8.7			6.7	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.8									
HCM 2000 Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			140.0							16.1		
Intersection Capacity Utilization			109.5%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

2021 Existing - MM - AM Peak Hour

4: Bronte Road & Driveway/North Service Road West

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	0	0	0	17	0	26	0	1084	241	226	2525	1
Future Volume (vph)	0	0	0	17	0	26	0	1084	241	226	2525	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	45.0		0.0	35.0		70.0	115.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			50.0			65.0			65.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor						0.98			0.98		1.00	
Frt						0.850			0.850			
Flt Protected				0.950	0.950					0.950		
Satd. Flow (prot)	0	1863	0	1681	1681	1583	1863	3438	1583	1770	3471	0
Flt Permitted				0.950	0.950					0.214		
Satd. Flow (perm)	0	1863	0	1681	1681	1555	1863	3438	1546	399	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						112			213			
Link Speed (k/h)		20			50			60			60	
Link Distance (m)		52.6			84.3			299.0			435.9	
Travel Time (s)		9.5			6.1			17.9			26.2	
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	4%	2%
Adj. Flow (vph)	0	0	0	17	0	27	0	1106	246	231	2577	1
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	8	9	27	0	1106	246	231	2578	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

10-04-2021

NA

CGH Transportation

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Lanes, Volumes, Timings

2021 Existing - MM - AM Peak Hour

4: Bronte Road & Driveway/North Service Road West

1300 Bronte Enns



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		8			4			2		1	6	
Permitted Phases	8			4		4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	15.0	15.0	15.0	6.0	15.0	
Minimum Split (s)	24.7	24.7		36.9	36.9	36.9	41.7	41.7	41.7	10.5	24.7	
Total Split (s)	13.0	13.0		39.0	39.0	39.0	77.0	77.0	77.0	11.0	88.0	
Total Split (%)	9.3%	9.3%		27.9%	27.9%	27.9%	55.0%	55.0%	55.0%	7.9%	62.9%	
Maximum Green (s)	6.3	6.3		33.1	33.1	33.1	70.3	70.3	70.3	7.0	81.3	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		2.2	2.2	2.2	3.0	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)		6.7		5.9	5.9	5.9	6.7	6.7	6.7	4.0	6.7	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		0.0	
Flash Dont Walk (s)				24.0	24.0	24.0	28.0	28.0	28.0		0.0	
Pedestrian Calls (#/hr)				1	1	1	0	0	0		0	
Act Effect Green (s)				16.5	16.5	16.5		100.2	100.2	120.0	119.9	
Actuated g/C Ratio				0.12	0.12	0.12		0.72	0.72	0.86	0.86	
v/c Ratio				0.04	0.05	0.10		0.45	0.21	0.49	0.87	
Control Delay				49.1	49.3	0.7		10.3	3.4	2.7	7.5	
Queue Delay				0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay				49.1	49.3	0.7		10.3	3.4	2.7	7.5	
LOS				D	D	A		B	A	A	A	
Approach Delay					19.4			9.1			7.1	
Approach LOS					B			A			A	
Queue Length 50th (m)				2.3	2.5	0.0		41.5	1.0	0.2	1.3	
Queue Length 95th (m)				7.1	7.5	0.0		162.2	19.0	m13.1	#478.8	
Internal Link Dist (m)		28.6			60.3			275.0			411.9	
Turn Bay Length (m)				45.0					70.0	115.0		
Base Capacity (vph)				397	397	453		2460	1166	469	2973	
Starvation Cap Reductn				0	0	0		0	0	0	0	
Spillback Cap Reductn				0	0	0		0	0	0	0	
Storage Cap Reductn				0	0	0		0	0	0	0	
Reduced v/c Ratio				0.02	0.02	0.06		0.45	0.21	0.49	0.87	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 27 (19%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 7.8

Intersection LOS: A

Intersection Capacity Utilization 107.3%

ICU Level of Service G

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 4: Bronte Road & Driveway/North Service Road West

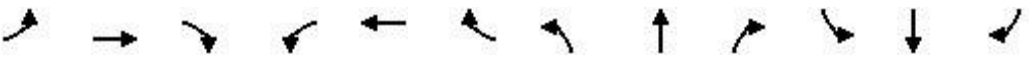


HCM Signalized Intersection Capacity Analysis

4: Bronte Road & Driveway/North Service Road West

2021 Existing - MM - AM Peak Hour

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	0	0	0	17	0	26	0	1084	241	226	2525	1
Future Volume (vph)	0	0	0	17	0	26	0	1084	241	226	2525	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Lane Util. Factor				0.95	0.95	1.00		0.95	1.00	1.00	0.95	
Frpb, ped/bikes				1.00	1.00	0.97		1.00	0.98	1.00	1.00	
Flpb, ped/bikes				1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt				1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected				0.95	0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1681	1681	1543		3438	1547	1770	3471	
Flt Permitted				0.95	0.95	1.00		1.00	1.00	0.21	1.00	
Satd. Flow (perm)				1681	1681	1543		3438	1547	398	3471	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	17	0	27	0	1106	246	231	2577	1
RTOR Reduction (vph)	0	0	0	0	0	25	0	0	64	0	0	0
Lane Group Flow (vph)	0	0	0	8	9	2	0	1106	182	231	2578	0
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	4%	2%
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		8			4			2		1	6	
Permitted Phases	8			4		4	2		2	6		
Actuated Green, G (s)				12.5	12.5	12.5		97.8	97.8	114.9	114.9	
Effective Green, g (s)				12.5	12.5	12.5		97.8	97.8	114.9	114.9	
Actuated g/C Ratio				0.09	0.09	0.09		0.70	0.70	0.82	0.82	
Clearance Time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Vehicle Extension (s)				5.0	5.0	5.0		5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)				150	150	137		2401	1080	455	2848	
v/s Ratio Prot								0.32		0.05	c0.74	
v/s Ratio Perm				0.00	0.01	0.00			0.12	0.37		
v/c Ratio				0.05	0.06	0.02		0.46	0.17	0.51	0.91	
Uniform Delay, d1				58.3	58.4	58.1		9.4	7.2	4.7	8.8	
Progression Factor				1.00	1.00	1.00		0.86	1.18	0.26	0.34	
Incremental Delay, d2				0.3	0.4	0.1		0.5	0.3	0.4	2.8	
Delay (s)				58.6	58.7	58.3		8.6	8.8	1.7	5.8	
Level of Service				E	E	E		A	A	A	A	
Approach Delay (s)		0.0			58.4			8.6			5.4	
Approach LOS		A			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.0									
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			140.0							23.3		
Intersection Capacity Utilization			107.3%								G	
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2021 Existing - MM - AM Peak Hour

1300 Bronte Enns

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	193	241	1084	0	0	1560
Future Volume (vph)	193	241	1084	0	0	1560
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	90.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	1.00	0.95	1.00	1.00	0.95
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3335	1568	3471	0	0	3505
Flt Permitted	0.950					
Satd. Flow (perm)	3335	1568	3471	0	0	3505
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		40				
Link Speed (k/h)	60		60			60
Link Distance (m)	65.9		376.8			299.0
Travel Time (s)	4.0		22.6			17.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	3%	4%	2%	2%	3%
Adj. Flow (vph)	210	262	1178	0	0	1696
Shared Lane Traffic (%)						
Lane Group Flow (vph)	210	262	1178	0	0	1696
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2021 Existing - MM - AM Peak Hour

1300 Bronte Enns



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8				
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.7	24.7	36.5			26.5
Total Split (s)	30.0	30.0	40.0			40.0
Total Split (%)	42.9%	42.9%	57.1%			57.1%
Maximum Green (s)	23.3	23.3	33.5			33.5
Yellow Time (s)	3.7	3.7	3.7			3.7
All-Red Time (s)	3.0	3.0	2.8			2.8
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	6.7	6.7	6.5			6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	C-Max			C-Max
Act Effect Green (s)	15.6	15.6	41.2			41.2
Actuated g/C Ratio	0.22	0.22	0.59			0.59
v/c Ratio	0.28	0.69	0.58			0.82
Control Delay	22.3	29.9	19.7			17.8
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	22.3	29.9	19.7			17.8
LOS	C	C	B			B
Approach Delay	26.5		19.7			17.8
Approach LOS	C		B			B
Queue Length 50th (m)	12.4	28.1	118.8			143.4
Queue Length 95th (m)	18.4	45.8	159.3			#225.4
Internal Link Dist (m)	41.9		352.8			275.0
Turn Bay Length (m)		90.0				
Base Capacity (vph)	1110	548	2040			2060
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.19	0.48	0.58			0.82

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 14 (20%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 19.7

Intersection LOS: B

Intersection Capacity Utilization 62.5%

ICU Level of Service B

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
 5: Bronte Road & QEW WB Off Ramp

2021 Existing - MM - AM Peak Hour
 1300 Bronte Enns

Splits and Phases: 5: Bronte Road & QEW WB Off Ramp



HCM Signalized Intersection Capacity Analysis

5: Bronte Road & QEW WB Off Ramp

2021 Existing - MM - AM Peak Hour
1300 Bronte Enns

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	193	241	1084	0	0	1560
Future Volume (vph)	193	241	1084	0	0	1560
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7	6.5			6.5
Lane Util. Factor	0.97	1.00	0.95			0.95
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3335	1568	3471			3505
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3335	1568	3471			3505
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	210	262	1178	0	0	1696
RTOR Reduction (vph)	0	31	0	0	0	0
Lane Group Flow (vph)	210	231	1178	0	0	1696
Heavy Vehicles (%)	5%	3%	4%	2%	2%	3%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	15.6	15.6	41.2			41.2
Effective Green, g (s)	15.6	15.6	41.2			41.2
Actuated g/C Ratio	0.22	0.22	0.59			0.59
Clearance Time (s)	6.7	6.7	6.5			6.5
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	743	349	2042			2062
v/s Ratio Prot	0.06		0.34			c0.48
v/s Ratio Perm		c0.15				
v/c Ratio	0.28	0.66	0.58			0.82
Uniform Delay, d1	22.6	24.8	9.0			11.5
Progression Factor	1.00	1.00	1.92			1.23
Incremental Delay, d2	0.2	4.7	0.9			1.9
Delay (s)	22.8	29.5	18.1			16.0
Level of Service	C	C	B			B
Approach Delay (s)	26.5		18.1			16.0
Approach LOS	C		B			B
Intersection Summary						
HCM 2000 Control Delay			18.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.78			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	13.2
Intersection Capacity Utilization			62.5%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings

2021 Existing - MM - AM Peak Hour

6: Bronte Road & Parking Lot Access/QEW EB Ramps

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1	2	359	2	576	3	731	232	519	1236	9
Future Volume (vph)	7	1	2	359	2	576	3	731	232	519	1236	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	10.0		0.0	130.0		125.0	120.0		95.0	255.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			65.0			95.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.91	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor									0.97		1.00	
Frt		0.900			0.868	0.850			0.850		0.999	
Flt Protected	0.950			0.950	0.994		0.950			0.950		
Satd. Flow (prot)	1770	1676	0	1665	1424	1461	1770	3374	1583	1770	3468	0
Flt Permitted	0.950			0.950	0.994		0.201			0.147		
Satd. Flow (perm)	1770	1676	0	1665	1424	1461	374	3374	1543	274	3468	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					254	332			252		1	
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		53.2			37.5			215.0			376.8	
Travel Time (s)		4.8			3.4			12.9			22.6	
Confl. Bikes (#/hr)									5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	3%	2%	5%	2%	7%	2%	2%	4%	2%
Adj. Flow (vph)	8	1	2	390	2	626	3	795	252	564	1343	10
Shared Lane Traffic (%)				10%		47%						
Lane Group Flow (vph)	8	3	0	351	335	332	3	795	252	564	1353	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

10-04-2021

NA

CGH Transportation

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	36.7	36.7		36.7	36.7	36.7	36.5	36.5	36.5	11.5	36.5	
Total Split (s)	18.0	18.0		45.0	45.0	45.0	53.0	53.0	53.0	24.0	77.0	
Total Split (%)	12.9%	12.9%		32.1%	32.1%	32.1%	37.9%	37.9%	37.9%	17.1%	55.0%	
Maximum Green (s)	11.3	11.3		38.3	38.3	38.3	46.5	46.5	46.5	20.0	70.5	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.8	2.8	2.8	1.0	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)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				23.0	23.0	23.0	23.0	23.0	23.0		23.0	
Pedestrian Calls (#/hr)				0	0	0	0	0	0		0	
Act Effct Green (s)	7.1	7.1		34.1	34.1	34.1	46.5	46.5	46.5	89.6	87.1	
Actuated g/C Ratio	0.05	0.05		0.24	0.24	0.24	0.33	0.33	0.33	0.64	0.62	
v/c Ratio	0.09	0.04		0.86	0.62	0.55	0.02	0.71	0.37	1.00	0.63	
Control Delay	65.6	64.0		71.5	16.7	7.6	32.3	45.1	5.4	72.0	15.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	65.6	64.0		71.5	16.7	7.6	32.3	45.1	5.4	72.0	15.2	
LOS	E	E		E	B	A	C	D	A	E	B	
Approach Delay		65.1			32.6			35.5			31.9	
Approach LOS		E			C			D			C	
Queue Length 50th (m)	2.3	0.9		101.5	20.4	0.0	0.6	106.5	0.0	142.4	102.6	
Queue Length 95th (m)	8.3	4.3		#140.9	57.2	26.6	3.0	130.8	19.5 m#	264.6	152.2	
Internal Link Dist (m)		29.2			13.5			191.0			352.8	
Turn Bay Length (m)	10.0			130.0		125.0	120.0		95.0	255.0		
Base Capacity (vph)	142	135		455	574	640	124	1120	680	566	2157	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.06	0.02		0.77	0.58	0.52	0.02	0.71	0.37	1.00	0.63	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 88 (63%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.00

Intersection Signal Delay: 33.1

Intersection LOS: C

Intersection Capacity Utilization 90.1%

ICU Level of Service E

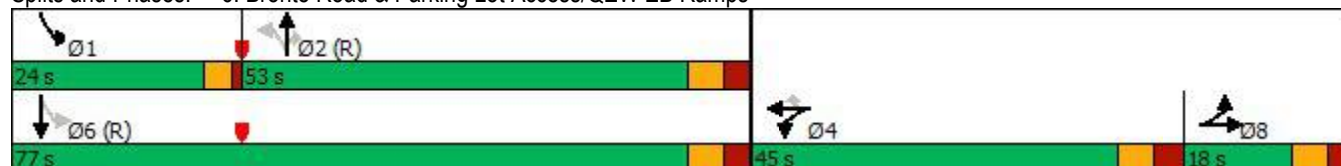
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 6: Bronte Road & Parking Lot Access/QEW EB Ramps



HCM Signalized Intersection Capacity Analysis

6: Bronte Road & Parking Lot Access/QEW EB Ramps

2021 Existing - MM - AM Peak Hour

1300 Bronte Enns

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	7	1	2	359	2	576	3	731	232	519	1236	9	
Future Volume (vph)	7	1	2	359	2	576	3	731	232	519	1236	9	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5		
Lane Util. Factor	1.00	1.00		0.95	0.91	0.95	1.00	0.95	1.00	1.00	0.95		
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97	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		
Frt	1.00	0.90		1.00	0.87	0.85	1.00	1.00	0.85	1.00	1.00		
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1770	1676		1665	1425	1461	1770	3374	1542	1770	3467		
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.20	1.00	1.00	0.15	1.00		
Satd. Flow (perm)	1770	1676		1665	1425	1461	375	3374	1542	274	3467		
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)	8	1	2	390	2	626	3	795	252	564	1343	10	
RTOR Reduction (vph)	0	0	0	0	192	251	0	0	176	0	0	0	
Lane Group Flow (vph)	8	3	0	351	143	81	3	795	77	564	1353	0	
Confl. Bikes (#/hr)									5			5	
Heavy Vehicles (%)	2%	2%	2%	3%	2%	5%	2%	7%	2%	2%	4%	2%	
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA		
Protected Phases	8	8		4	4			2		1	6		
Permitted Phases						4	2		2	6			
Actuated Green, G (s)	2.9	2.9		34.1	34.1	34.1	42.5	42.5	42.5	83.1	83.1		
Effective Green, g (s)	2.9	2.9		34.1	34.1	34.1	42.5	42.5	42.5	83.1	83.1		
Actuated g/C Ratio	0.02	0.02		0.24	0.24	0.24	0.30	0.30	0.30	0.59	0.59		
Clearance Time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	36	34		405	347	355	113	1024	468	553	2057		
v/s Ratio Prot	c0.00	0.00		c0.21	0.10			0.24		c0.27	0.39		
v/s Ratio Perm						0.06	0.01		0.05	c0.34			
v/c Ratio	0.22	0.09		0.87	0.41	0.23	0.03	0.78	0.16	1.02	0.66		
Uniform Delay, d1	67.4	67.3		50.8	44.5	42.4	34.2	44.4	35.7	37.7	19.0		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.40	0.77		
Incremental Delay, d2	3.1	1.1		17.4	0.8	0.3	0.4	5.8	0.8	35.8	1.1		
Delay (s)	70.6	68.4		68.2	45.3	42.7	34.7	50.2	36.5	88.6	15.7		
Level of Service	E	E		E	D	D	C	D	D	F	B		
Approach Delay (s)		70.0			52.3			46.9			37.1		
Approach LOS		E			D			D			D		
Intersection Summary													
HCM 2000 Control Delay			43.6		HCM 2000 Level of Service					D			
HCM 2000 Volume to Capacity ratio			0.98										
Actuated Cycle Length (s)			140.0		Sum of lost time (s)					23.9			
Intersection Capacity Utilization			90.1%		ICU Level of Service					E			
Analysis Period (min)			15										
c Critical Lane Group													

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2021 Existing PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	74	110	182	155	252	263	1727	303	209	1031	16
Future Volume (vph)	7	74	110	182	155	252	263	1727	303	209	1031	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	140.0		0.0	135.0		80.0	180.0		50.0
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (m)	65.0			100.0			70.0			70.0		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99		0.98			0.97	1.00		0.97			0.97
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	3400	1863	1583	1770	3539	1558	1770	3471	1473
Flt Permitted	0.653			0.562			0.192			0.051		
Satd. Flow (perm)	1208	1863	1550	2011	1863	1542	358	3539	1518	95	3471	1435
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			121			189			211			122
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		296.6			291.2			1189.9			120.4	
Travel Time (s)		17.8			17.5			71.4			7.2	
Confl. Peds. (#/hr)	6					6	1		1	1		1
Confl. Bikes (#/hr)			5			5			5			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 (%)	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Adj. Flow (vph)	7	79	117	194	165	268	280	1837	322	222	1097	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	79	117	194	165	268	280	1837	322	222	1097	17
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.00	1.00	1.03
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2021 Existing PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0	10.0	6.0	20.0	20.0	6.0	20.0	20.0
Minimum Split (s)	10.5	36.7	36.7	10.5	36.7	36.7	10.5	36.5	36.5	10.5	36.5	36.5
Total Split (s)	11.2	23.8	23.8	19.6	32.2	32.2	12.6	84.0	84.0	12.6	84.0	84.0
Total Split (%)	8.0%	17.0%	17.0%	14.0%	23.0%	23.0%	9.0%	60.0%	60.0%	9.0%	60.0%	60.0%
Maximum Green (s)	7.2	17.1	17.1	15.6	25.5	25.5	8.6	77.5	77.5	8.6	77.5	77.5
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	2.8	2.8	1.0	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	0.0	0.0
Total Lost Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
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	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)					7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)					23.0	23.0		23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)					6	6		1	1		1	1
Act Effct Green (s)	21.4	12.5	12.5	31.2	26.3	26.3	93.4	77.5	77.5	98.8	80.9	80.9
Actuated g/C Ratio	0.15	0.09	0.09	0.22	0.19	0.19	0.67	0.55	0.55	0.71	0.58	0.58
v/c Ratio	0.03	0.48	0.47	0.34	0.47	0.60	0.75	0.94	0.34	0.83	0.55	0.02
Control Delay	39.9	69.6	15.1	45.6	55.4	21.9	25.0	18.9	1.9	62.8	20.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.9	69.6	15.1	45.6	55.4	21.9	25.0	18.9	1.9	62.8	20.0	0.1
LOS	D	E	B	D	E	C	C	B	A	E	C	A
Approach Delay		37.2			38.0			17.3			26.9	
Approach LOS		D			D			B			C	
Queue Length 50th (m)	1.6	22.5	0.0	24.4	42.8	19.7	20.0	157.5	0.0	45.9	102.7	0.0
Queue Length 95th (m)	5.6	38.4	17.5	32.9	67.8	52.2	m#29.4	#276.7	m12.9	#123.2	126.8	0.0
Internal Link Dist (m)		272.6			267.2			1165.9			96.4	
Turn Bay Length (m)	70.0		70.0	140.0			135.0		80.0	180.0		50.0
Base Capacity (vph)	221	229	297	602	358	449	374	1959	934	268	2005	880
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.34	0.39	0.32	0.46	0.60	0.75	0.94	0.34	0.83	0.55	0.02

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 35 (25%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 1: Bronte Road & Upper Middle Road

2021 Existing PM Peak Hour
1300 Bronte Enns

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 23.8

Intersection LOS: C

Intersection Capacity Utilization 87.9%

ICU Level of Service E

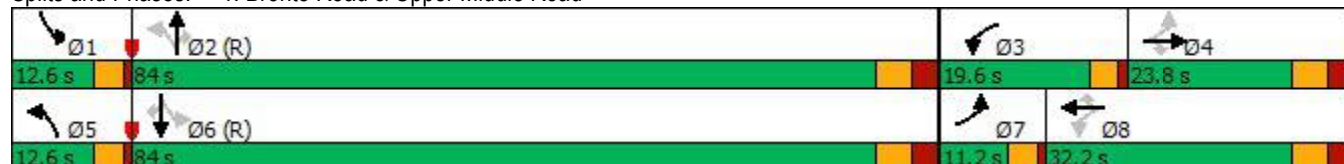
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 1: Bronte Road & Upper Middle Road



HCM Signalized Intersection Capacity Analysis

1: Bronte Road & Upper Middle Road

2021 Existing PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	74	110	182	155	252	263	1727	303	209	1031	16
Future Volume (vph)	7	74	110	182	155	252	263	1727	303	209	1031	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.97
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	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1762	1863	1549	3400	1863	1542	1770	3539	1518	1770	3471	1435
Flt Permitted	0.65	1.00	1.00	0.56	1.00	1.00	0.19	1.00	1.00	0.05	1.00	1.00
Satd. Flow (perm)	1211	1863	1549	2012	1863	1542	357	3539	1518	96	3471	1435
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)	7	79	117	194	165	268	280	1837	322	222	1097	17
RTOR Reduction (vph)	0	0	104	0	0	153	0	0	99	0	0	8
Lane Group Flow (vph)	7	79	13	194	165	115	280	1837	223	222	1097	9
Confl. Peds. (#/hr)	6					6	1		1	1		1
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	17.1	15.7	15.7	31.7	26.3	26.3	87.7	74.3	74.3	94.5	77.7	77.7
Effective Green, g (s)	17.1	15.7	15.7	31.7	26.3	26.3	87.7	74.3	74.3	94.5	77.7	77.7
Actuated g/C Ratio	0.12	0.11	0.11	0.23	0.19	0.19	0.63	0.53	0.53	0.68	0.56	0.56
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	153	208	173	574	349	289	358	1878	805	265	1926	796
v/s Ratio Prot	0.00	0.04		c0.03	c0.09		0.07	c0.52		c0.10	0.32	
v/s Ratio Perm	0.01		0.01	0.05		0.07	0.41		0.15	0.46		0.01
v/c Ratio	0.05	0.38	0.08	0.34	0.47	0.40	0.78	0.98	0.28	0.84	0.57	0.01
Uniform Delay, d1	54.2	57.6	55.7	44.5	50.7	49.9	14.8	32.1	18.1	46.9	20.3	14.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.75	0.39	0.23	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.2	0.2	0.4	1.0	0.9	6.5	11.7	0.5	20.0	1.2	0.0
Delay (s)	54.3	58.8	55.8	44.8	51.7	50.8	32.5	24.3	4.7	66.9	21.5	14.0
Level of Service	D	E	E	D	D	D	C	C	A	E	C	B
Approach Delay (s)		56.9			49.2			22.7			28.9	
Approach LOS		E			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			29.6									
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			140.0									
Intersection Capacity Utilization			87.9%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2021 Existing PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	18	0	53	1	2288	7	19	1338	0
Future Volume (vph)	0	0	0	18	0	53	1	2288	7	19	1338	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		40.0	35.0		30.0	70.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			20.0			60.0		
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
Ped Bike Factor						0.98			0.98			
Frt						0.850			0.850			
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	0	1863	0	1770	0	1583	1770	3505	1388	1770	3471	0
Flt Permitted				0.757			0.196			0.035		
Satd. Flow (perm)	0	1863	0	1410	0	1557	365	3505	1356	65	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						55			56			
Link Speed (k/h)		20			20			60			60	
Link Distance (m)		78.7			109.0			435.9			1189.9	
Travel Time (s)		14.2			19.6			26.2			71.4	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	14%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Adj. Flow (vph)	0	0	0	19	0	55	1	2359	7	20	1379	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	19	0	55	1	2359	7	20	1379	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.03	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1		1	1	2	1	1	2	
Detector Template	Left	Thru		Left		Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0		2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0		2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4						9.4			9.4	
Detector 2 Size(m)		0.6						0.6			0.6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2021 Existing PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type				Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8		8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0		10.0	15.0	15.0	15.0	5.0	15.0	
Minimum Split (s)	24.2	24.2		35.2		35.2	34.9	34.9	34.9	9.5	34.9	
Total Split (s)	40.6	40.6		40.6		40.6	88.2	88.2	88.2	11.2	99.4	
Total Split (%)	29.0%	29.0%		29.0%		29.0%	63.0%	63.0%	63.0%	8.0%	71.0%	
Maximum Green (s)	34.4	34.4		34.4		34.4	82.3	82.3	82.3	7.2	93.5	
Yellow Time (s)	3.1	3.1		3.1		3.1	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.1	3.1		3.1		3.1	2.2	2.2	2.2	1.0	2.2	
Lost Time Adjust (s)		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.2		6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.6	3.6	3.6	3.0	3.6	
Recall Mode	None	None		None		None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0		7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				22.0		22.0	22.0	22.0	22.0		22.0	
Pedestrian Calls (#/hr)				0		0	0	0	0		0	
Act Effect Green (s)				10.0		10.0	116.4	116.4	116.4	123.0	122.3	
Actuated g/C Ratio				0.07		0.07	0.83	0.83	0.83	0.88	0.87	
v/c Ratio				0.19		0.34	0.00	0.81	0.01	0.16	0.45	
Control Delay				66.0		20.9	0.0	8.0	0.0	9.5	2.5	
Queue Delay				0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay				66.0		20.9	0.0	8.0	0.0	9.5	2.5	
LOS				E		C	A	A	A	A	A	
Approach Delay					32.5			7.9			2.6	
Approach LOS					C			A			A	
Queue Length 50th (m)				5.3		0.0	0.0	37.0	0.0	0.8	32.1	
Queue Length 95th (m)				14.3		14.2	m0.0	m25.2	m0.0	m1.4	33.2	
Internal Link Dist (m)		54.7			85.0			411.9			1165.9	
Turn Bay Length (m)						40.0	35.0		30.0	70.0		
Base Capacity (vph)				346		424	303	2914	1136	144	3033	
Starvation Cap Reductn				0		0	0	0	0	0	0	
Spillback Cap Reductn				0		0	0	0	0	0	0	
Storage Cap Reductn				0		0	0	0	0	0	0	
Reduced v/c Ratio				0.05		0.13	0.00	0.81	0.01	0.14	0.45	

Intersection Summary

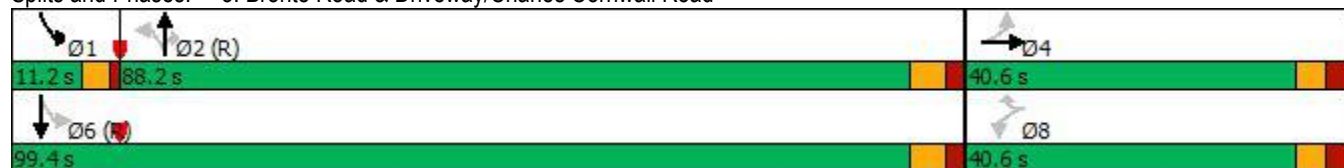
Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 103.6 (74%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.81

Lanes, Volumes, Timings 3: Bronte Road & Driveway/Charles Cornwall Road

2021 Existing PM Peak Hour
1300 Bronte Enns

Intersection Signal Delay: 6.5 Intersection LOS: A
Intersection Capacity Utilization 81.7% ICU Level of Service D
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Bronte Road & Driveway/Charles Cornwall Road



HCM Signalized Intersection Capacity Analysis

3: Bronte Road & Driveway/Charles Cornwall Road

2021 Existing PM Peak Hour
1300 Bronte Enns

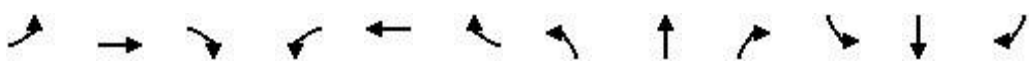
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔		↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	0	0	0	18	0	53	1	2288	7	19	1338	0
Future Volume (vph)	0	0	0	18	0	53	1	2288	7	19	1338	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Lane Util. Factor				1.00		1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes				1.00		0.97	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes				1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Frt				1.00		0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected				0.95		1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1770		1534	1770	3505	1357	1770	3471	
Flt Permitted				0.76		1.00	0.20	1.00	1.00	0.03	1.00	
Satd. Flow (perm)				1410		1534	365	3505	1357	65	3471	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	19	0	55	1	2359	7	20	1379	0
RTOR Reduction (vph)	0	0	0	0	0	52	0	0	1	0	0	0
Lane Group Flow (vph)	0	0	0	19	0	3	1	2359	6	20	1379	0
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	14%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Turn Type				Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4					2			1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)				8.0		8.0	112.4	112.4	112.4	119.9	119.9	
Effective Green, g (s)				8.0		8.0	112.4	112.4	112.4	119.9	119.9	
Actuated g/C Ratio				0.06		0.06	0.80	0.80	0.80	0.86	0.86	
Clearance Time (s)				6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Vehicle Extension (s)				3.0		3.0	3.6	3.6	3.6	3.0	3.6	
Lane Grp Cap (vph)				80		87	293	2814	1089	98	2972	
v/s Ratio Prot								c0.67		0.01	c0.40	
v/s Ratio Perm				c0.01		0.00	0.00		0.00	0.17		
v/c Ratio				0.24		0.04	0.00	0.84	0.01	0.20	0.46	
Uniform Delay, d1				63.1		62.4	2.7	8.3	2.7	16.3	2.4	
Progression Factor				1.00		1.00	0.10	0.83	1.00	4.83	0.83	
Incremental Delay, d2				1.5		0.2	0.0	0.3	0.0	0.9	0.5	
Delay (s)				64.6		62.5	0.3	7.2	2.7	79.7	2.4	
Level of Service				E		E	A	A	A	E	A	
Approach Delay (s)		0.0			63.1			7.2			3.6	
Approach LOS		A			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.0									
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			140.0							16.1		
Intersection Capacity Utilization			81.7%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

2021 Existing PM Peak Hour

4: Bronte Road & Driveway/North Service Road West

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	0	0	0	129	0	104	0	2173	74	58	1323	2
Future Volume (vph)	0	0	0	129	0	104	0	2173	74	58	1323	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	45.0		0.0	35.0		70.0	115.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			50.0			65.0			65.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor						0.98			0.97		1.00	
Frt						0.850			0.850			
Flt Protected				0.950	0.950					0.950		
Satd. Flow (prot)	0	1863	0	1681	1681	1583	1863	3505	1583	1770	3471	0
Flt Permitted				0.950	0.950					0.045		
Satd. Flow (perm)	0	1863	0	1681	1681	1553	1863	3505	1540	84	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						112			106			
Link Speed (k/h)		20			50			60			60	
Link Distance (m)		52.6			84.3			299.0			435.9	
Travel Time (s)		9.5			6.1			17.9			26.2	
Confl. Peds. (#/hr)	2					2			2	2		
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	4%	2%
Adj. Flow (vph)	0	0	0	133	0	107	0	2240	76	60	1364	2
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	66	67	107	0	2240	76	60	1366	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

10-04-2021

NA

CGH Transportation

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Lanes, Volumes, Timings
4: Bronte Road & Driveway/North Service Road West

2021 Existing PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8			4			2			1	6	
Permitted Phases	8			4		4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	15.0	15.0	15.0	6.0	15.0	
Minimum Split (s)	24.7	24.7		36.9	36.9	36.9	41.7	41.7	41.7	10.5	24.7	
Total Split (s)	13.0	13.0		39.0	39.0	39.0	77.0	77.0	77.0	11.0	88.0	
Total Split (%)	9.3%	9.3%		27.9%	27.9%	27.9%	55.0%	55.0%	55.0%	7.9%	62.9%	
Maximum Green (s)	6.3	6.3		33.1	33.1	33.1	70.3	70.3	70.3	7.0	81.3	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		2.2	2.2	2.2	3.0	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)	6.7			5.9	5.9	5.9	6.7	6.7	6.7	4.0	6.7	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0			
Flash Dont Walk (s)				24.0	24.0	24.0	28.0	28.0	28.0			
Pedestrian Calls (#/hr)				2	2	2	2	2	2			
Act Effect Green (s)				33.1	33.1	33.1	85.1			97.0	94.3	
Actuated g/C Ratio				0.24	0.24	0.24	0.61			0.69	0.67	
v/c Ratio				0.17	0.17	0.24	1.05			0.41	0.58	
Control Delay				43.9	44.0	8.0	45.2			28.9	14.2	
Queue Delay				0.0	0.0	0.0	4.4			0.0	0.0	
Total Delay				43.9	44.0	8.0	49.6			28.9	14.2	
LOS				D	D	A	D			C	B	
Approach Delay				27.9			48.0			14.8		
Approach LOS				C			D			B		
Queue Length 50th (m)				16.2	16.5	0.0	~377.5			8.5	85.6	
Queue Length 95th (m)				30.7	31.0	14.5	m#406.5			21.2	117.0	
Internal Link Dist (m)	28.6			60.3			275.0			411.9		
Turn Bay Length (m)				45.0			70.0			115.0		
Base Capacity (vph)				397	397	452	2129			148	2337	
Starvation Cap Reductn				0	0	0	22			0	0	
Spillback Cap Reductn				0	0	0	0			0	0	
Storage Cap Reductn				0	0	0	0			0	0	
Reduced v/c Ratio				0.17	0.17	0.24	1.06			0.41	0.58	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 85 (61%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.05

Lanes, Volumes, Timings 4: Bronte Road & Driveway/North Service Road West

2021 Existing PM Peak Hour
1300 Bronte Enns

Intersection Signal Delay: 34.9

Intersection LOS: C

Intersection Capacity Utilization 80.0%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 4: Bronte Road & Driveway/North Service Road West



HCM Signalized Intersection Capacity Analysis

4: Bronte Road & Driveway/North Service Road West

2021 Existing PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↕	↕	↔	↕	↕
Traffic Volume (vph)	0	0	0	129	0	104	0	2173	74	58	1323	2
Future Volume (vph)	0	0	0	129	0	104	0	2173	74	58	1323	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Lane Util. Factor				0.95	0.95	1.00		0.95	1.00	1.00	0.95	
Frpb, ped/bikes				1.00	1.00	0.98		1.00	0.97	1.00	1.00	
Flpb, ped/bikes				1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt				1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected				0.95	0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1681	1681	1553		3505	1541	1770	3470	
Flt Permitted				0.95	0.95	1.00		1.00	1.00	0.05	1.00	
Satd. Flow (perm)				1681	1681	1553		3505	1541	84	3470	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	133	0	107	0	2240	76	60	1364	2
RTOR Reduction (vph)	0	0	0	0	0	82	0	0	30	0	0	0
Lane Group Flow (vph)	0	0	0	66	67	25	0	2240	46	60	1366	0
Confl. Peds. (#/hr)	2					2			2	2		
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	4%	2%
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		8			4			2		1	6	
Permitted Phases	8			4		4	2		2	6		
Actuated Green, G (s)				33.1	33.1	33.1		84.3	84.3	94.3	94.3	
Effective Green, g (s)				33.1	33.1	33.1		84.3	84.3	94.3	94.3	
Actuated g/C Ratio				0.24	0.24	0.24		0.60	0.60	0.67	0.67	
Clearance Time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Vehicle Extension (s)				5.0	5.0	5.0		5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)				397	397	367		2110	927	128	2337	
v/s Ratio Prot								c0.64		0.02	c0.39	
v/s Ratio Perm				0.04	0.04	0.02			0.03	0.29		
v/c Ratio				0.17	0.17	0.07		1.06	0.05	0.47	0.58	
Uniform Delay, d1				42.5	42.5	41.5		27.9	11.4	33.9	12.3	
Progression Factor				1.00	1.00	1.00		0.50	0.49	1.78	1.06	
Incremental Delay, d2				0.4	0.4	0.2		32.4	0.0	2.5	1.0	
Delay (s)				42.9	42.9	41.7		46.5	5.7	63.0	14.0	
Level of Service				D	D	D		D	A	E	B	
Approach Delay (s)		0.0			42.4			45.2			16.0	
Approach LOS		A			D			D			B	
Intersection Summary												
HCM 2000 Control Delay			34.6				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)		23.3			
Intersection Capacity Utilization			80.0%				ICU Level of Service		D			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2021 Existing PM Peak Hour
1300 Bronte Enns

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 		 			 
Traffic Volume (vph)	232	467	1756	0	0	848
Future Volume (vph)	232	467	1756	0	0	848
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	90.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	1.00	0.95	1.00	1.00	0.95
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3433	1583	3505	0	0	3505
Flt Permitted	0.950					
Satd. Flow (perm)	3433	1583	3505	0	0	3505
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		17				
Link Speed (k/h)	60		60			60
Link Distance (m)	65.9		376.8			299.0
Travel Time (s)	4.0		22.6			17.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	3%	2%	2%	3%
Adj. Flow (vph)	252	508	1909	0	0	922
Shared Lane Traffic (%)						
Lane Group Flow (vph)	252	508	1909	0	0	922
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2021 Existing PM Peak Hour
1300 Bronte Enns



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8					
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.7	24.7	36.5			26.5
Total Split (s)	46.0	46.0	94.0			94.0
Total Split (%)	32.9%	32.9%	67.1%			67.1%
Maximum Green (s)	39.3	39.3	87.5			87.5
Yellow Time (s)	3.7	3.7	3.7			3.7
All-Red Time (s)	3.0	3.0	2.8			2.8
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	6.7	6.7	6.5			6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	C-Max			C-Max
Act Effect Green (s)	39.3	39.3	87.5			87.5
Actuated g/C Ratio	0.28	0.28	0.62			0.62
v/c Ratio	0.26	1.11	0.87			0.42
Control Delay	40.0	121.4	19.6			16.2
Queue Delay	0.0	0.0	15.7			0.0
Total Delay	40.0	121.4	35.3			16.2
LOS	D	F	D			B
Approach Delay	94.4		35.3			16.2
Approach LOS	F		D			B
Queue Length 50th (m)	29.4	~165.8	283.4			58.6
Queue Length 95th (m)	41.7	#238.2	52.5			59.1
Internal Link Dist (m)	41.9		352.8			275.0
Turn Bay Length (m)		90.0				
Base Capacity (vph)	963	456	2190			2190
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	321			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.26	1.11	1.02			0.42

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 67 (48%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.11

Intersection Signal Delay: 42.9

Intersection LOS: D

Intersection Capacity Utilization 88.5%

ICU Level of Service E

Analysis Period (min) 15

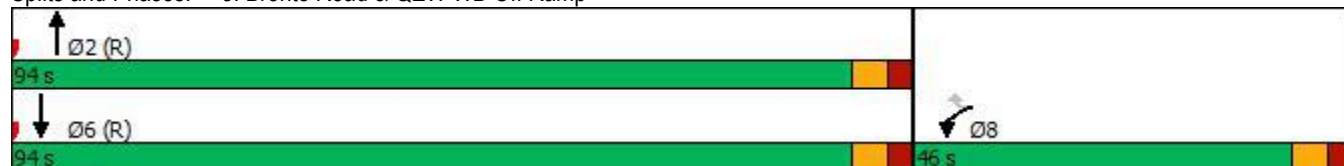
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 5: Bronte Road & QEW WB Off Ramp



HCM Signalized Intersection Capacity Analysis

5: Bronte Road & QEW WB Off Ramp

2021 Existing PM Peak Hour
1300 Bronte Enns

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	232	467	1756	0	0	848
Future Volume (vph)	232	467	1756	0	0	848
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7	6.5			6.5
Lane Util. Factor	0.97	1.00	0.95			0.95
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3433	1583	3505			3505
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3433	1583	3505			3505
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	252	508	1909	0	0	922
RTOR Reduction (vph)	0	12	0	0	0	0
Lane Group Flow (vph)	252	496	1909	0	0	922
Heavy Vehicles (%)	2%	2%	3%	2%	2%	3%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	39.3	39.3	87.5			87.5
Effective Green, g (s)	39.3	39.3	87.5			87.5
Actuated g/C Ratio	0.28	0.28	0.62			0.62
Clearance Time (s)	6.7	6.7	6.5			6.5
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	963	444	2190			2190
v/s Ratio Prot	0.07		c0.54			0.26
v/s Ratio Perm		c0.31				
v/c Ratio	0.26	1.12	0.87			0.42
Uniform Delay, d1	39.1	50.4	21.6			13.4
Progression Factor	1.00	1.00	0.73			1.16
Incremental Delay, d2	0.1	78.4	3.4			0.5
Delay (s)	39.2	128.8	19.2			16.1
Level of Service	D	F	B			B
Approach Delay (s)	99.1		19.2			16.1
Approach LOS	F		B			B
Intersection Summary						
HCM 2000 Control Delay			35.3		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.95			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	13.2
Intersection Capacity Utilization			88.5%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
6: Bronte Road & Parking Lot Access/QEW EB Ramps

2021 Existing PM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	0	4	214	1	778	1	1420	228	209	861	3
Future Volume (vph)	6	0	4	214	1	778	1	1420	228	209	861	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	10.0		0.0	130.0		125.0	120.0		95.0	255.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			65.0			95.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.91	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor									0.97		1.00	
Frt		0.850			0.858	0.850			0.850			
Flt Protected	0.950			0.950	0.997		0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1681	1424	1475	1770	3539	1583	1770	3539	0
Flt Permitted	0.950			0.950	0.997		0.304			0.054		
Satd. Flow (perm)	1770	1583	0	1681	1424	1475	566	3539	1543	101	3539	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					415	423			151			
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		53.2			37.5			215.0			376.8	
Travel Time (s)		4.8			3.4			12.9			22.6	
Confl. Bikes (#/hr)									5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	7	0	4	233	1	846	1	1543	248	227	936	3
Shared Lane Traffic (%)				10%		49%						
Lane Group Flow (vph)	7	4	0	210	439	431	1	1543	248	227	939	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

10-04-2021

NA

CGH Transportation

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Lanes, Volumes, Timings
6: Bronte Road & Parking Lot Access/QEW EB Ramps

2021 Existing PM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	36.7	36.7		36.7	36.7	36.7	36.5	36.5	36.5	11.5	36.5	
Total Split (s)	18.0	18.0		45.0	45.0	45.0	53.0	53.0	53.0	24.0	77.0	
Total Split (%)	12.9%	12.9%		32.1%	32.1%	32.1%	37.9%	37.9%	37.9%	17.1%	55.0%	
Maximum Green (s)	11.3	11.3		38.3	38.3	38.3	46.5	46.5	46.5	20.0	70.5	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.8	2.8	2.8	1.0	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)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				23.0	23.0	23.0	23.0	23.0	23.0		23.0	
Pedestrian Calls (#/hr)				0	0	0	0	0	0		0	
Act Effct Green (s)	7.1	7.1		25.2	25.2	25.2	74.4	74.4	74.4	98.6	96.1	
Actuated g/C Ratio	0.05	0.05		0.18	0.18	0.18	0.53	0.53	0.53	0.70	0.69	
v/c Ratio	0.08	0.05		0.70	0.74	0.70	0.00	0.82	0.28	0.81	0.39	
Control Delay	65.3	64.8		65.1	13.6	11.3	27.0	34.2	10.8	62.6	11.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	65.3	64.8		65.1	13.6	11.3	27.0	34.2	10.8	62.6	11.6	
LOS	E	E		E	B	B	C	C	B	E	B	
Approach Delay		65.1			22.7			31.0			21.5	
Approach LOS		E			C			C			C	
Queue Length 50th (m)	2.0	1.1		60.9	6.4	2.1	0.1	173.1	12.5	51.4	39.4	
Queue Length 95th (m)	7.4	5.4		84.3	44.9	35.2	1.6	#340.8	43.8	79.0	80.3	
Internal Link Dist (m)		29.2			13.5			191.0			352.8	
Turn Bay Length (m)	10.0			130.0		125.0	120.0		95.0	255.0		
Base Capacity (vph)	142	127		459	691	710	301	1881	891	325	2428	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.05	0.03		0.46	0.64	0.61	0.00	0.82	0.28	0.70	0.39	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 66 (47%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 26.1

Intersection LOS: C

10-04-2021

NA

CGH Transportation

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Lanes, Volumes, Timings 6: Bronte Road & Parking Lot Access/QEW EB Ramps

2021 Existing PM Peak Hour
1300 Bronte Enns

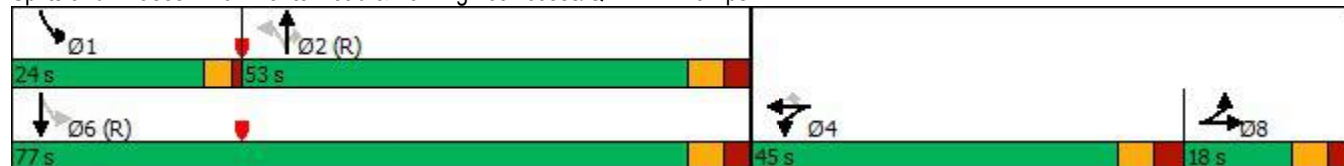
Intersection Capacity Utilization 93.8% ICU Level of Service F

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 6: Bronte Road & Parking Lot Access/QEW EB Ramps



HCM Signalized Intersection Capacity Analysis

6: Bronte Road & Parking Lot Access/QEW EB Ramps

2021 Existing PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	0	4	214	1	778	1	1420	228	209	861	3
Future Volume (vph)	6	0	4	214	1	778	1	1420	228	209	861	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lane Util. Factor	1.00	1.00		0.95	0.91	0.95	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98	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	
Frt	1.00	0.85		1.00	0.86	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1583		1681	1425	1475	1770	3539	1546	1770	3537	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.30	1.00	1.00	0.05	1.00	
Satd. Flow (perm)	1770	1583		1681	1425	1475	567	3539	1546	100	3537	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	0	4	233	1	846	1	1543	248	227	936	3
RTOR Reduction (vph)	0	0	0	0	340	347	0	0	75	0	0	0
Lane Group Flow (vph)	7	4	0	210	99	84	1	1543	173	227	939	0
Confl. Bikes (#/hr)									5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Actuated Green, G (s)	2.9	2.9		25.2	25.2	25.2	70.4	70.4	70.4	92.0	92.0	
Effective Green, g (s)	2.9	2.9		25.2	25.2	25.2	70.4	70.4	70.4	92.0	92.0	
Actuated g/C Ratio	0.02	0.02		0.18	0.18	0.18	0.50	0.50	0.50	0.66	0.66	
Clearance Time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	36	32		302	256	265	285	1779	777	275	2324	
v/s Ratio Prot	c0.00	0.00		c0.12	0.07			c0.44		c0.10	0.27	
v/s Ratio Perm						0.06	0.00		0.11	0.44		
v/c Ratio	0.19	0.12		0.70	0.39	0.32	0.00	0.87	0.22	0.83	0.40	
Uniform Delay, d1	67.4	67.3		53.8	50.6	49.9	17.3	30.7	19.5	44.2	11.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.17	0.98	
Incremental Delay, d2	2.6	1.8		6.8	1.0	0.7	0.0	6.0	0.7	17.0	0.5	
Delay (s)	70.0	69.1		60.6	51.5	50.6	17.4	36.7	20.1	68.5	11.5	
Level of Service	E	E		E	D	D	B	D	C	E	B	
Approach Delay (s)		69.7			52.9			34.4			22.6	
Approach LOS		E			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			36.0									
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			140.0									
Intersection Capacity Utilization			93.8%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2021 Existing PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	74	110	182	155	252	263	1727	303	209	1031	16
Future Volume (vph)	7	74	110	182	155	252	263	1727	303	209	1031	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	140.0		0.0	135.0		80.0	180.0		50.0
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (m)	65.0			100.0			70.0			70.0		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99		0.98			0.97	1.00		0.97			0.97
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	3400	1863	1583	1770	3539	1558	1770	3471	1473
Flt Permitted	0.653			0.563			0.198			0.053		
Satd. Flow (perm)	1208	1863	1551	2015	1863	1542	369	3539	1518	99	3471	1435
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			121			193			198			122
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		296.6			291.2			1189.9			120.4	
Travel Time (s)		17.8			17.5			71.4			7.2	
Confl. Peds. (#/hr)	6					6	1		1	1		1
Confl. Bikes (#/hr)			5			5			5			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 (%)	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Adj. Flow (vph)	7	79	117	194	165	268	280	1837	322	222	1097	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	79	117	194	165	268	280	1837	322	222	1097	17
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.00	1.00	1.03
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2021 Existing PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0	10.0	6.0	20.0	20.0	6.0	20.0	20.0
Minimum Split (s)	10.5	36.7	36.7	10.5	36.7	36.7	10.5	36.5	36.5	10.5	36.5	36.5
Total Split (s)	11.0	23.8	23.8	18.0	32.4	32.4	12.6	80.0	80.0	16.6	84.0	84.0
Total Split (%)	7.9%	17.0%	17.0%	12.9%	23.1%	23.1%	9.0%	57.1%	57.1%	11.9%	60.0%	60.0%
Maximum Green (s)	7.0	17.1	17.1	14.0	25.7	25.7	8.6	73.5	73.5	12.6	77.5	77.5
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	2.8	2.8	1.0	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	0.0	0.0
Total Lost Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
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	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)					7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)					23.0	23.0		23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)					6	6		1	1		1	1
Act Effct Green (s)	21.5	12.6	12.6	31.2	26.3	26.3	91.1	75.2	75.2	100.8	80.9	80.9
Actuated g/C Ratio	0.15	0.09	0.09	0.22	0.19	0.19	0.65	0.54	0.54	0.72	0.58	0.58
v/c Ratio	0.03	0.47	0.47	0.34	0.47	0.60	0.75	0.97	0.36	0.74	0.55	0.02
Control Delay	39.7	69.1	14.9	45.6	55.4	21.1	24.7	25.9	2.4	50.7	20.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.7	69.1	14.9	45.6	55.4	21.1	24.7	25.9	2.4	50.7	20.0	0.1
LOS	D	E	B	D	E	C	C	C	A	D	C	A
Approach Delay		36.9			37.7			22.7			24.9	
Approach LOS		D			D			C			C	
Queue Length 50th (m)	1.6	22.5	0.0	24.4	42.8	18.7	18.6	210.6	2.1	43.2	102.7	0.0
Queue Length 95th (m)	5.6	38.2	17.4	32.9	67.8	50.8	m#31.1	#330.8	m13.7	#106.0	126.8	0.0
Internal Link Dist (m)		272.6			267.2			1165.9			96.4	
Turn Bay Length (m)	70.0		70.0	140.0			135.0		80.0	180.0		50.0
Base Capacity (vph)	220	248	312	587	359	452	374	1900	907	299	2005	880
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.32	0.38	0.33	0.46	0.59	0.75	0.97	0.36	0.74	0.55	0.02

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 35 (25%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 1: Bronte Road & Upper Middle Road

2021 Existing PM Peak Hour
1300 Bronte Enns

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 26.0

Intersection LOS: C

Intersection Capacity Utilization 87.9%

ICU Level of Service E

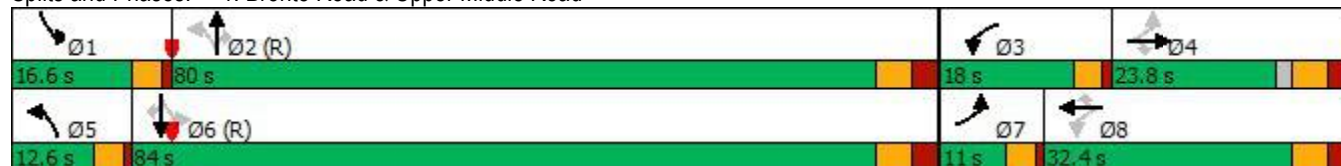
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 1: Bronte Road & Upper Middle Road



HCM Signalized Intersection Capacity Analysis

1: Bronte Road & Upper Middle Road

2021 Existing PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	74	110	182	155	252	263	1727	303	209	1031	16
Future Volume (vph)	7	74	110	182	155	252	263	1727	303	209	1031	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.97
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	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1762	1863	1549	3400	1863	1542	1770	3539	1518	1770	3471	1435
Flt Permitted	0.65	1.00	1.00	0.56	1.00	1.00	0.20	1.00	1.00	0.05	1.00	1.00
Satd. Flow (perm)	1211	1863	1549	2015	1863	1542	369	3539	1518	98	3471	1435
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)	7	79	117	194	165	268	280	1837	322	222	1097	17
RTOR Reduction (vph)	0	0	104	0	0	157	0	0	96	0	0	8
Lane Group Flow (vph)	7	79	13	194	165	111	280	1837	226	222	1097	9
Confl. Peds. (#/hr)	6					6	1		1	1		1
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	17.2	15.8	15.8	31.7	26.3	26.3	85.4	72.0	72.0	95.1	77.7	77.7
Effective Green, g (s)	17.2	15.8	15.8	31.7	26.3	26.3	85.4	72.0	72.0	95.1	77.7	77.7
Actuated g/C Ratio	0.12	0.11	0.11	0.23	0.19	0.19	0.61	0.51	0.51	0.68	0.56	0.56
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	154	210	174	573	349	289	359	1820	780	294	1926	796
v/s Ratio Prot	0.00	0.04		c0.03	c0.09		0.07	c0.52		c0.10	0.32	
v/s Ratio Perm	0.01		0.01	0.05		0.07	0.40		0.15	0.41		0.01
v/c Ratio	0.05	0.38	0.08	0.34	0.47	0.38	0.78	1.01	0.29	0.76	0.57	0.01
Uniform Delay, d1	54.1	57.5	55.6	44.5	50.7	49.8	15.2	34.0	19.4	44.9	20.3	14.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.56	0.47	0.25	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.1	0.2	0.4	1.0	0.9	6.3	18.6	0.6	10.5	1.2	0.0
Delay (s)	54.2	58.7	55.8	44.8	51.7	50.6	29.9	34.5	5.3	55.4	21.5	14.0
Level of Service	D	E	E	D	D	D	C	C	A	E	C	B
Approach Delay (s)		56.8			49.1			30.1			27.0	
Approach LOS		E			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			33.0									
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			140.0									
Intersection Capacity Utilization			87.9%									
Analysis Period (min)			15									
c Critical Lane Group												

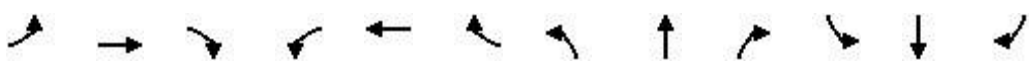
Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2021 Existing PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	18	0	53	1	2288	7	19	1338	0
Future Volume (vph)	0	0	0	18	0	53	1	2288	7	19	1338	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		40.0	35.0		30.0	70.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			20.0			60.0		
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
Ped Bike Factor						0.98			0.98			
Frt						0.850			0.850			
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	0	1863	0	1770	0	1583	1770	3505	1388	1770	3471	0
Flt Permitted				0.757			0.196			0.035		
Satd. Flow (perm)	0	1863	0	1410	0	1557	365	3505	1356	65	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						55			56			
Link Speed (k/h)		20			20			60			60	
Link Distance (m)		78.7			109.0			435.9			1189.9	
Travel Time (s)		14.2			19.6			26.2			71.4	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	14%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Adj. Flow (vph)	0	0	0	19	0	55	1	2359	7	20	1379	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	19	0	55	1	2359	7	20	1379	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.03	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1		1	1	2	1	1	2	
Detector Template	Left	Thru		Left		Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0		2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0		2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4						9.4			9.4	
Detector 2 Size(m)		0.6						0.6			0.6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2021 Existing PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type				Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8		8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0		10.0	15.0	15.0	15.0	5.0	15.0	
Minimum Split (s)	24.2	24.2		35.2		35.2	34.9	34.9	34.9	9.5	34.9	
Total Split (s)	40.6	40.6		40.6		40.6	88.2	88.2	88.2	11.2	99.4	
Total Split (%)	29.0%	29.0%		29.0%		29.0%	63.0%	63.0%	63.0%	8.0%	71.0%	
Maximum Green (s)	34.4	34.4		34.4		34.4	82.3	82.3	82.3	7.2	93.5	
Yellow Time (s)	3.1	3.1		3.1		3.1	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.1	3.1		3.1		3.1	2.2	2.2	2.2	1.0	2.2	
Lost Time Adjust (s)		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.2		6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.6	3.6	3.6	3.0	3.6	
Recall Mode	None	None		None		None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0		7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				22.0		22.0	22.0	22.0	22.0		22.0	
Pedestrian Calls (#/hr)				0		0	0	0	0		0	
Act Effect Green (s)				10.0		10.0	116.4	116.4	116.4	123.0	122.3	
Actuated g/C Ratio				0.07		0.07	0.83	0.83	0.83	0.88	0.87	
v/c Ratio				0.19		0.34	0.00	0.81	0.01	0.16	0.45	
Control Delay				66.0		20.9	0.0	8.0	0.0	9.4	3.0	
Queue Delay				0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay				66.0		20.9	0.0	8.0	0.0	9.4	3.0	
LOS				E		C	A	A	A	A	A	
Approach Delay					32.5			7.9			3.1	
Approach LOS					C			A			A	
Queue Length 50th (m)				5.3		0.0	0.0	37.3	0.0	0.7	33.1	
Queue Length 95th (m)				14.3		14.2	m0.0	m25.2	m0.0	m1.3	40.1	
Internal Link Dist (m)		54.7			85.0			411.9			1165.9	
Turn Bay Length (m)						40.0	35.0		30.0	70.0		
Base Capacity (vph)				346		424	303	2914	1136	144	3033	
Starvation Cap Reductn				0		0	0	0	0	0	0	
Spillback Cap Reductn				0		0	0	0	0	0	0	
Storage Cap Reductn				0		0	0	0	0	0	0	
Reduced v/c Ratio				0.05		0.13	0.00	0.81	0.01	0.14	0.45	

Intersection Summary

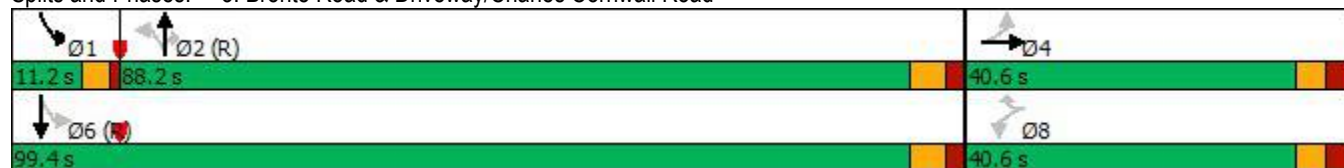
Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 103.6 (74%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.81

Lanes, Volumes, Timings 3: Bronte Road & Driveway/Charles Cornwall Road

2021 Existing PM Peak Hour
1300 Bronte Enns

Intersection Signal Delay: 6.7 Intersection LOS: A
Intersection Capacity Utilization 81.7% ICU Level of Service D
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Bronte Road & Driveway/Charles Cornwall Road



HCM Signalized Intersection Capacity Analysis

3: Bronte Road & Driveway/Charles Cornwall Road

2021 Existing PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔		↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	0	0	0	18	0	53	1	2288	7	19	1338	0
Future Volume (vph)	0	0	0	18	0	53	1	2288	7	19	1338	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Lane Util. Factor				1.00		1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes				1.00		0.97	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes				1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Frt				1.00		0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected				0.95		1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1770		1534	1770	3505	1357	1770	3471	
Flt Permitted				0.76		1.00	0.20	1.00	1.00	0.03	1.00	
Satd. Flow (perm)				1410		1534	365	3505	1357	65	3471	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	19	0	55	1	2359	7	20	1379	0
RTOR Reduction (vph)	0	0	0	0	0	52	0	0	1	0	0	0
Lane Group Flow (vph)	0	0	0	19	0	3	1	2359	6	20	1379	0
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	14%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Turn Type				Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)				8.0		8.0	112.4	112.4	112.4	119.9	119.9	
Effective Green, g (s)				8.0		8.0	112.4	112.4	112.4	119.9	119.9	
Actuated g/C Ratio				0.06		0.06	0.80	0.80	0.80	0.86	0.86	
Clearance Time (s)				6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Vehicle Extension (s)				3.0		3.0	3.6	3.6	3.6	3.0	3.6	
Lane Grp Cap (vph)				80		87	293	2814	1089	98	2972	
v/s Ratio Prot								c0.67		0.01	c0.40	
v/s Ratio Perm				c0.01		0.00	0.00		0.00	0.17		
v/c Ratio				0.24		0.04	0.00	0.84	0.01	0.20	0.46	
Uniform Delay, d1				63.1		62.4	2.7	8.3	2.7	16.3	2.4	
Progression Factor				1.00		1.00	0.10	0.83	1.00	4.80	1.03	
Incremental Delay, d2				1.5		0.2	0.0	0.3	0.0	0.9	0.5	
Delay (s)				64.6		62.5	0.3	7.2	2.7	79.3	2.9	
Level of Service				E		E	A	A	A	E	A	
Approach Delay (s)		0.0			63.1			7.2			4.0	
Approach LOS		A			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.1									
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			140.0							16.1		
Intersection Capacity Utilization			81.7%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Bronte Road & Driveway/North Service Road West

2021 Existing PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	0	0	0	129	0	104	0	2173	74	58	1323	2
Future Volume (vph)	0	0	0	129	0	104	0	2173	74	58	1323	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	45.0		0.0	35.0		70.0	115.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			50.0			65.0			65.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor						0.98			0.97		1.00	
Frt						0.850			0.850			
Flt Protected				0.950	0.950					0.950		
Satd. Flow (prot)	0	1863	0	1681	1681	1583	1863	3505	1583	1770	3471	0
Flt Permitted				0.950	0.950					0.045		
Satd. Flow (perm)	0	1863	0	1681	1681	1553	1863	3505	1540	84	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						112			106			
Link Speed (k/h)		20			50			60			60	
Link Distance (m)		52.6			84.3			299.0			435.9	
Travel Time (s)		9.5			6.1			17.9			26.2	
Confl. Peds. (#/hr)	2					2			2	2		
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	4%	2%
Adj. Flow (vph)	0	0	0	133	0	107	0	2240	76	60	1364	2
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	66	67	107	0	2240	76	60	1366	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
4: Bronte Road & Driveway/North Service Road West

2021 Existing PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8			4			2			1	6	
Permitted Phases	8			4		4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	15.0	15.0	15.0	6.0	15.0	
Minimum Split (s)	24.7	24.7		36.9	36.9	36.9	41.7	41.7	41.7	10.5	24.7	
Total Split (s)	13.0	13.0		39.0	39.0	39.0	77.0	77.0	77.0	11.0	88.0	
Total Split (%)	9.3%	9.3%		27.9%	27.9%	27.9%	55.0%	55.0%	55.0%	7.9%	62.9%	
Maximum Green (s)	6.3	6.3		33.1	33.1	33.1	70.3	70.3	70.3	7.0	81.3	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		2.2	2.2	2.2	3.0	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)	6.7			5.9	5.9	5.9	6.7	6.7	6.7	4.0	6.7	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0			
Flash Dont Walk (s)				24.0	24.0	24.0	28.0	28.0	28.0			
Pedestrian Calls (#/hr)				2	2	2	2	2	2			
Act Effect Green (s)				33.1	33.1	33.1	85.1			97.0	94.3	
Actuated g/C Ratio				0.24	0.24	0.24	0.61			0.69	0.67	
v/c Ratio				0.17	0.17	0.24	1.05			0.41	0.58	
Control Delay				43.9	44.0	8.0	44.3			29.7	12.3	
Queue Delay				0.0	0.0	0.0	4.4			0.0	0.0	
Total Delay				43.9	44.0	8.0	48.8			29.7	12.3	
LOS				D	D	A	D			C	B	
Approach Delay				27.9			47.2			13.0		
Approach LOS				C			D			B		
Queue Length 50th (m)				16.2	16.5	0.0	~377.3			7.7	70.3	
Queue Length 95th (m)				30.7	31.0	14.5	m#427.2			21.3	100.8	
Internal Link Dist (m)	28.6			60.3			275.0			411.9		
Turn Bay Length (m)				45.0			70.0			115.0		
Base Capacity (vph)				397	397	452	2129			977	148	2337
Starvation Cap Reductn				0	0	0	22			0	0	0
Spillback Cap Reductn				0	0	0	0			0	0	0
Storage Cap Reductn				0	0	0	0			0	0	0
Reduced v/c Ratio				0.17	0.17	0.24	1.06			0.41	0.58	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 85 (61%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.05

Lanes, Volumes, Timings 4: Bronte Road & Driveway/North Service Road West

2021 Existing PM Peak Hour
1300 Bronte Enns

Intersection Signal Delay: 33.8

Intersection LOS: C

Intersection Capacity Utilization 80.0%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 4: Bronte Road & Driveway/North Service Road West



HCM Signalized Intersection Capacity Analysis

4: Bronte Road & Driveway/North Service Road West

2021 Existing PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	129	0	104	0	2173	74	58	1323	2
Future Volume (vph)	0	0	0	129	0	104	0	2173	74	58	1323	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Lane Util. Factor				0.95	0.95	1.00		0.95	1.00	1.00	0.95	
Frpb, ped/bikes				1.00	1.00	0.98		1.00	0.97	1.00	1.00	
Flpb, ped/bikes				1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt				1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected				0.95	0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1681	1681	1553		3505	1541	1770	3470	
Flt Permitted				0.95	0.95	1.00		1.00	1.00	0.05	1.00	
Satd. Flow (perm)				1681	1681	1553		3505	1541	84	3470	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	133	0	107	0	2240	76	60	1364	2
RTOR Reduction (vph)	0	0	0	0	0	82	0	0	30	0	0	0
Lane Group Flow (vph)	0	0	0	66	67	25	0	2240	46	60	1366	0
Confl. Peds. (#/hr)	2					2			2	2		
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	4%	2%
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		8			4			2		1	6	
Permitted Phases	8			4		4	2		2	6		
Actuated Green, G (s)				33.1	33.1	33.1		84.3	84.3	94.3	94.3	
Effective Green, g (s)				33.1	33.1	33.1		84.3	84.3	94.3	94.3	
Actuated g/C Ratio				0.24	0.24	0.24		0.60	0.60	0.67	0.67	
Clearance Time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Vehicle Extension (s)				5.0	5.0	5.0		5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)				397	397	367		2110	927	128	2337	
v/s Ratio Prot								c0.64		0.02	c0.39	
v/s Ratio Perm				0.04	0.04	0.02			0.03	0.29		
v/c Ratio				0.17	0.17	0.07		1.06	0.05	0.47	0.58	
Uniform Delay, d1				42.5	42.5	41.5		27.9	11.4	33.9	12.3	
Progression Factor				1.00	1.00	1.00		0.49	0.19	1.85	0.90	
Incremental Delay, d2				0.4	0.4	0.2		32.0	0.0	2.5	1.0	
Delay (s)				42.9	42.9	41.7		45.6	2.2	65.2	12.1	
Level of Service				D	D	D		D	A	E	B	
Approach Delay (s)		0.0			42.4			44.2			14.3	
Approach LOS		A			D			D			B	
Intersection Summary												
HCM 2000 Control Delay			33.4									
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			140.0							23.3		
Intersection Capacity Utilization			80.0%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2021 Existing PM Peak Hour
1300 Bronte Enns

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	232	467	1756	0	0	848
Future Volume (vph)	232	467	1756	0	0	848
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	90.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	1.00	0.95	1.00	1.00	0.95
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3433	1583	3505	0	0	3505
Flt Permitted	0.950					
Satd. Flow (perm)	3433	1583	3505	0	0	3505
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		11				
Link Speed (k/h)	60		60			60
Link Distance (m)	65.9		376.8			299.0
Travel Time (s)	4.0		22.6			17.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	3%	2%	2%	3%
Adj. Flow (vph)	252	508	1909	0	0	922
Shared Lane Traffic (%)						
Lane Group Flow (vph)	252	508	1909	0	0	922
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2021 Existing PM Peak Hour
1300 Bronte Enns



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8					
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.7	24.7	36.5			26.5
Total Split (s)	53.0	53.0	87.0			87.0
Total Split (%)	37.9%	37.9%	62.1%			62.1%
Maximum Green (s)	46.3	46.3	80.5			80.5
Yellow Time (s)	3.7	3.7	3.7			3.7
All-Red Time (s)	3.0	3.0	2.8			2.8
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	6.7	6.7	6.5			6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	C-Max			C-Max
Act Effect Green (s)	45.6	45.6	81.2			81.2
Actuated g/C Ratio	0.33	0.33	0.58			0.58
v/c Ratio	0.23	0.97	0.94			0.45
Control Delay	34.8	78.8	25.4			23.6
Queue Delay	0.0	0.0	44.6			0.0
Total Delay	34.8	78.8	70.0			23.6
LOS	C	E	E			C
Approach Delay	64.2		70.0			23.6
Approach LOS	E		E			C
Queue Length 50th (m)	27.3	142.5	295.6			79.1
Queue Length 95th (m)	38.6	#216.6	#88.3			78.7
Internal Link Dist (m)	41.9		352.8			275.0
Turn Bay Length (m)		90.0				
Base Capacity (vph)	1135	530	2034			2034
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	299			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.22	0.96	1.10			0.45

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 67 (48%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 56.9

Intersection LOS: E

Intersection Capacity Utilization 88.5%

ICU Level of Service E

Analysis Period (min) 15

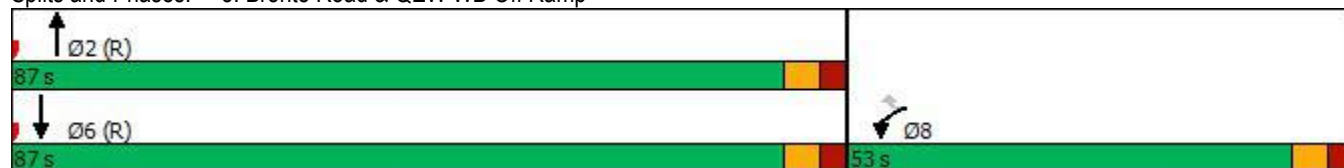
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
 5: Bronte Road & QEW WB Off Ramp

2021 Existing PM Peak Hour
 1300 Bronte Enns

Splits and Phases: 5: Bronte Road & QEW WB Off Ramp



HCM Signalized Intersection Capacity Analysis

5: Bronte Road & QEW WB Off Ramp

2021 Existing PM Peak Hour
1300 Bronte Enns

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	232	467	1756	0	0	848
Future Volume (vph)	232	467	1756	0	0	848
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7	6.5			6.5
Lane Util. Factor	0.97	1.00	0.95			0.95
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3433	1583	3505			3505
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3433	1583	3505			3505
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	252	508	1909	0	0	922
RTOR Reduction (vph)	0	7	0	0	0	0
Lane Group Flow (vph)	252	501	1909	0	0	922
Heavy Vehicles (%)	2%	2%	3%	2%	2%	3%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	45.6	45.6	81.2			81.2
Effective Green, g (s)	45.6	45.6	81.2			81.2
Actuated g/C Ratio	0.33	0.33	0.58			0.58
Clearance Time (s)	6.7	6.7	6.5			6.5
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	1118	515	2032			2032
v/s Ratio Prot	0.07		c0.54			0.26
v/s Ratio Perm		c0.32				
v/c Ratio	0.23	0.97	0.94			0.45
Uniform Delay, d1	34.3	46.6	27.1			16.8
Progression Factor	1.00	1.00	0.65			1.35
Incremental Delay, d2	0.1	32.4	7.0			0.6
Delay (s)	34.5	78.9	24.7			23.2
Level of Service	C	E	C			C
Approach Delay (s)	64.2		24.7			23.2
Approach LOS	E		C			C
Intersection Summary						
HCM 2000 Control Delay			32.7		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.95			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	13.2
Intersection Capacity Utilization			88.5%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
6: Bronte Road & Parking Lot Access/QEW EB Ramps

2021 Existing PM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	0	4	214	1	778	1	1420	228	209	861	3
Future Volume (vph)	6	0	4	214	1	778	1	1420	228	209	861	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	10.0		0.0	130.0		125.0	120.0		95.0	255.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			65.0			95.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.91	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor									0.97		1.00	
Frt		0.850			0.858	0.850			0.850			
Flt Protected	0.950			0.950	0.997		0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1681	1424	1475	1770	3539	1583	1770	3539	0
Flt Permitted	0.950			0.950	0.997		0.304			0.054		
Satd. Flow (perm)	1770	1583	0	1681	1424	1475	566	3539	1543	101	3539	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					415	423			151			
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		53.2			37.5			215.0			376.8	
Travel Time (s)		4.8			3.4			12.9			22.6	
Confl. Bikes (#/hr)									5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	7	0	4	233	1	846	1	1543	248	227	936	3
Shared Lane Traffic (%)				10%		49%						
Lane Group Flow (vph)	7	4	0	210	439	431	1	1543	248	227	939	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

10-04-2021

NA

CGH Transportation

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Lanes, Volumes, Timings
6: Bronte Road & Parking Lot Access/QEW EB Ramps

2021 Existing PM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	36.7	36.7		36.7	36.7	36.7	36.5	36.5	36.5	11.5	36.5	
Total Split (s)	18.0	18.0		45.0	45.0	45.0	53.0	53.0	53.0	24.0	77.0	
Total Split (%)	12.9%	12.9%		32.1%	32.1%	32.1%	37.9%	37.9%	37.9%	17.1%	55.0%	
Maximum Green (s)	11.3	11.3		38.3	38.3	38.3	46.5	46.5	46.5	20.0	70.5	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.8	2.8	2.8	1.0	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)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				23.0	23.0	23.0	23.0	23.0	23.0		23.0	
Pedestrian Calls (#/hr)				0	0	0	0	0	0		0	
Act Effect Green (s)	7.1	7.1		25.2	25.2	25.2	74.4	74.4	74.4	98.6	96.1	
Actuated g/C Ratio	0.05	0.05		0.18	0.18	0.18	0.53	0.53	0.53	0.70	0.69	
v/c Ratio	0.08	0.05		0.70	0.74	0.70	0.00	0.82	0.28	0.81	0.39	
Control Delay	65.3	64.8		65.1	13.6	11.3	27.0	34.2	10.8	62.2	12.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	65.3	64.8		65.1	13.6	11.3	27.0	34.2	10.8	62.2	12.5	
LOS	E	E		E	B	B	C	C	B	E	B	
Approach Delay		65.1			22.7			31.0			22.1	
Approach LOS		E			C			C			C	
Queue Length 50th (m)	2.0	1.1		60.9	6.4	2.1	0.1	173.1	12.5	50.3	39.3	
Queue Length 95th (m)	7.4	5.4		84.3	44.9	35.2	1.6	#340.8	43.8	88.4	97.0	
Internal Link Dist (m)		29.2			13.5			191.0			352.8	
Turn Bay Length (m)	10.0			130.0		125.0	120.0		95.0	255.0		
Base Capacity (vph)	142	127		459	691	710	301	1881	891	325	2428	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.05	0.03		0.46	0.64	0.61	0.00	0.82	0.28	0.70	0.39	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 66 (47%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 26.3

Intersection LOS: C

Lanes, Volumes, Timings 6: Bronte Road & Parking Lot Access/QEW EB Ramps

2021 Existing PM Peak Hour
1300 Bronte Enns

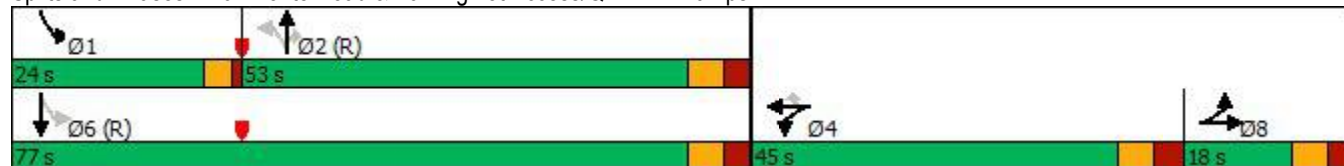
Intersection Capacity Utilization 93.8% ICU Level of Service F

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 6: Bronte Road & Parking Lot Access/QEW EB Ramps



HCM Signalized Intersection Capacity Analysis

6: Bronte Road & Parking Lot Access/QEW EB Ramps

2021 Existing PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	0	4	214	1	778	1	1420	228	209	861	3
Future Volume (vph)	6	0	4	214	1	778	1	1420	228	209	861	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lane Util. Factor	1.00	1.00		0.95	0.91	0.95	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98	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	
Frt	1.00	0.85		1.00	0.86	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1583		1681	1425	1475	1770	3539	1546	1770	3537	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.30	1.00	1.00	0.05	1.00	
Satd. Flow (perm)	1770	1583		1681	1425	1475	567	3539	1546	100	3537	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	0	4	233	1	846	1	1543	248	227	936	3
RTOR Reduction (vph)	0	0	0	0	340	347	0	0	75	0	0	0
Lane Group Flow (vph)	7	4	0	210	99	84	1	1543	173	227	939	0
Confl. Bikes (#/hr)									5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Actuated Green, G (s)	2.9	2.9		25.2	25.2	25.2	70.4	70.4	70.4	92.0	92.0	
Effective Green, g (s)	2.9	2.9		25.2	25.2	25.2	70.4	70.4	70.4	92.0	92.0	
Actuated g/C Ratio	0.02	0.02		0.18	0.18	0.18	0.50	0.50	0.50	0.66	0.66	
Clearance Time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	36	32		302	256	265	285	1779	777	275	2324	
v/s Ratio Prot	c0.00	0.00		c0.12	0.07			c0.44		c0.10	0.27	
v/s Ratio Perm						0.06	0.00		0.11	0.44		
v/c Ratio	0.19	0.12		0.70	0.39	0.32	0.00	0.87	0.22	0.83	0.40	
Uniform Delay, d1	67.4	67.3		53.8	50.6	49.9	17.3	30.7	19.5	44.2	11.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.16	1.06	
Incremental Delay, d2	2.6	1.8		6.8	1.0	0.7	0.0	6.0	0.7	16.9	0.5	
Delay (s)	70.0	69.1		60.6	51.5	50.6	17.4	36.7	20.1	68.1	12.4	
Level of Service	E	E		E	D	D	B	D	C	E	B	
Approach Delay (s)		69.7			52.9			34.4			23.2	
Approach LOS		E			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			36.2									
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			140.0									
Intersection Capacity Utilization			93.8%									
Analysis Period (min)			15									
c Critical Lane Group												

Appendix I

2026 Future Background Conditions Synchro Worksheets

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2026 Future Background AM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	203	390	524	88	196	65	980	249	262	2124	12
Future Volume (vph)	11	203	390	524	88	196	65	980	249	262	2124	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	140.0		0.0	135.0		80.0	180.0		50.0
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (m)	65.0			100.0			70.0			70.0		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99		0.98			0.97			0.96			0.97
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1656	1863	1583	3433	1792	1553	1719	3343	1485	1770	3406	1336
Flt Permitted	0.698			0.423			0.062			0.163		
Satd. Flow (perm)	1200	1863	1556	1529	1792	1503	112	3343	1425	304	3406	1289
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			121			202			233			91
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		296.6			291.2			731.4			120.4	
Travel Time (s)		17.8			17.5			43.9			7.2	
Confl. Peds. (#/hr)	11					11	5		7	7		5
Confl. Bikes (#/hr)			5			5			5			5
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 (%)	9%	2%	2%	2%	6%	4%	5%	8%	7%	2%	6%	18%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Adj. Flow (vph)	11	209	402	540	91	202	67	1010	257	270	2190	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	209	402	540	91	202	67	1010	257	270	2190	12
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.00	1.00	1.03
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

12-03-2021

NA

CGH Transportation

Page 1

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2026 Future Background AM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0	10.0	6.0	20.0	20.0	6.0	20.0	20.0
Minimum Split (s)	10.5	36.7	36.7	10.5	36.7	36.7	10.5	36.5	36.5	10.5	36.5	36.5
Total Split (s)	10.5	36.7	36.7	10.5	36.7	36.7	10.5	64.3	64.3	28.5	82.3	82.3
Total Split (%)	7.5%	26.2%	26.2%	7.5%	26.2%	26.2%	7.5%	45.9%	45.9%	20.4%	58.8%	58.8%
Maximum Green (s)	6.5	30.0	30.0	6.5	30.0	30.0	6.5	57.8	57.8	24.5	75.8	75.8
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	2.8	2.8	1.0	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	0.0	0.0
Total Lost Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
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	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)					7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)					23.0	23.0		23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)					11	11		7	7		5	5
Act Effct Green (s)	37.9	29.0	29.0	40.6	35.3	35.3	75.7	66.8	66.8	89.8	78.9	78.9
Actuated g/C Ratio	0.27	0.21	0.21	0.29	0.25	0.25	0.54	0.48	0.48	0.64	0.56	0.56
v/c Ratio	0.03	0.54	0.96	1.02	0.20	0.38	0.50	0.63	0.32	0.74	1.14	0.02
Control Delay	34.2	55.1	73.4	88.5	44.0	8.0	41.8	31.1	9.2	26.2	100.4	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.2	55.1	73.4	88.5	44.0	8.0	41.8	31.1	9.2	26.2	100.4	0.0
LOS	C	E	E	F	D	A	D	C	A	C	F	A
Approach Delay		66.6			64.1			27.5			91.8	
Approach LOS		E			E			C			F	
Queue Length 50th (m)	2.2	54.4	85.4	66.6	19.9	0.0	7.1	109.0	19.1	32.0	~403.5	0.0
Queue Length 95th (m)	7.2	81.7	#151.2	#112.0	38.9	21.6	21.9	153.2	42.6	57.5	#445.5	0.0
Internal Link Dist (m)		272.6			267.2			707.4			96.4	
Turn Bay Length (m)	70.0		70.0	140.0			135.0		80.0	180.0		50.0
Base Capacity (vph)	349	399	428	532	452	530	135	1595	801	451	1919	765
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.52	0.94	1.02	0.20	0.38	0.50	0.63	0.32	0.60	1.14	0.02

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 82.6 (59%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

1: Bronte Road & Upper Middle Road

2026 Future Background AM Peak Hour

1300 Bronte Enns

Maximum v/c Ratio: 1.14

Intersection Signal Delay: 68.1

Intersection LOS: E

Intersection Capacity Utilization 112.1%

ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Bronte Road & Upper Middle Road

 Ø1		 Ø2 (R)		 Ø3		 Ø4	
28.5 s		64.3 s		10.5 s		36.7 s	
 Ø5		 Ø6 (R)		 Ø7		 Ø8	
10.5 s		62.3 s		10.5 s		36.7 s	

HCM Signalized Intersection Capacity Analysis

1: Bronte Road & Upper Middle Road

2026 Future Background AM Peak Hour

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	203	390	524	88	196	65	980	249	262	2124	12
Future Volume (vph)	11	203	390	524	88	196	65	980	249	262	2124	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00	0.97
Flpb, ped/bikes	0.99	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	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	1863	1556	3433	1792	1504	1719	3343	1426	1769	3406	1289
Flt Permitted	0.70	1.00	1.00	0.42	1.00	1.00	0.06	1.00	1.00	0.16	1.00	1.00
Satd. Flow (perm)	1205	1863	1556	1530	1792	1504	112	3343	1426	303	3406	1289
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)	11	209	402	540	91	202	67	1010	257	270	2190	12
RTOR Reduction (vph)	0	0	94	0	0	151	0	0	126	0	0	6
Lane Group Flow (vph)	11	209	308	540	91	51	67	1010	131	270	2190	6
Confl. Peds. (#/hr)	11					11	5		7	7		5
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	9%	2%	2%	2%	6%	4%	5%	8%	7%	2%	6%	18%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	34.0	31.4	31.4	41.8	35.3	35.3	69.6	64.4	64.4	84.9	75.7	75.7
Effective Green, g (s)	34.0	31.4	31.4	41.8	35.3	35.3	69.6	64.4	64.4	84.9	75.7	75.7
Actuated g/C Ratio	0.24	0.22	0.22	0.30	0.25	0.25	0.50	0.46	0.46	0.61	0.54	0.54
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	300	417	348	545	451	379	115	1537	655	356	1841	696
v/s Ratio Prot	0.00	0.11		c0.05	0.05		0.02	0.30		c0.09	c0.64	
v/s Ratio Perm	0.01		0.20	c0.25		0.03	0.27		0.09	0.37		0.01
v/c Ratio	0.04	0.50	0.89	0.99	0.20	0.13	0.58	0.66	0.20	0.76	1.19	0.01
Uniform Delay, d1	40.4	47.5	52.6	50.1	41.2	40.5	31.9	29.3	22.5	19.0	32.1	14.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.55	1.02	1.96	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.0	22.5	36.1	0.2	0.2	6.6	2.0	0.6	8.9	91.1	0.0
Delay (s)	40.4	48.4	75.1	86.2	41.5	40.7	56.1	31.7	44.6	28.0	123.2	14.9
Level of Service	D	D	E	F	D	D	E	C	D	C	F	B
Approach Delay (s)		65.5			70.3			35.5			112.3	
Approach LOS		E			E			D			F	
Intersection Summary												
HCM 2000 Control Delay			80.6									
HCM 2000 Volume to Capacity ratio			1.14									
Actuated Cycle Length (s)			140.0									
Intersection Capacity Utilization			112.1%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
2: Bronte Road & Saw Whet Boulevard

2026 Future Background AM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	11	172	0	95	4	1193	54	30	3100	1
Future Volume (vph)	4	0	11	172	0	95	4	1193	54	30	3100	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	15.0		15.0	15.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.850			0.850				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1770	1583	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.644			0.750			0.038			0.182		
Satd. Flow (perm)	1200	1583	0	1397	1583	0	71	3539	1583	339	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			96				22			19
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		42.5			50.2			458.5			731.4	
Travel Time (s)		3.1			3.6			27.5			43.9	
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)	4	0	12	187	0	103	4	1297	59	33	3370	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	12	0	187	103	0	4	1297	59	33	3370	1
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	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
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6

Lanes, Volumes, Timings
2: Bronte Road & Saw Whet Boulevard

2026 Future Background AM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	35.5	35.5		35.5	35.5		35.5	35.5	35.5	35.5	35.5	35.5
Total Split (s)	35.5	35.5		35.5	35.5		104.5	104.5	104.5	104.5	104.5	104.5
Total Split (%)	25.4%	25.4%		25.4%	25.4%		74.6%	74.6%	74.6%	74.6%	74.6%	74.6%
Maximum Green (s)	30.0	30.0		30.0	30.0		99.0	99.0	99.0	99.0	99.0	99.0
Yellow Time (s)	3.3	3.3		3.3	3.3		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.2	2.2		2.2	2.2		1.8	1.8	1.8	1.8	1.8	1.8
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)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	23.0	23.0		23.0	23.0		23.0	23.0	23.0	23.0	23.0	23.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effect Green (s)	23.4	23.4		23.4	23.4		105.6	105.6	105.6	105.6	105.6	105.6
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.75	0.75	0.75	0.75	0.75	0.75
v/c Ratio	0.02	0.04		0.80	0.30		0.08	0.49	0.05	0.13	1.26	0.00
Control Delay	45.0	11.4		80.0	12.4		10.0	7.5	3.4	4.3	134.0	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	45.0	11.4		80.0	12.4		10.0	7.5	3.4	4.3	134.0	0.0
LOS	D	B		F	B		A	A	A	A	F	A
Approach Delay		19.8			56.0			7.4			132.7	
Approach LOS		B			E			A			F	
Queue Length 50th (m)	1.0	0.0		52.8	1.7		0.2	121.1	1.7	1.8	~648.7	0.0
Queue Length 95th (m)	4.5	4.2		77.7	17.7		m0.7	126.4	m4.9	m2.3	m#591.8	m0.0
Internal Link Dist (m)		18.5			26.2			434.5			707.4	
Turn Bay Length (m)	15.0			15.0			15.0		15.0	15.0		15.0
Base Capacity (vph)	257	354		299	414		53	2669	1199	255	2669	1199
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.03		0.63	0.25		0.08	0.49	0.05	0.13	1.26	0.00

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 85 (61%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.26

Intersection Signal Delay: 94.4

Intersection LOS: F

Intersection Capacity Utilization 111.1%

ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Bronte Road & Saw Whet Boulevard



HCM Signalized Intersection Capacity Analysis

2: Bronte Road & Saw Whet Boulevard

2026 Future Background AM Peak Hour

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	11	172	0	95	4	1193	54	30	3100	1
Future Volume (vph)	4	0	11	172	0	95	4	1193	54	30	3100	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	5.5	5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.85		1.00	0.85		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)	1770	1583		1770	1583		1770	3539	1583	1770	3539	1583
Flt Permitted	0.64	1.00		0.75	1.00		0.04	1.00	1.00	0.18	1.00	1.00
Satd. Flow (perm)	1199	1583		1397	1583		71	3539	1583	338	3539	1583
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)	4	0	12	187	0	103	4	1297	59	33	3370	1
RTOR Reduction (vph)	0	10	0	0	80	0	0	0	5	0	0	0
Lane Group Flow (vph)	4	2	0	187	23	0	4	1297	54	33	3370	1
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	23.4	23.4		23.4	23.4		105.6	105.6	105.6	105.6	105.6	105.6
Effective Green, g (s)	23.4	23.4		23.4	23.4		105.6	105.6	105.6	105.6	105.6	105.6
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.75	0.75	0.75	0.75	0.75	0.75
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	200	264		233	264		53	2669	1194	254	2669	1194
v/s Ratio Prot		0.00			0.01			0.37			c0.95	
v/s Ratio Perm	0.00			c0.13			0.06		0.03	0.10		0.00
v/c Ratio	0.02	0.01		0.80	0.09		0.08	0.49	0.04	0.13	1.26	0.00
Uniform Delay, d1	48.7	48.6		56.1	49.3		4.5	6.7	4.4	4.7	17.2	4.2
Progression Factor	1.00	1.00		1.00	1.00		1.11	0.96	0.90	0.68	0.54	1.00
Incremental Delay, d2	0.0	0.0		17.8	0.1		2.3	0.5	0.1	0.1	118.5	0.0
Delay (s)	48.8	48.6		73.9	49.4		7.3	6.9	4.0	3.3	127.7	4.2
Level of Service	D	D		E	D		A	A	A	A	F	A
Approach Delay (s)		48.7			65.2			6.8			126.5	
Approach LOS		D			E			A			F	
Intersection Summary												
HCM 2000 Control Delay	90.6			HCM 2000 Level of Service					F			
HCM 2000 Volume to Capacity ratio	1.18											
Actuated Cycle Length (s)	140.0			Sum of lost time (s)					11.0			
Intersection Capacity Utilization	111.1%			ICU Level of Service					H			
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2026 Future Background AM Peak Hour

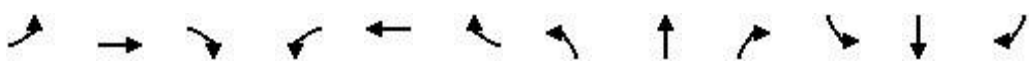
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	161	0	65	0	1233	78	149	3123	0
Future Volume (vph)	1	0	1	161	0	65	0	1233	78	149	3123	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		40.0	35.0		30.0	70.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			20.0			60.0		
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
Ped Bike Factor		0.99				0.98			0.98			
Frt		0.932				0.850			0.850			
Flt Protected		0.976		0.950						0.950		
Satd. Flow (prot)	0	1680	0	1530	0	1392	1863	3406	1439	1770	3471	0
Flt Permitted		0.976		0.757						0.158		
Satd. Flow (perm)	0	1680	0	1219	0	1368	1863	3406	1406	294	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		54				67			56			
Link Speed (k/h)		20			20			60			60	
Link Distance (m)		78.7			109.0			435.9			458.5	
Travel Time (s)		14.2			19.6			26.2			27.5	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	18%	2%	16%	2%	6%	10%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Adj. Flow (vph)	1	0	1	166	0	67	0	1271	80	154	3220	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2	0	166	0	67	0	1271	80	154	3220	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.03	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1		1	1	2	1	1	2	
Detector Template	Left	Thru		Left		Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0		2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0		2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4						9.4			9.4	
Detector 2 Size(m)		0.6						0.6			0.6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2026 Future Background AM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA		Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8		8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0		10.0	15.0	15.0	15.0	5.0	15.0	
Minimum Split (s)	24.2	24.2		35.2		35.2	34.9	34.9	34.9	9.5	34.9	
Total Split (s)	35.2	35.2		35.2		35.2	88.2	88.2	88.2	16.6	104.8	
Total Split (%)	25.1%	25.1%		25.1%		25.1%	63.0%	63.0%	63.0%	11.9%	74.9%	
Maximum Green (s)	29.0	29.0		29.0		29.0	82.3	82.3	82.3	12.6	98.9	
Yellow Time (s)	3.1	3.1		3.1		3.1	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.1	3.1		3.1		3.1	2.2	2.2	2.2	1.0	2.2	
Lost Time Adjust (s)		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.2		6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.6	3.6	3.6	3.0	3.6	
Recall Mode	None	None		None		None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0		7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				22.0		22.0	22.0	22.0	22.0		22.0	
Pedestrian Calls (#/hr)				0		0	0	0	0		0	
Act Effect Green (s)		23.3		23.3		23.3		91.8	91.8	106.5	104.6	
Actuated g/C Ratio		0.17		0.17		0.17		0.66	0.66	0.76	0.75	
v/c Ratio		0.01		0.82		0.24		0.57	0.09	0.49	1.24	
Control Delay		0.0		85.8		12.2		23.0	13.2	2.9	121.2	
Queue Delay		0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay		0.0		85.8		12.2		23.0	13.2	2.9	121.2	
LOS		A		F		B		C	B	A	F	
Approach Delay					64.6			22.4			115.8	
Approach LOS					E			C			F	
Queue Length 50th (m)		0.0		46.9		0.0		86.1	4.1	2.6	~615.2	
Queue Length 95th (m)		0.0		71.9		13.4		165.2	m20.6	m2.1 m	#432.2	
Internal Link Dist (m)		54.7			85.0			411.9			434.5	
Turn Bay Length (m)						40.0			30.0	70.0		
Base Capacity (vph)		390		252		336		2232	940	356	2594	
Starvation Cap Reductn		0		0		0		0	0	0	0	
Spillback Cap Reductn		0		0		0		0	0	0	0	
Storage Cap Reductn		0		0		0		0	0	0	0	
Reduced v/c Ratio		0.01		0.66		0.20		0.57	0.09	0.43	1.24	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 128.8 (92%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.24

Lanes, Volumes, Timings 3: Bronte Road & Driveway/Charles Cornwall Road

2026 Future Background AM Peak Hour
1300 Bronte Enns

Intersection Signal Delay: 87.9

Intersection LOS: F

Intersection Capacity Utilization 127.6%

ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

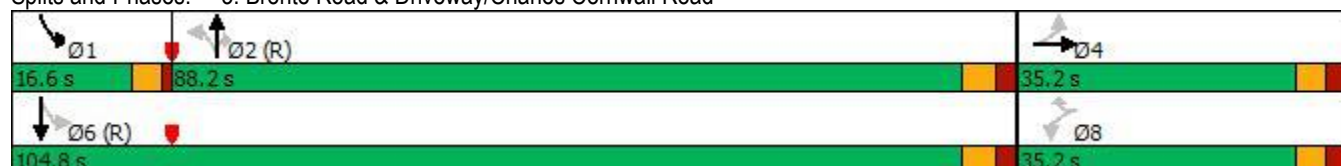
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Bronte Road & Driveway/Charles Cornwall Road



HCM Signalized Intersection Capacity Analysis

3: Bronte Road & Driveway/Charles Cornwall Road

2026 Future Background AM Peak Hour

1300 Bronte Enns

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	1	0	1	161	0	65	0	1233	78	149	3123	0	
Future Volume (vph)	1	0	1	161	0	65	0	1233	78	149	3123	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		6.2		6.2		6.2		5.9	5.9	4.0	5.9		
Lane Util. Factor		1.00		1.00		1.00		0.95	1.00	1.00	0.95		
Frpb, ped/bikes		0.99		1.00		0.98		1.00	0.98	1.00	1.00		
Flpb, ped/bikes		1.00		1.00		1.00		1.00	1.00	1.00	1.00		
Frt		0.93		1.00		0.85		1.00	0.85	1.00	1.00		
Flt Protected		0.98		0.95		1.00		1.00	1.00	0.95	1.00		
Satd. Flow (prot)		1679		1530		1366		3406	1406	1770	3471		
Flt Permitted		0.98		0.76		1.00		1.00	1.00	0.16	1.00		
Satd. Flow (perm)		1679		1218		1366		3406	1406	294	3471		
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)	1	0	1	166	0	67	0	1271	80	154	3220	0	
RTOR Reduction (vph)	0	2	0	0	0	56	0	0	19	0	0	0	
Lane Group Flow (vph)	0	0	0	166	0	11	0	1271	61	154	3220	0	
Confl. Bikes (#/hr)			5			5			5			5	
Heavy Vehicles (%)	2%	2%	2%	18%	2%	16%	2%	6%	10%	2%	4%	2%	
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6	
Turn Type	Perm	NA		Perm		Perm	Perm	NA	Perm	pm+pt	NA		
Protected Phases		4						2		1	6		
Permitted Phases	4			8		8	2		2	6			
Actuated Green, G (s)		23.3		23.3		23.3		91.7	91.7	104.6	104.6		
Effective Green, g (s)		23.3		23.3		23.3		91.7	91.7	104.6	104.6		
Actuated g/C Ratio		0.17		0.17		0.17		0.66	0.66	0.75	0.75		
Clearance Time (s)		6.2		6.2		6.2		5.9	5.9	4.0	5.9		
Vehicle Extension (s)		3.0		3.0		3.0		3.6	3.6	3.0	3.6		
Lane Grp Cap (vph)		279		202		227		2230	920	313	2593		
v/s Ratio Prot								0.37		0.03	c0.93		
v/s Ratio Perm		0.00		c0.14		0.01			0.04	0.34			
v/c Ratio		0.00		0.82		0.05		0.57	0.07	0.49	1.24		
Uniform Delay, d1		48.6		56.3		49.0		13.3	8.7	9.0	17.7		
Progression Factor		1.00		1.00		1.00		1.54	3.02	0.49	0.25		
Incremental Delay, d2		0.0		22.8		0.1		0.8	0.1	0.1	109.1		
Delay (s)		48.7		79.1		49.1		21.2	26.4	4.5	113.6		
Level of Service		D		E		D		C	C	A	F		
Approach Delay (s)		48.7			70.5			21.5			108.6		
Approach LOS		D			E			C			F		
Intersection Summary													
HCM 2000 Control Delay			83.1									HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio			1.20										
Actuated Cycle Length (s)			140.0							16.1			
Intersection Capacity Utilization			127.6%									ICU Level of Service	H
Analysis Period (min)			15										
c Critical Lane Group													

Lanes, Volumes, Timings

2026 Future Background AM Peak Hour

4: Bronte Road & Driveway/North Service Road West

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	17	0	44	0	1289	241	268	3026	1
Future Volume (vph)	0	0	0	17	0	44	0	1289	241	268	3026	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	45.0		0.0	35.0		70.0	115.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			50.0			65.0			65.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor						0.98			0.98		1.00	
Frt						0.850			0.850			
Flt Protected				0.950	0.950					0.950		
Satd. Flow (prot)	0	1863	0	1681	1681	1583	1863	3438	1583	1770	3471	0
Flt Permitted				0.950	0.950					0.119		
Satd. Flow (perm)	0	1863	0	1681	1681	1555	1863	3438	1546	222	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						112			179			
Link Speed (k/h)		20			50			60			60	
Link Distance (m)		52.6			84.3			299.0			435.9	
Travel Time (s)		9.5			6.1			17.9			26.2	
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	4%	2%
Adj. Flow (vph)	0	0	0	17	0	45	0	1315	246	273	3088	1
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	8	9	45	0	1315	246	273	3089	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

12-03-2021

NA

CGH Transportation

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Lanes, Volumes, Timings

2026 Future Background AM Peak Hour

4: Bronte Road & Driveway/North Service Road West

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8			4			2			1	6	
Permitted Phases	8			4		4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	15.0	15.0	15.0	6.0	15.0	
Minimum Split (s)	24.7	24.7		36.9	36.9	36.9	41.7	41.7	41.7	10.5	24.7	
Total Split (s)	13.0	13.0		39.0	39.0	39.0	77.0	77.0	77.0	11.0	88.0	
Total Split (%)	9.3%	9.3%		27.9%	27.9%	27.9%	55.0%	55.0%	55.0%	7.9%	62.9%	
Maximum Green (s)	6.3	6.3		33.1	33.1	33.1	70.3	70.3	70.3	7.0	81.3	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		2.2	2.2	2.2	3.0	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)	6.7			5.9	5.9	5.9	6.7	6.7	6.7	4.0	6.7	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		0.0	
Flash Dont Walk (s)				24.0	24.0	24.0	28.0	28.0	28.0		0.0	
Pedestrian Calls (#/hr)				1	1	1	0	0	0		0	
Act Effect Green (s)				16.5	16.5	16.5		80.0	80.0	116.8	115.4	
Actuated g/C Ratio				0.12	0.12	0.12		0.57	0.57	0.83	0.82	
v/c Ratio				0.04	0.05	0.16		0.67	0.26	0.53	1.08	
Control Delay				49.1	49.3	1.2		22.1	6.9	24.3	46.0	
Queue Delay				0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay				49.1	49.3	1.2		22.1	6.9	24.3	46.0	
LOS				D	D	A		C	A	C	D	
Approach Delay				14.4			19.7			44.2		
Approach LOS				B			B			D		
Queue Length 50th (m)				2.3	2.5	0.0		71.2	2.1	27.8	~529.9	
Queue Length 95th (m)				7.1	7.5	0.0		220.7	29.7	m16.5 m#	419.9	
Internal Link Dist (m)	28.6			60.3			275.0			411.9		
Turn Bay Length (m)				45.0						70.0	115.0	
Base Capacity (vph)				397	397	453		1965	960	517	2861	
Starvation Cap Reductn				0	0	0		0	0	0	0	
Spillback Cap Reductn				0	0	0		0	0	0	0	
Storage Cap Reductn				0	0	0		0	0	0	0	
Reduced v/c Ratio				0.02	0.02	0.10		0.67	0.26	0.53	1.08	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 27 (19%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.08

Intersection Signal Delay: 36.2

Intersection LOS: D

Intersection Capacity Utilization 121.2%

ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 4: Bronte Road & Driveway/North Service Road West



HCM Signalized Intersection Capacity Analysis

4: Bronte Road & Driveway/North Service Road West

2026 Future Background AM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	17	0	44	0	1289	241	268	3026	1
Future Volume (vph)	0	0	0	17	0	44	0	1289	241	268	3026	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Lane Util. Factor				0.95	0.95	1.00		0.95	1.00	1.00	0.95	
Frpb, ped/bikes				1.00	1.00	0.98		1.00	0.98	1.00	1.00	
Flpb, ped/bikes				1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt				1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected				0.95	0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1681	1681	1545		3438	1546	1770	3471	
Flt Permitted				0.95	0.95	1.00		1.00	1.00	0.12	1.00	
Satd. Flow (perm)				1681	1681	1545		3438	1546	222	3471	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	17	0	45	0	1315	246	273	3088	1
RTOR Reduction (vph)	0	0	0	0	0	40	0	0	78	0	0	0
Lane Group Flow (vph)	0	0	0	8	9	5	0	1315	168	273	3089	0
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	4%	2%
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		8			4			2		1	6	
Permitted Phases	8			4		4	2		2	6		
Actuated Green, G (s)				14.5	14.5	14.5		78.8	78.8	112.9	112.9	
Effective Green, g (s)				14.5	14.5	14.5		78.8	78.8	112.9	112.9	
Actuated g/C Ratio				0.10	0.10	0.10		0.56	0.56	0.81	0.81	
Clearance Time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Vehicle Extension (s)				5.0	5.0	5.0		5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)				174	174	160		1935	870	511	2799	
v/s Ratio Prot								0.38		0.11	c0.89	
v/s Ratio Perm				0.00	0.01	0.00			0.11	0.31		
v/c Ratio				0.05	0.05	0.03		0.68	0.19	0.53	1.10	
Uniform Delay, d1				56.5	56.6	56.4		21.7	15.0	19.9	13.5	
Progression Factor				1.00	1.00	1.00		0.95	1.34	1.57	0.27	
Incremental Delay, d2				0.2	0.3	0.2		1.4	0.4	0.1	47.2	
Delay (s)				56.7	56.8	56.6		22.0	20.5	31.4	50.9	
Level of Service				E	E	E		C	C	C	D	
Approach Delay (s)		0.0			56.6			21.8			49.3	
Approach LOS		A			E			C			D	
Intersection Summary												
HCM 2000 Control Delay			40.8									
HCM 2000 Volume to Capacity ratio			1.07									
Actuated Cycle Length (s)			140.0							23.3		
Intersection Capacity Utilization			121.2%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2026 Future Background AM Peak Hour

1300 Bronte Enns

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	193	289	1241	0	0	1897
Future Volume (vph)	193	289	1241	0	0	1897
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	90.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	1.00	0.95	1.00	1.00	0.95
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3335	1568	3471	0	0	3505
Flt Permitted	0.950					
Satd. Flow (perm)	3335	1568	3471	0	0	3505
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		24				
Link Speed (k/h)	60		60			60
Link Distance (m)	65.9		376.8			299.0
Travel Time (s)	4.0		22.6			17.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	3%	4%	2%	2%	3%
Adj. Flow (vph)	210	314	1349	0	0	2062
Shared Lane Traffic (%)						
Lane Group Flow (vph)	210	314	1349	0	0	2062
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2026 Future Background AM Peak Hour

1300 Bronte Enns



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8					
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.7	24.7	36.5			26.5
Total Split (s)	30.0	30.0	40.0			40.0
Total Split (%)	42.9%	42.9%	57.1%			57.1%
Maximum Green (s)	23.3	23.3	33.5			33.5
Yellow Time (s)	3.7	3.7	3.7			3.7
All-Red Time (s)	3.0	3.0	2.8			2.8
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	6.7	6.7	6.5			6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	C-Max			C-Max
Act Effect Green (s)	17.9	17.9	38.9			38.9
Actuated g/C Ratio	0.26	0.26	0.56			0.56
v/c Ratio	0.25	0.75	0.70			1.06
Control Delay	20.2	33.3	26.2			48.4
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	20.2	33.3	26.2			48.4
LOS	C	C	C			D
Approach Delay	28.1		26.2			48.4
Approach LOS	C		C			D
Queue Length 50th (m)	11.7	36.4	149.6			~222.3
Queue Length 95th (m)	17.8	57.5	190.4			m#258.4
Internal Link Dist (m)	41.9		352.8			275.0
Turn Bay Length (m)		90.0				
Base Capacity (vph)	1110	537	1931			1949
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.19	0.58	0.70			1.06

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 14 (20%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.06

Intersection Signal Delay: 38.1

Intersection LOS: D

Intersection Capacity Utilization 71.8%

ICU Level of Service C

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

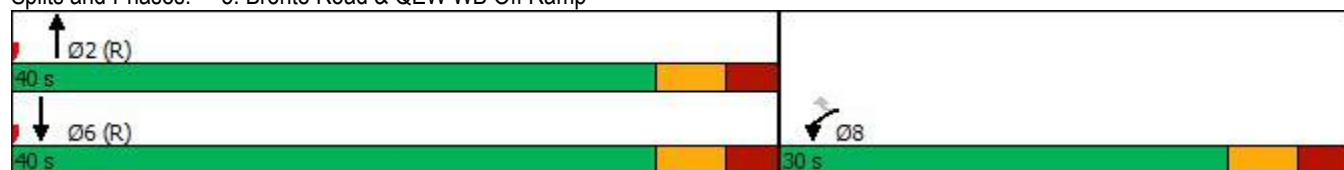
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 5: Bronte Road & QEW WB Off Ramp



HCM Signalized Intersection Capacity Analysis

5: Bronte Road & QEW WB Off Ramp

2026 Future Background AM Peak Hour
1300 Bronte Enns

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	193	289	1241	0	0	1897
Future Volume (vph)	193	289	1241	0	0	1897
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7	6.5			6.5
Lane Util. Factor	0.97	1.00	0.95			0.95
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3335	1568	3471			3505
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3335	1568	3471			3505
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	210	314	1349	0	0	2062
RTOR Reduction (vph)	0	18	0	0	0	0
Lane Group Flow (vph)	210	296	1349	0	0	2062
Heavy Vehicles (%)	5%	3%	4%	2%	2%	3%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	17.9	17.9	38.9			38.9
Effective Green, g (s)	17.9	17.9	38.9			38.9
Actuated g/C Ratio	0.26	0.26	0.56			0.56
Clearance Time (s)	6.7	6.7	6.5			6.5
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	852	400	1928			1947
v/s Ratio Prot	0.06		0.39			c0.59
v/s Ratio Perm		c0.19				
v/c Ratio	0.25	0.74	0.70			1.06
Uniform Delay, d1	20.7	23.9	11.3			15.6
Progression Factor	1.00	1.00	2.02			1.17
Incremental Delay, d2	0.2	7.2	1.5			28.0
Delay (s)	20.8	31.1	24.3			46.3
Level of Service	C	C	C			D
Approach Delay (s)	27.0		24.3			46.3
Approach LOS	C		C			D
Intersection Summary						
HCM 2000 Control Delay			36.2		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.96			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	13.2
Intersection Capacity Utilization			71.8%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings

2026 Future Background AM Peak Hour

6: Bronte Road & Parking Lot Access/QEW EB Ramps

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1	2	359	2	601	3	826	232	651	1408	9
Future Volume (vph)	7	1	2	359	2	601	3	826	232	651	1408	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	10.0		0.0	130.0		125.0	120.0		95.0	255.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			65.0			95.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.91	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor									0.97		1.00	
Frt		0.900			0.868	0.850			0.850		0.999	
Flt Protected	0.950			0.950	0.994		0.950			0.950		
Satd. Flow (prot)	1770	1676	0	1665	1424	1461	1770	3374	1583	1770	3468	0
Flt Permitted	0.950			0.950	0.994		0.166			0.097		
Satd. Flow (perm)	1770	1676	0	1665	1424	1461	309	3374	1543	181	3468	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					265	346			252		1	
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		53.2			37.5			215.0			376.8	
Travel Time (s)		4.8			3.4			12.9			22.6	
Confl. Bikes (#/hr)									5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	3%	2%	5%	2%	7%	2%	2%	4%	2%
Adj. Flow (vph)	8	1	2	390	2	653	3	898	252	708	1530	10
Shared Lane Traffic (%)				10%		47%						
Lane Group Flow (vph)	8	3	0	351	348	346	3	898	252	708	1540	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

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NA

CGH Transportation

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Lanes, Volumes, Timings

2026 Future Background AM Peak Hour

6: Bronte Road & Parking Lot Access/QEW EB Ramps

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	36.7	36.7		36.7	36.7	36.7	36.5	36.5	36.5	11.5	36.5	
Total Split (s)	18.0	18.0		45.0	45.0	45.0	53.0	53.0	53.0	24.0	77.0	
Total Split (%)	12.9%	12.9%		32.1%	32.1%	32.1%	37.9%	37.9%	37.9%	17.1%	55.0%	
Maximum Green (s)	11.3	11.3		38.3	38.3	38.3	46.5	46.5	46.5	20.0	70.5	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.8	2.8	2.8	1.0	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)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				23.0	23.0	23.0	23.0	23.0	23.0		23.0	
Pedestrian Calls (#/hr)				0	0	0	0	0	0		0	
Act Effect Green (s)	7.1	7.1		34.3	34.3	34.3	46.5	46.5	46.5	89.4	86.9	
Actuated g/C Ratio	0.05	0.05		0.24	0.24	0.24	0.33	0.33	0.33	0.64	0.62	
v/c Ratio	0.09	0.04		0.86	0.63	0.56	0.03	0.80	0.37	1.34	0.72	
Control Delay	65.6	64.0		71.0	16.7	7.6	33.0	49.1	5.4	191.2	15.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	65.6	64.0		71.0	16.7	7.6	33.0	49.1	5.4	191.2	15.4	
LOS	E	E		E	B	A	C	D	A	F	B	
Approach Delay		65.1			31.9			39.5			70.7	
Approach LOS		E			C			D			E	
Queue Length 50th (m)	2.3	0.9		101.5	20.9	0.0	0.6	125.3	0.0	~240.6	142.7	
Queue Length 95th (m)	8.3	4.3		#140.9	59.2	26.9	3.1	152.4	19.5 m	#287.2	m149.0	
Internal Link Dist (m)		29.2			13.5			191.0			352.8	
Turn Bay Length (m)	10.0			130.0		125.0	120.0		95.0	255.0		
Base Capacity (vph)	142	135		455	582	651	102	1120	680	529	2153	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.06	0.02		0.77	0.60	0.53	0.03	0.80	0.37	1.34	0.72	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 88 (63%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.34

Intersection Signal Delay: 53.5

Intersection LOS: D

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NA

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Intersection Capacity Utilization 96.0%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

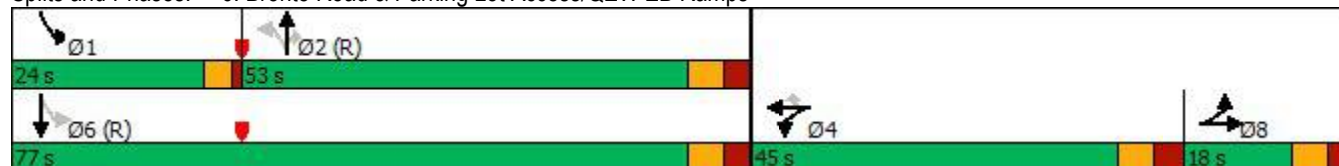
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 6: Bronte Road & Parking Lot Access/QEW EB Ramps



HCM Signalized Intersection Capacity Analysis

6: Bronte Road & Parking Lot Access/QEW EB Ramps

2026 Future Background AM Peak Hour

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1	2	359	2	601	3	826	232	651	1408	9
Future Volume (vph)	7	1	2	359	2	601	3	826	232	651	1408	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lane Util. Factor	1.00	1.00		0.95	0.91	0.95	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97	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	
Frt	1.00	0.90		1.00	0.87	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1676		1665	1424	1461	1770	3374	1542	1770	3468	
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.17	1.00	1.00	0.10	1.00	
Satd. Flow (perm)	1770	1676		1665	1424	1461	310	3374	1542	181	3468	
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)	8	1	2	390	2	653	3	898	252	708	1530	10
RTOR Reduction (vph)	0	0	0	0	200	261	0	0	176	0	0	0
Lane Group Flow (vph)	8	3	0	351	148	85	3	898	77	708	1540	0
Confl. Bikes (#/hr)									5			5
Heavy Vehicles (%)	2%	2%	2%	3%	2%	5%	2%	7%	2%	2%	4%	2%
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Actuated Green, G (s)	2.9	2.9		34.3	34.3	34.3	42.5	42.5	42.5	82.9	82.9	
Effective Green, g (s)	2.9	2.9		34.3	34.3	34.3	42.5	42.5	42.5	82.9	82.9	
Actuated g/C Ratio	0.02	0.02		0.24	0.24	0.24	0.30	0.30	0.30	0.59	0.59	
Clearance Time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	36	34		407	348	357	94	1024	468	520	2053	
v/s Ratio Prot	c0.00	0.00		c0.21	0.10			0.27		c0.35	0.44	
v/s Ratio Perm						0.06	0.01		0.05	c0.45		
v/c Ratio	0.22	0.09		0.86	0.43	0.24	0.03	0.88	0.16	1.36	0.75	
Uniform Delay, d1	67.4	67.3		50.6	44.5	42.4	34.3	46.3	35.7	42.2	20.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.13	0.72	
Incremental Delay, d2	3.1	1.1		16.9	0.8	0.3	0.6	10.5	0.8	166.1	0.7	
Delay (s)	70.6	68.4		67.5	45.4	42.7	34.9	56.8	36.5	213.7	15.8	
Level of Service	E	E		E	D	D	C	E	D	F	B	
Approach Delay (s)		70.0			51.9			52.3			78.1	
Approach LOS		E			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			65.3			HCM 2000 Level of Service				E		
HCM 2000 Volume to Capacity ratio			1.22									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			23.9			
Intersection Capacity Utilization			96.0%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2026 FB - MM - AM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	203	390	524	88	196	65	980	249	262	2124	12
Future Volume (vph)	11	203	390	524	88	196	65	980	249	262	2124	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	140.0		0.0	135.0		80.0	180.0		50.0
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (m)	65.0			100.0			70.0			70.0		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99		0.98			0.97			0.96			0.97
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1656	1863	1583	3433	1792	1553	1719	3343	1485	1770	3406	1336
Flt Permitted	0.698			0.423			0.062			0.163		
Satd. Flow (perm)	1200	1863	1556	1529	1792	1503	112	3343	1425	304	3406	1289
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			121			202			233			91
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		296.6			291.2			731.4			120.4	
Travel Time (s)		17.8			17.5			43.9			7.2	
Confl. Peds. (#/hr)	11					11	5		7	7		5
Confl. Bikes (#/hr)			5			5			5			5
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 (%)	9%	2%	2%	2%	6%	4%	5%	8%	7%	2%	6%	18%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Adj. Flow (vph)	11	209	402	540	91	202	67	1010	257	270	2190	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	209	402	540	91	202	67	1010	257	270	2190	12
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.00	1.00	1.03
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2026 FB - MM - AM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0	10.0	6.0	20.0	20.0	6.0	20.0	20.0
Minimum Split (s)	10.5	36.7	36.7	10.5	36.7	36.7	10.5	36.5	36.5	10.5	36.5	36.5
Total Split (s)	10.5	36.7	36.7	10.5	36.7	36.7	10.5	64.3	64.3	28.5	82.3	82.3
Total Split (%)	7.5%	26.2%	26.2%	7.5%	26.2%	26.2%	7.5%	45.9%	45.9%	20.4%	58.8%	58.8%
Maximum Green (s)	6.5	30.0	30.0	6.5	30.0	30.0	6.5	57.8	57.8	24.5	75.8	75.8
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	2.8	2.8	1.0	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	0.0	0.0
Total Lost Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
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	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)					7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)					23.0	23.0		23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)					11	11		7	7		5	5
Act Effct Green (s)	37.9	29.0	29.0	40.6	35.3	35.3	75.7	66.8	66.8	89.8	78.9	78.9
Actuated g/C Ratio	0.27	0.21	0.21	0.29	0.25	0.25	0.54	0.48	0.48	0.64	0.56	0.56
v/c Ratio	0.03	0.54	0.96	1.02	0.20	0.38	0.50	0.63	0.32	0.74	1.14	0.02
Control Delay	34.2	55.1	73.4	88.5	44.0	8.0	35.0	33.1	8.9	26.2	100.4	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.2	55.1	73.4	88.5	44.0	8.0	35.0	33.1	8.9	26.2	100.4	0.0
LOS	C	E	E	F	D	A	C	C	A	C	F	A
Approach Delay		66.6			64.1			28.5			91.8	
Approach LOS		E			E			C			F	
Queue Length 50th (m)	2.2	54.4	85.4	66.6	19.9	0.0	9.1	98.6	3.6	32.0	~403.5	0.0
Queue Length 95th (m)	7.2	81.7	#151.2	#112.0	38.9	21.6	24.1	138.6	34.1	57.5	#445.5	0.0
Internal Link Dist (m)		272.6			267.2			707.4			96.4	
Turn Bay Length (m)	70.0		70.0	140.0			135.0		80.0	180.0		50.0
Base Capacity (vph)	349	399	428	532	452	530	135	1595	801	451	1919	765
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.52	0.94	1.02	0.20	0.38	0.50	0.63	0.32	0.60	1.14	0.02

Intersection Summary

Area Type: Other
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 82.6 (59%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 145
Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 1: Bronte Road & Upper Middle Road

2026 FB - MM - AM Peak Hour
1300 Bronte Enns

Maximum v/c Ratio: 1.14

Intersection Signal Delay: 68.4

Intersection LOS: E

Intersection Capacity Utilization 112.1%

ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Bronte Road & Upper Middle Road

 Ø1 28.5 s		 Ø2 (R) 64.3 s		 Ø3 10.5 s		 Ø4 36.7 s	
 Ø5 10.5 s		 Ø6 (R) 62.3 s		 Ø7 10.5 s		 Ø8 36.7 s	

HCM Signalized Intersection Capacity Analysis

2026 FB - MM - AM Peak Hour

1: Bronte Road & Upper Middle Road

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	203	390	524	88	196	65	980	249	262	2124	12
Future Volume (vph)	11	203	390	524	88	196	65	980	249	262	2124	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00	0.97
Flpb, ped/bikes	0.99	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	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	1863	1556	3433	1792	1504	1719	3343	1426	1769	3406	1289
Flt Permitted	0.70	1.00	1.00	0.42	1.00	1.00	0.06	1.00	1.00	0.16	1.00	1.00
Satd. Flow (perm)	1205	1863	1556	1530	1792	1504	112	3343	1426	303	3406	1289
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)	11	209	402	540	91	202	67	1010	257	270	2190	12
RTOR Reduction (vph)	0	0	94	0	0	151	0	0	126	0	0	6
Lane Group Flow (vph)	11	209	308	540	91	51	67	1010	131	270	2190	6
Confl. Peds. (#/hr)	11						11	5		7		5
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	9%	2%	2%	2%	6%	4%	5%	8%	7%	2%	6%	18%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	34.0	31.4	31.4	41.8	35.3	35.3	69.6	64.4	64.4	84.9	75.7	75.7
Effective Green, g (s)	34.0	31.4	31.4	41.8	35.3	35.3	69.6	64.4	64.4	84.9	75.7	75.7
Actuated g/C Ratio	0.24	0.22	0.22	0.30	0.25	0.25	0.50	0.46	0.46	0.61	0.54	0.54
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	300	417	348	545	451	379	115	1537	655	356	1841	696
v/s Ratio Prot	0.00	0.11		c0.05	0.05		0.02	0.30		c0.09	c0.64	
v/s Ratio Perm	0.01		0.20	c0.25		0.03	0.27		0.09	0.37		0.01
v/c Ratio	0.04	0.50	0.89	0.99	0.20	0.13	0.58	0.66	0.20	0.76	1.19	0.01
Uniform Delay, d1	40.4	47.5	52.6	50.1	41.2	40.5	31.9	29.3	22.5	19.0	32.1	14.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.20	1.08	1.88	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.0	22.5	36.1	0.2	0.2	6.6	2.0	0.6	8.9	91.1	0.0
Delay (s)	40.4	48.4	75.1	86.2	41.5	40.7	45.0	33.7	42.9	28.0	123.2	14.9
Level of Service	D	D	E	F	D	D	D	C	D	C	F	B
Approach Delay (s)		65.5			70.3			36.0			112.3	
Approach LOS		E			E			D			F	
Intersection Summary												
HCM 2000 Control Delay			80.8									
HCM 2000 Volume to Capacity ratio			1.14									
Actuated Cycle Length (s)			140.0									
Intersection Capacity Utilization			112.1%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
2: Bronte Road & Saw Whet Boulevard

2026 FB - MM - AM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	11	172	0	95	4	1193	54	30	3100	1
Future Volume (vph)	4	0	11	172	0	95	4	1193	54	30	3100	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	15.0		15.0	15.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.850			0.850				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1770	1583	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.644			0.750			0.038			0.182		
Satd. Flow (perm)	1200	1583	0	1397	1583	0	71	3539	1583	339	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			96				22			19
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		42.5			50.2			458.5			731.4	
Travel Time (s)		3.1			3.6			27.5			43.9	
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)	4	0	12	187	0	103	4	1297	59	33	3370	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	12	0	187	103	0	4	1297	59	33	3370	1
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	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
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6

Lanes, Volumes, Timings
2: Bronte Road & Saw Whet Boulevard

2026 FB - MM - AM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	35.5	35.5		35.5	35.5		35.5	35.5	35.5	35.5	35.5	35.5
Total Split (s)	35.5	35.5		35.5	35.5		104.5	104.5	104.5	104.5	104.5	104.5
Total Split (%)	25.4%	25.4%		25.4%	25.4%		74.6%	74.6%	74.6%	74.6%	74.6%	74.6%
Maximum Green (s)	30.0	30.0		30.0	30.0		99.0	99.0	99.0	99.0	99.0	99.0
Yellow Time (s)	3.3	3.3		3.3	3.3		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.2	2.2		2.2	2.2		1.8	1.8	1.8	1.8	1.8	1.8
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)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	23.0	23.0		23.0	23.0		23.0	23.0	23.0	23.0	23.0	23.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effect Green (s)	23.4	23.4		23.4	23.4		105.6	105.6	105.6	105.6	105.6	105.6
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.75	0.75	0.75	0.75	0.75	0.75
v/c Ratio	0.02	0.04		0.80	0.30		0.08	0.49	0.05	0.13	1.26	0.00
Control Delay	45.0	11.4		80.0	12.4		9.5	7.9	3.8	5.0	134.6	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	45.0	11.4		80.0	12.4		9.5	7.9	3.8	5.0	134.6	0.0
LOS	D	B		F	B		A	A	A	A	F	A
Approach Delay		19.8			56.0			7.8			133.3	
Approach LOS		B			E			A			F	
Queue Length 50th (m)	1.0	0.0		52.8	1.7		0.3	69.2	2.4	1.9	~648.7	0.0
Queue Length 95th (m)	4.5	4.2		77.7	17.7		2.0	99.1	7.3	m2.4	m#591.8	m0.0
Internal Link Dist (m)		18.5			26.2			434.5			707.4	
Turn Bay Length (m)	15.0			15.0			15.0		15.0	15.0		15.0
Base Capacity (vph)	257	354		299	414		53	2669	1199	255	2669	1199
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.03		0.63	0.25		0.08	0.49	0.05	0.13	1.26	0.00

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 80 (57%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.26

Intersection Signal Delay: 94.9

Intersection LOS: F

Intersection Capacity Utilization 111.1%

ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
 2: Bronte Road & Saw Whet Boulevard

2026 FB - MM - AM Peak Hour
 1300 Bronte Enns

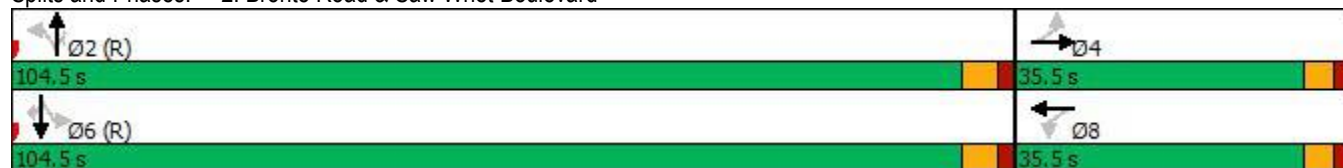
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Bronte Road & Saw Whet Boulevard



HCM Signalized Intersection Capacity Analysis

2: Bronte Road & Saw Whet Boulevard

2026 FB - MM - AM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	11	172	0	95	4	1193	54	30	3100	1
Future Volume (vph)	4	0	11	172	0	95	4	1193	54	30	3100	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	5.5	5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.85		1.00	0.85		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)	1770	1583		1770	1583		1770	3539	1583	1770	3539	1583
Flt Permitted	0.64	1.00		0.75	1.00		0.04	1.00	1.00	0.18	1.00	1.00
Satd. Flow (perm)	1199	1583		1397	1583		71	3539	1583	338	3539	1583
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)	4	0	12	187	0	103	4	1297	59	33	3370	1
RTOR Reduction (vph)	0	10	0	0	80	0	0	0	5	0	0	0
Lane Group Flow (vph)	4	2	0	187	23	0	4	1297	54	33	3370	1
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	23.4	23.4		23.4	23.4		105.6	105.6	105.6	105.6	105.6	105.6
Effective Green, g (s)	23.4	23.4		23.4	23.4		105.6	105.6	105.6	105.6	105.6	105.6
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.75	0.75	0.75	0.75	0.75	0.75
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	200	264		233	264		53	2669	1194	254	2669	1194
v/s Ratio Prot		0.00			0.01			0.37			c0.95	
v/s Ratio Perm	0.00			c0.13			0.06		0.03	0.10		0.00
v/c Ratio	0.02	0.01		0.80	0.09		0.08	0.49	0.04	0.13	1.26	0.00
Uniform Delay, d1	48.7	48.6		56.1	49.3		4.5	6.7	4.4	4.7	17.2	4.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.79	0.59	1.00
Incremental Delay, d2	0.0	0.0		17.8	0.1		2.8	0.6	0.1	0.1	118.5	0.0
Delay (s)	48.8	48.6		73.9	49.4		7.2	7.3	4.4	3.8	128.7	4.2
Level of Service	D	D		E	D		A	A	A	A	F	A
Approach Delay (s)		48.7			65.2			7.2			127.4	
Approach LOS		D			E			A			F	
Intersection Summary												
HCM 2000 Control Delay	91.4			HCM 2000 Level of Service			F					
HCM 2000 Volume to Capacity ratio	1.18											
Actuated Cycle Length (s)	140.0			Sum of lost time (s)			11.0					
Intersection Capacity Utilization	111.1%			ICU Level of Service			H					
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2026 FB - MM - AM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	161	0	65	0	1233	78	149	3123	0
Future Volume (vph)	1	0	1	161	0	65	0	1233	78	149	3123	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		40.0	35.0		7.5	70.0		7.5
Storage Lanes	0		0	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			20.0			60.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.99				0.98		1.00				
Frt		0.932				0.850		0.991				
Flt Protected		0.976		0.950						0.950		
Satd. Flow (prot)	0	1680	0	1530	0	1392	1863	3363	0	1770	3471	0
Flt Permitted		0.976		0.757						0.140		
Satd. Flow (perm)	0	1680	0	1219	0	1368	1863	3363	0	261	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		53				67		8				
Link Speed (k/h)		20			20			60			60	
Link Distance (m)		78.7			109.0			435.9			458.5	
Travel Time (s)		14.2			19.6			26.2			27.5	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	18%	2%	16%	2%	6%	10%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Adj. Flow (vph)	1	0	1	166	0	67	0	1271	80	154	3220	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2	0	166	0	67	0	1351	0	154	3220	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1		1	1	2		1	2	
Detector Template	Left	Thru		Left		Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0		2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0		2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4						9.4			9.4	
Detector 2 Size(m)		0.6						0.6			0.6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2026 FB - MM - AM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA		Perm		Perm	Perm	NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8		8	2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0		10.0	15.0	15.0		5.0	15.0	
Minimum Split (s)	24.2	24.2		35.2		35.2	34.9	34.9		9.5	34.9	
Total Split (s)	35.2	35.2		35.2		35.2	85.0	85.0		16.6	108.0	
Total Split (%)	24.6%	24.6%		24.6%		24.6%	59.4%	59.4%		11.6%	75.4%	
Maximum Green (s)	29.0	29.0		29.0		29.0	79.1	79.1		12.6	102.1	
Yellow Time (s)	3.1	3.1		3.1		3.1	3.7	3.7		3.0	3.7	
All-Red Time (s)	3.1	3.1		3.1		3.1	2.2	2.2		1.0	2.2	
Lost Time Adjust (s)		0.0		0.0		0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.2		6.2		6.2	5.9	5.9		4.0	5.9	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.6	3.6		3.0	3.6	
Recall Mode	None	None		None		None	C-Max	C-Max		None	C-Max	
Walk Time (s)				7.0		7.0	7.0	7.0			7.0	
Flash Dont Walk (s)				22.0		22.0	22.0	22.0			22.0	
Pedestrian Calls (#/hr)				0		0	0	0			0	
Act Effect Green (s)		23.7		23.7		23.7		94.4		109.3	107.4	
Actuated g/C Ratio		0.17		0.17		0.17		0.66		0.76	0.75	
v/c Ratio		0.01		0.83		0.24		0.61		0.52	1.24	
Control Delay		0.0		87.5		12.6		16.3		11.6	131.0	
Queue Delay		0.0		0.0		0.0		0.0		0.0	0.0	
Total Delay		0.0		87.5		12.6		16.3		11.6	131.0	
LOS		A		F		B		B		B	F	
Approach Delay					66.0			16.3			125.6	
Approach LOS					E			B			F	
Queue Length 50th (m)		0.0		48.0		0.0		114.6		10.9	~629.2	
Queue Length 95th (m)		0.0		73.8		13.8		158.7		19.5	#678.0	
Internal Link Dist (m)		54.7			85.0			411.9			434.5	
Turn Bay Length (m)						40.0				70.0		
Base Capacity (vph)		382		246		330		2219		332	2603	
Starvation Cap Reductn		0		0		0		0		0	0	
Spillback Cap Reductn		0		0		0		0		0	0	
Storage Cap Reductn		0		0		0		0		0	0	
Reduced v/c Ratio		0.01		0.67		0.20		0.61		0.46	1.24	

Intersection Summary

Area Type: Other
 Cycle Length: 143.2
 Actuated Cycle Length: 143.2
 Offset: 128.8 (90%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.24

Lanes, Volumes, Timings 3: Bronte Road & Driveway/Charles Cornwall Road

2026 FB - MM - AM Peak Hour
1300 Bronte Enns

Intersection Signal Delay: 92.9

Intersection LOS: F

Intersection Capacity Utilization 127.6%

ICU Level of Service H

Analysis Period (min) 15

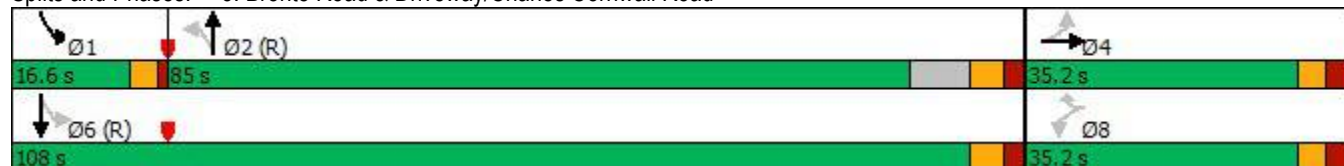
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 3: Bronte Road & Driveway/Charles Cornwall Road



HCM Signalized Intersection Capacity Analysis

3: Bronte Road & Driveway/Charles Cornwall Road

2026 FB - MM - AM Peak Hour

1300 Bronte Enns

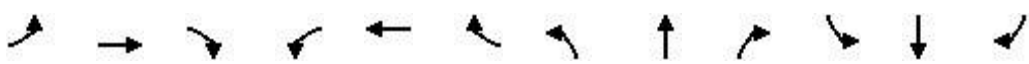
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	161	0	65	0	1233	78	149	3123	0
Future Volume (vph)	1	0	1	161	0	65	0	1233	78	149	3123	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.2		6.2		6.2		5.9		4.0	5.9	
Lane Util. Factor		1.00		1.00		1.00		0.95		1.00	0.95	
Frpb, ped/bikes		0.99		1.00		0.98		1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00		1.00		1.00		1.00	1.00	
Frt		0.93		1.00		0.85		0.99		1.00	1.00	
Flt Protected		0.98		0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)		1679		1530		1366		3363		1770	3471	
Flt Permitted		0.98		0.76		1.00		1.00		0.14	1.00	
Satd. Flow (perm)		1679		1218		1366		3363		261	3471	
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)	1	0	1	166	0	67	0	1271	80	154	3220	0
RTOR Reduction (vph)	0	2	0	0	0	56	0	3	0	0	0	0
Lane Group Flow (vph)	0	0	0	166	0	11	0	1348	0	154	3220	0
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	18%	2%	16%	2%	6%	10%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Turn Type	Perm	NA		Perm		Perm	Perm	NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		23.7		23.7		23.7		94.4		107.4	107.4	
Effective Green, g (s)		23.7		23.7		23.7		94.4		107.4	107.4	
Actuated g/C Ratio		0.17		0.17		0.17		0.66		0.75	0.75	
Clearance Time (s)		6.2		6.2		6.2		5.9		4.0	5.9	
Vehicle Extension (s)		3.0		3.0		3.0		3.6		3.0	3.6	
Lane Grp Cap (vph)		277		201		226		2216		290	2603	
v/s Ratio Prot								0.40		0.03	c0.93	
v/s Ratio Perm		0.00		c0.14		0.01				0.36		
v/c Ratio		0.00		0.83		0.05		0.61		0.53	1.24	
Uniform Delay, d1		49.9		57.8		50.3		13.9		10.2	17.9	
Progression Factor		1.00		1.00		1.00		1.00		1.00	1.00	
Incremental Delay, d2		0.0		23.3		0.1		1.3		1.9	110.2	
Delay (s)		49.9		81.1		50.4		15.1		12.1	128.1	
Level of Service		D		F		D		B		B	F	
Approach Delay (s)		49.9			72.2			15.1			122.8	
Approach LOS		D			E			B			F	
Intersection Summary												
HCM 2000 Control Delay			91.0									F
HCM 2000 Volume to Capacity ratio			1.20									
Actuated Cycle Length (s)			143.2							16.1		
Intersection Capacity Utilization			127.6%								H	
ICU Level of Service												
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

2026 FB - MM - AM Peak Hour

4: Bronte Road & Driveway/North Service Road West

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	0	0	0	17	0	44	0	1289	241	268	3026	1
Future Volume (vph)	0	0	0	17	0	44	0	1289	241	268	3026	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	45.0		0.0	35.0		70.0	115.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			50.0			65.0			65.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor						0.98			0.98		1.00	
Frt						0.850			0.850			
Flt Protected				0.950	0.950					0.950		
Satd. Flow (prot)	0	1863	0	1681	1681	1583	1863	3438	1583	1770	3471	0
Flt Permitted				0.950	0.950					0.119		
Satd. Flow (perm)	0	1863	0	1681	1681	1555	1863	3438	1546	222	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						112			179			
Link Speed (k/h)		20			50			60			60	
Link Distance (m)		52.6			84.3			299.0			435.9	
Travel Time (s)		9.5			6.1			17.9			26.2	
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	4%	2%
Adj. Flow (vph)	0	0	0	17	0	45	0	1315	246	273	3088	1
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	8	9	45	0	1315	246	273	3089	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

12-03-2021

NA

CGH Transportation

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Lanes, Volumes, Timings

2026 FB - MM - AM Peak Hour

4: Bronte Road & Driveway/North Service Road West

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8			4			2			1	6	
Permitted Phases	8			4		4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	15.0	15.0	15.0	6.0	15.0	
Minimum Split (s)	24.7	24.7		36.9	36.9	36.9	41.7	41.7	41.7	10.5	24.7	
Total Split (s)	13.0	13.0		39.0	39.0	39.0	77.0	77.0	77.0	11.0	88.0	
Total Split (%)	9.3%	9.3%		27.9%	27.9%	27.9%	55.0%	55.0%	55.0%	7.9%	62.9%	
Maximum Green (s)	6.3	6.3		33.1	33.1	33.1	70.3	70.3	70.3	7.0	81.3	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		2.2	2.2	2.2	3.0	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)	6.7			5.9	5.9	5.9	6.7	6.7	6.7	4.0	6.7	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0			
Flash Dont Walk (s)				24.0	24.0	24.0	28.0	28.0	28.0			
Pedestrian Calls (#/hr)				1	1	1	0	0	0			
Act Effect Green (s)				16.5	16.5	16.5	80.0			116.8	115.4	
Actuated g/C Ratio				0.12	0.12	0.12	0.57			0.83	0.82	
v/c Ratio				0.04	0.05	0.16	0.67			0.53	1.08	
Control Delay				49.1	49.3	1.2	22.1			6.9	19.0	59.5
Queue Delay				0.0	0.0	0.0	0.0			0.0	0.0	
Total Delay				49.1	49.3	1.2	22.1			6.9	19.0	59.5
LOS				D	D	A	C			A	B	E
Approach Delay				14.4			19.7			56.2		
Approach LOS				B			B			E		
Queue Length 50th (m)				2.3	2.5	0.0	71.0			2.2	24.4	~532.5
Queue Length 95th (m)				7.1	7.5	0.0	220.9			28.8	68.3	#637.4
Internal Link Dist (m)	28.6			60.3			275.0			411.9		
Turn Bay Length (m)				45.0						70.0	115.0	
Base Capacity (vph)				397	397	453	1965			960	517	2861
Starvation Cap Reductn				0	0	0	0			0	0	0
Spillback Cap Reductn				0	0	0	0			0	0	0
Storage Cap Reductn				0	0	0	0			0	0	0
Reduced v/c Ratio				0.02	0.02	0.10	0.67			0.26	0.53	1.08

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 27 (19%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.08

Lanes, Volumes, Timings
4: Bronte Road & Driveway/North Service Road West

2026 FB - MM - AM Peak Hour
1300 Bronte Enns

Intersection Signal Delay: 44.3

Intersection LOS: D

Intersection Capacity Utilization 121.2%

ICU Level of Service H

Analysis Period (min) 15

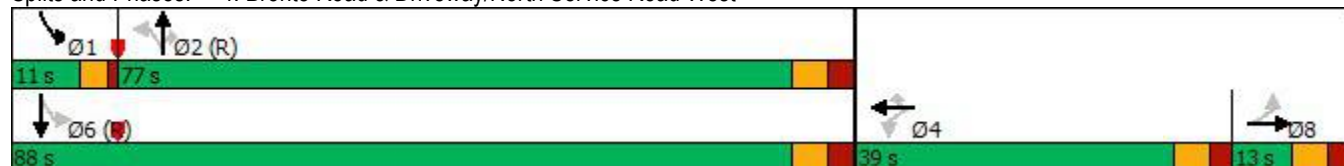
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Bronte Road & Driveway/North Service Road West



HCM Signalized Intersection Capacity Analysis

4: Bronte Road & Driveway/North Service Road West

2026 FB - MM - AM Peak Hour

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↕	↕	↔	↕	↕
Traffic Volume (vph)	0	0	0	17	0	44	0	1289	241	268	3026	1
Future Volume (vph)	0	0	0	17	0	44	0	1289	241	268	3026	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Lane Util. Factor				0.95	0.95	1.00		0.95	1.00	1.00	0.95	
Frpb, ped/bikes				1.00	1.00	0.98		1.00	0.98	1.00	1.00	
Flpb, ped/bikes				1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt				1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected				0.95	0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1681	1681	1545		3438	1546	1770	3471	
Flt Permitted				0.95	0.95	1.00		1.00	1.00	0.12	1.00	
Satd. Flow (perm)				1681	1681	1545		3438	1546	222	3471	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	17	0	45	0	1315	246	273	3088	1
RTOR Reduction (vph)	0	0	0	0	0	40	0	0	78	0	0	0
Lane Group Flow (vph)	0	0	0	8	9	5	0	1315	168	273	3089	0
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	4%	2%
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		8			4			2		1	6	
Permitted Phases	8			4		4	2		2	6		
Actuated Green, G (s)				14.5	14.5	14.5		78.8	78.8	112.9	112.9	
Effective Green, g (s)				14.5	14.5	14.5		78.8	78.8	112.9	112.9	
Actuated g/C Ratio				0.10	0.10	0.10		0.56	0.56	0.81	0.81	
Clearance Time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Vehicle Extension (s)				5.0	5.0	5.0		5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)				174	174	160		1935	870	511	2799	
v/s Ratio Prot								0.38		0.11	c0.89	
v/s Ratio Perm				0.00	0.01	0.00			0.11	0.31		
v/c Ratio				0.05	0.05	0.03		0.68	0.19	0.53	1.10	
Uniform Delay, d1				56.5	56.6	56.4		21.7	15.0	19.9	13.5	
Progression Factor				1.00	1.00	1.00		0.95	1.34	1.00	1.00	
Incremental Delay, d2				0.2	0.3	0.2		1.4	0.4	1.1	52.7	
Delay (s)				56.7	56.8	56.6		21.9	20.4	21.0	66.2	
Level of Service				E	E	E		C	C	C	E	
Approach Delay (s)		0.0			56.6			21.7			62.6	
Approach LOS		A			E			C			E	
Intersection Summary												
HCM 2000 Control Delay			49.7				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			1.07									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)		23.3			
Intersection Capacity Utilization			121.2%				ICU Level of Service		H			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2026 FB - MM - AM Peak Hour
1300 Bronte Enns

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	193	289	1241	0	0	1897
Future Volume (vph)	193	289	1241	0	0	1897
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	90.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	1.00	0.95	1.00	1.00	0.95
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3335	1568	3471	0	0	3505
Flt Permitted	0.950					
Satd. Flow (perm)	3335	1568	3471	0	0	3505
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		24				
Link Speed (k/h)	60		60			60
Link Distance (m)	65.9		376.8			299.0
Travel Time (s)	4.0		22.6			17.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	3%	4%	2%	2%	3%
Adj. Flow (vph)	210	314	1349	0	0	2062
Shared Lane Traffic (%)						
Lane Group Flow (vph)	210	314	1349	0	0	2062
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2026 FB - MM - AM Peak Hour
1300 Bronte Enns



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8					
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.7	24.7	36.5			26.5
Total Split (s)	30.0	30.0	40.0			40.0
Total Split (%)	42.9%	42.9%	57.1%			57.1%
Maximum Green (s)	23.3	23.3	33.5			33.5
Yellow Time (s)	3.7	3.7	3.7			3.7
All-Red Time (s)	3.0	3.0	2.8			2.8
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	6.7	6.7	6.5			6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	C-Max			C-Max
Act Effect Green (s)	17.9	17.9	38.9			38.9
Actuated g/C Ratio	0.26	0.26	0.56			0.56
v/c Ratio	0.25	0.75	0.70			1.06
Control Delay	20.2	33.3	27.5			48.6
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	20.2	33.3	27.5			48.6
LOS	C	C	C			D
Approach Delay	28.1		27.5			48.6
Approach LOS	C		C			D
Queue Length 50th (m)	11.7	36.4	150.2			~222.1
Queue Length 95th (m)	17.8	57.5	m169.2			m#258.4
Internal Link Dist (m)	41.9		352.8			275.0
Turn Bay Length (m)		90.0				
Base Capacity (vph)	1110	537	1931			1949
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.19	0.58	0.70			1.06

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 14 (20%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.06

Intersection Signal Delay: 38.6

Intersection LOS: D

Intersection Capacity Utilization 71.8%

ICU Level of Service C

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Lanes, Volumes, Timings
 5: Bronte Road & QEW WB Off Ramp

2026 FB - MM - AM Peak Hour

1300 Bronte Enns

Queue shown is maximum after two cycles.

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

Splits and Phases: 5: Bronte Road & QEW WB Off Ramp



HCM Signalized Intersection Capacity Analysis

5: Bronte Road & QEW WB Off Ramp

2026 FB - MM - AM Peak Hour
1300 Bronte Enns

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	193	289	1241	0	0	1897
Future Volume (vph)	193	289	1241	0	0	1897
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7	6.5			6.5
Lane Util. Factor	0.97	1.00	0.95			0.95
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3335	1568	3471			3505
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3335	1568	3471			3505
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	210	314	1349	0	0	2062
RTOR Reduction (vph)	0	18	0	0	0	0
Lane Group Flow (vph)	210	296	1349	0	0	2062
Heavy Vehicles (%)	5%	3%	4%	2%	2%	3%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	17.9	17.9	38.9			38.9
Effective Green, g (s)	17.9	17.9	38.9			38.9
Actuated g/C Ratio	0.26	0.26	0.56			0.56
Clearance Time (s)	6.7	6.7	6.5			6.5
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	852	400	1928			1947
v/s Ratio Prot	0.06		0.39			c0.59
v/s Ratio Perm		c0.19				
v/c Ratio	0.25	0.74	0.70			1.06
Uniform Delay, d1	20.7	23.9	11.3			15.6
Progression Factor	1.00	1.00	2.16			1.19
Incremental Delay, d2	0.2	7.2	1.1			28.0
Delay (s)	20.8	31.1	25.5			46.6
Level of Service	C	C	C			D
Approach Delay (s)	27.0		25.5			46.6
Approach LOS	C		C			D
Intersection Summary						
HCM 2000 Control Delay			36.7		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.96			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	13.2
Intersection Capacity Utilization			71.8%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1	2	359	2	601	3	826	232	651	1408	9
Future Volume (vph)	7	1	2	359	2	601	3	826	232	651	1408	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	10.0		0.0	130.0		125.0	120.0		95.0	255.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			65.0			95.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.91	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor									0.97		1.00	
Frt		0.900			0.868	0.850			0.850		0.999	
Flt Protected	0.950			0.950	0.994		0.950			0.950		
Satd. Flow (prot)	1770	1676	0	1665	1424	1461	1770	3374	1583	1770	3468	0
Flt Permitted	0.950			0.950	0.994		0.166			0.113		
Satd. Flow (perm)	1770	1676	0	1665	1424	1461	309	3374	1540	210	3468	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					265	346			236		1	
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		53.2			37.5			215.0			376.8	
Travel Time (s)		4.8			3.4			12.9			22.6	
Confl. Bikes (#/hr)									5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	3%	2%	5%	2%	7%	2%	2%	4%	2%
Adj. Flow (vph)	8	1	2	390	2	653	3	898	252	708	1530	10
Shared Lane Traffic (%)				10%		47%						
Lane Group Flow (vph)	8	3	0	351	348	346	3	898	252	708	1540	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	36.7	36.7		36.7	36.7	36.7	36.5	36.5	36.5	11.5	36.5	
Total Split (s)	18.0	18.0		45.0	45.0	45.0	42.0	42.0	42.0	35.0	77.0	
Total Split (%)	12.9%	12.9%		32.1%	32.1%	32.1%	30.0%	30.0%	30.0%	25.0%	55.0%	
Maximum Green (s)	11.3	11.3		38.3	38.3	38.3	35.5	35.5	35.5	31.0	70.5	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.8	2.8	2.8	1.0	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)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				23.0	23.0	23.0	23.0	23.0	23.0		23.0	
Pedestrian Calls (#/hr)				0	0	0	0	0	0		0	
Act Effect Green (s)	7.1	7.1		34.3	34.3	34.3	35.5	35.5	35.5	89.4	86.9	
Actuated g/C Ratio	0.05	0.05		0.24	0.24	0.24	0.25	0.25	0.25	0.64	0.62	
v/c Ratio	0.09	0.04		0.86	0.63	0.56	0.04	1.05	0.45	1.07	0.72	
Control Delay	65.6	64.0		71.0	16.7	7.6	41.3	94.6	9.0	77.9	21.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	65.6	64.0		71.0	16.7	7.6	41.3	94.6	9.0	77.9	21.2	
LOS	E	E		E	B	A	D	F	A	E	C	
Approach Delay		65.1			31.9			75.8			39.1	
Approach LOS		E			C			E			D	
Queue Length 50th (m)	2.3	0.9		101.5	20.9	0.0	0.7	~149.6	3.5	~206.5	87.6	
Queue Length 95th (m)	8.3	4.3		#140.9	59.2	26.9	3.5	#192.6	27.1 m#247.4	m125.3		
Internal Link Dist (m)		29.2			13.5			191.0			352.8	
Turn Bay Length (m)	10.0			130.0		125.0	120.0		95.0	255.0		
Base Capacity (vph)	142	135		455	582	651	78	855	566	662	2153	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.06	0.02		0.77	0.60	0.53	0.04	1.05	0.45	1.07	0.72	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 88 (63%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.07

Intersection Signal Delay: 47.0

Intersection LOS: D

Lanes, Volumes, Timings
 6: Bronte Road & Parking Lot Access/QEW EB Ramps

2026 FB - MM - AM Peak Hour
 1300 Bronte Enns

Intersection Capacity Utilization 96.0% ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

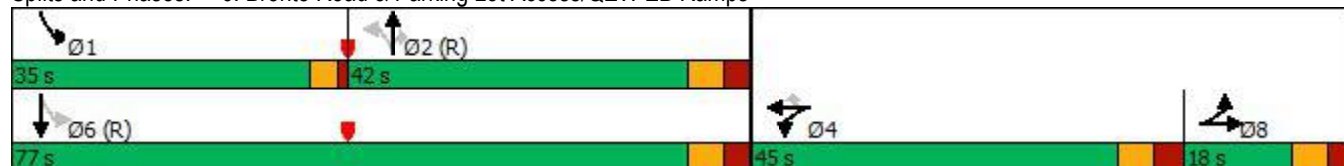
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 6: Bronte Road & Parking Lot Access/QEW EB Ramps



HCM Signalized Intersection Capacity Analysis

6: Bronte Road & Parking Lot Access/QEW EB Ramps

2026 FB - MM - AM Peak Hour

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1	2	359	2	601	3	826	232	651	1408	9
Future Volume (vph)	7	1	2	359	2	601	3	826	232	651	1408	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lane Util. Factor	1.00	1.00		0.95	0.91	0.95	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97	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	
Frt	1.00	0.90		1.00	0.87	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1676		1665	1424	1461	1770	3374	1539	1770	3468	
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.17	1.00	1.00	0.11	1.00	
Satd. Flow (perm)	1770	1676		1665	1424	1461	310	3374	1539	210	3468	
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)	8	1	2	390	2	653	3	898	252	708	1530	10
RTOR Reduction (vph)	0	0	0	0	200	261	0	0	183	0	0	0
Lane Group Flow (vph)	8	3	0	351	148	85	3	898	69	708	1540	0
Confl. Bikes (#/hr)									5			5
Heavy Vehicles (%)	2%	2%	2%	3%	2%	5%	2%	7%	2%	2%	4%	2%
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Actuated Green, G (s)	2.9	2.9		34.3	34.3	34.3	31.5	31.5	31.5	82.9	82.9	
Effective Green, g (s)	2.9	2.9		34.3	34.3	34.3	31.5	31.5	31.5	82.9	82.9	
Actuated g/C Ratio	0.02	0.02		0.24	0.24	0.24	0.22	0.22	0.22	0.59	0.59	
Clearance Time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	36	34		407	348	357	69	759	346	652	2053	
v/s Ratio Prot	c0.00	0.00		c0.21	0.10			c0.27		c0.37	0.44	
v/s Ratio Perm						0.06	0.01		0.04	0.28		
v/c Ratio	0.22	0.09		0.86	0.43	0.24	0.04	1.18	0.20	1.09	0.75	
Uniform Delay, d1	67.4	67.3		50.6	44.5	42.4	42.5	54.2	44.0	39.5	20.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.09	1.00	
Incremental Delay, d2	3.1	1.1		16.9	0.8	0.3	1.2	95.6	1.3	46.5	0.7	
Delay (s)	70.6	68.4		67.5	45.4	42.7	43.6	149.9	45.3	89.5	21.7	
Level of Service	E	E		E	D	D	D	F	D	F	C	
Approach Delay (s)		70.0			51.9			126.7			43.1	
Approach LOS		E			D			F			D	
Intersection Summary												
HCM 2000 Control Delay			66.9			HCM 2000 Level of Service				E		
HCM 2000 Volume to Capacity ratio			1.03									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			23.9			
Intersection Capacity Utilization			96.0%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2026 Future Background PM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	74	114	242	155	252	294	1974	374	241	1234	18
Future Volume (vph)	7	74	114	242	155	252	294	1974	374	241	1234	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	140.0		0.0	135.0		80.0	180.0		50.0
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (m)	65.0			100.0			70.0			70.0		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99		0.98			0.97			0.97			0.97
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	3400	1863	1583	1770	3539	1558	1770	3471	1473
Flt Permitted	0.653			0.561			0.112			0.054		
Satd. Flow (perm)	1208	1863	1550	2008	1863	1542	209	3539	1518	101	3471	1435
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			121			185			228			122
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		296.6			291.2			731.4			120.4	
Travel Time (s)		17.8			17.5			43.9			7.2	
Confl. Peds. (#/hr)	6					6	1		1	1		1
Confl. Bikes (#/hr)			5			5			5			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 (%)	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Adj. Flow (vph)	7	79	121	257	165	268	313	2100	398	256	1313	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	79	121	257	165	268	313	2100	398	256	1313	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)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.00	1.00	1.03
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

12-03-2021

NA

CGH Transportation

Page 1

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2026 Future Background PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0	10.0	6.0	20.0	20.0	6.0	20.0	20.0
Minimum Split (s)	10.5	36.7	36.7	10.5	36.7	36.7	10.5	36.5	36.5	10.5	36.5	36.5
Total Split (s)	11.2	23.8	23.8	19.6	32.2	32.2	12.6	84.0	84.0	12.6	84.0	84.0
Total Split (%)	8.0%	17.0%	17.0%	14.0%	23.0%	23.0%	9.0%	60.0%	60.0%	9.0%	60.0%	60.0%
Maximum Green (s)	7.2	17.1	17.1	15.6	25.5	25.5	8.6	77.5	77.5	8.6	77.5	77.5
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	2.8	2.8	1.0	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	0.0	0.0
Total Lost Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
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	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)					7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)					23.0	23.0		23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)					6	6		1	1		1	1
Act Effct Green (s)	21.2	12.3	12.3	32.8	27.9	27.9	95.2	77.5	77.5	95.2	77.5	77.5
Actuated g/C Ratio	0.15	0.09	0.09	0.23	0.20	0.20	0.68	0.55	0.55	0.68	0.55	0.55
v/c Ratio	0.03	0.48	0.49	0.42	0.44	0.59	1.01	1.07	0.42	1.03	0.68	0.02
Control Delay	39.1	70.3	16.5	45.9	53.4	21.7	64.5	59.2	5.5	104.4	24.8	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	39.1	70.3	16.5	45.9	53.4	21.7	64.5	59.2	5.5	104.4	24.8	0.1
LOS	D	E	B	D	D	C	E	E	A	F	C	A
Approach Delay		37.8			38.3			52.2			37.3	
Approach LOS		D			D			D			D	
Queue Length 50th (m)	1.6	22.5	0.0	32.4	42.0	20.4	59.9	~355.4	17.0	57.7	139.6	0.0
Queue Length 95th (m)	5.6	38.7	19.3	42.5	67.8	53.5	m#52.3	m#344.3	m19.0	#145.0	165.3	0.0
Internal Link Dist (m)		272.6			267.2			707.4			96.4	
Turn Bay Length (m)	70.0		70.0	140.0			135.0		80.0	180.0		50.0
Base Capacity (vph)	220	227	295	625	373	457	311	1959	942	249	1921	848
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.35	0.41	0.41	0.44	0.59	1.01	1.07	0.42	1.03	0.68	0.02

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 35 (25%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 1: Bronte Road & Upper Middle Road

2026 Future Background PM Peak Hour
1300 Bronte Enns

Maximum v/c Ratio: 1.07

Intersection Signal Delay: 45.3

Intersection LOS: D

Intersection Capacity Utilization 97.9%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 1: Bronte Road & Upper Middle Road

 Ø1		 Ø2 (R)		 Ø3		 Ø4	
12.6 s		84 s		19.6 s		23.8 s	
 Ø5		 Ø6 (R)		 Ø7		 Ø8	
12.6 s		84 s		11.2 s		32.2 s	

HCM Signalized Intersection Capacity Analysis

1: Bronte Road & Upper Middle Road

2026 Future Background PM Peak Hour

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	74	114	242	155	252	294	1974	374	241	1234	18
Future Volume (vph)	7	74	114	242	155	252	294	1974	374	241	1234	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.97
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	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1762	1863	1548	3400	1863	1543	1770	3539	1518	1770	3471	1435
Flt Permitted	0.65	1.00	1.00	0.56	1.00	1.00	0.11	1.00	1.00	0.05	1.00	1.00
Satd. Flow (perm)	1211	1863	1548	2007	1863	1543	209	3539	1518	100	3471	1435
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)	7	79	121	257	165	268	313	2100	398	256	1313	19
RTOR Reduction (vph)	0	0	108	0	0	148	0	0	107	0	0	9
Lane Group Flow (vph)	7	79	13	257	165	120	313	2100	291	256	1313	10
Confl. Peds. (#/hr)	6					6	1		1	1		1
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	16.9	15.5	15.5	33.3	27.9	27.9	89.5	74.3	74.3	89.5	74.3	74.3
Effective Green, g (s)	16.9	15.5	15.5	33.3	27.9	27.9	89.5	74.3	74.3	89.5	74.3	74.3
Actuated g/C Ratio	0.12	0.11	0.11	0.24	0.20	0.20	0.64	0.53	0.53	0.64	0.53	0.53
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	151	206	171	614	371	307	303	1878	805	245	1842	761
v/s Ratio Prot	0.00	0.04		c0.04	c0.09		0.11	c0.59		c0.11	0.38	
v/s Ratio Perm	0.01		0.01	0.06		0.08	0.55		0.19	0.55		0.01
v/c Ratio	0.05	0.38	0.08	0.42	0.44	0.39	1.03	1.12	0.36	1.04	0.71	0.01
Uniform Delay, d1	54.3	57.8	55.8	44.0	49.2	48.7	33.8	32.9	19.1	49.3	24.8	15.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.64	0.73	0.73	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.2	0.2	0.5	0.9	0.8	33.7	55.2	0.3	69.7	2.4	0.0
Delay (s)	54.5	59.0	56.0	44.5	50.1	49.5	89.1	79.3	14.1	119.1	27.2	15.6
Level of Service	D	E	E	D	D	D	F	E	B	F	C	B
Approach Delay (s)		57.1			47.8			71.2			41.9	
Approach LOS		E			D			E			D	
Intersection Summary												
HCM 2000 Control Delay			58.8									
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			140.0									
Intersection Capacity Utilization			97.9%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
2: Bronte Road & Saw Whet Boulevard

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	7	106	0	60	12	2652	177	99	1518	4
Future Volume (vph)	3	0	7	106	0	60	12	2652	177	99	1518	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	15.0		15.0	15.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.850			0.850				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1770	1583	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.715			0.752			0.122			0.036		
Satd. Flow (perm)	1332	1583	0	1401	1583	0	227	3539	1583	67	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		48			19				32			19
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		42.5			50.2			458.5			731.4	
Travel Time (s)		3.1			3.6			27.5			43.9	
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)	3	0	8	115	0	65	13	2883	192	108	1650	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	8	0	115	65	0	13	2883	192	108	1650	4
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	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
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6

Lanes, Volumes, Timings
2: Bronte Road & Saw Whet Boulevard

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1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	35.5	35.5		35.5	35.5		35.5	35.5	35.5	35.5	35.5	35.5
Total Split (s)	35.5	35.5		35.5	35.5		104.5	104.5	104.5	104.5	104.5	104.5
Total Split (%)	25.4%	25.4%		25.4%	25.4%		74.6%	74.6%	74.6%	74.6%	74.6%	74.6%
Maximum Green (s)	30.0	30.0		30.0	30.0		99.0	99.0	99.0	99.0	99.0	99.0
Yellow Time (s)	3.3	3.3		3.3	3.3		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.2	2.2		2.2	2.2		1.8	1.8	1.8	1.8	1.8	1.8
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)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	23.0	23.0		23.0	23.0		23.0	23.0	23.0	23.0	23.0	23.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effect Green (s)	16.8	16.8		16.8	16.8		112.2	112.2	112.2	112.2	112.2	112.2
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.80	0.80	0.80	0.80	0.80	0.80
v/c Ratio	0.02	0.03		0.68	0.32		0.07	1.02	0.15	2.04	0.58	0.00
Control Delay	50.7	0.3		78.3	43.0		0.7	26.5	0.4	535.4	12.6	1.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.7	0.3		78.3	43.0		0.7	26.5	0.4	535.4	12.6	1.5
LOS	D	A		E	D		A	C	A	F	B	A
Approach Delay		14.0			65.5			24.7			44.6	
Approach LOS		B			E			C			D	
Queue Length 50th (m)	0.8	0.0		32.7	12.3		0.2	~479.1	2.3	~43.8	130.0	0.0
Queue Length 95th (m)	3.7	0.0		51.9	26.2		m0.1	m404.0	m0.0	m#80.1	195.8	m0.0
Internal Link Dist (m)		18.5			26.2			434.5			707.4	
Turn Bay Length (m)	15.0			15.0			15.0		15.0	15.0		15.0
Base Capacity (vph)	285	376		300	354		181	2835	1274	53	2835	1272
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.02		0.38	0.18		0.07	1.02	0.15	2.04	0.58	0.00

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 2.04

Intersection Signal Delay: 33.1

Intersection LOS: C

Intersection Capacity Utilization 104.0%

ICU Level of Service G

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
 2: Bronte Road & Saw Whet Boulevard

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Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Bronte Road & Saw Whet Boulevard



HCM Signalized Intersection Capacity Analysis

2: Bronte Road & Saw Whet Boulevard

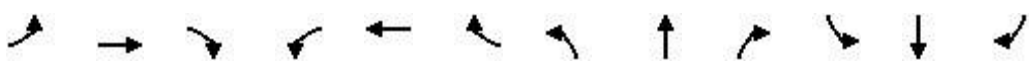
2026 Future Background PM Peak Hour

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	7	106	0	60	12	2652	177	99	1518	4
Future Volume (vph)	3	0	7	106	0	60	12	2652	177	99	1518	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	5.5	5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.85		1.00	0.85		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)	1770	1583		1770	1583		1770	3539	1583	1770	3539	1583
Flt Permitted	0.71	1.00		0.75	1.00		0.12	1.00	1.00	0.04	1.00	1.00
Satd. Flow (perm)	1331	1583		1402	1583		227	3539	1583	66	3539	1583
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)	3	0	8	115	0	65	13	2883	192	108	1650	4
RTOR Reduction (vph)	0	7	0	0	17	0	0	0	6	0	0	1
Lane Group Flow (vph)	3	1	0	115	48	0	13	2883	186	108	1650	3
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2		6		6
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	16.8	16.8		16.8	16.8		112.2	112.2	112.2	112.2	112.2	112.2
Effective Green, g (s)	16.8	16.8		16.8	16.8		112.2	112.2	112.2	112.2	112.2	112.2
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.80	0.80	0.80	0.80	0.80	0.80
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	159	189		168	189		181	2836	1268	52	2836	1268
v/s Ratio Prot		0.00			0.03			0.81			0.47	
v/s Ratio Perm	0.00			c0.08			0.06		0.12	c1.63		0.00
v/c Ratio	0.02	0.01		0.68	0.26		0.07	1.02	0.15	2.08	0.58	0.00
Uniform Delay, d1	54.3	54.2		59.1	55.9		2.9	13.9	3.1	13.9	5.2	2.8
Progression Factor	1.00	1.00		1.00	1.00		0.15	1.10	0.12	2.56	2.05	1.00
Incremental Delay, d2	0.0	0.0		11.0	0.7		0.1	10.1	0.0	533.4	0.7	0.0
Delay (s)	54.4	54.3		70.0	56.6		0.5	25.4	0.4	569.1	11.3	2.8
Level of Service	D	D		E	E		A	C	A	F	B	A
Approach Delay (s)		54.3			65.2			23.7			45.5	
Approach LOS		D			E			C			D	
Intersection Summary												
HCM 2000 Control Delay	32.9			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	1.86											
Actuated Cycle Length (s)	140.0			Sum of lost time (s)			11.0					
Intersection Capacity Utilization	104.0%			ICU Level of Service			G					
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

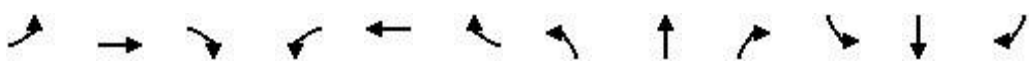
2026 Future Background PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↖		↗	↖	↗	↗	↖	↗↔	
Traffic Volume (vph)	0	0	0	138	0	110	1	2738	175	89	1578	0
Future Volume (vph)	0	0	0	138	0	110	1	2738	175	89	1578	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		40.0	35.0		30.0	70.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			20.0			60.0		
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
Ped Bike Factor						0.98			0.98			
Frt						0.850			0.850			
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	0	1863	0	1770	0	1583	1770	3505	1388	1770	3471	0
Flt Permitted				0.757			0.137			0.040		
Satd. Flow (perm)	0	1863	0	1410	0	1557	255	3505	1356	75	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						89			56			
Link Speed (k/h)		20			20			60			60	
Link Distance (m)		78.7			109.0			435.9			458.5	
Travel Time (s)		14.2			19.6			26.2			27.5	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	14%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Adj. Flow (vph)	0	0	0	142	0	113	1	2823	180	92	1627	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	142	0	113	1	2823	180	92	1627	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.03	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1		1	1	2	1	1	2	
Detector Template	Left	Thru		Left		Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0		2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0		2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4						9.4			9.4	
Detector 2 Size(m)		0.6						0.6			0.6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2026 Future Background PM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type				Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8		8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0		10.0	15.0	15.0	15.0	5.0	15.0	
Minimum Split (s)	24.2	24.2		35.2		35.2	34.9	34.9	34.9	9.5	34.9	
Total Split (s)	40.6	40.6		40.6		40.6	88.2	88.2	88.2	11.2	99.4	
Total Split (%)	29.0%	29.0%		29.0%		29.0%	63.0%	63.0%	63.0%	8.0%	71.0%	
Maximum Green (s)	34.4	34.4		34.4		34.4	82.3	82.3	82.3	7.2	93.5	
Yellow Time (s)	3.1	3.1		3.1		3.1	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.1	3.1		3.1		3.1	2.2	2.2	2.2	1.0	2.2	
Lost Time Adjust (s)		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.2		6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.6	3.6	3.6	3.0	3.6	
Recall Mode	None	None		None		None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0		7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				22.0		22.0	22.0	22.0	22.0		22.0	
Pedestrian Calls (#/hr)				0		0	0	0	0		0	
Act Effect Green (s)				19.4		19.4	95.7	95.7	95.7	110.4	108.5	
Actuated g/C Ratio				0.14		0.14	0.68	0.68	0.68	0.79	0.78	
v/c Ratio				0.73		0.39	0.01	1.18	0.19	0.56	0.61	
Control Delay				77.9		18.8	1.0	94.8	0.1	39.1	8.7	
Queue Delay				0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay				77.9		18.8	1.0	94.8	0.1	39.1	8.7	
LOS				E		B	A	F	A	D	A	
Approach Delay					51.7			89.1			10.3	
Approach LOS					D			F			B	
Queue Length 50th (m)				40.2		6.2	0.0	~528.3	0.0	14.1	49.6	
Queue Length 95th (m)				61.0		23.7	m0.0	m#362.3	m0.0	34.2	128.8	
Internal Link Dist (m)		54.7			85.0			411.9			434.5	
Turn Bay Length (m)						40.0	35.0		30.0	70.0		
Base Capacity (vph)				346		449	174	2396	944	169	2689	
Starvation Cap Reductn				0		0	0	0	0	0	0	
Spillback Cap Reductn				0		0	0	0	0	0	0	
Storage Cap Reductn				0		0	0	0	0	0	0	
Reduced v/c Ratio				0.41		0.25	0.01	1.18	0.19	0.54	0.61	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 103.6 (74%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.18

Lanes, Volumes, Timings 3: Bronte Road & Driveway/Charles Cornwall Road

2026 Future Background PM Peak Hour
1300 Bronte Enns

Intersection Signal Delay: 60.0

Intersection LOS: E

Intersection Capacity Utilization 94.1%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

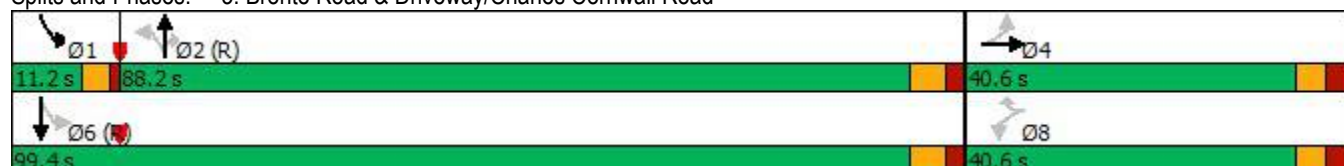
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Bronte Road & Driveway/Charles Cornwall Road



HCM Signalized Intersection Capacity Analysis

3: Bronte Road & Driveway/Charles Cornwall Road

2026 Future Background PM Peak Hour

1300 Bronte Enns

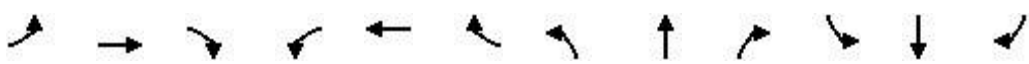
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	138	0	110	1	2738	175	89	1578	0
Future Volume (vph)	0	0	0	138	0	110	1	2738	175	89	1578	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Lane Util. Factor				1.00		1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes				1.00		0.98	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes				1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Frt				1.00		0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected				0.95		1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1770		1552	1770	3505	1357	1770	3471	
Flt Permitted				0.76		1.00	0.14	1.00	1.00	0.04	1.00	
Satd. Flow (perm)				1410		1552	254	3505	1357	75	3471	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	142	0	113	1	2823	180	92	1627	0
RTOR Reduction (vph)	0	0	0	0	0	77	0	0	18	0	0	0
Lane Group Flow (vph)	0	0	0	142	0	36	1	2823	162	92	1627	0
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	14%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Turn Type				Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)				19.4		19.4	95.7	95.7	95.7	108.5	108.5	
Effective Green, g (s)				19.4		19.4	95.7	95.7	95.7	108.5	108.5	
Actuated g/C Ratio				0.14		0.14	0.68	0.68	0.68	0.78	0.78	
Clearance Time (s)				6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Vehicle Extension (s)				3.0		3.0	3.6	3.6	3.6	3.0	3.6	
Lane Grp Cap (vph)				195		215	173	2395	927	164	2690	
v/s Ratio Prot								c0.81		0.04	c0.47	
v/s Ratio Perm				c0.10		0.02	0.00		0.12	0.40		
v/c Ratio				0.73		0.17	0.01	1.18	0.18	0.56	0.60	
Uniform Delay, d1				57.8		53.2	7.0	22.1	8.0	42.6	6.7	
Progression Factor				1.00		1.00	0.08	0.39	0.00	1.31	1.05	
Incremental Delay, d2				12.7		0.4	0.0	80.9	0.0	3.6	0.8	
Delay (s)				70.5		53.6	0.6	89.4	0.1	59.5	7.9	
Level of Service				E		D	A	F	A	E	A	
Approach Delay (s)		0.0			63.0			84.1			10.6	
Approach LOS		A			E			F			B	
Intersection Summary												
HCM 2000 Control Delay			57.6									
HCM 2000 Volume to Capacity ratio			1.07									
Actuated Cycle Length (s)			140.0							16.1		
Intersection Capacity Utilization			94.1%							F		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

2026 Future Background PM Peak Hour

4: Bronte Road & Driveway/North Service Road West

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	129	0	154	0	2674	74	88	1624	2
Future Volume (vph)	0	0	0	129	0	154	0	2674	74	88	1624	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	45.0		0.0	35.0		70.0	115.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			50.0			65.0			65.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor						0.98			0.97		1.00	
Frt						0.850			0.850			
Flt Protected				0.950	0.950					0.950		
Satd. Flow (prot)	0	1863	0	1681	1681	1583	1863	3505	1583	1770	3471	0
Flt Permitted				0.950	0.950					0.047		
Satd. Flow (perm)	0	1863	0	1681	1681	1553	1863	3505	1540	88	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						159			106			
Link Speed (k/h)		20			50			60			60	
Link Distance (m)		52.6			84.3			299.0			435.9	
Travel Time (s)		9.5			6.1			17.9			26.2	
Confl. Peds. (#/hr)	2					2			2	2		
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	4%	2%
Adj. Flow (vph)	0	0	0	133	0	159	0	2757	76	91	1674	2
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	66	67	159	0	2757	76	91	1676	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

12-03-2021

NA

CGH Transportation

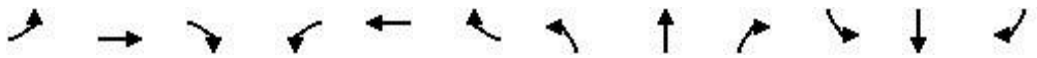
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Lanes, Volumes, Timings

2026 Future Background PM Peak Hour

4: Bronte Road & Driveway/North Service Road West

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8			4			2			1	6	
Permitted Phases	8			4		4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	15.0	15.0	15.0	6.0	15.0	
Minimum Split (s)	24.7	24.7		36.9	36.9	36.9	41.7	41.7	41.7	10.5	24.7	
Total Split (s)	13.0	13.0		39.0	39.0	39.0	77.0	77.0	77.0	11.0	88.0	
Total Split (%)	9.3%	9.3%		27.9%	27.9%	27.9%	55.0%	55.0%	55.0%	7.9%	62.9%	
Maximum Green (s)	6.3	6.3		33.1	33.1	33.1	70.3	70.3	70.3	7.0	81.3	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		2.2	2.2	2.2	3.0	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)		6.7		5.9	5.9	5.9	6.7	6.7	6.7	4.0	6.7	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		0.0	
Flash Dont Walk (s)				24.0	24.0	24.0	28.0	28.0	28.0		0.0	
Pedestrian Calls (#/hr)				2	2	2	2	2	2		0	
Act Effect Green (s)				33.1	33.1	33.1		81.5	81.5	97.0	94.3	
Actuated g/C Ratio				0.24	0.24	0.24		0.58	0.58	0.69	0.67	
v/c Ratio				0.17	0.17	0.33		1.35	0.08	0.55	0.72	
Control Delay				43.9	44.0	8.0		181.4	0.6	30.8	13.7	
Queue Delay				0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay				43.9	44.0	8.0		181.4	0.6	30.8	13.7	
LOS				D	D	A		F	A	C	B	
Approach Delay					24.4			176.6			14.6	
Approach LOS					C			F			B	
Queue Length 50th (m)				16.2	16.5	0.0		~550.0	0.0	10.4	152.3	
Queue Length 95th (m)				30.7	31.0	18.7		m#485.3	m0.0	m28.7	123.1	
Internal Link Dist (m)		28.6			60.3			275.0			411.9	
Turn Bay Length (m)				45.0					70.0	115.0		
Base Capacity (vph)				397	397	488		2040	940	168	2337	
Starvation Cap Reductn				0	0	0		15	0	0	0	
Spillback Cap Reductn				0	0	0		0	0	0	0	
Storage Cap Reductn				0	0	0		0	0	0	0	
Reduced v/c Ratio				0.17	0.17	0.33		1.36	0.08	0.54	0.72	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 85 (61%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.35

Intersection Signal Delay: 109.0

Intersection LOS: F

Intersection Capacity Utilization 95.2%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 4: Bronte Road & Driveway/North Service Road West



HCM Signalized Intersection Capacity Analysis

4: Bronte Road & Driveway/North Service Road West

2026 Future Background PM Peak Hour

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	129	0	154	0	2674	74	88	1624	2
Future Volume (vph)	0	0	0	129	0	154	0	2674	74	88	1624	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Lane Util. Factor				0.95	0.95	1.00		0.95	1.00	1.00	0.95	
Frpb, ped/bikes				1.00	1.00	0.98		1.00	0.97	1.00	1.00	
Flpb, ped/bikes				1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt				1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected				0.95	0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1681	1681	1553		3505	1540	1770	3471	
Flt Permitted				0.95	0.95	1.00		1.00	1.00	0.05	1.00	
Satd. Flow (perm)				1681	1681	1553		3505	1540	87	3471	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	133	0	159	0	2757	76	91	1674	2
RTOR Reduction (vph)	0	0	0	0	0	121	0	0	32	0	0	0
Lane Group Flow (vph)	0	0	0	66	67	38	0	2757	44	91	1676	0
Confl. Peds. (#/hr)	2					2			2	2		
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	4%	2%
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		8			4			2		1	6	
Permitted Phases	8			4		4	2		2	6		
Actuated Green, G (s)				33.1	33.1	33.1		81.5	81.5	94.3	94.3	
Effective Green, g (s)				33.1	33.1	33.1		81.5	81.5	94.3	94.3	
Actuated g/C Ratio				0.24	0.24	0.24		0.58	0.58	0.67	0.67	
Clearance Time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Vehicle Extension (s)				5.0	5.0	5.0		5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)				397	397	367		2040	896	164	2337	
v/s Ratio Prot								c0.79		0.03	c0.48	
v/s Ratio Perm				0.04	0.04	0.02			0.03	0.34		
v/c Ratio				0.17	0.17	0.10		1.35	0.05	0.55	0.72	
Uniform Delay, d1				42.5	42.5	41.8		29.2	12.6	34.1	14.4	
Progression Factor				1.00	1.00	1.00		0.72	0.56	1.10	0.82	
Incremental Delay, d2				0.4	0.4	0.3		158.5	0.0	3.3	1.6	
Delay (s)				42.9	42.9	42.1		179.5	7.1	40.8	13.4	
Level of Service				D	D	D		F	A	D	B	
Approach Delay (s)		0.0			42.5			174.9			14.8	
Approach LOS		A			D			F			B	
Intersection Summary												
HCM 2000 Control Delay			109.2				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.05									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)		23.3			
Intersection Capacity Utilization			95.2%				ICU Level of Service		F			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2026 Future Background PM Peak Hour

1300 Bronte Enns

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	232	617	2064	0	0	1056
Future Volume (vph)	232	617	2064	0	0	1056
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	90.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	1.00	0.95	1.00	1.00	0.95
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3433	1583	3505	0	0	3505
Flt Permitted	0.950					
Satd. Flow (perm)	3433	1583	3505	0	0	3505
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		8				
Link Speed (k/h)	60		60			60
Link Distance (m)	65.9		376.8			299.0
Travel Time (s)	4.0		22.6			17.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	3%	2%	2%	3%
Adj. Flow (vph)	252	671	2243	0	0	1148
Shared Lane Traffic (%)						
Lane Group Flow (vph)	252	671	2243	0	0	1148
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2026 Future Background PM Peak Hour
1300 Bronte Enns



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8					
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.7	24.7	36.5			26.5
Total Split (s)	46.0	46.0	94.0			94.0
Total Split (%)	32.9%	32.9%	67.1%			67.1%
Maximum Green (s)	39.3	39.3	87.5			87.5
Yellow Time (s)	3.7	3.7	3.7			3.7
All-Red Time (s)	3.0	3.0	2.8			2.8
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	6.7	6.7	6.5			6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	C-Max			C-Max
Act Effect Green (s)	39.3	39.3	87.5			87.5
Actuated g/C Ratio	0.28	0.28	0.62			0.62
v/c Ratio	0.26	1.49	1.02			0.52
Control Delay	40.0	268.0	36.2			12.9
Queue Delay	0.0	0.0	31.6			0.0
Total Delay	40.0	268.0	67.8			12.9
LOS	D	F	E			B
Approach Delay	205.8		67.8			12.9
Approach LOS	F		E			B
Queue Length 50th (m)	29.4	~269.8	~372.7			49.7
Queue Length 95th (m)	41.7	#347.7	m90.3			59.7
Internal Link Dist (m)	41.9		352.8			275.0
Turn Bay Length (m)		90.0				
Base Capacity (vph)	963	450	2190			2190
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	1	827			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.26	1.49	1.65			0.52

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 67 (48%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.49

Intersection Signal Delay: 82.7

Intersection LOS: F

Intersection Capacity Utilization 106.3%

ICU Level of Service G

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

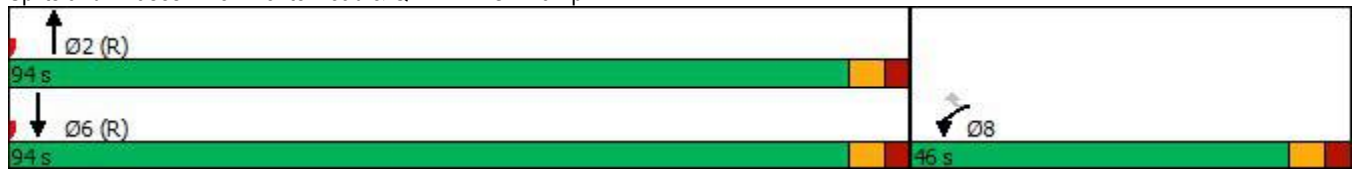
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 5: Bronte Road & QEW WB Off Ramp



HCM Signalized Intersection Capacity Analysis

5: Bronte Road & QEW WB Off Ramp

2026 Future Background PM Peak Hour
1300 Bronte Enns

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	232	617	2064	0	0	1056
Future Volume (vph)	232	617	2064	0	0	1056
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7	6.5			6.5
Lane Util. Factor	0.97	1.00	0.95			0.95
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3433	1583	3505			3505
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3433	1583	3505			3505
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	252	671	2243	0	0	1148
RTOR Reduction (vph)	0	6	0	0	0	0
Lane Group Flow (vph)	252	665	2243	0	0	1148
Heavy Vehicles (%)	2%	2%	3%	2%	2%	3%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	39.3	39.3	87.5			87.5
Effective Green, g (s)	39.3	39.3	87.5			87.5
Actuated g/C Ratio	0.28	0.28	0.62			0.62
Clearance Time (s)	6.7	6.7	6.5			6.5
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	963	444	2190			2190
v/s Ratio Prot	0.07		c0.64			0.33
v/s Ratio Perm		c0.42				
v/c Ratio	0.26	1.50	1.02			0.52
Uniform Delay, d1	39.1	50.4	26.2			14.6
Progression Factor	1.00	1.00	0.67			0.83
Incremental Delay, d2	0.1	235.8	17.6			0.7
Delay (s)	39.2	286.2	35.0			12.8
Level of Service	D	F	D			B
Approach Delay (s)	218.8		35.0			12.8
Approach LOS	F		D			B
Intersection Summary						
HCM 2000 Control Delay			68.4		HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio			1.17			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	13.2
Intersection Capacity Utilization			106.3%		ICU Level of Service	G
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings

2026 Future Background PM Peak Hour

6: Bronte Road & Parking Lot Access/QEW EB Ramps

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	0	4	214	1	851	1	1620	228	296	984	3
Future Volume (vph)	6	0	4	214	1	851	1	1620	228	296	984	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	10.0		0.0	130.0		125.0	120.0		95.0	255.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			65.0			95.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.91	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor									0.97		1.00	
Frt		0.850			0.858	0.850			0.850			
Flt Protected	0.950			0.950	0.998		0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1681	1425	1475	1770	3539	1583	1770	3539	0
Flt Permitted	0.950			0.950	0.998		0.267			0.064		
Satd. Flow (perm)	1770	1583	0	1681	1425	1475	497	3539	1543	119	3539	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					423	423			133			
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		53.2			37.5			215.0			376.8	
Travel Time (s)		4.8			3.4			12.9			22.6	
Confl. Bikes (#/hr)									5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	7	0	4	233	1	925	1	1761	248	322	1070	3
Shared Lane Traffic (%)				10%		49%						
Lane Group Flow (vph)	7	4	0	210	477	472	1	1761	248	322	1073	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

12-03-2021

NA

CGH Transportation

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Lanes, Volumes, Timings

2026 Future Background PM Peak Hour

6: Bronte Road & Parking Lot Access/QEW EB Ramps

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	36.7	36.7		36.7	36.7	36.7	36.5	36.5	36.5	11.5	36.5	
Total Split (s)	18.0	18.0		45.0	45.0	45.0	53.0	53.0	53.0	24.0	77.0	
Total Split (%)	12.9%	12.9%		32.1%	32.1%	32.1%	37.9%	37.9%	37.9%	17.1%	55.0%	
Maximum Green (s)	11.3	11.3		38.3	38.3	38.3	46.5	46.5	46.5	20.0	70.5	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.8	2.8	2.8	1.0	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)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				23.0	23.0	23.0	23.0	23.0	23.0		23.0	
Pedestrian Calls (#/hr)				0	0	0	0	0	0		0	
Act Effct Green (s)	7.1	7.1		25.9	25.9	25.9	62.8	62.8	62.8	97.9	95.4	
Actuated g/C Ratio	0.05	0.05		0.18	0.18	0.18	0.45	0.45	0.45	0.70	0.68	
v/c Ratio	0.08	0.05		0.68	0.78	0.76	0.00	1.11	0.32	0.77	0.45	
Control Delay	65.3	64.8		63.0	17.1	15.7	30.0	95.1	14.9	46.1	16.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	65.3	64.8		63.0	17.1	15.7	30.0	95.1	14.9	46.1	16.3	
LOS	E	E		E	B	B	C	F	B	D	B	
Approach Delay		65.1			24.8			85.1			23.2	
Approach LOS		E			C			F			C	
Queue Length 50th (m)	2.0	1.1		60.9	14.9	12.8	0.2	~285.3	18.1	71.8	86.8	
Queue Length 95th (m)	7.4	5.4		82.0	58.4	52.4	1.6	#417.6	49.6	#137.7	125.7	
Internal Link Dist (m)		29.2			13.5			191.0			352.8	
Turn Bay Length (m)	10.0			130.0		125.0	120.0		95.0	255.0		
Base Capacity (vph)	142	127		459	697	710	222	1586	765	420	2410	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.05	0.03		0.46	0.68	0.66	0.00	1.11	0.32	0.77	0.45	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 66 (47%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.11

Intersection Signal Delay: 50.9

Intersection LOS: D

12-03-2021

NA

CGH Transportation

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Intersection Capacity Utilization 102.3%

ICU Level of Service G

Analysis Period (min) 15

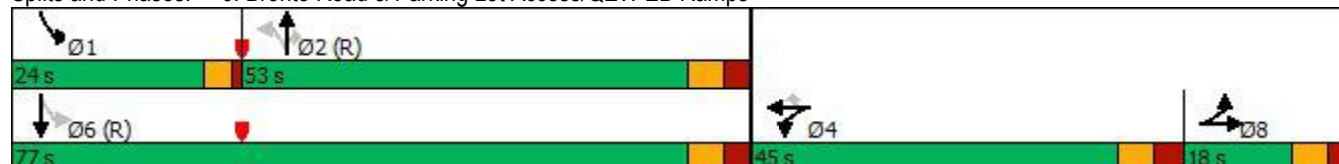
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 6: Bronte Road & Parking Lot Access/QEW EB Ramps



HCM Signalized Intersection Capacity Analysis

6: Bronte Road & Parking Lot Access/QEW EB Ramps

2026 Future Background PM Peak Hour

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	0	4	214	1	851	1	1620	228	296	984	3
Future Volume (vph)	6	0	4	214	1	851	1	1620	228	296	984	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lane Util. Factor	1.00	1.00		0.95	0.91	0.95	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98	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	
Frt	1.00	0.85		1.00	0.86	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1583		1681	1424	1475	1770	3539	1545	1770	3538	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.27	1.00	1.00	0.06	1.00	
Satd. Flow (perm)	1770	1583		1681	1424	1475	496	3539	1545	119	3538	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	0	4	233	1	925	1	1761	248	322	1070	3
RTOR Reduction (vph)	0	0	0	0	345	345	0	0	77	0	0	0
Lane Group Flow (vph)	7	4	0	210	132	127	1	1761	171	322	1073	0
Confl. Bikes (#/hr)									5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Actuated Green, G (s)	2.9	2.9		25.9	25.9	25.9	58.7	58.7	58.7	91.3	91.3	
Effective Green, g (s)	2.9	2.9		25.9	25.9	25.9	58.7	58.7	58.7	91.3	91.3	
Actuated g/C Ratio	0.02	0.02		0.18	0.18	0.18	0.42	0.42	0.42	0.65	0.65	
Clearance Time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	36	32		310	263	272	207	1483	647	414	2307	
v/s Ratio Prot	c0.00	0.00		c0.12	0.09			c0.50		c0.16	0.30	
v/s Ratio Perm						0.09	0.00		0.11	0.35		
v/c Ratio	0.19	0.12		0.68	0.50	0.47	0.00	1.19	0.26	0.78	0.47	
Uniform Delay, d1	67.4	67.3		53.2	51.3	50.9	23.7	40.6	26.5	42.1	12.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.93	1.26	
Incremental Delay, d2	2.6	1.8		5.8	1.5	1.3	0.0	91.4	1.0	8.0	0.6	
Delay (s)	70.0	69.1		58.9	52.8	52.2	23.7	132.1	27.5	47.4	16.0	
Level of Service	E	E		E	D	D	C	F	C	D	B	
Approach Delay (s)		69.7			53.6			119.1			23.2	
Approach LOS		E			D			F			C	
Intersection Summary												
HCM 2000 Control Delay	73.2			HCM 2000 Level of Service					E			
HCM 2000 Volume to Capacity ratio	0.95											
Actuated Cycle Length (s)	140.0			Sum of lost time (s)					23.9			
Intersection Capacity Utilization	102.3%			ICU Level of Service					G			
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2026 FB - MM - PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	74	114	242	155	252	294	1974	374	241	1234	18
Future Volume (vph)	7	74	114	242	155	252	294	1974	374	241	1234	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	140.0		0.0	135.0		80.0	180.0		50.0
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (m)	65.0			100.0			70.0			70.0		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99		0.98			0.97			0.97			0.97
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	3400	1863	1583	1770	3539	1558	1770	3471	1473
Flt Permitted	0.653			0.578			0.091			0.059		
Satd. Flow (perm)	1209	1863	1556	2068	1863	1543	170	3539	1518	110	3471	1434
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			121			237			205			122
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		296.6			291.2			731.4			120.4	
Travel Time (s)		17.8			17.5			43.9			7.2	
Confl. Peds. (#/hr)	6					6	1		1	1		1
Confl. Bikes (#/hr)			5			5			5			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 (%)	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Adj. Flow (vph)	7	79	121	257	165	268	313	2100	398	256	1313	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	79	121	257	165	268	313	2100	398	256	1313	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)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.00	1.00	1.03
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0	10.0	6.0	20.0	20.0	6.0	20.0	20.0
Minimum Split (s)	10.5	36.7	36.7	10.5	36.7	36.7	10.5	36.5	36.5	10.5	36.5	36.5
Total Split (s)	10.5	36.7	36.7	10.5	36.7	36.7	24.2	76.8	76.8	16.0	68.6	68.6
Total Split (%)	7.5%	26.2%	26.2%	7.5%	26.2%	26.2%	17.3%	54.9%	54.9%	11.4%	49.0%	49.0%
Maximum Green (s)	6.5	30.0	30.0	6.5	30.0	30.0	20.2	70.3	70.3	12.0	62.1	62.1
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	2.8	2.8	1.0	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	0.0	0.0
Total Lost Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
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	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)					7.0	7.0			7.0	7.0	7.0	7.0
Flash Dont Walk (s)					23.0	23.0			23.0	23.0	23.0	23.0
Pedestrian Calls (#/hr)					6	6			1	1	1	1
Act Effct Green (s)	23.8	14.9	14.9	27.3	23.3	23.3	99.8	72.1	72.1	98.6	71.4	71.4
Actuated g/C Ratio	0.17	0.11	0.11	0.20	0.17	0.17	0.71	0.52	0.52	0.70	0.51	0.51
v/c Ratio	0.03	0.40	0.44	0.55	0.53	0.59	0.75	1.15	0.45	0.68	0.74	0.02
Control Delay	40.3	62.2	13.4	52.9	59.4	14.5	48.8	91.3	3.2	45.1	31.3	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	40.3	62.2	13.4	52.9	59.4	14.5	48.8	91.3	3.2	45.1	31.3	0.1
LOS	D	E	B	D	E	B	D	F	A	D	C	A
Approach Delay	32.9			39.6			74.1			33.2		
Approach LOS	C			D			E			C		
Queue Length 50th (m)	1.7	22.5	0.0	34.8	45.1	7.9	63.7	~367.8	10.0	49.7	151.5	0.0
Queue Length 95th (m)	5.3	34.5	17.2	40.8	65.2	34.7	m50.2	m#230.8	m8.5	#135.9	210.4	0.0
Internal Link Dist (m)	272.6			267.2			707.4			96.4		
Turn Bay Length (m)	70.0			70.0	140.0			135.0			80.0	50.0
Base Capacity (vph)	233	399	428	464	399	516	418	1821	881	378	1769	790
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.20	0.28	0.55	0.41	0.52	0.75	1.15	0.45	0.68	0.74	0.02

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 35 (25%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

1: Bronte Road & Upper Middle Road

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Maximum v/c Ratio: 1.15

Intersection Signal Delay: 55.7

Intersection LOS: E

Intersection Capacity Utilization 97.9%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 1: Bronte Road & Upper Middle Road

 Ø1	 Ø2 (R)	 Ø3	 Ø4
16 s	76.8 s	10.5 s	36.7 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
24.2 s	68.6 s	10.5 s	36.7 s

HCM Signalized Intersection Capacity Analysis

1: Bronte Road & Upper Middle Road

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1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	74	114	242	155	252	294	1974	374	241	1234	18
Future Volume (vph)	7	74	114	242	155	252	294	1974	374	241	1234	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.97
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	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1762	1863	1551	3400	1863	1541	1770	3539	1517	1770	3471	1435
Flt Permitted	0.65	1.00	1.00	0.58	1.00	1.00	0.09	1.00	1.00	0.06	1.00	1.00
Satd. Flow (perm)	1211	1863	1551	2068	1863	1541	169	3539	1517	109	3471	1435
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)	7	79	121	257	165	268	313	2100	398	256	1313	19
RTOR Reduction (vph)	0	0	105	0	0	198	0	0	104	0	0	10
Lane Group Flow (vph)	7	79	16	257	165	70	313	2100	294	256	1313	9
Confl. Peds. (#/hr)	6					6	1		1	1		1
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	19.4	18.1	18.1	28.6	23.3	23.3	94.9	68.8	68.8	93.5	68.1	68.1
Effective Green, g (s)	19.4	18.1	18.1	28.6	23.3	23.3	94.9	68.8	68.8	93.5	68.1	68.1
Actuated g/C Ratio	0.14	0.13	0.13	0.20	0.17	0.17	0.68	0.49	0.49	0.67	0.49	0.49
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	172	240	200	484	310	256	413	1739	745	374	1688	698
v/s Ratio Prot	0.00	0.04		c0.02	c0.09		c0.14	c0.59		0.12	0.38	
v/s Ratio Perm	0.01		0.01	0.08		0.05	0.37		0.19	0.33		0.01
v/c Ratio	0.04	0.33	0.08	0.53	0.53	0.28	0.76	1.21	0.39	0.68	0.78	0.01
Uniform Delay, d1	52.2	55.4	53.6	49.1	53.4	51.0	34.9	35.6	22.5	41.2	29.7	18.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.66	0.58	0.31	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.8	0.2	1.1	1.8	0.6	0.7	94.0	0.1	5.1	3.6	0.0
Delay (s)	52.2	56.2	53.8	50.3	55.1	51.6	58.6	114.6	7.1	46.4	33.3	18.6
Level of Service	D	E	D	D	E	D	E	F	A	D	C	B
Approach Delay (s)		54.7			51.9			93.2			35.2	
Approach LOS		D			D			F			D	
Intersection Summary												
HCM 2000 Control Delay			68.9									
HCM 2000 Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			140.0									
Intersection Capacity Utilization			97.9%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
2: Bronte Road & Saw Whet Boulevard

2026 FB - MM - PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	7	106	0	60	12	2652	177	99	1518	4
Future Volume (vph)	3	0	7	106	0	60	12	2652	177	99	1518	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	15.0		15.0	15.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.850			0.850				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1770	1583	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.715			0.752			0.141			0.039		
Satd. Flow (perm)	1332	1583	0	1401	1583	0	263	3539	1583	73	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		55			60				55			19
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		42.5			50.2			458.5			731.4	
Travel Time (s)		3.1			3.6			27.5			43.9	
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)	3	0	8	115	0	65	13	2883	192	108	1650	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	8	0	115	65	0	13	2883	192	108	1650	4
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	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
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		6

Lanes, Volumes, Timings
2: Bronte Road & Saw Whet Boulevard

2026 FB - MM - PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	35.5	35.5		35.5	35.5		35.5	35.5	35.5	9.5	35.5	35.5
Total Split (s)	35.5	35.5		35.5	35.5		95.0	95.0	95.0	9.5	104.5	104.5
Total Split (%)	25.4%	25.4%		25.4%	25.4%		67.9%	67.9%	67.9%	6.8%	74.6%	74.6%
Maximum Green (s)	30.0	30.0		30.0	30.0		89.5	89.5	89.5	5.0	99.0	99.0
Yellow Time (s)	3.3	3.3		3.3	3.3		3.7	3.7	3.7	3.5	3.7	3.7
All-Red Time (s)	2.2	2.2		2.2	2.2		1.8	1.8	1.8	1.0	1.8	1.8
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)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	4.5	5.5	5.5
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	23.0	23.0		23.0	23.0		23.0	23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0		0	0
Act Effect Green (s)	16.8	16.8		16.8	16.8		96.9	96.9	96.9	113.2	112.2	112.2
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.69	0.69	0.69	0.81	0.80	0.80
v/c Ratio	0.02	0.03		0.68	0.27		0.07	1.18	0.17	0.57	0.58	0.00
Control Delay	50.7	0.3		78.3	16.5		6.5	93.2	3.6	30.9	18.6	0.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.7	0.3		78.3	16.5		6.5	93.2	3.6	30.9	18.6	0.8
LOS	D	A		E	B		A	F	A	C	B	A
Approach Delay		14.0			56.0			87.2			19.3	
Approach LOS		B			E			F			B	
Queue Length 50th (m)	0.8	0.0		32.7	1.3		0.6	~526.7	3.3	12.3	216.1	0.0
Queue Length 95th (m)	3.7	0.0		51.9	15.0		m0.7	m#434.7	m3.2	m25.8	256.2	m0.0
Internal Link Dist (m)		18.5			26.2			434.5			707.4	
Turn Bay Length (m)	15.0			15.0			15.0		15.0	15.0		15.0
Base Capacity (vph)	285	382		300	386		182	2450	1113	189	2835	1272
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.02		0.38	0.17		0.07	1.18	0.17	0.57	0.58	0.00

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 119 (85%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.18

Intersection Signal Delay: 62.2

Intersection LOS: E

Intersection Capacity Utilization 104.0%

ICU Level of Service G

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Bronte Road & Saw Whet Boulevard



HCM Signalized Intersection Capacity Analysis

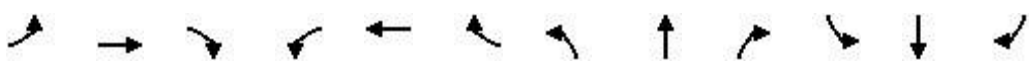
2: Bronte Road & Saw Whet Boulevard

2026 FB - MM - PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	7	106	0	60	12	2652	177	99	1518	4
Future Volume (vph)	3	0	7	106	0	60	12	2652	177	99	1518	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	4.5	5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.85		1.00	0.85		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)	1770	1583		1770	1583		1770	3539	1583	1770	3539	1583
Flt Permitted	0.71	1.00		0.75	1.00		0.14	1.00	1.00	0.04	1.00	1.00
Satd. Flow (perm)	1331	1583		1402	1583		262	3539	1583	73	3539	1583
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)	3	0	8	115	0	65	13	2883	192	108	1650	4
RTOR Reduction (vph)	0	7	0	0	53	0	0	0	17	0	0	1
Lane Group Flow (vph)	3	1	0	115	12	0	13	2883	175	108	1650	3
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	16.8	16.8		16.8	16.8		97.0	97.0	97.0	112.2	112.2	112.2
Effective Green, g (s)	16.8	16.8		16.8	16.8		97.0	97.0	97.0	112.2	112.2	112.2
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.69	0.69	0.69	0.80	0.80	0.80
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	4.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	159	189		168	189		181	2452	1096	188	2836	1268
v/s Ratio Prot		0.00			0.01			c0.81		0.04	c0.47	
v/s Ratio Perm	0.00			c0.08			0.05		0.11	0.41		0.00
v/c Ratio	0.02	0.01		0.68	0.06		0.07	1.18	0.16	0.57	0.58	0.00
Uniform Delay, d1	54.3	54.2		59.1	54.6		6.9	21.5	7.4	45.9	5.2	2.8
Progression Factor	1.00	1.00		1.00	1.00		0.70	0.34	0.59	0.84	3.10	1.00
Incremental Delay, d2	0.0	0.0		11.0	0.1		0.1	79.5	0.0	3.2	0.7	0.0
Delay (s)	54.4	54.3		70.0	54.8		4.9	86.8	4.4	41.6	16.7	2.8
Level of Service	D	D		E	D		A	F	A	D	B	A
Approach Delay (s)		54.3			64.5			81.3			18.2	
Approach LOS		D			E			F			B	
Intersection Summary												
HCM 2000 Control Delay	58.6			HCM 2000 Level of Service			E					
HCM 2000 Volume to Capacity ratio	1.07											
Actuated Cycle Length (s)	140.0			Sum of lost time (s)			15.5					
Intersection Capacity Utilization	104.0%			ICU Level of Service			G					
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2026 FB - MM - PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔		↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	0	0	0	138	0	110	1	2738	175	89	1578	0
Future Volume (vph)	0	0	0	138	0	110	1	2738	175	89	1578	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		40.0	35.0		30.0	70.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			20.0			60.0		
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
Ped Bike Factor						0.98			0.98			
Frt						0.850			0.850			
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	0	1863	0	1770	0	1583	1770	3505	1388	1770	3471	0
Flt Permitted				0.757			0.136			0.040		
Satd. Flow (perm)	0	1863	0	1410	0	1556	253	3505	1357	75	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						65			56			
Link Speed (k/h)		20			20			60			60	
Link Distance (m)		78.7			109.0			435.9			458.5	
Travel Time (s)		14.2			19.6			26.2			27.5	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	14%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Adj. Flow (vph)	0	0	0	142	0	113	1	2823	180	92	1627	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	142	0	113	1	2823	180	92	1627	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.03	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1		1	1	2	1	1	2	
Detector Template	Left	Thru		Left		Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0		2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0		2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4						9.4			9.4	
Detector 2 Size(m)		0.6						0.6			0.6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2026 FB - MM - PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0							0.0			0.0	
Turn Type				Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	4							2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8		8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0		10.0	15.0	15.0	15.0	5.0	15.0	
Minimum Split (s)	24.2	24.2		35.2		35.2	34.9	34.9	34.9	9.5	34.9	
Total Split (s)	35.2	35.2		35.2		35.2	95.3	95.3	95.3	9.5	104.8	
Total Split (%)	25.1%	25.1%		25.1%		25.1%	68.1%	68.1%	68.1%	6.8%	74.9%	
Maximum Green (s)	29.0	29.0		29.0		29.0	89.4	89.4	89.4	5.5	98.9	
Yellow Time (s)	3.1	3.1		3.1		3.1	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.1	3.1		3.1		3.1	2.2	2.2	2.2	1.0	2.2	
Lost Time Adjust (s)		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.2		6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.6	3.6	3.6	3.0	3.6	
Recall Mode	None	None		None		None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0			7.0	7.0	7.0	7.0		
Flash Dont Walk (s)				22.0			22.0	22.0	22.0	22.0		
Pedestrian Calls (#/hr)				0			0	0	0	0		
Act Effct Green (s)				19.3			19.3	96.4	96.4	96.4	110.5	108.6
Actuated g/C Ratio				0.14			0.14	0.69	0.69	0.69	0.79	0.78
v/c Ratio				0.73			0.42	0.01	1.17	0.19	0.58	0.60
Control Delay				78.3			28.5	0.0	90.2	0.0	50.1	2.7
Queue Delay				0.0			0.0	0.0	0.0	0.0	0.0	0.0
Total Delay				78.3			28.5	0.0	90.2	0.0	50.1	2.7
LOS				E			C	A	F	A	D	A
Approach Delay					56.2		84.7				5.3	
Approach LOS					E		F				A	
Queue Length 50th (m)				40.2			12.6	0.0	~530.6	0.0	14.6	7.1
Queue Length 95th (m)				61.1			30.6	m0.0	m348.1	m0.0	#34.8	48.3
Internal Link Dist (m)	54.7				85.0		411.9				434.5	
Turn Bay Length (m)						40.0	35.0			30.0	70.0	
Base Capacity (vph)				292			373	174	2413	951	158	2691
Starvation Cap Reductn				0			0	0	0	0	0	0
Spillback Cap Reductn				0			0	0	0	0	0	0
Storage Cap Reductn				0			0	0	0	0	0	0
Reduced v/c Ratio				0.49			0.30	0.01	1.17	0.19	0.58	0.60

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 103.6 (74%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.17

Lanes, Volumes, Timings 3: Bronte Road & Driveway/Charles Cornwall Road

2026 FB - MM - PM Peak Hour
1300 Bronte Enns

Intersection Signal Delay: 55.8

Intersection LOS: E

Intersection Capacity Utilization 94.1%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

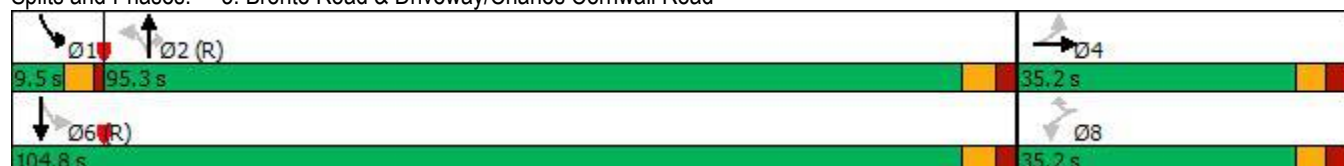
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

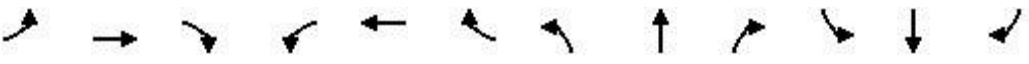
Splits and Phases: 3: Bronte Road & Driveway/Charles Cornwall Road



HCM Signalized Intersection Capacity Analysis

3: Bronte Road & Driveway/Charles Cornwall Road

2026 FB - MM - PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔		↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	0	0	0	138	0	110	1	2738	175	89	1578	0
Future Volume (vph)	0	0	0	138	0	110	1	2738	175	89	1578	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Lane Util. Factor				1.00		1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes				1.00		0.98	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes				1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Frt				1.00		0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected				0.95		1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1770		1552	1770	3505	1357	1770	3471	
Flt Permitted				0.76		1.00	0.14	1.00	1.00	0.04	1.00	
Satd. Flow (perm)				1410		1552	253	3505	1357	74	3471	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	142	0	113	1	2823	180	92	1627	0
RTOR Reduction (vph)	0	0	0	0	0	56	0	0	17	0	0	0
Lane Group Flow (vph)	0	0	0	142	0	57	1	2823	163	92	1627	0
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	14%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Turn Type				Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)				19.3		19.3	96.4	96.4	96.4	108.6	108.6	
Effective Green, g (s)				19.3		19.3	96.4	96.4	96.4	108.6	108.6	
Actuated g/C Ratio				0.14		0.14	0.69	0.69	0.69	0.78	0.78	
Clearance Time (s)				6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Vehicle Extension (s)				3.0		3.0	3.6	3.6	3.6	3.0	3.6	
Lane Grp Cap (vph)				194		213	174	2413	934	156	2692	
v/s Ratio Prot								c0.81		0.03	c0.47	
v/s Ratio Perm				c0.10		0.04	0.00		0.12	0.42		
v/c Ratio				0.73		0.27	0.01	1.17	0.17	0.59	0.60	
Uniform Delay, d1				57.9		54.0	6.8	21.8	7.7	43.2	6.6	
Progression Factor				1.00		1.00	0.02	0.34	0.00	1.73	0.25	
Incremental Delay, d2				13.3		0.7	0.0	76.9	0.0	4.7	0.8	
Delay (s)				71.2		54.7	0.1	84.4	0.0	79.4	2.5	
Level of Service				E		D	A	F	A	E	A	
Approach Delay (s)		0.0			63.9			79.3			6.6	
Approach LOS		A			E			E			A	
Intersection Summary												
HCM 2000 Control Delay			53.4									
HCM 2000 Volume to Capacity ratio			1.07									
Actuated Cycle Length (s)			140.0							16.1		
Intersection Capacity Utilization			94.1%							F		
Analysis Period (min)			15									
c Critical Lane Group												

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	129	0	154	0	2674	74	88	1624	2
Future Volume (vph)	0	0	0	129	0	154	0	2674	74	88	1624	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	45.0		0.0	35.0		70.0	115.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			50.0			65.0			65.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor						0.98			0.97		1.00	
Frt						0.850			0.850			
Flt Protected				0.950	0.950					0.950		
Satd. Flow (prot)	0	1863	0	1681	1681	1583	1863	3505	1583	1770	3471	0
Flt Permitted				0.950	0.950					0.047		
Satd. Flow (perm)	0	1863	0	1681	1681	1553	1863	3505	1540	88	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						159			106			
Link Speed (k/h)		20			50			60			60	
Link Distance (m)		52.6			84.3			299.0			435.9	
Travel Time (s)		9.5			6.1			17.9			26.2	
Confl. Peds. (#/hr)	2					2			2	2		
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	4%	2%
Adj. Flow (vph)	0	0	0	133	0	159	0	2757	76	91	1674	2
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	66	67	159	0	2757	76	91	1676	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

2026 FB - MM - PM Peak Hour

4: Bronte Road & Driveway/North Service Road West

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8			4			2			1	6	
Permitted Phases	8			4		4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	15.0	15.0	15.0	6.0	15.0	
Minimum Split (s)	24.7	24.7		36.9	36.9	36.9	41.7	41.7	41.7	10.5	24.7	
Total Split (s)	13.0	13.0		39.0	39.0	39.0	77.0	77.0	77.0	11.0	88.0	
Total Split (%)	9.3%	9.3%		27.9%	27.9%	27.9%	55.0%	55.0%	55.0%	7.9%	62.9%	
Maximum Green (s)	6.3	6.3		33.1	33.1	33.1	70.3	70.3	70.3	7.0	81.3	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		2.2	2.2	2.2	3.0	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)	6.7			5.9	5.9	5.9	6.7	6.7	6.7	4.0	6.7	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0			
Flash Dont Walk (s)				24.0	24.0	24.0	28.0	28.0	28.0			
Pedestrian Calls (#/hr)				2	2	2	2	2	2			
Act Effect Green (s)				33.1	33.1	33.1		81.5	81.5	97.0	94.3	
Actuated g/C Ratio				0.24	0.24	0.24		0.58	0.58	0.69	0.67	
v/c Ratio				0.17	0.17	0.33		1.35	0.08	0.55	0.72	
Control Delay				43.9	44.0	8.0		177.9	0.0	26.8	32.4	
Queue Delay				0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay				43.9	44.0	8.0		177.9	0.0	26.8	32.4	
LOS				D	D	A		F	A	C	C	
Approach Delay				24.4			173.1			32.1		
Approach LOS				C			F			C		
Queue Length 50th (m)				16.2	16.5	0.0		~547.4	0.0	16.9	236.5	
Queue Length 95th (m)				30.7	31.0	18.7		m#427.1	m0.0	m25.8	233.6	
Internal Link Dist (m)	28.6			60.3			275.0			411.9		
Turn Bay Length (m)				45.0			70.0			115.0		
Base Capacity (vph)				397	397	488		2040	940	168	2337	
Starvation Cap Reductn				0	0	0		15	0	0	0	
Spillback Cap Reductn				0	0	0		0	0	0	0	
Storage Cap Reductn				0	0	0		0	0	0	0	
Reduced v/c Ratio				0.17	0.17	0.33		1.36	0.08	0.54	0.72	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 85 (61%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.35

Lanes, Volumes, Timings 4: Bronte Road & Driveway/North Service Road West

2026 FB - MM - PM Peak Hour
1300 Bronte Enns

Intersection Signal Delay: 113.3 Intersection LOS: F
Intersection Capacity Utilization 95.2% ICU Level of Service F
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

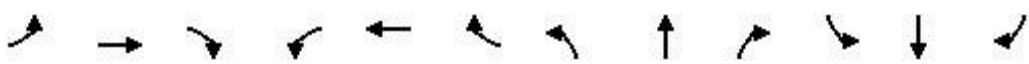
Splits and Phases: 4: Bronte Road & Driveway/North Service Road West



HCM Signalized Intersection Capacity Analysis

4: Bronte Road & Driveway/North Service Road West

2026 FB - MM - PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↖	↗	↗	↖	↕	↗	↖	↕	
Traffic Volume (vph)	0	0	0	129	0	154	0	2674	74	88	1624	2
Future Volume (vph)	0	0	0	129	0	154	0	2674	74	88	1624	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Lane Util. Factor				0.95	0.95	1.00		0.95	1.00	1.00	0.95	
Frpb, ped/bikes				1.00	1.00	0.98		1.00	0.97	1.00	1.00	
Flpb, ped/bikes				1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt				1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected				0.95	0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1681	1681	1553		3505	1540	1770	3471	
Flt Permitted				0.95	0.95	1.00		1.00	1.00	0.05	1.00	
Satd. Flow (perm)				1681	1681	1553		3505	1540	87	3471	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	133	0	159	0	2757	76	91	1674	2
RTOR Reduction (vph)	0	0	0	0	0	121	0	0	32	0	0	0
Lane Group Flow (vph)	0	0	0	66	67	38	0	2757	44	91	1676	0
Confl. Peds. (#/hr)	2					2			2	2		
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	4%	2%
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		8			4			2		1	6	
Permitted Phases	8			4		4	2		2	6		
Actuated Green, G (s)				33.1	33.1	33.1		81.5	81.5	94.3	94.3	
Effective Green, g (s)				33.1	33.1	33.1		81.5	81.5	94.3	94.3	
Actuated g/C Ratio				0.24	0.24	0.24		0.58	0.58	0.67	0.67	
Clearance Time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Vehicle Extension (s)				5.0	5.0	5.0		5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)				397	397	367		2040	896	164	2337	
v/s Ratio Prot								c0.79		0.03	c0.48	
v/s Ratio Perm				0.04	0.04	0.02			0.03	0.34		
v/c Ratio				0.17	0.17	0.10		1.35	0.05	0.55	0.72	
Uniform Delay, d1				42.5	42.5	41.8		29.2	12.6	34.1	14.4	
Progression Factor				1.00	1.00	1.00		0.50	0.03	0.89	2.09	
Incremental Delay, d2				0.4	0.4	0.3		158.5	0.0	3.3	1.6	
Delay (s)				42.9	42.9	42.1		173.1	0.4	33.6	31.7	
Level of Service				D	D	D		F	A	C	C	
Approach Delay (s)		0.0			42.5			168.4			31.8	
Approach LOS		A			D			F			C	
Intersection Summary												
HCM 2000 Control Delay			111.6				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.05									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)		23.3			
Intersection Capacity Utilization			95.2%				ICU Level of Service		F			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2026 FB - MM - PM Peak Hour

1300 Bronte Enns

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	232	617	2064	0	0	1056
Future Volume (vph)	232	617	2064	0	0	1056
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	90.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	1.00	0.95	1.00	1.00	0.95
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3433	1583	3505	0	0	3505
Flt Permitted	0.950					
Satd. Flow (perm)	3433	1583	3505	0	0	3505
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		3				
Link Speed (k/h)	60		60			60
Link Distance (m)	65.9		376.8			299.0
Travel Time (s)	4.0		22.6			17.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	3%	2%	2%	3%
Adj. Flow (vph)	252	671	2243	0	0	1148
Shared Lane Traffic (%)						
Lane Group Flow (vph)	252	671	2243	0	0	1148
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2026 FB - MM - PM Peak Hour
1300 Bronte Enns



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8					
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.7	24.7	36.5			26.5
Total Split (s)	59.0	59.0	81.0			81.0
Total Split (%)	42.1%	42.1%	57.9%			57.9%
Maximum Green (s)	52.3	52.3	74.5			74.5
Yellow Time (s)	3.7	3.7	3.7			3.7
All-Red Time (s)	3.0	3.0	2.8			2.8
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	6.7	6.7	6.5			6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	C-Max			C-Max
Act Effect Green (s)	52.3	52.3	74.5			74.5
Actuated g/C Ratio	0.37	0.37	0.53			0.53
v/c Ratio	0.20	1.13	1.20			0.62
Control Delay	30.2	118.9	111.4			12.1
Queue Delay	0.0	0.0	1.5			0.0
Total Delay	30.2	118.9	113.0			12.1
LOS	C	F	F			B
Approach Delay	94.7		113.0			12.1
Approach LOS	F		F			B
Queue Length 50th (m)	25.4	~226.5	~412.8			36.3
Queue Length 95th (m)	36.0	#304.4 m	#396.2			54.8
Internal Link Dist (m)	41.9		352.8			275.0
Turn Bay Length (m)		90.0				
Base Capacity (vph)	1282	593	1865			1865
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	667			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.20	1.13	1.87			0.62

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 67 (48%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.20

Intersection Signal Delay: 82.2

Intersection LOS: F

Intersection Capacity Utilization 106.3%

ICU Level of Service G

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Lanes, Volumes, Timings
 5: Bronte Road & QEW WB Off Ramp

2026 FB - MM - PM Peak Hour

1300 Bronte Enns

Queue shown is maximum after two cycles.

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

Splits and Phases: 5: Bronte Road & QEW WB Off Ramp



HCM Signalized Intersection Capacity Analysis

5: Bronte Road & QEW WB Off Ramp

2026 FB - MM - PM Peak Hour
1300 Bronte Enns

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 		 			 
Traffic Volume (vph)	232	617	2064	0	0	1056
Future Volume (vph)	232	617	2064	0	0	1056
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7	6.5			6.5
Lane Util. Factor	0.97	1.00	0.95			0.95
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3433	1583	3505			3505
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3433	1583	3505			3505
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	252	671	2243	0	0	1148
RTOR Reduction (vph)	0	2	0	0	0	0
Lane Group Flow (vph)	252	669	2243	0	0	1148
Heavy Vehicles (%)	2%	2%	3%	2%	2%	3%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	52.3	52.3	74.5			74.5
Effective Green, g (s)	52.3	52.3	74.5			74.5
Actuated g/C Ratio	0.37	0.37	0.53			0.53
Clearance Time (s)	6.7	6.7	6.5			6.5
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	1282	591	1865			1865
v/s Ratio Prot	0.07		c0.64			0.33
v/s Ratio Perm		c0.42				
v/c Ratio	0.20	1.13	1.20			0.62
Uniform Delay, d1	29.6	43.9	32.8			22.8
Progression Factor	1.00	1.00	0.45			0.47
Incremental Delay, d2	0.1	79.1	92.9			1.1
Delay (s)	29.7	123.0	107.5			11.9
Level of Service	C	F	F			B
Approach Delay (s)	97.5		107.5			11.9
Approach LOS	F		F			B
Intersection Summary						
HCM 2000 Control Delay			80.0		HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio			1.17			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	13.2
Intersection Capacity Utilization			106.3%		ICU Level of Service	G
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings

2026 FB - MM - PM Peak Hour

6: Bronte Road & Parking Lot Access/QEW EB Ramps

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	0	4	214	1	851	1	1620	228	296	984	3
Future Volume (vph)	6	0	4	214	1	851	1	1620	228	296	984	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	10.0		0.0	130.0		125.0	120.0		95.0	255.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			65.0			95.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.91	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor									0.98		1.00	
Frt		0.850			0.858	0.850			0.850			
Flt Protected	0.950			0.950	0.998		0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1681	1425	1475	1770	3539	1583	1770	3539	0
Flt Permitted	0.950			0.950	0.998		0.267			0.061		
Satd. Flow (perm)	1770	1583	0	1681	1425	1475	497	3539	1544	114	3539	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					384	384			145			
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		53.2			37.5			215.0			376.8	
Travel Time (s)		4.8			3.4			12.9			22.6	
Confl. Bikes (#/hr)									5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	7	0	4	233	1	925	1	1761	248	322	1070	3
Shared Lane Traffic (%)				10%		49%						
Lane Group Flow (vph)	7	4	0	210	477	472	1	1761	248	322	1073	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

12-03-2021

NA

CGH Transportation

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	36.7	36.7		36.7	36.7	36.7	36.5	36.5	36.5	11.5	36.5	
Total Split (s)	18.0	18.0		37.0	37.0	37.0	61.0	61.0	61.0	24.0	85.0	
Total Split (%)	12.9%	12.9%		26.4%	26.4%	26.4%	43.6%	43.6%	43.6%	17.1%	60.7%	
Maximum Green (s)	11.3	11.3		30.3	30.3	30.3	54.5	54.5	54.5	20.0	78.5	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.8	2.8	2.8	1.0	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)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				23.0	23.0	23.0	23.0	23.0	23.0		23.0	
Pedestrian Calls (#/hr)				0	0	0	0	0	0		0	
Act Effct Green (s)	7.1	7.1		24.4	24.4	24.4	65.5	65.5	65.5	99.4	96.9	
Actuated g/C Ratio	0.05	0.05		0.17	0.17	0.17	0.47	0.47	0.47	0.71	0.69	
v/c Ratio	0.08	0.05		0.72	0.84	0.82	0.00	1.06	0.31	0.80	0.44	
Control Delay	65.3	64.8		67.9	25.7	23.6	26.0	77.4	12.0	54.6	14.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	65.3	64.8		67.9	25.7	23.6	26.0	77.4	12.0	54.6	14.2	
LOS	E	E		E	C	C	C	E	B	D	B	
Approach Delay		65.1			32.5			69.3			23.6	
Approach LOS		E			C			E			C	
Queue Length 50th (m)	2.0	1.1		61.0	28.6	24.9	0.2	~287.7	16.2	77.3	67.4	
Queue Length 95th (m)	7.4	5.4		87.8	81.0	73.4	1.5	#385.4	42.0	#139.2	104.3	
Internal Link Dist (m)		29.2			13.5			191.0			352.8	
Turn Bay Length (m)	10.0			130.0		125.0	120.0		95.0	255.0		
Base Capacity (vph)	142	127		363	609	620	232	1655	799	404	2448	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.05	0.03		0.58	0.78	0.76	0.00	1.06	0.31	0.80	0.44	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 66 (47%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.06

Intersection Signal Delay: 46.0

Intersection LOS: D

Intersection Capacity Utilization 102.3%

ICU Level of Service G

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 6: Bronte Road & Parking Lot Access/QEW EB Ramps



HCM Signalized Intersection Capacity Analysis

6: Bronte Road & Parking Lot Access/QEW EB Ramps

2026 FB - MM - PM Peak Hour

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	0	4	214	1	851	1	1620	228	296	984	3
Future Volume (vph)	6	0	4	214	1	851	1	1620	228	296	984	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lane Util. Factor	1.00	1.00		0.95	0.91	0.95	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98	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	
Frt	1.00	0.85		1.00	0.86	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1583		1681	1424	1475	1770	3539	1545	1770	3538	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.27	1.00	1.00	0.06	1.00	
Satd. Flow (perm)	1770	1583		1681	1424	1475	496	3539	1545	114	3538	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	0	4	233	1	925	1	1761	248	322	1070	3
RTOR Reduction (vph)	0	0	0	0	317	317	0	0	81	0	0	0
Lane Group Flow (vph)	7	4	0	210	160	155	1	1761	167	322	1073	0
Confl. Bikes (#/hr)									5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Actuated Green, G (s)	2.9	2.9		24.4	24.4	24.4	61.4	61.4	61.4	92.8	92.8	
Effective Green, g (s)	2.9	2.9		24.4	24.4	24.4	61.4	61.4	61.4	92.8	92.8	
Actuated g/C Ratio	0.02	0.02		0.17	0.17	0.17	0.44	0.44	0.44	0.66	0.66	
Clearance Time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	36	32		292	248	257	217	1552	677	399	2345	
v/s Ratio Prot	c0.00	0.00		c0.12	0.11			c0.50		c0.16	0.30	
v/s Ratio Perm						0.11	0.00		0.11	0.38		
v/c Ratio	0.19	0.12		0.72	0.64	0.60	0.00	1.13	0.25	0.81	0.46	
Uniform Delay, d1	67.4	67.3		54.6	53.8	53.3	22.1	39.3	24.7	43.5	11.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.09	1.22	
Incremental Delay, d2	2.6	1.8		8.2	5.7	4.0	0.0	69.2	0.9	9.8	0.5	
Delay (s)	70.0	69.1		62.8	59.4	57.3	22.1	108.5	25.6	57.4	14.5	
Level of Service	E	E		E	E	E	C	F	C	E	B	
Approach Delay (s)		69.7			59.2			98.2			24.4	
Approach LOS		E			E			F			C	
Intersection Summary												
HCM 2000 Control Delay	65.7			HCM 2000 Level of Service			E					
HCM 2000 Volume to Capacity ratio	0.95											
Actuated Cycle Length (s)	140.0			Sum of lost time (s)			23.9					
Intersection Capacity Utilization	102.3%			ICU Level of Service			G					
Analysis Period (min)	15											
c Critical Lane Group												

Appendix J

2026 Future Total Conditions Synchro Worksheets

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2026 Future Total AM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	203	390	527	88	196	65	982	260	262	2125	12
Future Volume (vph)	11	203	390	527	88	196	65	982	260	262	2125	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	140.0		0.0	135.0		80.0	180.0		50.0
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (m)	65.0			100.0			70.0			70.0		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99		0.98			0.97			0.96			0.97
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1656	1863	1583	3433	1792	1553	1719	3343	1485	1770	3406	1336
Flt Permitted	0.698			0.423			0.062			0.162		
Satd. Flow (perm)	1200	1863	1556	1529	1792	1503	112	3343	1425	302	3406	1289
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			121			202			242			91
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		296.6			291.2			731.4			120.4	
Travel Time (s)		17.8			17.5			43.9			7.2	
Confl. Peds. (#/hr)	11					11	5		7	7		5
Confl. Bikes (#/hr)			5			5			5			5
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 (%)	9%	2%	2%	2%	6%	4%	5%	8%	7%	2%	6%	18%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Adj. Flow (vph)	11	209	402	543	91	202	67	1012	268	270	2191	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	209	402	543	91	202	67	1012	268	270	2191	12
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.00	1.00	1.03
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2026 Future Total AM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0	10.0	6.0	20.0	20.0	6.0	20.0	20.0
Minimum Split (s)	10.5	36.7	36.7	10.5	36.7	36.7	10.5	36.5	36.5	10.5	36.5	36.5
Total Split (s)	10.5	36.7	36.7	10.5	36.7	36.7	10.5	64.3	64.3	28.5	82.3	82.3
Total Split (%)	7.5%	26.2%	26.2%	7.5%	26.2%	26.2%	7.5%	45.9%	45.9%	20.4%	58.8%	58.8%
Maximum Green (s)	6.5	30.0	30.0	6.5	30.0	30.0	6.5	57.8	57.8	24.5	75.8	75.8
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	2.8	2.8	1.0	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	0.0	0.0
Total Lost Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
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	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)					7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)					23.0	23.0		23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)					11	11		7	7		5	5
Act Effct Green (s)	37.9	29.0	29.0	40.6	35.3	35.3	75.7	66.8	66.8	89.8	78.9	78.9
Actuated g/C Ratio	0.27	0.21	0.21	0.29	0.25	0.25	0.54	0.48	0.48	0.64	0.56	0.56
v/c Ratio	0.03	0.54	0.96	1.02	0.20	0.38	0.50	0.63	0.33	0.74	1.14	0.02
Control Delay	34.2	55.1	73.4	89.9	44.0	8.0	41.6	36.4	13.3	26.4	100.6	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.2	55.1	73.4	89.9	44.0	8.0	41.6	36.4	13.3	26.4	100.6	0.0
LOS	C	E	E	F	D	A	D	D	B	C	F	A
Approach Delay		66.6			65.1			32.1			92.0	
Approach LOS		E			E			C			F	
Queue Length 50th (m)	2.2	54.4	85.4	67.1	19.9	0.0	9.9	112.2	19.9	32.0	~403.8	0.0
Queue Length 95th (m)	7.2	81.7	#151.2	#112.7	38.9	21.6	22.0	153.6	42.6	57.9	#445.8	0.0
Internal Link Dist (m)		272.6			267.2			707.4			96.4	
Turn Bay Length (m)	70.0		70.0	140.0			135.0		80.0	180.0		50.0
Base Capacity (vph)	349	399	428	532	452	530	135	1594	806	450	1919	765
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.52	0.94	1.02	0.20	0.38	0.50	0.63	0.33	0.60	1.14	0.02

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 82.6 (59%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 1: Bronte Road & Upper Middle Road

2026 Future Total AM Peak Hour
1300 Bronte Enns

Maximum v/c Ratio: 1.14

Intersection Signal Delay: 69.4

Intersection LOS: E

Intersection Capacity Utilization 112.3%

ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Bronte Road & Upper Middle Road

 Ø1		 Ø2 (R)		 Ø3		 Ø4	
28.5 s		64.3 s		10.5 s		36.7 s	
 Ø5		 Ø6 (R)		 Ø7		 Ø8	
10.5 s		62.3 s		10.5 s		36.7 s	

HCM Signalized Intersection Capacity Analysis

1: Bronte Road & Upper Middle Road

2026 Future Total AM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	203	390	527	88	196	65	982	260	262	2125	12
Future Volume (vph)	11	203	390	527	88	196	65	982	260	262	2125	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00	0.97
Flpb, ped/bikes	0.99	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	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	1863	1556	3433	1792	1504	1719	3343	1426	1769	3406	1289
Flt Permitted	0.70	1.00	1.00	0.42	1.00	1.00	0.06	1.00	1.00	0.16	1.00	1.00
Satd. Flow (perm)	1205	1863	1556	1530	1792	1504	112	3343	1426	302	3406	1289
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)	11	209	402	543	91	202	67	1012	268	270	2191	12
RTOR Reduction (vph)	0	0	94	0	0	151	0	0	131	0	0	6
Lane Group Flow (vph)	11	209	308	543	91	51	67	1012	137	270	2191	6
Confl. Peds. (#/hr)	11					11	5		7	7		5
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	9%	2%	2%	2%	6%	4%	5%	8%	7%	2%	6%	18%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	34.0	31.4	31.4	41.8	35.3	35.3	69.6	64.4	64.4	84.9	75.7	75.7
Effective Green, g (s)	34.0	31.4	31.4	41.8	35.3	35.3	69.6	64.4	64.4	84.9	75.7	75.7
Actuated g/C Ratio	0.24	0.22	0.22	0.30	0.25	0.25	0.50	0.46	0.46	0.61	0.54	0.54
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	300	417	348	545	451	379	115	1537	655	356	1841	696
v/s Ratio Prot	0.00	0.11		c0.05	0.05		0.02	0.30		c0.09	c0.64	
v/s Ratio Perm	0.01		0.20	c0.25		0.03	0.27		0.10	0.37		0.01
v/c Ratio	0.04	0.50	0.89	1.00	0.20	0.13	0.58	0.66	0.21	0.76	1.19	0.01
Uniform Delay, d1	40.4	47.5	52.6	50.2	41.2	40.5	31.9	29.3	22.6	19.1	32.1	14.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.53	1.20	2.91	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.0	22.5	37.4	0.2	0.2	6.6	2.0	0.7	8.9	91.3	0.0
Delay (s)	40.4	48.4	75.1	87.6	41.5	40.7	55.6	37.1	66.3	28.0	123.4	14.9
Level of Service	D	D	E	F	D	D	E	D	E	C	F	B
Approach Delay (s)		65.5			71.2			43.8			112.5	
Approach LOS		E			E			D			F	
Intersection Summary												
HCM 2000 Control Delay			82.9									
HCM 2000 Volume to Capacity ratio			1.14									
Actuated Cycle Length (s)			140.0									
Intersection Capacity Utilization			112.3%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
2: Bronte Road & Saw Whet Boulevard

2026 Future Total AM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	0	50	172	0	95	16	1193	54	30	3100	5
Future Volume (vph)	18	0	50	172	0	95	16	1193	54	30	3100	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	15.0		15.0	15.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.850			0.850				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1770	1583	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.646			0.722			0.038			0.181		
Satd. Flow (perm)	1203	1583	0	1345	1583	0	71	3539	1583	337	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			96				22			19
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		42.5			50.2			458.5			731.4	
Travel Time (s)		3.1			3.6			27.5			43.9	
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)	20	0	54	187	0	103	17	1297	59	33	3370	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	54	0	187	103	0	17	1297	59	33	3370	5
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	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
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6

Lanes, Volumes, Timings
2: Bronte Road & Saw Whet Boulevard

2026 Future Total AM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	35.5	35.5		35.5	35.5		35.5	35.5	35.5	35.5	35.5	35.5
Total Split (s)	35.5	35.5		35.5	35.5		104.5	104.5	104.5	104.5	104.5	104.5
Total Split (%)	25.4%	25.4%		25.4%	25.4%		74.6%	74.6%	74.6%	74.6%	74.6%	74.6%
Maximum Green (s)	30.0	30.0		30.0	30.0		99.0	99.0	99.0	99.0	99.0	99.0
Yellow Time (s)	3.3	3.3		3.3	3.3		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.2	2.2		2.2	2.2		1.8	1.8	1.8	1.8	1.8	1.8
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)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	23.0	23.0		23.0	23.0		23.0	23.0	23.0	23.0	23.0	23.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effect Green (s)	23.9	23.9		23.9	23.9		105.1	105.1	105.1	105.1	105.1	105.1
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.75	0.75	0.75	0.75	0.75	0.75
v/c Ratio	0.10	0.19		0.82	0.30		0.32	0.49	0.05	0.13	1.27	0.00
Control Delay	47.2	34.0		81.9	12.2		34.1	15.2	6.8	4.4	136.9	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	47.2	34.0		81.9	12.2		34.1	15.2	6.8	4.4	136.9	0.0
LOS	D	C		F	B		C	B	A	A	F	A
Approach Delay		37.6			57.1			15.1			135.4	
Approach LOS		D			E			B			F	
Queue Length 50th (m)	4.9	8.7		52.8	1.7		2.7	133.4	6.0	1.9	~652.2	0.0
Queue Length 95th (m)	12.3	20.8		78.5	17.7		m5.7	138.8	m8.9	m2.3	m#590.6	m0.0
Internal Link Dist (m)		18.5			26.2			434.5			707.4	
Turn Bay Length (m)	15.0			15.0			15.0		15.0	15.0		15.0
Base Capacity (vph)	257	354		288	414		53	2657	1193	253	2657	1193
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.15		0.65	0.25		0.32	0.49	0.05	0.13	1.27	0.00

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 85 (61%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.27

Intersection Signal Delay: 97.5

Intersection LOS: F

Intersection Capacity Utilization 111.1%

ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
 2: Bronte Road & Saw Whet Boulevard

2026 Future Total AM Peak Hour
 1300 Bronte Enns

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Bronte Road & Saw Whet Boulevard



HCM Signalized Intersection Capacity Analysis

2: Bronte Road & Saw Whet Boulevard

2026 Future Total AM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	0	50	172	0	95	16	1193	54	30	3100	5
Future Volume (vph)	18	0	50	172	0	95	16	1193	54	30	3100	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	5.5	5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.85		1.00	0.85		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)	1770	1583		1770	1583		1770	3539	1583	1770	3539	1583
Flt Permitted	0.65	1.00		0.72	1.00		0.04	1.00	1.00	0.18	1.00	1.00
Satd. Flow (perm)	1203	1583		1345	1583		71	3539	1583	337	3539	1583
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)	20	0	54	187	0	103	17	1297	59	33	3370	5
RTOR Reduction (vph)	0	16	0	0	80	0	0	0	5	0	0	1
Lane Group Flow (vph)	20	38	0	187	23	0	17	1297	54	33	3370	4
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	23.9	23.9		23.9	23.9		105.1	105.1	105.1	105.1	105.1	105.1
Effective Green, g (s)	23.9	23.9		23.9	23.9		105.1	105.1	105.1	105.1	105.1	105.1
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.75	0.75	0.75	0.75	0.75	0.75
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	205	270		229	270		53	2656	1188	252	2656	1188
v/s Ratio Prot		0.02			0.01			0.37			c0.95	
v/s Ratio Perm	0.02			c0.14			0.24		0.03	0.10		0.00
v/c Ratio	0.10	0.14		0.82	0.09		0.32	0.49	0.05	0.13	1.27	0.00
Uniform Delay, d1	49.0	49.3		55.9	48.9		5.7	6.9	4.5	4.8	17.5	4.4
Progression Factor	1.00	1.00		1.00	1.00		1.86	1.96	1.77	0.68	0.54	0.53
Incremental Delay, d2	0.2	0.2		19.7	0.1		13.0	0.5	0.1	0.1	121.3	0.0
Delay (s)	49.2	49.6		75.6	49.0		23.6	14.0	8.0	3.4	130.7	2.3
Level of Service	D	D		E	D		C	B	A	A	F	A
Approach Delay (s)		49.5			66.2			13.9			129.2	
Approach LOS		D			E			B			F	
Intersection Summary												
HCM 2000 Control Delay	93.8			HCM 2000 Level of Service					F			
HCM 2000 Volume to Capacity ratio	1.18											
Actuated Cycle Length (s)	140.0			Sum of lost time (s)					11.0			
Intersection Capacity Utilization	111.1%			ICU Level of Service					H			
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2026 Future Total AM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	161	0	65	0	1245	78	149	3162	0
Future Volume (vph)	1	0	1	161	0	65	0	1245	78	149	3162	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		40.0	35.0		30.0	70.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			20.0			60.0		
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
Ped Bike Factor		0.99				0.98			0.98			
Frt		0.932				0.850			0.850			
Flt Protected		0.976		0.950						0.950		
Satd. Flow (prot)	0	1680	0	1530	0	1392	1863	3406	1439	1770	3471	0
Flt Permitted		0.976		0.757						0.155		
Satd. Flow (perm)	0	1680	0	1219	0	1368	1863	3406	1406	289	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		54				67			56			
Link Speed (k/h)		20			20			60			60	
Link Distance (m)		78.7			109.0			435.9			458.5	
Travel Time (s)		14.2			19.6			26.2			27.5	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	18%	2%	16%	2%	6%	10%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Adj. Flow (vph)	1	0	1	166	0	67	0	1284	80	154	3260	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2	0	166	0	67	0	1284	80	154	3260	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.03	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1		1	1	2	1	1	2	
Detector Template	Left	Thru		Left		Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0		2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0		2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4						9.4			9.4	
Detector 2 Size(m)		0.6						0.6			0.6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2026 Future Total AM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA		Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8		8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0		10.0	15.0	15.0	15.0	5.0	15.0	
Minimum Split (s)	24.2	24.2		35.2		35.2	34.9	34.9	34.9	9.5	34.9	
Total Split (s)	35.2	35.2		35.2		35.2	88.2	88.2	88.2	16.6	104.8	
Total Split (%)	25.1%	25.1%		25.1%		25.1%	63.0%	63.0%	63.0%	11.9%	74.9%	
Maximum Green (s)	29.0	29.0		29.0		29.0	82.3	82.3	82.3	12.6	98.9	
Yellow Time (s)	3.1	3.1		3.1		3.1	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.1	3.1		3.1		3.1	2.2	2.2	2.2	1.0	2.2	
Lost Time Adjust (s)		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.2		6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.6	3.6	3.6	3.0	3.6	
Recall Mode	None	None		None		None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0		7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				22.0		22.0	22.0	22.0	22.0		22.0	
Pedestrian Calls (#/hr)				0		0	0	0	0		0	
Act Effect Green (s)		23.3		23.3		23.3		91.8	91.8	106.5	104.6	
Actuated g/C Ratio		0.17		0.17		0.17		0.66	0.66	0.76	0.75	
v/c Ratio		0.01		0.82		0.24		0.58	0.09	0.49	1.26	
Control Delay		0.0		85.8		12.2		14.9	8.4	3.3	128.7	
Queue Delay		0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay		0.0		85.8		12.2		14.9	8.4	3.3	128.7	
LOS		A		F		B		B	A	A	F	
Approach Delay					64.6			14.5			123.0	
Approach LOS					E			B			F	
Queue Length 50th (m)		0.0		46.9		0.0		66.0	3.6	3.0	~628.5	
Queue Length 95th (m)		0.0		71.9		13.4		95.5	m10.6	m2.6	m#441.8	
Internal Link Dist (m)		54.7			85.0			411.9			434.5	
Turn Bay Length (m)						40.0			30.0	70.0		
Base Capacity (vph)		390		252		336		2232	940	353	2594	
Starvation Cap Reductn		0		0		0		0	0	0	0	
Spillback Cap Reductn		0		0		0		0	0	0	0	
Storage Cap Reductn		0		0		0		0	0	0	0	
Reduced v/c Ratio		0.01		0.66		0.20		0.58	0.09	0.44	1.26	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 128.8 (92%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.26

Lanes, Volumes, Timings 3: Bronte Road & Driveway/Charles Cornwall Road

2026 Future Total AM Peak Hour
1300 Bronte Enns

Intersection Signal Delay: 90.7

Intersection LOS: F

Intersection Capacity Utilization 128.7%

ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

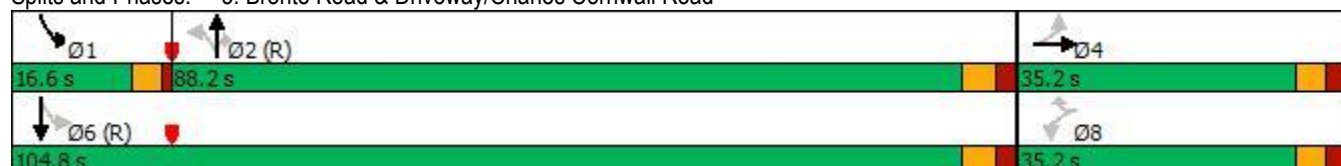
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Bronte Road & Driveway/Charles Cornwall Road



HCM Signalized Intersection Capacity Analysis

3: Bronte Road & Driveway/Charles Cornwall Road

2026 Future Total AM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	161	0	65	0	1245	78	149	3162	0
Future Volume (vph)	1	0	1	161	0	65	0	1245	78	149	3162	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.2		6.2		6.2		5.9	5.9	4.0	5.9	
Lane Util. Factor		1.00		1.00		1.00		0.95	1.00	1.00	0.95	
Frpb, ped/bikes		0.99		1.00		0.98		1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Frt		0.93		1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected		0.98		0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1679		1530		1366		3406	1406	1770	3471	
Flt Permitted		0.98		0.76		1.00		1.00	1.00	0.15	1.00	
Satd. Flow (perm)		1679		1218		1366		3406	1406	288	3471	
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)	1	0	1	166	0	67	0	1284	80	154	3260	0
RTOR Reduction (vph)	0	2	0	0	0	56	0	0	19	0	0	0
Lane Group Flow (vph)	0	0	0	166	0	11	0	1284	61	154	3260	0
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	18%	2%	16%	2%	6%	10%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Turn Type	Perm	NA		Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		23.3		23.3		23.3		91.7	91.7	104.6	104.6	
Effective Green, g (s)		23.3		23.3		23.3		91.7	91.7	104.6	104.6	
Actuated g/C Ratio		0.17		0.17		0.17		0.66	0.66	0.75	0.75	
Clearance Time (s)		6.2		6.2		6.2		5.9	5.9	4.0	5.9	
Vehicle Extension (s)		3.0		3.0		3.0		3.6	3.6	3.0	3.6	
Lane Grp Cap (vph)		279		202		227		2230	920	309	2593	
v/s Ratio Prot								0.38		0.03	c0.94	
v/s Ratio Perm		0.00		c0.14		0.01			0.04	0.34		
v/c Ratio		0.00		0.82		0.05		0.58	0.07	0.50	1.26	
Uniform Delay, d1		48.6		56.3		49.0		13.4	8.7	9.2	17.7	
Progression Factor		1.00		1.00		1.00		0.97	1.92	0.55	0.27	
Incremental Delay, d2		0.0		22.8		0.1		0.8	0.1	0.1	116.1	
Delay (s)		48.7		79.1		49.1		13.8	16.8	5.2	120.9	
Level of Service		D		E		D		B	B	A	F	
Approach Delay (s)		48.7			70.5			14.0			115.7	
Approach LOS		D			E			B			F	
Intersection Summary												
HCM 2000 Control Delay			85.9				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.22									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			16.1		
Intersection Capacity Utilization			128.7%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

2026 Future Total AM Peak Hour

4: Bronte Road & Driveway/North Service Road West

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	17	0	44	0	1301	241	268	3065	1
Future Volume (vph)	0	0	0	17	0	44	0	1301	241	268	3065	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	45.0		0.0	35.0		70.0	115.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			50.0			65.0			65.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor						0.98			0.97		1.00	
Frt						0.850			0.850			
Flt Protected				0.950	0.950					0.950		
Satd. Flow (prot)	0	1863	0	1681	1681	1583	1863	3438	1583	1770	3471	0
Flt Permitted				0.950	0.950					0.120		
Satd. Flow (perm)	0	1863	0	1681	1681	1555	1863	3438	1542	224	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						112			129			
Link Speed (k/h)		20			50			60			60	
Link Distance (m)		52.6			84.3			299.0			435.9	
Travel Time (s)		9.5			6.1			17.9			26.2	
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	4%	2%
Adj. Flow (vph)	0	0	0	17	0	45	0	1328	246	273	3128	1
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	8	9	45	0	1328	246	273	3129	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

12-03-2021

NA

CGH Transportation

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Lanes, Volumes, Timings

2026 Future Total AM Peak Hour

4: Bronte Road & Driveway/North Service Road West

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8			4			2			1	6	
Permitted Phases	8			4		4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	15.0	15.0	15.0	6.0	15.0	
Minimum Split (s)	24.7	24.7		36.9	36.9	36.9	41.7	41.7	41.7	10.5	24.7	
Total Split (s)	29.0	29.0		42.0	42.0	42.0	51.0	51.0	51.0	18.0	69.0	
Total Split (%)	20.7%	20.7%		30.0%	30.0%	30.0%	36.4%	36.4%	36.4%	12.9%	49.3%	
Maximum Green (s)	22.3	22.3		36.1	36.1	36.1	44.3	44.3	44.3	14.0	62.3	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		2.2	2.2	2.2	3.0	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)	6.7			5.9	5.9	5.9	6.7	6.7	6.7	4.0	6.7	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0			
Flash Dont Walk (s)				24.0	24.0	24.0	28.0	28.0	28.0			
Pedestrian Calls (#/hr)				1	1	1	0	0	0			
Act Effect Green (s)				16.8	16.8	16.8	81.3			116.5	115.1	
Actuated g/C Ratio				0.12	0.12	0.12	0.58			0.83	0.82	
v/c Ratio				0.04	0.04	0.16	0.67			0.54	1.10	
Control Delay				48.8	49.0	1.2	14.4			4.4	26.0	58.0
Queue Delay				0.0	0.0	0.0	0.0			0.0	0.0	
Total Delay				48.8	49.0	1.2	14.4			4.4	26.0	58.0
LOS				D	D	A	B			A	C	E
Approach Delay				14.3			12.8			55.5		
Approach LOS				B			B			E		
Queue Length 50th (m)				2.3	2.5	0.0	88.3			1.4	40.9	~545.0
Queue Length 95th (m)				7.1	7.5	0.0	141.5			m28.5	m29.7	m#420.8
Internal Link Dist (m)	28.6			60.3			275.0			411.9		
Turn Bay Length (m)				45.0						70.0	115.0	
Base Capacity (vph)				433	433	484	1995			948	501	2854
Starvation Cap Reductn				0	0	0	0			0	0	0
Spillback Cap Reductn				0	0	0	0			0	0	0
Storage Cap Reductn				0	0	0	0			0	0	0
Reduced v/c Ratio				0.02	0.02	0.09	0.67			0.26	0.54	1.10

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 27 (19%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.10

Intersection Signal Delay: 41.6

Intersection LOS: D

Intersection Capacity Utilization 122.2%

ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

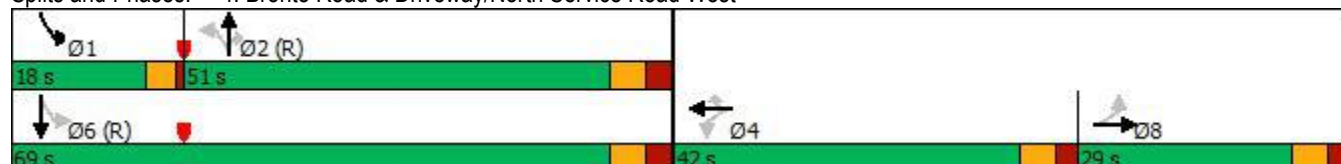
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 4: Bronte Road & Driveway/North Service Road West



HCM Signalized Intersection Capacity Analysis

4: Bronte Road & Driveway/North Service Road West

2026 Future Total AM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	17	0	44	0	1301	241	268	3065	1
Future Volume (vph)	0	0	0	17	0	44	0	1301	241	268	3065	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Lane Util. Factor				0.95	0.95	1.00		0.95	1.00	1.00	0.95	
Frpb, ped/bikes				1.00	1.00	0.98		1.00	0.98	1.00	1.00	
Flpb, ped/bikes				1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt				1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected				0.95	0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1681	1681	1546		3438	1547	1770	3471	
Flt Permitted				0.95	0.95	1.00		1.00	1.00	0.12	1.00	
Satd. Flow (perm)				1681	1681	1546		3438	1547	223	3471	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	17	0	45	0	1328	246	273	3128	1
RTOR Reduction (vph)	0	0	0	0	0	40	0	0	55	0	0	0
Lane Group Flow (vph)	0	0	0	8	9	5	0	1328	191	273	3129	0
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	4%	2%
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		8			4			2		1	6	
Permitted Phases	8			4		4	2		2	6		
Actuated Green, G (s)				14.8	14.8	14.8		80.1	80.1	112.6	112.6	
Effective Green, g (s)				14.8	14.8	14.8		80.1	80.1	112.6	112.6	
Actuated g/C Ratio				0.11	0.11	0.11		0.57	0.57	0.80	0.80	
Clearance Time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Vehicle Extension (s)				5.0	5.0	5.0		5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)				177	177	163		1967	885	494	2791	
v/s Ratio Prot								0.39		0.11	c0.90	
v/s Ratio Perm				0.00	0.01	0.00			0.12	0.33		
v/c Ratio				0.05	0.05	0.03		0.68	0.22	0.55	1.12	
Uniform Delay, d1				56.3	56.3	56.2		20.9	14.6	20.2	13.7	
Progression Factor				1.00	1.00	1.00		0.58	0.48	1.80	0.70	
Incremental Delay, d2				0.2	0.3	0.2		1.4	0.4	0.1	55.0	
Delay (s)				56.5	56.5	56.3		13.5	7.4	36.5	64.6	
Level of Service				E	E	E		B	A	D	E	
Approach Delay (s)		0.0			56.4			12.6			62.4	
Approach LOS		A			E			B			E	
Intersection Summary												
HCM 2000 Control Delay			46.7				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			1.09									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)		23.3			
Intersection Capacity Utilization			122.2%				ICU Level of Service		H			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2026 Future Total AM Peak Hour
1300 Bronte Enns

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	193	297	1245	0	0	1936
Future Volume (vph)	193	297	1245	0	0	1936
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	90.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	1.00	0.95	1.00	1.00	0.95
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3335	1568	3471	0	0	3505
Flt Permitted	0.950					
Satd. Flow (perm)	3335	1568	3471	0	0	3505
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		41				
Link Speed (k/h)	60		60			60
Link Distance (m)	65.9		376.8			299.0
Travel Time (s)	4.0		22.6			17.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	3%	4%	2%	2%	3%
Adj. Flow (vph)	210	323	1353	0	0	2104
Shared Lane Traffic (%)						
Lane Group Flow (vph)	210	323	1353	0	0	2104
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2026 Future Total AM Peak Hour
1300 Bronte Enns



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8					
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.7	24.7	36.5			26.5
Total Split (s)	24.7	24.7	45.3			45.3
Total Split (%)	35.3%	35.3%	64.7%			64.7%
Maximum Green (s)	18.0	18.0	38.8			38.8
Yellow Time (s)	3.7	3.7	3.7			3.7
All-Red Time (s)	3.0	3.0	2.8			2.8
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	6.7	6.7	6.5			6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	C-Max			C-Max
Act Effect Green (s)	16.2	16.2	40.6			40.6
Actuated g/C Ratio	0.23	0.23	0.58			0.58
v/c Ratio	0.27	0.82	0.67			1.03
Control Delay	22.4	40.5	21.0			43.0
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	22.4	40.5	21.0			43.0
LOS	C	D	C			D
Approach Delay	33.4		21.0			43.0
Approach LOS	C		C			D
Queue Length 50th (m)	11.8	35.7	128.4			~200.1
Queue Length 95th (m)	20.1	#73.5	m129.6			m243.3
Internal Link Dist (m)	41.9		352.8			275.0
Turn Bay Length (m)		90.0				
Base Capacity (vph)	857	433	2014			2034
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.25	0.75	0.67			1.03

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 14 (20%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.03

Intersection Signal Delay: 34.3

Intersection LOS: C

Intersection Capacity Utilization 72.8%

ICU Level of Service C

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Lanes, Volumes, Timings
 5: Bronte Road & QEW WB Off Ramp

2026 Future Total AM Peak Hour

1300 Bronte Enns

Queue shown is maximum after two cycles.

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

Splits and Phases: 5: Bronte Road & QEW WB Off Ramp



HCM Signalized Intersection Capacity Analysis

5: Bronte Road & QEW WB Off Ramp

2026 Future Total AM Peak Hour
1300 Bronte Enns

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	193	297	1245	0	0	1936
Future Volume (vph)	193	297	1245	0	0	1936
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7	6.5			6.5
Lane Util. Factor	0.97	1.00	0.95			0.95
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3335	1568	3471			3505
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3335	1568	3471			3505
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	210	323	1353	0	0	2104
RTOR Reduction (vph)	0	32	0	0	0	0
Lane Group Flow (vph)	210	291	1353	0	0	2104
Heavy Vehicles (%)	5%	3%	4%	2%	2%	3%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	16.2	16.2	40.6			40.6
Effective Green, g (s)	16.2	16.2	40.6			40.6
Actuated g/C Ratio	0.23	0.23	0.58			0.58
Clearance Time (s)	6.7	6.7	6.5			6.5
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	771	362	2013			2032
v/s Ratio Prot	0.06		0.39			c0.60
v/s Ratio Perm		c0.19				
v/c Ratio	0.27	0.81	0.67			1.04
Uniform Delay, d1	22.1	25.4	10.1			14.7
Progression Factor	1.00	1.00	1.91			1.67
Incremental Delay, d2	0.2	12.3	0.8			18.0
Delay (s)	22.3	37.7	20.1			42.5
Level of Service	C	D	C			D
Approach Delay (s)	31.6		20.1			42.5
Approach LOS	C		C			D
Intersection Summary						
HCM 2000 Control Delay			33.4		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.97			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	13.2
Intersection Capacity Utilization			72.8%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
6: Bronte Road & Parking Lot Access/QEW EB Ramps

2026 Future Total AM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1	2	359	2	604	3	827	232	679	1410	9
Future Volume (vph)	7	1	2	359	2	604	3	827	232	679	1410	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	10.0		0.0	130.0		125.0	120.0		95.0	255.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			65.0			95.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.91	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor									0.97		1.00	
Frt		0.900			0.868	0.850			0.850		0.999	
Flt Protected	0.950			0.950	0.994		0.950			0.950		
Satd. Flow (prot)	1770	1676	0	1665	1424	1461	1770	3374	1583	1770	3468	0
Flt Permitted	0.950			0.950	0.994		0.166			0.126		
Satd. Flow (perm)	1770	1676	0	1665	1424	1461	309	3374	1539	235	3468	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					281	348			228			
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		53.2			37.5			215.0			376.8	
Travel Time (s)		4.8			3.4			12.9			22.6	
Confl. Bikes (#/hr)									5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	3%	2%	5%	2%	7%	2%	2%	4%	2%
Adj. Flow (vph)	8	1	2	390	2	657	3	899	252	738	1533	10
Shared Lane Traffic (%)				10%		47%						
Lane Group Flow (vph)	8	3	0	351	350	348	3	899	252	738	1543	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
6: Bronte Road & Parking Lot Access/QEW EB Ramps

2026 Future Total AM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	36.7	36.7		36.7	36.7	36.7	36.5	36.5	36.5	11.5	36.5	
Total Split (s)	36.7	36.7		50.0	50.0	50.0	38.3	38.3	38.3	15.0	53.3	
Total Split (%)	26.2%	26.2%		35.7%	35.7%	35.7%	27.4%	27.4%	27.4%	10.7%	38.1%	
Maximum Green (s)	30.0	30.0		43.3	43.3	43.3	31.8	31.8	31.8	11.0	46.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.8	2.8	2.8	1.0	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)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				23.0	23.0	23.0	23.0	23.0	23.0		23.0	
Pedestrian Calls (#/hr)				0	0	0	0	0	0		0	
Act Effct Green (s)	7.1	7.1		35.8	35.8	35.8	31.8	31.8	31.8	88.0	85.5	
Actuated g/C Ratio	0.05	0.05		0.26	0.26	0.26	0.23	0.23	0.23	0.63	0.61	
v/c Ratio	0.09	0.04		0.83	0.61	0.55	0.04	1.17	0.48	1.07	0.73	
Control Delay	65.6	64.0		65.1	13.9	7.1	44.3	138.4	10.9	73.8	25.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	65.6	64.0		65.1	13.9	7.1	44.3	138.4	10.9	73.8	25.5	
LOS	E	E		E	B	A	D	F	B	E	C	
Approach Delay		65.1			28.8			110.3			41.1	
Approach LOS		E			C			F			D	
Queue Length 50th (m)	2.3	0.9		101.4	17.2	0.0	0.7	~164.1	5.6	211.1	179.8	
Queue Length 95th (m)	8.3	4.3		133.2	50.5	25.5	3.6	#207.1	30.7	m#278.6	m208.4	
Internal Link Dist (m)		29.2			13.5			191.0			352.8	
Turn Bay Length (m)	10.0			130.0		125.0	120.0		95.0	255.0		
Base Capacity (vph)	379	359		514	634	692	70	766	525	692	2116	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.02	0.01		0.68	0.55	0.50	0.04	1.17	0.48	1.07	0.73	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 88 (63%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.17
 Intersection Signal Delay: 56.1
 Intersection LOS: E

Intersection Capacity Utilization 97.6%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

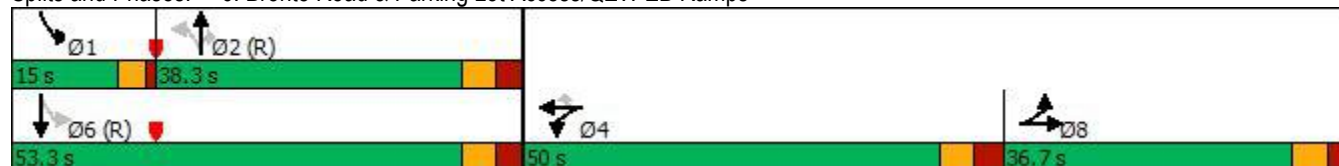
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 6: Bronte Road & Parking Lot Access/QEW EB Ramps



HCM Signalized Intersection Capacity Analysis

6: Bronte Road & Parking Lot Access/QEW EB Ramps

2026 Future Total AM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1	2	359	2	604	3	827	232	679	1410	9
Future Volume (vph)	7	1	2	359	2	604	3	827	232	679	1410	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lane Util. Factor	1.00	1.00		0.95	0.91	0.95	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97	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	
Frt	1.00	0.90		1.00	0.87	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1676		1665	1424	1461	1770	3374	1537	1770	3468	
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.17	1.00	1.00	0.13	1.00	
Satd. Flow (perm)	1770	1676		1665	1424	1461	309	3374	1537	235	3468	
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)	8	1	2	390	2	657	3	899	252	738	1533	10
RTOR Reduction (vph)	0	0	0	0	209	259	0	0	183	0	0	0
Lane Group Flow (vph)	8	3	0	351	141	89	3	899	69	738	1543	0
Confl. Bikes (#/hr)									5			5
Heavy Vehicles (%)	2%	2%	2%	3%	2%	5%	2%	7%	2%	2%	4%	2%
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Actuated Green, G (s)	2.9	2.9		35.8	35.8	35.8	27.7	27.7	27.7	81.4	81.4	
Effective Green, g (s)	2.9	2.9		35.8	35.8	35.8	27.7	27.7	27.7	81.4	81.4	
Actuated g/C Ratio	0.02	0.02		0.26	0.26	0.26	0.20	0.20	0.20	0.58	0.58	
Clearance Time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	36	34		425	364	373	61	667	304	681	2016	
v/s Ratio Prot	c0.00	0.00		c0.21	0.10			c0.27		c0.38	0.44	
v/s Ratio Perm						0.06	0.01		0.04	0.25		
v/c Ratio	0.22	0.09		0.83	0.39	0.24	0.05	1.35	0.23	1.08	0.77	
Uniform Delay, d1	67.4	67.3		49.2	43.0	41.3	45.5	56.1	47.2	38.5	22.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.12	
Incremental Delay, d2	3.1	1.1		12.4	0.7	0.3	1.5	166.4	1.7	46.0	0.9	
Delay (s)	70.6	68.4		61.5	43.7	41.6	47.0	222.5	48.9	83.7	25.7	
Level of Service	E	E		E	D	D	D	F	D	F	C	
Approach Delay (s)		70.0			49.0			184.1			44.5	
Approach LOS		E			D			F			D	
Intersection Summary												
HCM 2000 Control Delay	81.4			HCM 2000 Level of Service					F			
HCM 2000 Volume to Capacity ratio	1.05											
Actuated Cycle Length (s)	140.0			Sum of lost time (s)					23.9			
Intersection Capacity Utilization	97.6%			ICU Level of Service					F			
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2026 Future Total PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	74	114	253	155	252	294	1975	381	241	1236	18
Future Volume (vph)	7	74	114	253	155	252	294	1975	381	241	1236	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	140.0		0.0	135.0		80.0	180.0		50.0
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (m)	65.0			100.0			70.0			70.0		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99		0.98			0.97			0.97			0.97
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	3400	1863	1583	1770	3539	1558	1770	3471	1473
Flt Permitted	0.653			0.561			0.112			0.054		
Satd. Flow (perm)	1208	1863	1550	2008	1863	1542	209	3539	1518	101	3471	1435
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			121			185			232			122
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		296.6			291.2			731.4			120.4	
Travel Time (s)		17.8			17.5			43.9			7.2	
Confl. Peds. (#/hr)	6					6	1		1	1		1
Confl. Bikes (#/hr)			5			5			5			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 (%)	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Adj. Flow (vph)	7	79	121	269	165	268	313	2101	405	256	1315	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	79	121	269	165	268	313	2101	405	256	1315	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)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.00	1.00	1.03
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0	10.0	6.0	20.0	20.0	6.0	20.0	20.0
Minimum Split (s)	10.5	36.7	36.7	10.5	36.7	36.7	10.5	36.5	36.5	10.5	36.5	36.5
Total Split (s)	11.2	23.8	23.8	19.6	32.2	32.2	12.6	84.0	84.0	12.6	84.0	84.0
Total Split (%)	8.0%	17.0%	17.0%	14.0%	23.0%	23.0%	9.0%	60.0%	60.0%	9.0%	60.0%	60.0%
Maximum Green (s)	7.2	17.1	17.1	15.6	25.5	25.5	8.6	77.5	77.5	8.6	77.5	77.5
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	2.8	2.8	1.0	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	0.0	0.0
Total Lost Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
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	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)					7.0	7.0			7.0	7.0		
Flash Dont Walk (s)					23.0	23.0			23.0	23.0		
Pedestrian Calls (#/hr)					6	6			1	1		
Act Effct Green (s)	21.2	12.3	12.3	33.0	28.2	28.2	95.0	77.5	77.5	95.0	77.5	77.5
Actuated g/C Ratio	0.15	0.09	0.09	0.24	0.20	0.20	0.68	0.55	0.55	0.68	0.55	0.55
v/c Ratio	0.03	0.48	0.49	0.44	0.44	0.59	1.02	1.07	0.43	1.04	0.68	0.02
Control Delay	39.1	70.3	16.5	46.0	53.1	21.6	82.8	73.8	8.6	107.4	24.8	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	39.1	70.3	16.5	46.0	53.1	21.6	82.8	73.8	8.6	107.4	24.8	0.1
LOS	D	E	B	D	D	C	F	E	A	F	C	A
Approach Delay	37.8			38.4			65.5			37.8		
Approach LOS	D			D			E			D		
Queue Length 50th (m)	1.6	22.5	0.0	33.9	41.8	20.3	~55.2	~356.8	25.4	~61.0	140.0	0.0
Queue Length 95th (m)	5.6	38.7	19.3	44.3	67.8	53.5	#116.4	#399.5	49.4	#145.0	165.6	0.0
Internal Link Dist (m)	272.6			267.2			707.4			96.4		
Turn Bay Length (m)	70.0			70.0	140.0			135.0			80.0	180.0
Base Capacity (vph)	220	227	295	629	375	458	308	1959	943	247	1921	848
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.35	0.41	0.43	0.44	0.59	1.02	1.07	0.43	1.04	0.68	0.02

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 35 (25%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 1: Bronte Road & Upper Middle Road

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Maximum v/c Ratio: 1.07

Intersection Signal Delay: 52.5

Intersection LOS: D

Intersection Capacity Utilization 98.2%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Bronte Road & Upper Middle Road

 Ø1	 Ø2 (R)	 Ø3	 Ø4
12.6 s	84 s	19.6 s	23.8 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
12.6 s	84 s	11.2 s	32.2 s

HCM Signalized Intersection Capacity Analysis

1: Bronte Road & Upper Middle Road

2026 Future Total PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	74	114	253	155	252	294	1975	381	241	1236	18
Future Volume (vph)	7	74	114	253	155	252	294	1975	381	241	1236	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.97
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	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1762	1863	1548	3400	1863	1543	1770	3539	1518	1770	3471	1435
Flt Permitted	0.65	1.00	1.00	0.56	1.00	1.00	0.11	1.00	1.00	0.05	1.00	1.00
Satd. Flow (perm)	1211	1863	1548	2007	1863	1543	208	3539	1518	100	3471	1435
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)	7	79	121	269	165	268	313	2101	405	256	1315	19
RTOR Reduction (vph)	0	0	108	0	0	148	0	0	109	0	0	9
Lane Group Flow (vph)	7	79	13	269	165	120	313	2101	296	256	1315	10
Confl. Peds. (#/hr)	6					6	1		1	1		1
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	16.9	15.5	15.5	33.6	28.2	28.2	89.2	74.2	74.2	89.2	74.2	74.2
Effective Green, g (s)	16.9	15.5	15.5	33.6	28.2	28.2	89.2	74.2	74.2	89.2	74.2	74.2
Actuated g/C Ratio	0.12	0.11	0.11	0.24	0.20	0.20	0.64	0.53	0.53	0.64	0.53	0.53
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	151	206	171	621	375	310	299	1875	804	242	1839	760
v/s Ratio Prot	0.00	0.04		c0.04	c0.09		0.11	c0.59		c0.11	0.38	
v/s Ratio Perm	0.01		0.01	0.06		0.08	0.55		0.19	0.56		0.01
v/c Ratio	0.05	0.38	0.08	0.43	0.44	0.39	1.05	1.12	0.37	1.06	0.72	0.01
Uniform Delay, d1	54.3	57.8	55.8	44.0	49.0	48.4	33.7	32.9	19.2	49.2	24.9	15.6
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	0.1	1.2	0.2	0.5	0.8	0.8	64.8	62.0	1.3	73.9	2.4	0.0
Delay (s)	54.5	59.0	56.0	44.5	49.8	49.2	98.5	94.9	20.5	123.1	27.3	15.6
Level of Service	D	E	E	D	D	D	F	F	C	F	C	B
Approach Delay (s)		57.1			47.5			84.6			42.6	
Approach LOS		E			D			F			D	
Intersection Summary												
HCM 2000 Control Delay			66.1				HCM 2000 Level of Service		E			
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)		21.2			
Intersection Capacity Utilization			98.2%				ICU Level of Service		F			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
2: Bronte Road & Saw Whet Boulevard

2026 Future Total PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	0	31	106	0	60	52	2652	177	99	1518	18
Future Volume (vph)	11	0	31	106	0	60	52	2652	177	99	1518	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	15.0		15.0	15.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.850			0.850				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1770	1583	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.715			0.735			0.141			0.037		
Satd. Flow (perm)	1332	1583	0	1369	1583	0	263	3539	1583	69	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		52			55				51			18
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		42.5			50.2			458.5			731.4	
Travel Time (s)		3.1			3.6			27.5			43.9	
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	0	34	115	0	65	57	2883	192	108	1650	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	34	0	115	65	0	57	2883	192	108	1650	20
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	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
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		6

Lanes, Volumes, Timings
2: Bronte Road & Saw Whet Boulevard

2026 Future Total PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	35.5	35.5		35.5	35.5		35.5	35.5	35.5	9.5	35.5	35.5
Total Split (s)	35.5	35.5		35.5	35.5		104.5	104.5	104.5	9.5	104.5	104.5
Total Split (%)	23.7%	23.7%		23.7%	23.7%		69.9%	69.9%	69.9%	6.4%	69.9%	69.9%
Maximum Green (s)	30.0	30.0		30.0	30.0		99.0	99.0	99.0	5.0	99.0	99.0
Yellow Time (s)	3.3	3.3		3.3	3.3		3.7	3.7	3.7	3.5	3.7	3.7
All-Red Time (s)	2.2	2.2		2.2	2.2		1.8	1.8	1.8	1.0	1.8	1.8
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)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	4.5	5.5	5.5
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	23.0	23.0		23.0	23.0		23.0	23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0		0	0
Act Effect Green (s)	17.8	17.8		17.8	17.8		104.6	104.6	104.6	121.7	120.7	120.7
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.70	0.70	0.70	0.81	0.81	0.81
v/c Ratio	0.08	0.15		0.71	0.27		0.31	1.16	0.17	0.57	0.58	0.02
Control Delay	56.3	7.1		85.0	20.1		15.5	102.8	6.5	41.5	6.7	1.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.3	7.1		85.0	20.1		15.5	102.8	6.5	41.5	6.7	1.8
LOS	E	A		F	C		B	F	A	D	A	A
Approach Delay		19.9			61.6			95.3			8.7	
Approach LOS		B			E			F			A	
Queue Length 50th (m)	3.4	0.0		35.1	2.8		6.4	~563.2	13.7	15.7	82.8	0.1
Queue Length 95th (m)	9.7	5.6		55.3	17.0		17.6	#617.0	25.9	#42.1	125.8	2.2
Internal Link Dist (m)		18.5			26.2			434.5			707.4	
Turn Bay Length (m)	15.0			15.0			15.0		15.0	15.0		15.0
Base Capacity (vph)	267	359		274	361		183	2475	1122	188	2856	1281
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.09		0.42	0.18		0.31	1.16	0.17	0.57	0.58	0.02

Intersection Summary

Area Type: Other

Cycle Length: 149.5

Actuated Cycle Length: 149.5

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.16

Intersection Signal Delay: 63.5

Intersection LOS: E

Intersection Capacity Utilization 104.0%

ICU Level of Service G

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
 2: Bronte Road & Saw Whet Boulevard

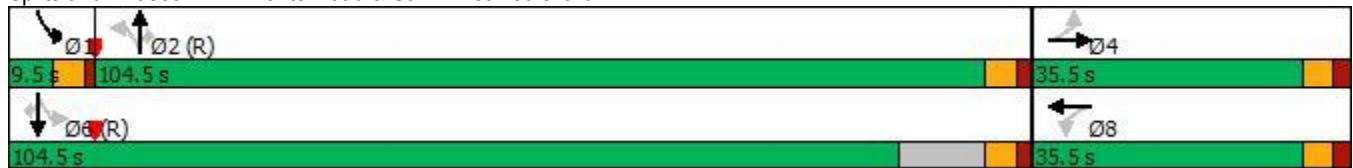
2026 Future Total PM Peak Hour
 1300 Bronte Enns

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Bronte Road & Saw Whet Boulevard



HCM Signalized Intersection Capacity Analysis

2: Bronte Road & Saw Whet Boulevard

2026 Future Total PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	0	31	106	0	60	52	2652	177	99	1518	18
Future Volume (vph)	11	0	31	106	0	60	52	2652	177	99	1518	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	4.5	5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.85		1.00	0.85		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)	1770	1583		1770	1583		1770	3539	1583	1770	3539	1583
Flt Permitted	0.71	1.00		0.73	1.00		0.14	1.00	1.00	0.04	1.00	1.00
Satd. Flow (perm)	1331	1583		1369	1583		263	3539	1583	68	3539	1583
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	0	34	115	0	65	57	2883	192	108	1650	20
RTOR Reduction (vph)	0	30	0	0	48	0	0	0	15	0	0	3
Lane Group Flow (vph)	12	4	0	115	17	0	57	2883	177	108	1650	17
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	17.8	17.8		17.8	17.8		104.6	104.6	104.6	120.7	120.7	120.7
Effective Green, g (s)	17.8	17.8		17.8	17.8		104.6	104.6	104.6	120.7	120.7	120.7
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.70	0.70	0.70	0.81	0.81	0.81
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	4.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	158	188		162	188		184	2476	1107	186	2857	1278
v/s Ratio Prot		0.00			0.01			c0.81		0.04	c0.47	
v/s Ratio Perm	0.01			c0.08			0.22		0.11	0.42		0.01
v/c Ratio	0.08	0.02		0.71	0.09		0.31	1.16	0.16	0.58	0.58	0.01
Uniform Delay, d1	58.5	58.2		63.4	58.6		8.6	22.5	7.6	50.4	5.2	2.8
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	0.2	0.0		13.3	0.2		4.3	78.8	0.3	4.6	0.9	0.0
Delay (s)	58.7	58.2		76.7	58.8		12.9	101.3	7.9	55.0	6.1	2.8
Level of Service	E	E		E	E		B	F	A	D	A	A
Approach Delay (s)		58.3			70.2			93.9			9.0	
Approach LOS		E			E			F			A	
Intersection Summary												
HCM 2000 Control Delay	63.4			HCM 2000 Level of Service			E					
HCM 2000 Volume to Capacity ratio	1.06											
Actuated Cycle Length (s)	149.5			Sum of lost time (s)			15.5					
Intersection Capacity Utilization	104.0%			ICU Level of Service			G					
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2026 Future Total PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	138	0	110	1	2778	175	89	1602	0
Future Volume (vph)	0	0	0	138	0	110	1	2778	175	89	1602	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		40.0	35.0		30.0	70.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			20.0			60.0		
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
Ped Bike Factor						0.98			0.98			
Frt						0.850			0.850			
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	0	1863	0	1770	0	1583	1770	3505	1388	1770	3471	0
Flt Permitted				0.757			0.132			0.040		
Satd. Flow (perm)	0	1863	0	1410	0	1557	246	3505	1356	75	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						89			56			
Link Speed (k/h)		20			20			60			60	
Link Distance (m)		78.7			109.0			435.9			458.5	
Travel Time (s)		14.2			19.6			26.2			27.5	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	14%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Adj. Flow (vph)	0	0	0	142	0	113	1	2864	180	92	1652	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	142	0	113	1	2864	180	92	1652	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.03	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1		1	1	2	1	1	2	
Detector Template	Left	Thru		Left		Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0		2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0		2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4						9.4			9.4	
Detector 2 Size(m)		0.6						0.6			0.6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2026 Future Total PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0							0.0		0.0		
Turn Type				Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	4							2		1 6		
Permitted Phases	4				8	8	2			2 6		
Detector Phase	4	4	8			8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0			10.0	15.0	15.0	15.0	5.0	15.0	
Minimum Split (s)	24.2	24.2	35.2			35.2	34.9	34.9	34.9	9.5	34.9	
Total Split (s)	40.6	40.6	40.6			40.6	88.2	88.2	88.2	11.2	99.4	
Total Split (%)	29.0%	29.0%	29.0%			29.0%	63.0%	63.0%	63.0%	8.0%	71.0%	
Maximum Green (s)	34.4	34.4	34.4			34.4	82.3	82.3	82.3	7.2	93.5	
Yellow Time (s)	3.1	3.1	3.1			3.1	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.1	3.1	3.1			3.1	2.2	2.2	2.2	1.0	2.2	
Lost Time Adjust (s)	0.0		0.0			0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2		6.2			6.2	5.9	5.9	5.9	4.0	5.9	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0			3.0	3.6	3.6	3.6	3.0	3.6	
Recall Mode	None	None	None			None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0		7.0	7.0	7.0	7.0		
Flash Dont Walk (s)				22.0	22.0		22.0	22.0	22.0	22.0		
Pedestrian Calls (#/hr)				0	0		0	0	0	0		
Act Effct Green (s)				19.4	19.4		95.7	95.7	95.7	110.4	108.5	
Actuated g/C Ratio				0.14	0.14		0.68	0.68	0.68	0.79	0.78	
v/c Ratio				0.73	0.39		0.01	1.20	0.19	0.56	0.61	
Control Delay				77.9	18.8		1.0	102.9	0.1	34.4	8.6	
Queue Delay				0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay				77.9	18.8		1.0	102.9	0.1	34.4	8.6	
LOS				E	B		A	F	A	C	A	
Approach Delay					51.7			96.7			10.0	
Approach LOS					D			F			A	
Queue Length 50th (m)				40.2	6.2		0.0	~542.2	0.0	9.2	94.2	
Queue Length 95th (m)				61.0	23.7		m0.0	m#363.1	m0.0	29.3	143.6	
Internal Link Dist (m)	54.7					85.0		411.9			434.5	
Turn Bay Length (m)						40.0	35.0	30.0		70.0		
Base Capacity (vph)				346	449		168	2396	944	169	2689	
Starvation Cap Reductn				0	0		0	0	0	0	0	
Spillback Cap Reductn				0	0		0	0	0	0	0	
Storage Cap Reductn				0	0		0	0	0	0	0	
Reduced v/c Ratio				0.41	0.25		0.01	1.20	0.19	0.54	0.61	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 103.6 (74%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.20

Lanes, Volumes, Timings 3: Bronte Road & Driveway/Charles Cornwall Road

2026 Future Total PM Peak Hour
1300 Bronte Enns

Intersection Signal Delay: 64.5

Intersection LOS: E

Intersection Capacity Utilization 95.2%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

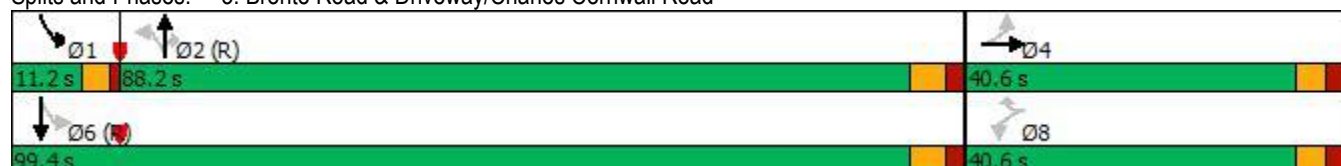
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Bronte Road & Driveway/Charles Cornwall Road



HCM Signalized Intersection Capacity Analysis

3: Bronte Road & Driveway/Charles Cornwall Road

2026 Future Total PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	138	0	110	1	2778	175	89	1602	0
Future Volume (vph)	0	0	0	138	0	110	1	2778	175	89	1602	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Lane Util. Factor				1.00		1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes				1.00		0.98	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes				1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Frt				1.00		0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected				0.95		1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1770		1552	1770	3505	1357	1770	3471	
Flt Permitted				0.76		1.00	0.13	1.00	1.00	0.04	1.00	
Satd. Flow (perm)				1410		1552	246	3505	1357	75	3471	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	142	0	113	1	2864	180	92	1652	0
RTOR Reduction (vph)	0	0	0	0	0	77	0	0	18	0	0	0
Lane Group Flow (vph)	0	0	0	142	0	36	1	2864	162	92	1652	0
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	14%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Turn Type				Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)				19.4		19.4	95.7	95.7	95.7	108.5	108.5	
Effective Green, g (s)				19.4		19.4	95.7	95.7	95.7	108.5	108.5	
Actuated g/C Ratio				0.14		0.14	0.68	0.68	0.68	0.78	0.78	
Clearance Time (s)				6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Vehicle Extension (s)				3.0		3.0	3.6	3.6	3.6	3.0	3.6	
Lane Grp Cap (vph)				195		215	168	2395	927	164	2690	
v/s Ratio Prot								c0.82		0.04	c0.48	
v/s Ratio Perm				c0.10		0.02	0.00		0.12	0.40		
v/c Ratio				0.73		0.17	0.01	1.20	0.18	0.56	0.61	
Uniform Delay, d1				57.8		53.2	7.0	22.1	8.0	42.6	6.8	
Progression Factor				1.00		1.00	0.08	0.40	0.00	1.00	1.00	
Incremental Delay, d2				12.7		0.4	0.0	88.5	0.0	4.3	1.1	
Delay (s)				70.5		53.6	0.6	97.4	0.1	46.9	7.8	
Level of Service				E		D	A	F	A	D	A	
Approach Delay (s)		0.0			63.0			91.6			9.9	
Approach LOS		A			E			F			A	
Intersection Summary												
HCM 2000 Control Delay			61.9									HCM 2000 Level of Service E
HCM 2000 Volume to Capacity ratio			1.09									
Actuated Cycle Length (s)			140.0							16.1		
Intersection Capacity Utilization			95.2%							F		
ICU Level of Service												
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

2026 Future Total PM Peak Hour

4: Bronte Road & Driveway/North Service Road West

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	129	0	154	0	2714	74	88	1648	2
Future Volume (vph)	0	0	0	129	0	154	0	2714	74	88	1648	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	45.0		0.0	35.0		70.0	115.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			50.0			65.0			65.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor						0.98			0.97		1.00	
Frt						0.850			0.850			
Flt Protected				0.950	0.950					0.950		
Satd. Flow (prot)	0	1863	0	1681	1681	1583	1863	3505	1583	1770	3471	0
Flt Permitted				0.950	0.950					0.047		
Satd. Flow (perm)	0	1863	0	1681	1681	1553	1863	3505	1540	88	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						159			106			
Link Speed (k/h)		20			50			60			60	
Link Distance (m)		52.6			84.3			299.0			435.9	
Travel Time (s)		9.5			6.1			17.9			26.2	
Confl. Peds. (#/hr)	2					2			2	2		
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	4%	2%
Adj. Flow (vph)	0	0	0	133	0	159	0	2798	76	91	1699	2
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	66	67	159	0	2798	76	91	1701	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

12-03-2021

NA

CGH Transportation

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Lanes, Volumes, Timings

2026 Future Total PM Peak Hour

4: Bronte Road & Driveway/North Service Road West

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8			4			2			1	6	
Permitted Phases	8			4		4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	15.0	15.0	15.0	6.0	15.0	
Minimum Split (s)	24.7	24.7		36.9	36.9	36.9	41.7	41.7	41.7	10.5	24.7	
Total Split (s)	13.0	13.0		39.0	39.0	39.0	77.0	77.0	77.0	11.0	88.0	
Total Split (%)	9.3%	9.3%		27.9%	27.9%	27.9%	55.0%	55.0%	55.0%	7.9%	62.9%	
Maximum Green (s)	6.3	6.3		33.1	33.1	33.1	70.3	70.3	70.3	7.0	81.3	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		2.2	2.2	2.2	3.0	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)	6.7			5.9	5.9	5.9	6.7	6.7	6.7	4.0	6.7	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0			
Flash Dont Walk (s)				24.0	24.0	24.0	28.0	28.0	28.0			
Pedestrian Calls (#/hr)				2	2	2	2	2	2			
Act Effect Green (s)				33.1	33.1	33.1		81.5	81.5	97.0	94.3	
Actuated g/C Ratio				0.24	0.24	0.24		0.58	0.58	0.69	0.67	
v/c Ratio				0.17	0.17	0.33		1.37	0.08	0.55	0.73	
Control Delay				43.9	44.0	8.0		191.3	0.6	35.4	13.7	
Queue Delay				0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay				43.9	44.0	8.0		191.3	0.6	35.4	13.7	
LOS				D	D	A		F	A	D	B	
Approach Delay				24.4			186.2			14.8		
Approach LOS				C			F			B		
Queue Length 50th (m)				16.2	16.5	0.0		~563.5	0.0	12.1	110.7	
Queue Length 95th (m)				30.7	31.0	18.7		m#485.2	m0.0	m30.4	128.7	
Internal Link Dist (m)	28.6			60.3			275.0			411.9		
Turn Bay Length (m)				45.0			70.0			115.0		
Base Capacity (vph)				397	397	488		2040	940	168	2337	
Starvation Cap Reductn				0	0	0		15	0	0	0	
Spillback Cap Reductn				0	0	0		0	0	0	0	
Storage Cap Reductn				0	0	0		0	0	0	0	
Reduced v/c Ratio				0.17	0.17	0.33		1.38	0.08	0.54	0.73	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 85 (61%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.37

Lanes, Volumes, Timings 4: Bronte Road & Driveway/North Service Road West

2026 Future Total PM Peak Hour
1300 Bronte Enns

Intersection Signal Delay: 114.7 Intersection LOS: F
Intersection Capacity Utilization 96.3% ICU Level of Service F
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

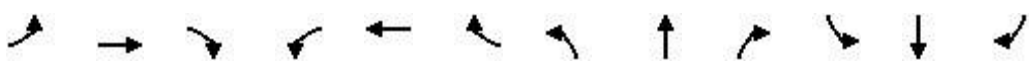
Splits and Phases: 4: Bronte Road & Driveway/North Service Road West



HCM Signalized Intersection Capacity Analysis

4: Bronte Road & Driveway/North Service Road West

2026 Future Total PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↕	↕	↔	↕	↕
Traffic Volume (vph)	0	0	0	129	0	154	0	2714	74	88	1648	2
Future Volume (vph)	0	0	0	129	0	154	0	2714	74	88	1648	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Lane Util. Factor				0.95	0.95	1.00		0.95	1.00	1.00	0.95	
Frpb, ped/bikes				1.00	1.00	0.98		1.00	0.97	1.00	1.00	
Flpb, ped/bikes				1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt				1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected				0.95	0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1681	1681	1553		3505	1540	1770	3471	
Flt Permitted				0.95	0.95	1.00		1.00	1.00	0.05	1.00	
Satd. Flow (perm)				1681	1681	1553		3505	1540	87	3471	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	133	0	159	0	2798	76	91	1699	2
RTOR Reduction (vph)	0	0	0	0	0	121	0	0	32	0	0	0
Lane Group Flow (vph)	0	0	0	66	67	38	0	2798	44	91	1701	0
Confl. Peds. (#/hr)	2					2			2	2		
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	4%	2%
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		8			4			2		1	6	
Permitted Phases	8			4		4	2		2	6		
Actuated Green, G (s)				33.1	33.1	33.1		81.5	81.5	94.3	94.3	
Effective Green, g (s)				33.1	33.1	33.1		81.5	81.5	94.3	94.3	
Actuated g/C Ratio				0.24	0.24	0.24		0.58	0.58	0.67	0.67	
Clearance Time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Vehicle Extension (s)				5.0	5.0	5.0		5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)				397	397	367		2040	896	164	2337	
v/s Ratio Prot								c0.80		0.03	c0.49	
v/s Ratio Perm				0.04	0.04	0.02			0.03	0.34		
v/c Ratio				0.17	0.17	0.10		1.37	0.05	0.55	0.73	
Uniform Delay, d1				42.5	42.5	41.8		29.2	12.6	34.1	14.6	
Progression Factor				1.00	1.00	1.00		0.77	0.55	1.35	0.81	
Incremental Delay, d2				0.4	0.4	0.3		167.5	0.0	3.2	1.6	
Delay (s)				42.9	42.9	42.1		190.2	6.9	49.3	13.4	
Level of Service				D	D	D		F	A	D	B	
Approach Delay (s)		0.0			42.5			185.3			15.3	
Approach LOS		A			D			F			B	
Intersection Summary												
HCM 2000 Control Delay			115.4				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.07									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)		23.3			
Intersection Capacity Utilization			96.3%				ICU Level of Service		F			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2026 Future Total PM Peak Hour
1300 Bronte Enns

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	232	645	2076	0	0	1080
Future Volume (vph)	232	645	2076	0	0	1080
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	90.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	1.00	0.95	1.00	1.00	0.95
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3433	1583	3505	0	0	3505
Flt Permitted	0.950					
Satd. Flow (perm)	3433	1583	3505	0	0	3505
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		7				
Link Speed (k/h)	60		60			60
Link Distance (m)	65.9		376.8			299.0
Travel Time (s)	4.0		22.6			17.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	3%	2%	2%	3%
Adj. Flow (vph)	252	701	2257	0	0	1174
Shared Lane Traffic (%)						
Lane Group Flow (vph)	252	701	2257	0	0	1174
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2026 Future Total PM Peak Hour
1300 Bronte Enns



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8					
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.7	24.7	36.5			26.5
Total Split (s)	46.0	46.0	94.0			94.0
Total Split (%)	32.9%	32.9%	67.1%			67.1%
Maximum Green (s)	39.3	39.3	87.5			87.5
Yellow Time (s)	3.7	3.7	3.7			3.7
All-Red Time (s)	3.0	3.0	2.8			2.8
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	6.7	6.7	6.5			6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	C-Max			C-Max
Act Effect Green (s)	39.3	39.3	87.5			87.5
Actuated g/C Ratio	0.28	0.28	0.62			0.62
v/c Ratio	0.26	1.56	1.03			0.54
Control Delay	40.0	297.4	34.1			9.7
Queue Delay	0.0	0.0	29.5			0.0
Total Delay	40.0	297.4	63.6			9.7
LOS	D	F	E			A
Approach Delay	229.3		63.6			9.7
Approach LOS	F		E			A
Queue Length 50th (m)	29.4	~288.7	~377.5			35.6
Queue Length 95th (m)	41.7	#367.8	m68.2			60.2
Internal Link Dist (m)	41.9		352.8			275.0
Turn Bay Length (m)		90.0				
Base Capacity (vph)	963	449	2190			2190
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	1	864			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.26	1.56	1.70			0.54

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 67 (48%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.56

Intersection Signal Delay: 85.2

Intersection LOS: F

Intersection Capacity Utilization 108.3%

ICU Level of Service G

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

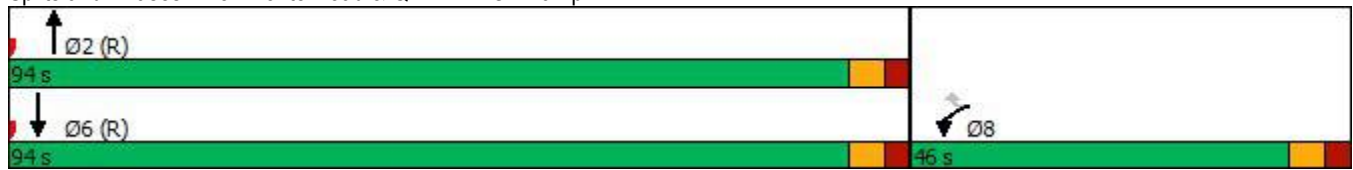
2026 Future Total PM Peak Hour

1300 Bronte Enns

Queue shown is maximum after two cycles.

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

Splits and Phases: 5: Bronte Road & QEW WB Off Ramp



HCM Signalized Intersection Capacity Analysis

5: Bronte Road & QEW WB Off Ramp

2026 Future Total PM Peak Hour
1300 Bronte Enns

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	232	645	2076	0	0	1080
Future Volume (vph)	232	645	2076	0	0	1080
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7	6.5			6.5
Lane Util. Factor	0.97	1.00	0.95			0.95
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3433	1583	3505			3505
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3433	1583	3505			3505
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	252	701	2257	0	0	1174
RTOR Reduction (vph)	0	5	0	0	0	0
Lane Group Flow (vph)	252	696	2257	0	0	1174
Heavy Vehicles (%)	2%	2%	3%	2%	2%	3%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	39.3	39.3	87.5			87.5
Effective Green, g (s)	39.3	39.3	87.5			87.5
Actuated g/C Ratio	0.28	0.28	0.62			0.62
Clearance Time (s)	6.7	6.7	6.5			6.5
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	963	444	2190			2190
v/s Ratio Prot	0.07		c0.64			0.33
v/s Ratio Perm		c0.44				
v/c Ratio	0.26	1.57	1.03			0.54
Uniform Delay, d1	39.1	50.4	26.2			14.8
Progression Factor	1.00	1.00	0.64			0.61
Incremental Delay, d2	0.1	266.1	15.9			0.7
Delay (s)	39.2	316.5	32.8			9.6
Level of Service	D	F	C			A
Approach Delay (s)	243.2		32.8			9.6
Approach LOS	F		C			A
Intersection Summary						
HCM 2000 Control Delay			72.3		HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio			1.20			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	13.2
Intersection Capacity Utilization			108.3%		ICU Level of Service	G
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings

2026 Future Total PM Peak Hour

6: Bronte Road & Parking Lot Access/QEW EB Ramps

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	0	4	214	1	860	1	1623	228	313	986	3
Future Volume (vph)	6	0	4	214	1	860	1	1623	228	313	986	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	10.0		0.0	130.0		125.0	120.0		95.0	255.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			65.0			95.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.91	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor									0.97		1.00	
Frt		0.850			0.857	0.850			0.850			
Flt Protected	0.950			0.950	0.998		0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1681	1423	1475	1770	3539	1583	1770	3539	0
Flt Permitted	0.950			0.950	0.998		0.266			0.088		
Satd. Flow (perm)	1770	1583	0	1681	1423	1475	495	3539	1540	164	3539	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					458	477			119			
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		53.2			37.5			215.0			376.8	
Travel Time (s)		4.8			3.4			12.9			22.6	
Confl. Bikes (#/hr)									5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	7	0	4	233	1	935	1	1764	248	340	1072	3
Shared Lane Traffic (%)				10%		49%						
Lane Group Flow (vph)	7	4	0	210	482	477	1	1764	248	340	1075	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

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NA

CGH Transportation

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Lanes, Volumes, Timings

2026 Future Total PM Peak Hour

6: Bronte Road & Parking Lot Access/QEW EB Ramps

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	36.7	36.7		36.7	36.7	36.7	36.5	36.5	36.5	11.5	36.5	
Total Split (s)	36.7	36.7		49.0	49.0	49.0	42.3	42.3	42.3	12.0	54.3	
Total Split (%)	26.2%	26.2%		35.0%	35.0%	35.0%	30.2%	30.2%	30.2%	8.6%	38.8%	
Maximum Green (s)	30.0	30.0		42.3	42.3	42.3	35.8	35.8	35.8	8.0	47.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.8	2.8	2.8	1.0	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)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				23.0	23.0	23.0	23.0	23.0	23.0		23.0	
Pedestrian Calls (#/hr)				0	0	0	0	0	0		0	
Act Effect Green (s)	7.1	7.1		25.6	25.6	25.6	45.8	45.8	45.8	98.1	95.6	
Actuated g/C Ratio	0.05	0.05		0.18	0.18	0.18	0.33	0.33	0.33	0.70	0.68	
v/c Ratio	0.08	0.05		0.68	0.76	0.72	0.01	1.52	0.43	0.53	0.44	
Control Delay	65.3	64.8		63.9	13.7	10.6	35.0	274.2	21.3	28.9	18.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	65.3	64.8		63.9	13.7	10.6	35.0	274.2	21.3	28.9	18.3	
LOS	E	E		E	B	B	C	F	C	C	B	
Approach Delay		65.1			21.4			242.9			20.8	
Approach LOS		E			C			F			C	
Queue Length 50th (m)	2.0	1.1		60.9	6.4	0.0	0.2	~325.6	23.9	54.1	77.2	
Queue Length 95th (m)	7.4	5.4		83.4	47.0	33.5	1.8	#453.1	58.9	116.3	156.4	
Internal Link Dist (m)		29.2			13.5			191.0			352.8	
Turn Bay Length (m)	10.0			130.0		125.0	120.0		95.0	255.0		
Base Capacity (vph)	379	339		507	749	778	162	1157	583	640	2417	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.02	0.01		0.41	0.64	0.61	0.01	1.52	0.43	0.53	0.44	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 66 (47%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.52

Intersection Signal Delay: 118.1

Intersection LOS: F

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NA

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Intersection Capacity Utilization 102.8%

ICU Level of Service G

Analysis Period (min) 15

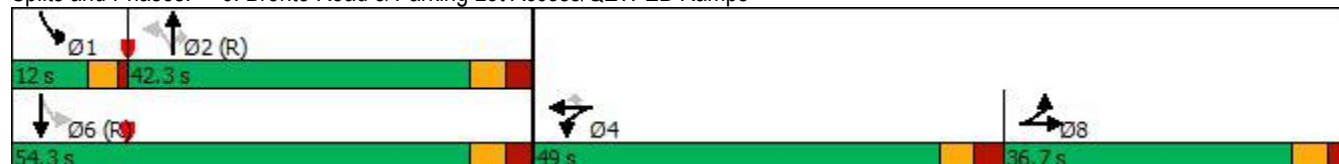
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 6: Bronte Road & Parking Lot Access/QEW EB Ramps



HCM Signalized Intersection Capacity Analysis

6: Bronte Road & Parking Lot Access/QEW EB Ramps

2026 Future Total PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	0	4	214	1	860	1	1623	228	313	986	3
Future Volume (vph)	6	0	4	214	1	860	1	1623	228	313	986	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lane Util. Factor	1.00	1.00		0.95	0.91	0.95	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97	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	
Frt	1.00	0.85		1.00	0.86	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1583		1681	1424	1475	1770	3539	1542	1770	3538	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.27	1.00	1.00	0.09	1.00	
Satd. Flow (perm)	1770	1583		1681	1424	1475	495	3539	1542	163	3538	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	0	4	233	1	935	1	1764	248	340	1072	3
RTOR Reduction (vph)	0	0	0	0	374	390	0	0	84	0	0	0
Lane Group Flow (vph)	7	4	0	210	108	87	1	1764	164	340	1075	0
Confl. Bikes (#/hr)									5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Actuated Green, G (s)	2.9	2.9		25.6	25.6	25.6	41.7	41.7	41.7	91.6	91.6	
Effective Green, g (s)	2.9	2.9		25.6	25.6	25.6	41.7	41.7	41.7	91.6	91.6	
Actuated g/C Ratio	0.02	0.02		0.18	0.18	0.18	0.30	0.30	0.30	0.65	0.65	
Clearance Time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	36	32		307	260	269	147	1054	459	633	2314	
v/s Ratio Prot	c0.00	0.00		c0.12	0.08			c0.50		c0.18	0.30	
v/s Ratio Perm						0.06	0.00		0.11	0.18		
v/c Ratio	0.19	0.12		0.68	0.41	0.32	0.01	1.67	0.36	0.54	0.46	
Uniform Delay, d1	67.4	67.3		53.4	50.6	49.7	34.6	49.1	38.6	28.2	12.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.45	
Incremental Delay, d2	2.6	1.8		6.2	1.1	0.7	0.1	307.3	2.2	0.8	0.6	
Delay (s)	70.0	69.1		59.6	51.6	50.4	34.7	356.5	40.8	27.6	18.0	
Level of Service	E	E		E	D	D	C	F	D	C	B	
Approach Delay (s)		69.7			52.6			317.4			20.3	
Approach LOS		E			D			F			C	
Intersection Summary												
HCM 2000 Control Delay	158.4			HCM 2000 Level of Service					F			
HCM 2000 Volume to Capacity ratio	0.97											
Actuated Cycle Length (s)	140.0			Sum of lost time (s)					23.9			
Intersection Capacity Utilization	102.8%			ICU Level of Service					G			
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2026 Future Total MM PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	74	114	253	155	252	294	1975	381	241	1236	18
Future Volume (vph)	7	74	114	253	155	252	294	1975	381	241	1236	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	140.0		0.0	135.0		80.0	180.0		50.0
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (m)	65.0			100.0			70.0			70.0		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99		0.98			0.97			0.97			0.97
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	3400	1863	1583	1770	3539	1558	1770	3471	1473
Flt Permitted	0.653			0.561			0.112			0.054		
Satd. Flow (perm)	1208	1863	1550	2008	1863	1542	209	3539	1518	101	3471	1435
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			121			185			232			122
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		296.6			291.2			731.4			120.4	
Travel Time (s)		17.8			17.5			43.9			7.2	
Confl. Peds. (#/hr)	6					6	1		1	1		1
Confl. Bikes (#/hr)			5			5			5			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 (%)	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Adj. Flow (vph)	7	79	121	269	165	268	313	2101	405	256	1315	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	79	121	269	165	268	313	2101	405	256	1315	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)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.00	1.00	1.03
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2026 Future Total MM PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0	10.0	6.0	20.0	20.0	6.0	20.0	20.0
Minimum Split (s)	10.5	36.7	36.7	10.5	36.7	36.7	10.5	36.5	36.5	10.5	36.5	36.5
Total Split (s)	11.2	23.8	23.8	19.6	32.2	32.2	12.6	84.0	84.0	12.6	84.0	84.0
Total Split (%)	8.0%	17.0%	17.0%	14.0%	23.0%	23.0%	9.0%	60.0%	60.0%	9.0%	60.0%	60.0%
Maximum Green (s)	7.2	17.1	17.1	15.6	25.5	25.5	8.6	77.5	77.5	8.6	77.5	77.5
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	2.8	2.8	1.0	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	0.0	0.0
Total Lost Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
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	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)					7.0	7.0			7.0	7.0		
Flash Dont Walk (s)					23.0	23.0			23.0	23.0		
Pedestrian Calls (#/hr)					6	6			1	1		
Act Effct Green (s)	21.2	12.3	12.3	33.0	28.2	28.2	95.0	77.5	77.5	95.0	77.5	77.5
Actuated g/C Ratio	0.15	0.09	0.09	0.24	0.20	0.20	0.68	0.55	0.55	0.68	0.55	0.55
v/c Ratio	0.03	0.48	0.49	0.44	0.44	0.59	1.02	1.07	0.43	1.04	0.68	0.02
Control Delay	39.1	70.3	16.5	46.0	53.1	21.6	82.8	73.8	8.6	107.4	24.8	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	39.1	70.3	16.5	46.0	53.1	21.6	82.8	73.8	8.6	107.4	24.8	0.1
LOS	D	E	B	D	D	C	F	E	A	F	C	A
Approach Delay	37.8			38.4			65.5			37.8		
Approach LOS	D			D			E			D		
Queue Length 50th (m)	1.6	22.5	0.0	33.9	41.8	20.3	~55.2	~356.8	25.4	~61.0	140.0	0.0
Queue Length 95th (m)	5.6	38.7	19.3	44.3	67.8	53.5	#116.4	#399.5	49.4	#145.0	165.6	0.0
Internal Link Dist (m)	272.6			267.2			707.4			96.4		
Turn Bay Length (m)	70.0			70.0	140.0			135.0			80.0	180.0
Base Capacity (vph)	220	227	295	629	375	458	308	1959	943	247	1921	848
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.35	0.41	0.43	0.44	0.59	1.02	1.07	0.43	1.04	0.68	0.02

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 35 (25%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 1: Bronte Road & Upper Middle Road

2026 Future Total MM PM Peak Hour
1300 Bronte Enns

Maximum v/c Ratio: 1.07

Intersection Signal Delay: 52.5

Intersection LOS: D

Intersection Capacity Utilization 98.2%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Bronte Road & Upper Middle Road

 Ø1		 Ø2 (R)		 Ø3		 Ø4	
12.6 s		84 s		19.6 s		23.8 s	
 Ø5		 Ø6 (R)		 Ø7		 Ø8	
12.6 s		84 s		11.2 s		32.2 s	

HCM Signalized Intersection Capacity Analysis

1: Bronte Road & Upper Middle Road

2026 Future Total MM PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	74	114	253	155	252	294	1975	381	241	1236	18
Future Volume (vph)	7	74	114	253	155	252	294	1975	381	241	1236	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.97
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	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1762	1863	1548	3400	1863	1543	1770	3539	1518	1770	3471	1435
Flt Permitted	0.65	1.00	1.00	0.56	1.00	1.00	0.11	1.00	1.00	0.05	1.00	1.00
Satd. Flow (perm)	1211	1863	1548	2007	1863	1543	208	3539	1518	100	3471	1435
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)	7	79	121	269	165	268	313	2101	405	256	1315	19
RTOR Reduction (vph)	0	0	108	0	0	148	0	0	109	0	0	9
Lane Group Flow (vph)	7	79	13	269	165	120	313	2101	296	256	1315	10
Confl. Peds. (#/hr)	6					6	1		1	1		1
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	16.9	15.5	15.5	33.6	28.2	28.2	89.2	74.2	74.2	89.2	74.2	74.2
Effective Green, g (s)	16.9	15.5	15.5	33.6	28.2	28.2	89.2	74.2	74.2	89.2	74.2	74.2
Actuated g/C Ratio	0.12	0.11	0.11	0.24	0.20	0.20	0.64	0.53	0.53	0.64	0.53	0.53
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	151	206	171	621	375	310	299	1875	804	242	1839	760
v/s Ratio Prot	0.00	0.04		c0.04	c0.09		0.11	c0.59		c0.11	0.38	
v/s Ratio Perm	0.01		0.01	0.06		0.08	0.55		0.19	0.56		0.01
v/c Ratio	0.05	0.38	0.08	0.43	0.44	0.39	1.05	1.12	0.37	1.06	0.72	0.01
Uniform Delay, d1	54.3	57.8	55.8	44.0	49.0	48.4	33.7	32.9	19.2	49.2	24.9	15.6
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	0.1	1.2	0.2	0.5	0.8	0.8	64.8	62.0	1.3	73.9	2.4	0.0
Delay (s)	54.5	59.0	56.0	44.5	49.8	49.2	98.5	94.9	20.5	123.1	27.3	15.6
Level of Service	D	E	E	D	D	D	F	F	C	F	C	B
Approach Delay (s)		57.1			47.5			84.6			42.6	
Approach LOS		E			D			F			D	
Intersection Summary												
HCM 2000 Control Delay			66.1				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			21.2		
Intersection Capacity Utilization			98.2%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
2: Bronte Road & Saw Whet Boulevard

2026 Future Total MM PM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	0	31	106	0	60	52	2652	177	99	1518	18
Future Volume (vph)	11	0	31	106	0	60	52	2652	177	99	1518	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	15.0		15.0	15.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.850			0.850				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1770	1583	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.715			0.735			0.141			0.037		
Satd. Flow (perm)	1332	1583	0	1369	1583	0	263	3539	1583	69	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		52			55				51			18
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		42.5			50.2			458.5			731.4	
Travel Time (s)		3.1			3.6			27.5			43.9	
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	0	34	115	0	65	57	2883	192	108	1650	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	34	0	115	65	0	57	2883	192	108	1650	20
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	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
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		6

Lanes, Volumes, Timings
2: Bronte Road & Saw Whet Boulevard

2026 Future Total MM PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	35.5	35.5		35.5	35.5		35.5	35.5	35.5	9.5	35.5	35.5
Total Split (s)	35.5	35.5		35.5	35.5		104.5	104.5	104.5	9.5	104.5	104.5
Total Split (%)	23.7%	23.7%		23.7%	23.7%		69.9%	69.9%	69.9%	6.4%	69.9%	69.9%
Maximum Green (s)	30.0	30.0		30.0	30.0		99.0	99.0	99.0	5.0	99.0	99.0
Yellow Time (s)	3.3	3.3		3.3	3.3		3.7	3.7	3.7	3.5	3.7	3.7
All-Red Time (s)	2.2	2.2		2.2	2.2		1.8	1.8	1.8	1.0	1.8	1.8
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)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	4.5	5.5	5.5
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	23.0	23.0		23.0	23.0		23.0	23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0		0	0
Act Effect Green (s)	17.8	17.8		17.8	17.8		104.6	104.6	104.6	121.7	120.7	120.7
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.70	0.70	0.70	0.81	0.81	0.81
v/c Ratio	0.08	0.15		0.71	0.27		0.31	1.16	0.17	0.57	0.58	0.02
Control Delay	56.3	7.1		85.0	20.1		15.5	102.8	6.5	41.5	6.7	1.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.3	7.1		85.0	20.1		15.5	102.8	6.5	41.5	6.7	1.8
LOS	E	A		F	C		B	F	A	D	A	A
Approach Delay		19.9			61.6			95.3			8.7	
Approach LOS		B			E			F			A	
Queue Length 50th (m)	3.4	0.0		35.1	2.8		6.4	~563.2	13.7	15.7	82.8	0.1
Queue Length 95th (m)	9.7	5.6		55.3	17.0		17.6	#617.0	25.9	#42.1	125.8	2.2
Internal Link Dist (m)		18.5			26.2			434.5			707.4	
Turn Bay Length (m)	15.0			15.0			15.0		15.0	15.0		15.0
Base Capacity (vph)	267	359		274	361		183	2475	1122	188	2856	1281
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.09		0.42	0.18		0.31	1.16	0.17	0.57	0.58	0.02

Intersection Summary

Area Type: Other

Cycle Length: 149.5

Actuated Cycle Length: 149.5

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.16

Intersection Signal Delay: 63.5

Intersection LOS: E

Intersection Capacity Utilization 104.0%

ICU Level of Service G

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
 2: Bronte Road & Saw Whet Boulevard

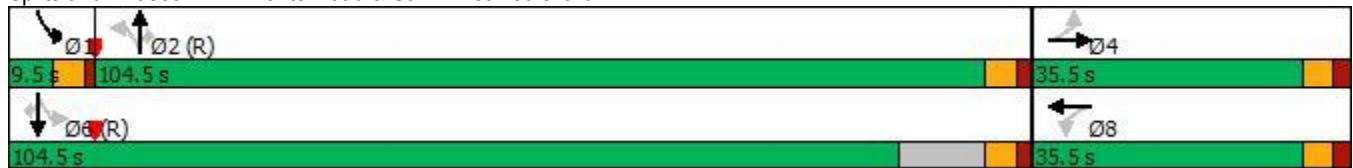
2026 Future Total MM PM Peak Hour
 1300 Bronte Enns

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Bronte Road & Saw Whet Boulevard



HCM Signalized Intersection Capacity Analysis

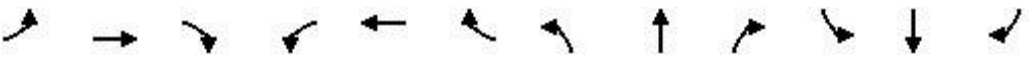
2: Bronte Road & Saw Whet Boulevard

2026 Future Total MM PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	0	31	106	0	60	52	2652	177	99	1518	18
Future Volume (vph)	11	0	31	106	0	60	52	2652	177	99	1518	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	4.5	5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.85		1.00	0.85		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)	1770	1583		1770	1583		1770	3539	1583	1770	3539	1583
Flt Permitted	0.71	1.00		0.73	1.00		0.14	1.00	1.00	0.04	1.00	1.00
Satd. Flow (perm)	1331	1583		1369	1583		263	3539	1583	68	3539	1583
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	0	34	115	0	65	57	2883	192	108	1650	20
RTOR Reduction (vph)	0	30	0	0	48	0	0	0	15	0	0	3
Lane Group Flow (vph)	12	4	0	115	17	0	57	2883	177	108	1650	17
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	17.8	17.8		17.8	17.8		104.6	104.6	104.6	120.7	120.7	120.7
Effective Green, g (s)	17.8	17.8		17.8	17.8		104.6	104.6	104.6	120.7	120.7	120.7
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.70	0.70	0.70	0.81	0.81	0.81
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	4.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	158	188		162	188		184	2476	1107	186	2857	1278
v/s Ratio Prot		0.00			0.01			c0.81		0.04	c0.47	
v/s Ratio Perm	0.01			c0.08			0.22		0.11	0.42		0.01
v/c Ratio	0.08	0.02		0.71	0.09		0.31	1.16	0.16	0.58	0.58	0.01
Uniform Delay, d1	58.5	58.2		63.4	58.6		8.6	22.5	7.6	50.4	5.2	2.8
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	0.2	0.0		13.3	0.2		4.3	78.8	0.3	4.6	0.9	0.0
Delay (s)	58.7	58.2		76.7	58.8		12.9	101.3	7.9	55.0	6.1	2.8
Level of Service	E	E		E	E		B	F	A	D	A	A
Approach Delay (s)		58.3			70.2			93.9			9.0	
Approach LOS		E			E			F			A	
Intersection Summary												
HCM 2000 Control Delay	63.4			HCM 2000 Level of Service			E					
HCM 2000 Volume to Capacity ratio	1.06											
Actuated Cycle Length (s)	149.5			Sum of lost time (s)			15.5					
Intersection Capacity Utilization	104.0%			ICU Level of Service			G					
Analysis Period (min)	15											
c Critical Lane Group												

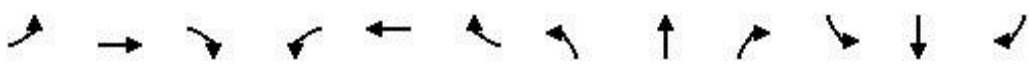
Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2026 Future Total MM PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔		↔	↔	↔	↔	↔	↔	
Traffic Volume (vph)	0	0	0	138	0	110	1	2778	175	89	1602	0
Future Volume (vph)	0	0	0	138	0	110	1	2778	175	89	1602	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		40.0	35.0		30.0	70.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			20.0			60.0		
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
Ped Bike Factor						0.98			0.98			
Frt						0.850			0.850			
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	0	1863	0	1770	0	1583	1770	3505	1388	1770	3471	0
Flt Permitted				0.757			0.132			0.040		
Satd. Flow (perm)	0	1863	0	1410	0	1557	246	3505	1356	75	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						89			56			
Link Speed (k/h)		20			20			60			60	
Link Distance (m)		78.7			109.0			435.9			458.5	
Travel Time (s)		14.2			19.6			26.2			27.5	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	14%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Adj. Flow (vph)	0	0	0	142	0	113	1	2864	180	92	1652	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	142	0	113	1	2864	180	92	1652	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.03	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1		1	1	2	1	1	2	
Detector Template	Left	Thru		Left		Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0		2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0		2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4						9.4			9.4	
Detector 2 Size(m)		0.6						0.6			0.6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2026 Future Total MM PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type				Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8		8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0		10.0	15.0	15.0	15.0	5.0	15.0	
Minimum Split (s)	24.2	24.2		35.2		35.2	34.9	34.9	34.9	9.5	34.9	
Total Split (s)	40.6	40.6		40.6		40.6	88.2	88.2	88.2	11.2	99.4	
Total Split (%)	29.0%	29.0%		29.0%		29.0%	63.0%	63.0%	63.0%	8.0%	71.0%	
Maximum Green (s)	34.4	34.4		34.4		34.4	82.3	82.3	82.3	7.2	93.5	
Yellow Time (s)	3.1	3.1		3.1		3.1	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.1	3.1		3.1		3.1	2.2	2.2	2.2	1.0	2.2	
Lost Time Adjust (s)		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.2		6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.6	3.6	3.6	3.0	3.6	
Recall Mode	None	None		None		None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0		7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				22.0		22.0	22.0	22.0	22.0		22.0	
Pedestrian Calls (#/hr)				0		0	0	0	0		0	
Act Effect Green (s)				19.4		19.4	95.7	95.7	95.7	110.4	108.5	
Actuated g/C Ratio				0.14		0.14	0.68	0.68	0.68	0.79	0.78	
v/c Ratio				0.73		0.39	0.01	1.20	0.19	0.56	0.61	
Control Delay				77.9		18.8	1.0	102.9	0.1	34.4	8.6	
Queue Delay				0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay				77.9		18.8	1.0	102.9	0.1	34.4	8.6	
LOS				E		B	A	F	A	C	A	
Approach Delay					51.7			96.7			10.0	
Approach LOS					D			F			A	
Queue Length 50th (m)				40.2		6.2	0.0	~541.9	0.0	9.2	94.2	
Queue Length 95th (m)				61.0		23.7	m0.0	m#363.0	m0.0	29.3	143.6	
Internal Link Dist (m)		54.7			85.0			411.9			434.5	
Turn Bay Length (m)						40.0	35.0		30.0	70.0		
Base Capacity (vph)				346		449	168	2396	944	169	2689	
Starvation Cap Reductn				0		0	0	0	0	0	0	
Spillback Cap Reductn				0		0	0	0	0	0	0	
Storage Cap Reductn				0		0	0	0	0	0	0	
Reduced v/c Ratio				0.41		0.25	0.01	1.20	0.19	0.54	0.61	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 103.6 (74%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.20

Lanes, Volumes, Timings 3: Bronte Road & Driveway/Charles Cornwall Road

2026 Future Total MM PM Peak Hour
1300 Bronte Enns

Intersection Signal Delay: 64.5

Intersection LOS: E

Intersection Capacity Utilization 95.2%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

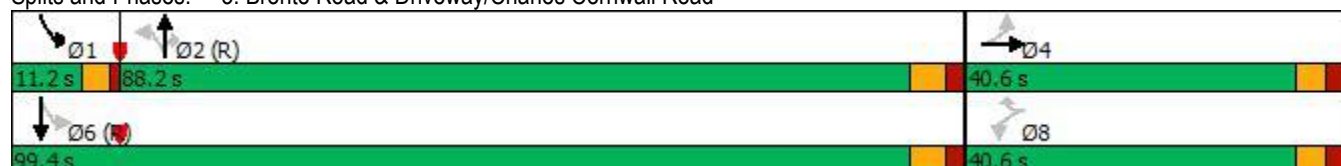
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Bronte Road & Driveway/Charles Cornwall Road



HCM Signalized Intersection Capacity Analysis

3: Bronte Road & Driveway/Charles Cornwall Road

2026 Future Total MM PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	138	0	110	1	2778	175	89	1602	0
Future Volume (vph)	0	0	0	138	0	110	1	2778	175	89	1602	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Lane Util. Factor				1.00		1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes				1.00		0.98	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes				1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Frt				1.00		0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected				0.95		1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1770		1552	1770	3505	1357	1770	3471	
Flt Permitted				0.76		1.00	0.13	1.00	1.00	0.04	1.00	
Satd. Flow (perm)				1410		1552	246	3505	1357	75	3471	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	142	0	113	1	2864	180	92	1652	0
RTOR Reduction (vph)	0	0	0	0	0	77	0	0	18	0	0	0
Lane Group Flow (vph)	0	0	0	142	0	36	1	2864	162	92	1652	0
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	14%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Turn Type				Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)				19.4		19.4	95.7	95.7	95.7	108.5	108.5	
Effective Green, g (s)				19.4		19.4	95.7	95.7	95.7	108.5	108.5	
Actuated g/C Ratio				0.14		0.14	0.68	0.68	0.68	0.78	0.78	
Clearance Time (s)				6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Vehicle Extension (s)				3.0		3.0	3.6	3.6	3.6	3.0	3.6	
Lane Grp Cap (vph)				195		215	168	2395	927	164	2690	
v/s Ratio Prot								c0.82		0.04	c0.48	
v/s Ratio Perm				c0.10		0.02	0.00		0.12	0.40		
v/c Ratio				0.73		0.17	0.01	1.20	0.18	0.56	0.61	
Uniform Delay, d1				57.8		53.2	7.0	22.1	8.0	42.6	6.8	
Progression Factor				1.00		1.00	0.08	0.40	0.00	1.00	1.00	
Incremental Delay, d2				12.7		0.4	0.0	88.5	0.0	4.3	1.1	
Delay (s)				70.5		53.6	0.6	97.4	0.1	46.9	7.8	
Level of Service				E		D	A	F	A	D	A	
Approach Delay (s)		0.0			63.0			91.6			9.9	
Approach LOS		A			E			F			A	
Intersection Summary												
HCM 2000 Control Delay			61.9									HCM 2000 Level of Service E
HCM 2000 Volume to Capacity ratio			1.09									
Actuated Cycle Length (s)			140.0							16.1		
Intersection Capacity Utilization			95.2%							F		
ICU Level of Service												
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

2026 Future Total MM PM Peak Hour

4: Bronte Road & Driveway/North Service Road West

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	129	0	154	0	2714	74	88	1648	2
Future Volume (vph)	0	0	0	129	0	154	0	2714	74	88	1648	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	45.0		0.0	35.0		70.0	115.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			50.0			65.0			65.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor						0.98			0.97		1.00	
Frt						0.850			0.850			
Flt Protected				0.950	0.950					0.950		
Satd. Flow (prot)	0	1863	0	1681	1681	1583	1863	3505	1583	1770	3471	0
Flt Permitted				0.950	0.950					0.047		
Satd. Flow (perm)	0	1863	0	1681	1681	1553	1863	3505	1540	88	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						159			106			
Link Speed (k/h)		20			50			60			60	
Link Distance (m)		52.6			84.3			299.0			435.9	
Travel Time (s)		9.5			6.1			17.9			26.2	
Confl. Peds. (#/hr)	2					2			2	2		
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	4%	2%
Adj. Flow (vph)	0	0	0	133	0	159	0	2798	76	91	1699	2
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	66	67	159	0	2798	76	91	1701	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

12-03-2021

NA

CGH Transportation

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Lanes, Volumes, Timings

2026 Future Total MM PM Peak Hour

4: Bronte Road & Driveway/North Service Road West

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8			4			2			1	6	
Permitted Phases	8			4		4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	15.0	15.0	15.0	6.0	15.0	
Minimum Split (s)	24.7	24.7		36.9	36.9	36.9	41.7	41.7	41.7	10.5	24.7	
Total Split (s)	13.0	13.0		39.0	39.0	39.0	77.0	77.0	77.0	11.0	88.0	
Total Split (%)	9.3%	9.3%		27.9%	27.9%	27.9%	55.0%	55.0%	55.0%	7.9%	62.9%	
Maximum Green (s)	6.3	6.3		33.1	33.1	33.1	70.3	70.3	70.3	7.0	81.3	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		2.2	2.2	2.2	3.0	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)	6.7			5.9	5.9	5.9	6.7	6.7	6.7	4.0	6.7	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0			
Flash Dont Walk (s)				24.0	24.0	24.0	28.0	28.0	28.0			
Pedestrian Calls (#/hr)				2	2	2	2	2	2			
Act Effect Green (s)				33.1	33.1	33.1		81.5	81.5	97.0	94.3	
Actuated g/C Ratio				0.24	0.24	0.24		0.58	0.58	0.69	0.67	
v/c Ratio				0.17	0.17	0.33		1.37	0.08	0.55	0.73	
Control Delay				43.9	44.0	8.0		186.7	0.0	35.4	13.7	
Queue Delay				0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay				43.9	44.0	8.0		186.7	0.0	35.4	13.7	
LOS				D	D	A		F	A	D	B	
Approach Delay				24.4			181.8			14.8		
Approach LOS				C			F			B		
Queue Length 50th (m)				16.2	16.5	0.0		~560.3	0.0	12.1	110.7	
Queue Length 95th (m)				30.7	31.0	18.7		m#423.8	m0.0	m30.4	128.7	
Internal Link Dist (m)	28.6			60.3			275.0			411.9		
Turn Bay Length (m)				45.0			70.0			115.0		
Base Capacity (vph)				397	397	488		2040	940	168	2337	
Starvation Cap Reductn				0	0	0		15	0	0	0	
Spillback Cap Reductn				0	0	0		0	0	0	0	
Storage Cap Reductn				0	0	0		0	0	0	0	
Reduced v/c Ratio				0.17	0.17	0.33		1.38	0.08	0.54	0.73	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 85 (61%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.37

Intersection Signal Delay: 112.2

Intersection LOS: F

Intersection Capacity Utilization 96.3%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 4: Bronte Road & Driveway/North Service Road West



HCM Signalized Intersection Capacity Analysis

4: Bronte Road & Driveway/North Service Road West

2026 Future Total MM PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	129	0	154	0	2714	74	88	1648	2
Future Volume (vph)	0	0	0	129	0	154	0	2714	74	88	1648	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Lane Util. Factor				0.95	0.95	1.00		0.95	1.00	1.00	0.95	
Frpb, ped/bikes				1.00	1.00	0.98		1.00	0.97	1.00	1.00	
Flpb, ped/bikes				1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt				1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected				0.95	0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1681	1681	1553		3505	1540	1770	3471	
Flt Permitted				0.95	0.95	1.00		1.00	1.00	0.05	1.00	
Satd. Flow (perm)				1681	1681	1553		3505	1540	87	3471	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	133	0	159	0	2798	76	91	1699	2
RTOR Reduction (vph)	0	0	0	0	0	121	0	0	32	0	0	0
Lane Group Flow (vph)	0	0	0	66	67	38	0	2798	44	91	1701	0
Confl. Peds. (#/hr)	2					2			2	2		
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	4%	2%
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		8			4			2		1	6	
Permitted Phases	8			4		4	2		2	6		
Actuated Green, G (s)				33.1	33.1	33.1		81.5	81.5	94.3	94.3	
Effective Green, g (s)				33.1	33.1	33.1		81.5	81.5	94.3	94.3	
Actuated g/C Ratio				0.24	0.24	0.24		0.58	0.58	0.67	0.67	
Clearance Time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Vehicle Extension (s)				5.0	5.0	5.0		5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)				397	397	367		2040	896	164	2337	
v/s Ratio Prot								c0.80		0.03	c0.49	
v/s Ratio Perm				0.04	0.04	0.02			0.03	0.34		
v/c Ratio				0.17	0.17	0.10		1.37	0.05	0.55	0.73	
Uniform Delay, d1				42.5	42.5	41.8		29.2	12.6	34.1	14.6	
Progression Factor				1.00	1.00	1.00		0.48	0.02	1.35	0.81	
Incremental Delay, d2				0.4	0.4	0.3		167.5	0.0	3.2	1.6	
Delay (s)				42.9	42.9	42.1		181.6	0.2	49.3	13.4	
Level of Service				D	D	D		F	A	D	B	
Approach Delay (s)		0.0			42.5			176.8			15.3	
Approach LOS		A			D			F			B	
Intersection Summary												
HCM 2000 Control Delay			110.5				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.07									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)		23.3			
Intersection Capacity Utilization			96.3%				ICU Level of Service		F			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2026 Future Total MM PM Peak Hour
1300 Bronte Enns

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	232	645	2076	0	0	1080
Future Volume (vph)	232	645	2076	0	0	1080
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	90.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	1.00	0.95	1.00	1.00	0.95
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3433	1583	3505	0	0	3505
Flt Permitted	0.950					
Satd. Flow (perm)	3433	1583	3505	0	0	3505
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		3				
Link Speed (k/h)	60		60			60
Link Distance (m)	65.9		376.8			299.0
Travel Time (s)	4.0		22.6			17.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	3%	2%	2%	3%
Adj. Flow (vph)	252	701	2257	0	0	1174
Shared Lane Traffic (%)						
Lane Group Flow (vph)	252	701	2257	0	0	1174
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2026 Future Total MM PM Peak Hour
1300 Bronte Enns



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8					
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.7	24.7	36.5			26.5
Total Split (s)	60.0	60.0	80.0			80.0
Total Split (%)	42.9%	42.9%	57.1%			57.1%
Maximum Green (s)	53.3	53.3	73.5			73.5
Yellow Time (s)	3.7	3.7	3.7			3.7
All-Red Time (s)	3.0	3.0	2.8			2.8
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	6.7	6.7	6.5			6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	C-Max			C-Max
Act Effect Green (s)	53.3	53.3	73.5			73.5
Actuated g/C Ratio	0.38	0.38	0.52			0.52
v/c Ratio	0.19	1.16	1.23			0.64
Control Delay	29.5	128.7	122.4			21.1
Queue Delay	0.0	0.0	1.6			0.0
Total Delay	29.5	128.7	124.0			21.1
LOS	C	F	F			C
Approach Delay	102.5		124.0			21.1
Approach LOS	F		F			C
Queue Length 50th (m)	25.1	~241.4	~434.9			64.8
Queue Length 95th (m)	35.5	#320.5	m68.3			125.8
Internal Link Dist (m)	41.9		352.8			275.0
Turn Bay Length (m)		90.0				
Base Capacity (vph)	1306	604	1840			1840
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	682			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.19	1.16	1.95			0.64

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 67 (48%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.23

Intersection Signal Delay: 91.8

Intersection LOS: F

Intersection Capacity Utilization 108.3%

ICU Level of Service G

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

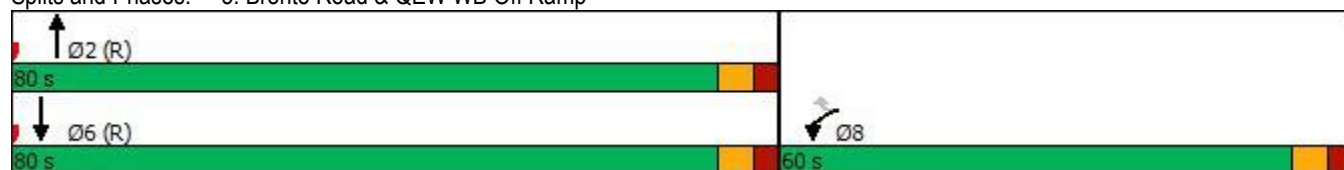
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 5: Bronte Road & QEW WB Off Ramp



HCM Signalized Intersection Capacity Analysis

5: Bronte Road & QEW WB Off Ramp

2026 Future Total MM PM Peak Hour
1300 Bronte Enns

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	232	645	2076	0	0	1080
Future Volume (vph)	232	645	2076	0	0	1080
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7	6.5			6.5
Lane Util. Factor	0.97	1.00	0.95			0.95
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3433	1583	3505			3505
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3433	1583	3505			3505
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	252	701	2257	0	0	1174
RTOR Reduction (vph)	0	2	0	0	0	0
Lane Group Flow (vph)	252	699	2257	0	0	1174
Heavy Vehicles (%)	2%	2%	3%	2%	2%	3%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	53.3	53.3	73.5			73.5
Effective Green, g (s)	53.3	53.3	73.5			73.5
Actuated g/C Ratio	0.38	0.38	0.52			0.52
Clearance Time (s)	6.7	6.7	6.5			6.5
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	1306	602	1840			1840
v/s Ratio Prot	0.07		c0.64			0.33
v/s Ratio Perm		c0.44				
v/c Ratio	0.19	1.16	1.23			0.64
Uniform Delay, d1	29.0	43.4	33.2			23.7
Progression Factor	1.00	1.00	0.49			0.83
Incremental Delay, d2	0.1	90.0	102.5			1.2
Delay (s)	29.0	133.3	118.8			20.8
Level of Service	C	F	F			C
Approach Delay (s)	105.8		118.8			20.8
Approach LOS	F		F			C
Intersection Summary						
HCM 2000 Control Delay			89.7		HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio			1.20			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	13.2
Intersection Capacity Utilization			108.3%		ICU Level of Service	G
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings

2026 Future Total MM PM Peak Hour

6: Bronte Road & Parking Lot Access/QEW EB Ramps

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	0	4	214	1	860	1	1623	228	313	986	3
Future Volume (vph)	6	0	4	214	1	860	1	1623	228	313	986	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	10.0		0.0	130.0		125.0	120.0		95.0	255.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			65.0			95.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.91	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor									0.97		1.00	
Frt		0.850			0.857	0.850			0.850			
Flt Protected	0.950			0.950	0.998		0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1681	1423	1475	1770	3539	1583	1770	3539	0
Flt Permitted	0.950			0.950	0.998		0.266			0.088		
Satd. Flow (perm)	1770	1583	0	1681	1423	1475	495	3539	1540	164	3539	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					458	477			119			
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		53.2			37.5			215.0			376.8	
Travel Time (s)		4.8			3.4			12.9			22.6	
Confl. Bikes (#/hr)									5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	7	0	4	233	1	935	1	1764	248	340	1072	3
Shared Lane Traffic (%)				10%		49%						
Lane Group Flow (vph)	7	4	0	210	482	477	1	1764	248	340	1075	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

12-03-2021

NA

CGH Transportation

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Lanes, Volumes, Timings

2026 Future Total MM PM Peak Hour

6: Bronte Road & Parking Lot Access/QEW EB Ramps

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	36.7	36.7		36.7	36.7	36.7	36.5	36.5	36.5	11.5	36.5	
Total Split (s)	36.7	36.7		49.0	49.0	49.0	42.3	42.3	42.3	12.0	54.3	
Total Split (%)	26.2%	26.2%		35.0%	35.0%	35.0%	30.2%	30.2%	30.2%	8.6%	38.8%	
Maximum Green (s)	30.0	30.0		42.3	42.3	42.3	35.8	35.8	35.8	8.0	47.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.8	2.8	2.8	1.0	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)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				23.0	23.0	23.0	23.0	23.0	23.0		23.0	
Pedestrian Calls (#/hr)				0	0	0	0	0	0		0	
Act Effct Green (s)	7.1	7.1		25.6	25.6	25.6	45.8	45.8	45.8	98.1	95.6	
Actuated g/C Ratio	0.05	0.05		0.18	0.18	0.18	0.33	0.33	0.33	0.70	0.68	
v/c Ratio	0.08	0.05		0.68	0.76	0.72	0.01	1.52	0.43	0.53	0.44	
Control Delay	65.3	64.8		63.9	13.7	10.6	35.0	274.2	21.3	34.3	22.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	65.3	64.8		63.9	13.7	10.6	35.0	274.2	21.3	34.3	22.7	
LOS	E	E		E	B	B	C	F	C	C	C	
Approach Delay		65.1			21.4			242.9			25.5	
Approach LOS		E			C			F			C	
Queue Length 50th (m)	2.0	1.1		60.9	6.4	0.0	0.2	~325.6	23.9	69.7	98.4	
Queue Length 95th (m)	7.4	5.4		83.4	47.0	33.5	1.8	#453.1	58.9	127.5	156.4	
Internal Link Dist (m)		29.2			13.5			191.0			352.8	
Turn Bay Length (m)	10.0			130.0		125.0	120.0		95.0	255.0		
Base Capacity (vph)	379	339		507	749	778	162	1157	583	640	2417	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.02	0.01		0.41	0.64	0.61	0.01	1.52	0.43	0.53	0.44	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 66 (47%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.52

Intersection Signal Delay: 119.5

Intersection LOS: F

12-03-2021

NA

CGH Transportation

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Intersection Capacity Utilization 102.8%

ICU Level of Service G

Analysis Period (min) 15

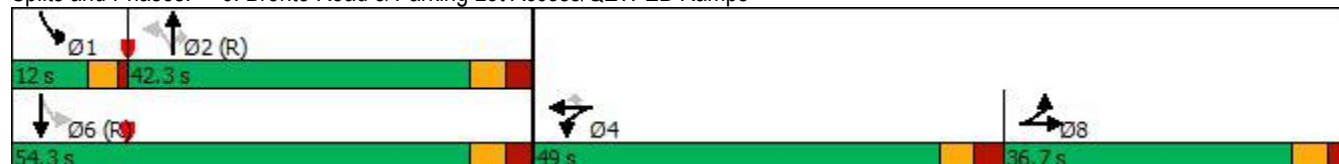
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 6: Bronte Road & Parking Lot Access/QEW EB Ramps



HCM Signalized Intersection Capacity Analysis

6: Bronte Road & Parking Lot Access/QEW EB Ramps

2026 Future Total MM PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	0	4	214	1	860	1	1623	228	313	986	3
Future Volume (vph)	6	0	4	214	1	860	1	1623	228	313	986	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lane Util. Factor	1.00	1.00		0.95	0.91	0.95	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97	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	
Frt	1.00	0.85		1.00	0.86	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1583		1681	1424	1475	1770	3539	1542	1770	3538	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.27	1.00	1.00	0.09	1.00	
Satd. Flow (perm)	1770	1583		1681	1424	1475	495	3539	1542	163	3538	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	0	4	233	1	935	1	1764	248	340	1072	3
RTOR Reduction (vph)	0	0	0	0	374	390	0	0	84	0	0	0
Lane Group Flow (vph)	7	4	0	210	108	87	1	1764	164	340	1075	0
Confl. Bikes (#/hr)									5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Actuated Green, G (s)	2.9	2.9		25.6	25.6	25.6	41.7	41.7	41.7	91.6	91.6	
Effective Green, g (s)	2.9	2.9		25.6	25.6	25.6	41.7	41.7	41.7	91.6	91.6	
Actuated g/C Ratio	0.02	0.02		0.18	0.18	0.18	0.30	0.30	0.30	0.65	0.65	
Clearance Time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	36	32		307	260	269	147	1054	459	633	2314	
v/s Ratio Prot	c0.00	0.00		c0.12	0.08			c0.50		c0.18	0.30	
v/s Ratio Perm						0.06	0.00		0.11	0.18		
v/c Ratio	0.19	0.12		0.68	0.41	0.32	0.01	1.67	0.36	0.54	0.46	
Uniform Delay, d1	67.4	67.3		53.4	50.6	49.7	34.6	49.1	38.6	28.2	12.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.15	1.82	
Incremental Delay, d2	2.6	1.8		6.2	1.1	0.7	0.1	307.3	2.2	0.7	0.6	
Delay (s)	70.0	69.1		59.6	51.6	50.4	34.7	356.5	40.8	33.2	22.4	
Level of Service	E	E		E	D	D	C	F	D	C	C	
Approach Delay (s)		69.7			52.6			317.4			25.0	
Approach LOS		E			D			F			C	
Intersection Summary												
HCM 2000 Control Delay	159.8			HCM 2000 Level of Service					F			
HCM 2000 Volume to Capacity ratio	0.97											
Actuated Cycle Length (s)	140.0			Sum of lost time (s)					23.9			
Intersection Capacity Utilization	102.8%			ICU Level of Service					G			
Analysis Period (min)	15											
c Critical Lane Group												

Appendix K

2031 Future Background Conditions Synchro Worksheets

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2031 Future Background AM Peak Hour Optimized

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	203	390	524	88	196	72	1072	270	289	2342	13
Future Volume (vph)	11	203	390	524	88	196	72	1072	270	289	2342	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	140.0		0.0	135.0		80.0	180.0		50.0
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (m)	65.0			100.0			70.0			70.0		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Ped Bike Factor	0.99		0.98			0.97			0.96	1.00		0.97
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1656	1863	1583	3433	1792	1553	1719	4222	1485	1770	4302	1336
Flt Permitted	0.698			0.422			0.068			0.125		
Satd. Flow (perm)	1200	1863	1556	1525	1792	1503	123	4222	1424	232	4302	1289
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			121			202			272			91
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		296.6			291.2			731.4			120.4	
Travel Time (s)		17.8			17.5			43.9			7.2	
Confl. Peds. (#/hr)	11					11	5		7	7		5
Confl. Bikes (#/hr)			5			5			5			5
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 (%)	9%	2%	2%	2%	6%	4%	5%	8%	7%	2%	6%	18%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Adj. Flow (vph)	11	209	402	540	91	202	74	1105	278	298	2414	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	209	402	540	91	202	74	1105	278	298	2414	13
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.00	1.00	1.03
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2031 Future Background AM Peak Hour Optimized

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0	10.0	6.0	20.0	20.0	6.0	20.0	20.0
Minimum Split (s)	10.5	36.7	36.7	10.5	36.7	36.7	10.5	36.5	36.5	10.5	36.5	36.5
Total Split (s)	10.5	36.7	36.7	12.2	38.4	38.4	10.5	58.5	58.5	32.6	80.6	80.6
Total Split (%)	7.5%	26.2%	26.2%	8.7%	27.4%	27.4%	7.5%	41.8%	41.8%	23.3%	57.6%	57.6%
Maximum Green (s)	6.5	30.0	30.0	8.2	31.7	31.7	6.5	52.0	52.0	28.6	74.1	74.1
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	2.8	2.8	1.0	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	0.0	0.0
Total Lost Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
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	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)					7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)					23.0	23.0		23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)					11	11		7	7		5	5
Act Effct Green (s)	37.9	29.0	29.0	43.0	37.0	37.0	69.9	61.0	61.0	88.1	77.2	77.2
Actuated g/C Ratio	0.27	0.21	0.21	0.31	0.26	0.26	0.50	0.44	0.44	0.63	0.55	0.55
v/c Ratio	0.03	0.54	0.96	0.93	0.19	0.37	0.55	0.60	0.36	0.80	1.02	0.02
Control Delay	33.1	55.1	73.4	67.3	42.5	7.7	48.8	37.9	12.9	39.8	54.9	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	33.1	55.1	73.4	67.3	42.5	7.7	48.8	37.9	12.9	39.8	54.9	0.1
LOS	C	E	E	E	D	A	D	D	B	D	D	A
Approach Delay		66.5			50.1			33.7			53.0	
Approach LOS		E			D			C			D	
Queue Length 50th (m)	2.2	54.4	85.4	65.4	19.6	0.0	11.8	89.8	20.8	49.0	~321.3	0.0
Queue Length 95th (m)	7.1	81.7	#151.2	#99.3	38.3	21.2	#26.8	129.2	37.8	81.4	#353.6	0.0
Internal Link Dist (m)		272.6			267.2			707.4			96.4	
Turn Bay Length (m)	70.0		70.0	140.0			135.0		80.0	180.0		50.0
Base Capacity (vph)	349	399	428	579	473	546	135	1840	774	460	2371	751
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.52	0.94	0.93	0.19	0.37	0.55	0.60	0.36	0.65	1.02	0.02

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 82.6 (59%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 1: Bronte Road & Upper Middle Road

2031 Future Background AM Peak Hour Optimized
1300 Bronte Enns

Maximum v/c Ratio: 1.02

Intersection Signal Delay: 49.1

Intersection LOS: D

Intersection Capacity Utilization 98.7%

ICU Level of Service F

Analysis Period (min) 15

* User Entered Value

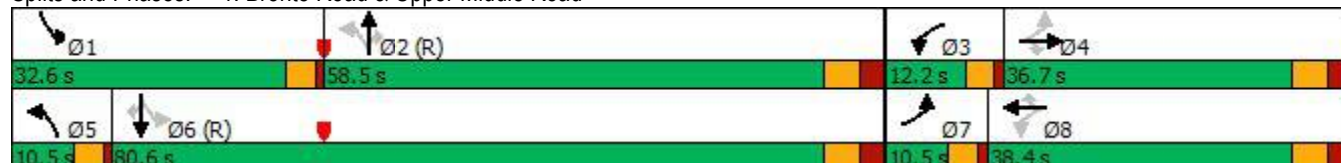
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Bronte Road & Upper Middle Road



HCM Signalized Intersection Capacity Analysis 2031 Future Background AM Peak Hour Optimized

1: Bronte Road & Upper Middle Road

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	203	390	524	88	196	72	1072	270	289	2342	13
Future Volume (vph)	11	203	390	524	88	196	72	1072	270	289	2342	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00	0.97
Flpb, ped/bikes	0.99	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	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	1863	1556	3433	1792	1504	1719	4222	1425	1769	4302	1289
Flt Permitted	0.70	1.00	1.00	0.42	1.00	1.00	0.07	1.00	1.00	0.12	1.00	1.00
Satd. Flow (perm)	1205	1863	1556	1526	1792	1504	123	4222	1425	232	4302	1289
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)	11	209	402	540	91	202	74	1105	278	298	2414	13
RTOR Reduction (vph)	0	0	94	0	0	149	0	0	158	0	0	6
Lane Group Flow (vph)	11	209	308	540	91	53	74	1105	120	298	2414	7
Confl. Peds. (#/hr)	11					11	5		7	7		5
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	9%	2%	2%	2%	6%	4%	5%	8%	7%	2%	6%	18%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	34.0	31.4	31.4	43.6	37.0	37.0	63.9	58.7	58.7	83.2	74.0	74.0
Effective Green, g (s)	34.0	31.4	31.4	43.6	37.0	37.0	63.9	58.7	58.7	83.2	74.0	74.0
Actuated g/C Ratio	0.24	0.22	0.22	0.31	0.26	0.26	0.46	0.42	0.42	0.59	0.53	0.53
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	300	417	348	586	473	397	115	1770	597	362	2273	681
v/s Ratio Prot	0.00	0.11		c0.05	0.05		0.02	0.26		c0.12	c0.56	
v/s Ratio Perm	0.01		0.20	c0.23		0.04	0.27		0.08	0.37		0.01
v/c Ratio	0.04	0.50	0.89	0.92	0.19	0.13	0.64	0.62	0.20	0.82	1.06	0.01
Uniform Delay, d1	40.4	47.5	52.6	46.9	39.9	39.3	32.8	32.0	25.8	28.3	33.0	15.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.52	1.15	3.27	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.0	22.5	20.1	0.2	0.2	10.9	1.6	0.7	14.0	37.9	0.0
Delay (s)	40.4	48.4	75.1	67.0	40.1	39.4	60.6	38.5	85.1	42.3	70.9	15.7
Level of Service	D	D	E	E	D	D	E	D	F	D	E	B
Approach Delay (s)		65.5			57.4			48.5			67.5	
Approach LOS		E			E			D			E	
Intersection Summary												
HCM 2000 Control Delay			60.9									
HCM 2000 Volume to Capacity ratio			1.04									
Actuated Cycle Length (s)			140.0									
Intersection Capacity Utilization			98.7%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
2: Bronte Road & Saw Whet Boulevard

2031 Future Background AM Peak Hour Optimized

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	10	169	0	95	4	1311	52	30	3421	1
Future Volume (vph)	4	0	10	169	0	95	4	1311	52	30	3421	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	15.0		15.0	15.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Frt		0.850			0.850				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1770	1583	0	1770	4471	1583	1770	4471	1583
Flt Permitted	0.643			0.750			0.038			0.127		
Satd. Flow (perm)	1198	1583	0	1397	1583	0	71	4471	1583	237	4471	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			74				24			19
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		42.5			50.2			458.5			731.4	
Travel Time (s)		3.1			3.6			27.5			43.9	
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)	4	0	11	184	0	103	4	1425	57	33	3718	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	11	0	184	103	0	4	1425	57	33	3718	1
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	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
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6

Lanes, Volumes, Timings
2: Bronte Road & Saw Whet Boulevard

2031 Future Background AM Peak Hour Optimized

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	35.5	35.5		35.5	35.5		35.5	35.5	35.5	35.5	35.5	35.5
Total Split (s)	35.5	35.5		35.5	35.5		104.5	104.5	104.5	104.5	104.5	104.5
Total Split (%)	25.4%	25.4%		25.4%	25.4%		74.6%	74.6%	74.6%	74.6%	74.6%	74.6%
Maximum Green (s)	30.0	30.0		30.0	30.0		99.0	99.0	99.0	99.0	99.0	99.0
Yellow Time (s)	3.3	3.3		3.3	3.3		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.2	2.2		2.2	2.2		1.8	1.8	1.8	1.8	1.8	1.8
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)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	23.0	23.0		23.0	23.0		23.0	23.0	23.0	23.0	23.0	23.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effect Green (s)	23.2	23.2		23.2	23.2		105.8	105.8	105.8	105.8	105.8	105.8
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.76	0.76	0.76	0.76	0.76	0.76
v/c Ratio	0.02	0.04		0.80	0.32		0.08	0.42	0.05	0.18	1.10	0.00
Control Delay	45.2	10.2		79.7	19.2		10.8	13.2	5.6	5.2	60.0	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	45.2	10.2		79.7	19.2		10.8	13.2	5.6	5.2	60.0	0.0
LOS	D	B		E	B		B	B	A	A	E	A
Approach Delay		19.5			58.0			12.9			59.5	
Approach LOS		B			E			B			E	
Queue Length 50th (m)	1.0	0.0		51.9	7.2		0.6	126.4	6.6	1.8	~512.0	0.0
Queue Length 95th (m)	4.5	3.8		76.3	23.5		m0.8	119.9	7.6	m2.5	m#535.0	m0.0
Internal Link Dist (m)		18.5			26.2			434.5			707.4	
Turn Bay Length (m)	15.0			15.0			15.0		15.0	15.0		15.0
Base Capacity (vph)	256	354		299	397		53	3379	1202	179	3379	1201
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.03		0.62	0.26		0.08	0.42	0.05	0.18	1.10	0.00

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 80 (57%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.10

Intersection Signal Delay: 46.8

Intersection LOS: D

Intersection Capacity Utilization 91.3%

ICU Level of Service F

Analysis Period (min) 15

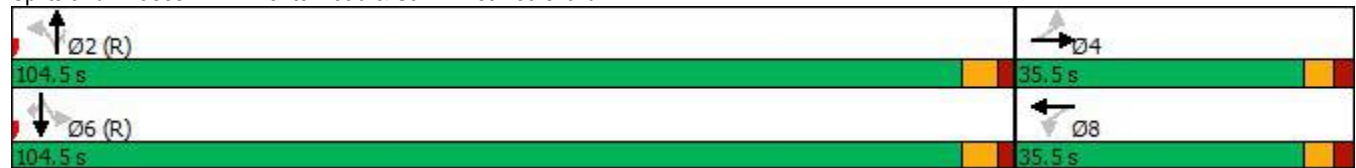
* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.

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

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

Splits and Phases: 2: Bronte Road & Saw Whet Boulevard



HCM Signalized Intersection Capacity Analysis 2031 Future Background AM Peak Hour Optimized

2: Bronte Road & Saw Whet Boulevard

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	10	169	0	95	4	1311	52	30	3421	1
Future Volume (vph)	4	0	10	169	0	95	4	1311	52	30	3421	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	5.5	5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	*0.80	1.00	1.00	*0.80	1.00
Frt	1.00	0.85		1.00	0.85		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)	1770	1583		1770	1583		1770	4471	1583	1770	4471	1583
Flt Permitted	0.64	1.00		0.75	1.00		0.04	1.00	1.00	0.13	1.00	1.00
Satd. Flow (perm)	1198	1583		1398	1583		70	4471	1583	237	4471	1583
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)	4	0	11	184	0	103	4	1425	57	33	3718	1
RTOR Reduction (vph)	0	9	0	0	62	0	0	0	6	0	0	0
Lane Group Flow (vph)	4	2	0	184	41	0	4	1425	51	33	3718	1
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	23.2	23.2		23.2	23.2		105.8	105.8	105.8	105.8	105.8	105.8
Effective Green, g (s)	23.2	23.2		23.2	23.2		105.8	105.8	105.8	105.8	105.8	105.8
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.76	0.76	0.76	0.76	0.76	0.76
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	198	262		231	262		52	3378	1196	179	3378	1196
v/s Ratio Prot		0.00			0.03			0.32			c0.83	
v/s Ratio Perm	0.00			c0.13			0.06		0.03	0.14		0.00
v/c Ratio	0.02	0.01		0.80	0.16		0.08	0.42	0.04	0.18	1.10	0.00
Uniform Delay, d1	48.9	48.8		56.1	50.0		4.4	6.1	4.3	4.9	17.1	4.2
Progression Factor	1.00	1.00		1.00	1.00		1.20	1.93	1.59	0.62	0.50	1.00
Incremental Delay, d2	0.0	0.0		17.1	0.3		2.6	0.3	0.1	1.0	47.7	0.0
Delay (s)	48.9	48.8		73.2	50.3		7.9	12.2	6.9	4.0	56.2	4.2
Level of Service	D	D		E	D		A	B	A	A	E	A
Approach Delay (s)		48.8			65.0			12.0			55.8	
Approach LOS		D			E			B			E	
Intersection Summary												
HCM 2000 Control Delay			44.5			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			1.05									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			11.0			
Intersection Capacity Utilization			91.3%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	161	0	65	0	1352	78	149	3426	0
Future Volume (vph)	1	0	1	161	0	65	0	1352	78	149	3426	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		40.0	35.0		30.0	70.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			20.0			60.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	*0.80	1.00	1.00	*0.80	0.91
Ped Bike Factor		0.99				0.98			0.98			
Frt		0.932				0.850			0.850			
Flt Protected		0.976		0.950						0.950		
Satd. Flow (prot)	0	1680	0	1530	0	1392	1863	4302	1439	1770	4385	0
Flt Permitted		0.976		0.757						0.115		
Satd. Flow (perm)	0	1680	0	1219	0	1368	1863	4302	1405	214	4385	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		54				67			56			
Link Speed (k/h)		20			20			60			60	
Link Distance (m)		78.7			109.0			435.9			458.5	
Travel Time (s)		14.2			19.6			26.2			27.5	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	18%	2%	16%	2%	6%	10%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Adj. Flow (vph)	1	0	1	166	0	67	0	1394	80	154	3532	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2	0	166	0	67	0	1394	80	154	3532	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.03	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1		1	1	2	1	1	2	
Detector Template	Left	Thru		Left		Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0		2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0		2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4						9.4			9.4	
Detector 2 Size(m)		0.6						0.6			0.6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA		Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8		8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0		10.0	15.0	15.0	15.0	5.0	15.0	
Minimum Split (s)	24.2	24.2		35.2		35.2	34.9	34.9	34.9	9.5	34.9	
Total Split (s)	35.2	35.2		35.2		35.2	86.8	86.8	86.8	18.0	104.8	
Total Split (%)	25.1%	25.1%		25.1%		25.1%	62.0%	62.0%	62.0%	12.9%	74.9%	
Maximum Green (s)	29.0	29.0		29.0		29.0	80.9	80.9	80.9	14.0	98.9	
Yellow Time (s)	3.1	3.1		3.1		3.1	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.1	3.1		3.1		3.1	2.2	2.2	2.2	1.0	2.2	
Lost Time Adjust (s)		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.2		6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.6	3.6	3.6	3.0	3.6	
Recall Mode	None	None		None		None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0		7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				22.0		22.0	22.0	22.0	22.0		22.0	
Pedestrian Calls (#/hr)				0		0	0	0	0		0	
Act Effect Green (s)		23.3		23.3		23.3		91.3	91.3	106.5	104.6	
Actuated g/C Ratio		0.17		0.17		0.17		0.65	0.65	0.76	0.75	
v/c Ratio		0.01		0.82		0.24		0.50	0.09	0.58	1.08	
Control Delay		0.0		85.8		12.2		13.8	8.2	10.5	46.8	
Queue Delay		0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay		0.0		85.8		12.2		13.8	8.2	10.5	46.8	
LOS		A		F		B		B	A	B	D	
Approach Delay					64.6			13.5			45.2	
Approach LOS					E			B			D	
Queue Length 50th (m)		0.0		46.9		0.0		53.1	3.0	2.3	~491.9	
Queue Length 95th (m)		0.0		71.9		13.4		77.4	m12.1	m2.1	m#433.7	
Internal Link Dist (m)		54.7			85.0			411.9			434.5	
Turn Bay Length (m)						40.0			30.0	70.0		
Base Capacity (vph)		390		252		336		2804	935	318	3277	
Starvation Cap Reductn		0		0		0		0	0	0	0	
Spillback Cap Reductn		0		0		0		0	0	0	0	
Storage Cap Reductn		0		0		0		0	0	0	0	
Reduced v/c Ratio		0.01		0.66		0.20		0.50	0.09	0.48	1.08	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 128.8 (92%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.08

Intersection Signal Delay: 37.4

Intersection LOS: D

Intersection Capacity Utilization 107.4%

ICU Level of Service G

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Bronte Road & Driveway/Charles Cornwall Road



HCM Signalized Intersection Capacity Analysis 2031 Future Background AM Peak Hour Optimized

3: Bronte Road & Driveway/Charles Cornwall Road

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	161	0	65	0	1352	78	149	3426	0
Future Volume (vph)	1	0	1	161	0	65	0	1352	78	149	3426	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.2		6.2		6.2		5.9	5.9	4.0	5.9	
Lane Util. Factor		1.00		1.00		1.00		*0.80	1.00	1.00	*0.80	
Frpb, ped/bikes		0.99		1.00		0.98		1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Frt		0.93		1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected		0.98		0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1679		1530		1366		4302	1406	1770	4385	
Flt Permitted		0.98		0.76		1.00		1.00	1.00	0.11	1.00	
Satd. Flow (perm)		1679		1218		1366		4302	1406	214	4385	
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)	1	0	1	166	0	67	0	1394	80	154	3532	0
RTOR Reduction (vph)	0	2	0	0	0	56	0	0	20	0	0	0
Lane Group Flow (vph)	0	0	0	166	0	11	0	1394	60	154	3532	0
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	18%	2%	16%	2%	6%	10%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Turn Type	Perm	NA		Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		23.3		23.3		23.3		91.2	91.2	104.6	104.6	
Effective Green, g (s)		23.3		23.3		23.3		91.2	91.2	104.6	104.6	
Actuated g/C Ratio		0.17		0.17		0.17		0.65	0.65	0.75	0.75	
Clearance Time (s)		6.2		6.2		6.2		5.9	5.9	4.0	5.9	
Vehicle Extension (s)		3.0		3.0		3.0		3.6	3.6	3.0	3.6	
Lane Grp Cap (vph)		279		202		227		2802	915	264	3276	
v/s Ratio Prot								0.32		0.04	c0.81	
v/s Ratio Perm		0.00		c0.14		0.01			0.04	0.40		
v/c Ratio		0.00		0.82		0.05		0.50	0.07	0.58	1.08	
Uniform Delay, d1		48.6		56.3		49.0		12.6	8.9	8.6	17.7	
Progression Factor		1.00		1.00		1.00		0.97	1.78	1.47	0.41	
Incremental Delay, d2		0.0		22.8		0.1		0.5	0.1	0.3	35.8	
Delay (s)		48.7		79.1		49.1		12.8	15.9	12.9	43.1	
Level of Service		D		E		D		B	B	B	D	
Approach Delay (s)		48.7			70.5			13.0			41.9	
Approach LOS		D			E			B			D	
Intersection Summary												
HCM 2000 Control Delay			35.2				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			1.06									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			16.1		
Intersection Capacity Utilization			107.4%				ICU Level of Service			G		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

2031 Future Background AM Peak Hour Optimized

4: Bronte Road & Driveway/North Service Road West

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	17	0	44	0	1413	241	268	3316	1
Future Volume (vph)	0	0	0	17	0	44	0	1413	241	268	3316	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	45.0		0.0	35.0		70.0	115.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			50.0			65.0			65.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	*0.80	1.00	1.00	*0.80	0.91
Ped Bike Factor						0.98			0.97		1.00	
Frt						0.850			0.850			
Flt Protected				0.950	0.950					0.950		
Satd. Flow (prot)	0	1863	0	1681	1681	1583	1863	4343	1583	1770	4385	0
Flt Permitted				0.950	0.950					0.094		
Satd. Flow (perm)	0	1863	0	1681	1681	1555	1863	4343	1543	175	4385	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						112			152			
Link Speed (k/h)		20			50			60			60	
Link Distance (m)		52.6			84.3			299.0			435.9	
Travel Time (s)		9.5			6.1			17.9			26.2	
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	4%	2%
Adj. Flow (vph)	0	0	0	17	0	45	0	1442	246	273	3384	1
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	8	9	45	0	1442	246	273	3385	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

12-04-2021

NA

CGH Transportation

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8			4			2			1	6	
Permitted Phases	8			4		4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	15.0	15.0	15.0	6.0	15.0	
Minimum Split (s)	24.7	24.7		36.9	36.9	36.9	41.7	41.7	41.7	10.5	24.7	
Total Split (s)	29.0	29.0		41.0	41.0	41.0	52.0	52.0	52.0	18.0	70.0	
Total Split (%)	20.7%	20.7%		29.3%	29.3%	29.3%	37.1%	37.1%	37.1%	12.9%	50.0%	
Maximum Green (s)	22.3	22.3		35.1	35.1	35.1	45.3	45.3	45.3	14.0	63.3	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		2.2	2.2	2.2	3.0	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)	6.7			5.9	5.9	5.9	6.7	6.7	6.7	4.0	6.7	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0			
Flash Dont Walk (s)				24.0	24.0	24.0	28.0	28.0	28.0			
Pedestrian Calls (#/hr)				1	1	1	0	0	0			
Act Effect Green (s)				16.7	16.7	16.7		81.3	81.3	116.6	115.2	
Actuated g/C Ratio				0.12	0.12	0.12		0.58	0.58	0.83	0.82	
v/c Ratio				0.04	0.04	0.16		0.57	0.26	0.58	0.94	
Control Delay				48.9	49.1	1.2		11.3	2.5	34.2	10.4	
Queue Delay				0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay				48.9	49.1	1.2		11.3	2.5	34.2	10.4	
LOS				D	D	A		B	A	C	B	
Approach Delay				14.3			10.0			12.2		
Approach LOS				B			B			B		
Queue Length 50th (m)				2.3	2.5	0.0		79.1	0.9	49.5	114.0	
Queue Length 95th (m)				7.1	7.5	0.0		92.3	m15.0	m46.4	m#411.6	
Internal Link Dist (m)	28.6			60.3			275.0			411.9		
Turn Bay Length (m)				45.0						70.0	115.0	
Base Capacity (vph)				421	421	473		2522	959	471	3609	
Starvation Cap Reductn				0	0	0		0	0	0	0	
Spillback Cap Reductn				0	0	0		0	0	0	0	
Storage Cap Reductn				0	0	0		0	0	0	0	
Reduced v/c Ratio				0.02	0.02	0.10		0.57	0.26	0.58	0.94	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 27 (19%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 11.5

Intersection LOS: B

Intersection Capacity Utilization 101.6%

ICU Level of Service G

Analysis Period (min) 15

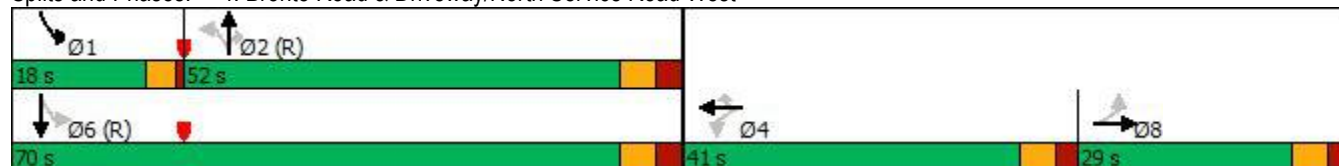
* User Entered Value

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

Queue shown is maximum after two cycles.

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

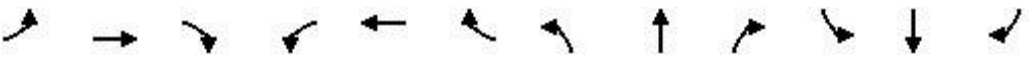
Splits and Phases: 4: Bronte Road & Driveway/North Service Road West



HCM Signalized Intersection Capacity Analysis 2031 Future Background AM Peak Hour Optimized

4: Bronte Road & Driveway/North Service Road West

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↑↑↑	↔	↔	↑↑↑	
Traffic Volume (vph)	0	0	0	17	0	44	0	1413	241	268	3316	1
Future Volume (vph)	0	0	0	17	0	44	0	1413	241	268	3316	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Lane Util. Factor				0.95	0.95	1.00		*0.80	1.00	1.00	*0.80	
Frpb, ped/bikes				1.00	1.00	0.98		1.00	0.98	1.00	1.00	
Flpb, ped/bikes				1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt				1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected				0.95	0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1681	1681	1546		4343	1547	1770	4384	
Flt Permitted				0.95	0.95	1.00		1.00	1.00	0.09	1.00	
Satd. Flow (perm)				1681	1681	1546		4343	1547	176	4384	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	17	0	45	0	1442	246	273	3384	1
RTOR Reduction (vph)	0	0	0	0	0	40	0	0	65	0	0	0
Lane Group Flow (vph)	0	0	0	8	9	5	0	1442	181	273	3385	0
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	4%	2%
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		8			4			2		1	6	
Permitted Phases	8			4		4	2		2	6		
Actuated Green, G (s)				14.7	14.7	14.7		80.1	80.1	112.7	112.7	
Effective Green, g (s)				14.7	14.7	14.7		80.1	80.1	112.7	112.7	
Actuated g/C Ratio				0.10	0.10	0.10		0.57	0.57	0.81	0.81	
Clearance Time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Vehicle Extension (s)				5.0	5.0	5.0		5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)				176	176	162		2484	885	467	3529	
v/s Ratio Prot								0.33		0.12	c0.77	
v/s Ratio Perm				0.00	0.01	0.00			0.12	0.35		
v/c Ratio				0.05	0.05	0.03		0.58	0.20	0.58	0.96	
Uniform Delay, d1				56.3	56.4	56.2		19.2	14.5	24.9	11.7	
Progression Factor				1.00	1.00	1.00		0.52	0.29	1.59	0.63	
Incremental Delay, d2				0.2	0.3	0.2		0.8	0.4	0.2	1.0	
Delay (s)				56.6	56.6	56.4		10.8	4.6	39.9	8.3	
Level of Service				E	E	E		B	A	D	A	
Approach Delay (s)		0.0			56.5			9.9			10.7	
Approach LOS		A			E			A			B	
Intersection Summary												
HCM 2000 Control Delay			11.0									
HCM 2000 Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			140.0							23.3		
Intersection Capacity Utilization			101.6%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2031 Future Background AM Peak Hour Optimized

1300 Bronte Enns

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	193	289	1365	0	0	2077
Future Volume (vph)	193	289	1365	0	0	2077
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	90.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	1.00	*0.80	1.00	1.00	*0.80
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3335	1568	4385	0	0	4427
Flt Permitted	0.950					
Satd. Flow (perm)	3335	1568	4385	0	0	4427
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		29				
Link Speed (k/h)	60		60			60
Link Distance (m)	65.9		376.8			299.0
Travel Time (s)	4.0		22.6			17.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	3%	4%	2%	2%	3%
Adj. Flow (vph)	210	314	1484	0	0	2258
Shared Lane Traffic (%)						
Lane Group Flow (vph)	210	314	1484	0	0	2258
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2031 Future Background AM Peak Hour Optimized

1300 Bronte Enns



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8				
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.7	24.7	36.5			26.5
Total Split (s)	24.7	24.7	45.3			45.3
Total Split (%)	35.3%	35.3%	64.7%			64.7%
Maximum Green (s)	18.0	18.0	38.8			38.8
Yellow Time (s)	3.7	3.7	3.7			3.7
All-Red Time (s)	3.0	3.0	2.8			2.8
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	6.7	6.7	6.5			6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	C-Max			C-Max
Act Effect Green (s)	16.2	16.2	40.6			40.6
Actuated g/C Ratio	0.23	0.23	0.58			0.58
v/c Ratio	0.27	0.82	0.58			0.88
Control Delay	22.4	41.2	17.6			22.6
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	22.4	41.2	17.6			22.6
LOS	C	D	B			C
Approach Delay	33.7		17.6			22.6
Approach LOS	C		B			C
Queue Length 50th (m)	11.8	36.0	103.8			155.7
Queue Length 95th (m)	20.1	#73.0	m116.8			211.4
Internal Link Dist (m)	41.9		352.8			275.0
Turn Bay Length (m)		90.0				
Base Capacity (vph)	857	424	2543			2567
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.25	0.74	0.58			0.88

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 14 (20%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 22.2

Intersection LOS: C

Intersection Capacity Utilization 59.5%

ICU Level of Service B

Analysis Period (min) 15

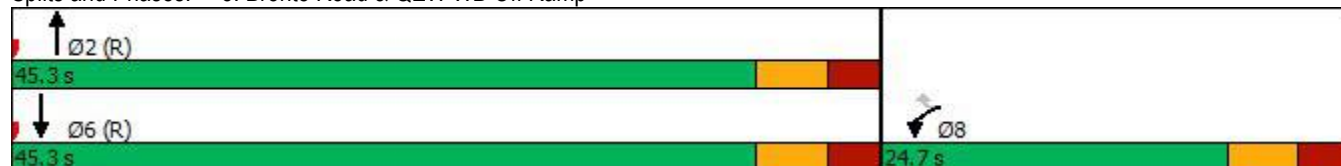
* User Entered Value

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 5: Bronte Road & QEW WB Off Ramp



HCM Signalized Intersection Capacity Analysis 2031 Future Background AM Peak Hour Optimized

5: Bronte Road & QEW WB Off Ramp

1300 Bronte Enns

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 		  			  
Traffic Volume (vph)	193	289	1365	0	0	2077
Future Volume (vph)	193	289	1365	0	0	2077
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7	6.5			6.5
Lane Util. Factor	0.97	1.00	*0.80			*0.80
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3335	1568	4385			4427
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3335	1568	4385			4427
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	210	314	1484	0	0	2258
RTOR Reduction (vph)	0	22	0	0	0	0
Lane Group Flow (vph)	210	292	1484	0	0	2258
Heavy Vehicles (%)	5%	3%	4%	2%	2%	3%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	16.2	16.2	40.6			40.6
Effective Green, g (s)	16.2	16.2	40.6			40.6
Actuated g/C Ratio	0.23	0.23	0.58			0.58
Clearance Time (s)	6.7	6.7	6.5			6.5
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	771	362	2543			2567
v/s Ratio Prot	0.06		0.34			c0.51
v/s Ratio Perm		c0.19				
v/c Ratio	0.27	0.81	0.58			0.88
Uniform Delay, d1	22.1	25.4	9.3			12.6
Progression Factor	1.00	1.00	1.75			1.57
Incremental Delay, d2	0.2	12.3	0.5			1.8
Delay (s)	22.3	37.7	16.9			21.5
Level of Service	C	D	B			C
Approach Delay (s)	31.5		16.9			21.5
Approach LOS	C		B			C
Intersection Summary						
HCM 2000 Control Delay			21.1		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.86			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	13.2
Intersection Capacity Utilization			59.5%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1	2	359	2	601	3	910	232	651	1550	9
Future Volume (vph)	7	1	2	359	2	601	3	910	232	651	1550	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	10.0		0.0	130.0		125.0	120.0		95.0	255.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			65.0			95.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.91	0.95	1.00	*0.80	1.00	1.00	*0.80	0.91
Ped Bike Factor									0.97		1.00	
Frt		0.900			0.868	0.850			0.850		0.999	
Flt Protected	0.950			0.950	0.994		0.950			0.950		
Satd. Flow (prot)	1770	1676	0	1665	1424	1461	1770	4262	1583	1770	4380	0
Flt Permitted	0.950			0.950	0.994		0.144			0.126		
Satd. Flow (perm)	1770	1676	0	1665	1424	1461	268	4262	1539	235	4380	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					279	346			252		1	
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		53.2			37.5			215.0			376.8	
Travel Time (s)		4.8			3.4			12.9			22.6	
Confl. Bikes (#/hr)									5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	3%	2%	5%	2%	7%	2%	2%	4%	2%
Adj. Flow (vph)	8	1	2	390	2	653	3	989	252	708	1685	10
Shared Lane Traffic (%)				10%		47%						
Lane Group Flow (vph)	8	3	0	351	348	346	3	989	252	708	1695	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	36.7	36.7		36.7	36.7	36.7	36.5	36.5	36.5	11.5	36.5	
Total Split (s)	36.7	36.7		50.0	50.0	50.0	38.3	38.3	38.3	15.0	53.3	
Total Split (%)	26.2%	26.2%		35.7%	35.7%	35.7%	27.4%	27.4%	27.4%	10.7%	38.1%	
Maximum Green (s)	30.0	30.0		43.3	43.3	43.3	31.8	31.8	31.8	11.0	46.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.8	2.8	2.8	1.0	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)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				23.0	23.0	23.0	23.0	23.0	23.0		23.0	
Pedestrian Calls (#/hr)				0	0	0	0	0	0		0	
Act Effect Green (s)	7.1	7.1		35.8	35.8	35.8	31.8	31.8	31.8	88.0	85.5	
Actuated g/C Ratio	0.05	0.05		0.26	0.26	0.26	0.23	0.23	0.23	0.63	0.61	
v/c Ratio	0.09	0.04		0.83	0.61	0.55	0.05	1.02	0.46	1.02	0.63	
Control Delay	65.6	64.0		65.1	13.9	7.1	45.0	87.2	8.0	65.5	21.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	65.6	64.0		65.1	13.9	7.1	45.0	87.2	8.0	65.5	21.3	
LOS	E	E		E	B	A	D	F	A	E	C	
Approach Delay		65.1			28.9			71.1			34.3	
Approach LOS		E			C			E			C	
Queue Length 50th (m)	2.3	0.9		101.4	17.2	0.0	0.7	~127.2	0.0	199.6	89.2	
Queue Length 95th (m)	8.3	4.3		133.2	50.8	25.1	3.6	#161.7	23.3 m#327.9	150.1		
Internal Link Dist (m)		29.2			13.5			191.0			352.8	
Turn Bay Length (m)	10.0			130.0		125.0	120.0		95.0	255.0		
Base Capacity (vph)	379	359		514	633	690	60	968	544	692	2674	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.02	0.01		0.68	0.55	0.50	0.05	1.02	0.46	1.02	0.63	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 88 (63%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.02

Intersection Signal Delay: 42.9

Intersection LOS: D

Intersection Capacity Utilization 90.8%

ICU Level of Service E

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 6: Bronte Road & Parking Lot Access/QEW EB Ramps



HCM Signalized Intersection Capacity Analysis 2031 Future Background AM Peak Hour Optimized 6: Bronte Road & Parking Lot Access/QEW EB Ramps

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1	2	359	2	601	3	910	232	651	1550	9
Future Volume (vph)	7	1	2	359	2	601	3	910	232	651	1550	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lane Util. Factor	1.00	1.00		0.95	0.91	0.95	1.00	*0.80	1.00	1.00	*0.80	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97	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	
Frt	1.00	0.90		1.00	0.87	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1676		1665	1424	1461	1770	4262	1537	1770	4381	
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.14	1.00	1.00	0.13	1.00	
Satd. Flow (perm)	1770	1676		1665	1424	1461	269	4262	1537	235	4381	
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)	8	1	2	390	2	653	3	989	252	708	1685	10
RTOR Reduction (vph)	0	0	0	0	208	258	0	0	202	0	0	0
Lane Group Flow (vph)	8	3	0	351	140	88	3	989	50	708	1695	0
Confl. Bikes (#/hr)									5			5
Heavy Vehicles (%)	2%	2%	2%	3%	2%	5%	2%	7%	2%	2%	4%	2%
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Actuated Green, G (s)	2.9	2.9		35.8	35.8	35.8	27.7	27.7	27.7	81.4	81.4	
Effective Green, g (s)	2.9	2.9		35.8	35.8	35.8	27.7	27.7	27.7	81.4	81.4	
Actuated g/C Ratio	0.02	0.02		0.26	0.26	0.26	0.20	0.20	0.20	0.58	0.58	
Clearance Time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	36	34		425	364	373	53	843	304	681	2547	
v/s Ratio Prot	c0.00	0.00		c0.21	0.10			c0.23		c0.37	0.39	
v/s Ratio Perm						0.06	0.01		0.03	0.24		
v/c Ratio	0.22	0.09		0.83	0.39	0.24	0.06	1.17	0.16	1.04	0.67	
Uniform Delay, d1	67.4	67.3		49.2	43.0	41.3	45.6	56.1	46.6	38.5	20.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.04	
Incremental Delay, d2	3.1	1.1		12.4	0.7	0.3	2.0	90.4	1.2	36.2	0.7	
Delay (s)	70.6	68.4		61.5	43.7	41.6	47.6	146.6	47.7	72.9	21.6	
Level of Service	E	E		E	D	D	D	F	D	E	C	
Approach Delay (s)		70.0			49.0			126.3			36.7	
Approach LOS		E			D			F			D	
Intersection Summary												
HCM 2000 Control Delay			63.2			HCM 2000 Level of Service				E		
HCM 2000 Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			23.9			
Intersection Capacity Utilization			90.8%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2031 Future Background PM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	74	114	242	155	252	325	2172	408	265	1353	20
Future Volume (vph)	7	74	114	242	155	252	325	2172	408	265	1353	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	140.0		0.0	135.0		80.0	180.0		50.0
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (m)	65.0			100.0			70.0			70.0		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Ped Bike Factor	0.99		0.98			0.97			0.97			0.97
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	3400	1863	1583	1770	4471	1558	1770	4385	1473
Flt Permitted	0.653			0.578			0.081			0.059		
Satd. Flow (perm)	1209	1863	1556	2068	1863	1543	151	4471	1517	110	4385	1433
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			121			268			245			122
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		296.6			291.2			731.4			120.4	
Travel Time (s)		17.8			17.5			43.9			7.2	
Confl. Peds. (#/hr)	6					6	1		1	1		1
Confl. Bikes (#/hr)			5			5			5			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 (%)	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Adj. Flow (vph)	7	79	121	257	165	268	346	2311	434	282	1439	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	79	121	257	165	268	346	2311	434	282	1439	21
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.00	1.00	1.03
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

12-05-2021

NA

CGH Transportation

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Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2031 Future Background PM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0	10.0	6.0	20.0	20.0	6.0	20.0	20.0
Minimum Split (s)	10.5	36.7	36.7	10.5	36.7	36.7	10.5	36.5	36.5	10.5	36.5	36.5
Total Split (s)	10.5	36.7	36.7	10.5	36.7	36.7	32.4	73.8	73.8	19.0	60.4	60.4
Total Split (%)	7.5%	26.2%	26.2%	7.5%	26.2%	26.2%	23.1%	52.7%	52.7%	13.6%	43.1%	43.1%
Maximum Green (s)	6.5	30.0	30.0	6.5	30.0	30.0	28.4	67.3	67.3	15.0	53.9	53.9
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	2.8	2.8	1.0	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	0.0	0.0
Total Lost Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
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	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)					7.0	7.0			7.0	7.0	7.0	7.0
Flash Dont Walk (s)					23.0	23.0			23.0	23.0	23.0	23.0
Pedestrian Calls (#/hr)					6	6			1	1	1	1
Act Effct Green (s)	23.8	14.9	14.9	27.3	23.3	23.3	96.9	70.2	70.2	98.4	71.3	71.3
Actuated g/C Ratio	0.17	0.11	0.11	0.20	0.17	0.17	0.69	0.50	0.50	0.70	0.51	0.51
v/c Ratio	0.03	0.40	0.44	0.55	0.53	0.56	0.85	1.03	0.49	0.70	0.64	0.03
Control Delay	40.3	62.2	13.4	52.9	59.4	10.0	56.9	46.4	8.0	47.1	28.6	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	40.3	62.2	13.4	52.9	59.4	10.0	56.9	46.4	8.0	47.1	28.6	0.1
LOS	D	E	B	D	E	B	E	D	A	D	C	A
Approach Delay	32.9				37.8			42.2			31.3	
Approach LOS	C				D			D			C	
Queue Length 50th (m)	1.7	22.5	0.0	34.8	45.1	0.0	82.5	232.7	25.4	56.7	120.3	0.0
Queue Length 95th (m)	5.3	34.5	17.2	40.8	65.2	24.7	m83.9	m#328.7	m28.3	#146.5	183.2	0.0
Internal Link Dist (m)	272.6				267.2			707.4			96.4	
Turn Bay Length (m)	70.0			70.0	140.0			135.0			80.0	180.0
Base Capacity (vph)	233	399	428	464	399	541	443	2241	882	400	2233	789
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.20	0.28	0.55	0.41	0.50	0.78	1.03	0.49	0.70	0.64	0.03

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 35 (25%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 1: Bronte Road & Upper Middle Road

2031 Future Background PM Peak Hour
1300 Bronte Enns

Maximum v/c Ratio: 1.03

Intersection Signal Delay: 38.0

Intersection LOS: D

Intersection Capacity Utilization 86.6%

ICU Level of Service E

Analysis Period (min) 15

* User Entered Value

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 1: Bronte Road & Upper Middle Road

 Ø1	 Ø2 (R) 	 Ø3	 Ø4
19 s	73.8 s	10.5 s	36.7 s
 Ø5	 Ø6 (R) 	 Ø7	 Ø8
32.4 s	60.4 s	10.5 s	36.7 s

HCM Signalized Intersection Capacity Analysis

1: Bronte Road & Upper Middle Road

2031 Future Background PM Peak Hour

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	74	114	242	155	252	325	2172	408	265	1353	20
Future Volume (vph)	7	74	114	242	155	252	325	2172	408	265	1353	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.97
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	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1762	1863	1551	3400	1863	1541	1770	4471	1517	1770	4385	1435
Flt Permitted	0.65	1.00	1.00	0.58	1.00	1.00	0.08	1.00	1.00	0.06	1.00	1.00
Satd. Flow (perm)	1211	1863	1551	2068	1863	1541	151	4471	1517	109	4385	1435
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)	7	79	121	257	165	268	346	2311	434	282	1439	21
RTOR Reduction (vph)	0	0	105	0	0	223	0	0	128	0	0	11
Lane Group Flow (vph)	7	79	16	257	165	45	346	2311	306	282	1439	10
Confl. Peds. (#/hr)	6					6	1		1	1		1
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	19.4	18.1	18.1	28.6	23.3	23.3	93.1	67.0	67.0	95.3	68.1	68.1
Effective Green, g (s)	19.4	18.1	18.1	28.6	23.3	23.3	93.1	67.0	67.0	95.3	68.1	68.1
Actuated g/C Ratio	0.14	0.13	0.13	0.20	0.17	0.17	0.66	0.48	0.48	0.68	0.49	0.49
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	172	240	200	484	310	256	402	2139	725	396	2132	698
v/s Ratio Prot	0.00	0.04		c0.02	c0.09		c0.16	c0.52		0.14	0.33	
v/s Ratio Perm	0.01		0.01	0.08		0.03	0.41		0.20	0.34		0.01
v/c Ratio	0.04	0.33	0.08	0.53	0.53	0.17	0.86	1.08	0.42	0.71	0.67	0.01
Uniform Delay, d1	52.2	55.4	53.6	49.1	53.4	50.1	38.8	36.5	23.9	41.7	27.5	18.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.38	0.74	0.78	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.8	0.2	1.1	1.8	0.3	6.3	39.5	0.6	6.0	1.7	0.0
Delay (s)	52.2	56.2	53.8	50.3	55.1	50.4	59.7	66.5	19.2	47.6	29.2	18.6
Level of Service	D	E	D	D	E	D	E	E	B	D	C	B
Approach Delay (s)		54.7			51.5			59.1			32.1	
Approach LOS		D			D			E			C	
Intersection Summary												
HCM 2000 Control Delay			49.8									
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			140.0									
Intersection Capacity Utilization			86.6%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
2: Bronte Road & Saw Whet Boulevard

2031 Future Background PM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	7	104	0	59	11	2921	174	99	1670	4
Future Volume (vph)	3	0	7	104	0	59	11	2921	174	99	1670	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	15.0		15.0	15.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Frt		0.850			0.850				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1770	1583	0	1770	4471	1583	1770	4471	1583
Flt Permitted	0.715			0.752			0.076			0.037		
Satd. Flow (perm)	1332	1583	0	1401	1583	0	142	4471	1583	69	4471	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		62			62				62			19
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		42.5			50.2			458.5			731.4	
Travel Time (s)		3.1			3.6			27.5			43.9	
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)	3	0	8	113	0	64	12	3175	189	108	1815	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	8	0	113	64	0	12	3175	189	108	1815	4
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	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
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		6

Lanes, Volumes, Timings
2: Bronte Road & Saw Whet Boulevard

2031 Future Background PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	35.5	35.5		35.5	35.5		35.5	35.5	35.5	9.5	35.5	35.5
Total Split (s)	35.5	35.5		35.5	35.5		95.0	95.0	95.0	9.5	104.5	104.5
Total Split (%)	25.4%	25.4%		25.4%	25.4%		67.9%	67.9%	67.9%	6.8%	74.6%	74.6%
Maximum Green (s)	30.0	30.0		30.0	30.0		89.5	89.5	89.5	5.0	99.0	99.0
Yellow Time (s)	3.3	3.3		3.3	3.3		3.7	3.7	3.7	3.5	3.7	3.7
All-Red Time (s)	2.2	2.2		2.2	2.2		1.8	1.8	1.8	1.0	1.8	1.8
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)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	4.5	5.5	5.5
Lead/Lag							Lead	Lead	Lead	Lag		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	23.0	23.0		23.0	23.0		23.0	23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0		0	0
Act Effect Green (s)	16.6	16.6		16.6	16.6		102.9	102.9	102.9	113.4	112.4	112.4
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.74	0.74	0.74	0.81	0.80	0.80
v/c Ratio	0.02	0.03		0.68	0.26		0.12	0.97	0.16	0.93	0.51	0.00
Control Delay	51.0	0.3		78.3	15.3		3.4	9.7	0.7	101.2	11.3	2.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.0	0.3		78.3	15.3		3.4	9.7	0.7	101.2	11.3	2.5
LOS	D	A		E	B		A	A	A	F	B	A
Approach Delay		14.1			55.5			9.2			16.3	
Approach LOS		B			E			A			B	
Queue Length 50th (m)	0.8	0.0		32.1	0.5		0.3	29.6	0.0	12.3	72.3	0.0
Queue Length 95th (m)	3.7	0.0		51.4	14.3		m0.4 m#400.5		m0.6 m#55.5	213.3	m0.0	
Internal Link Dist (m)		18.5			26.2			434.5			707.4	
Turn Bay Length (m)	15.0			15.0			15.0		15.0	15.0		15.0
Base Capacity (vph)	285	387		300	387		104	3284	1179	116	3588	1274
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.02		0.38	0.17		0.12	0.97	0.16	0.93	0.51	0.00

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 127 (91%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 13.2

Intersection LOS: B

Intersection Capacity Utilization 87.3%

ICU Level of Service E

Analysis Period (min) 15

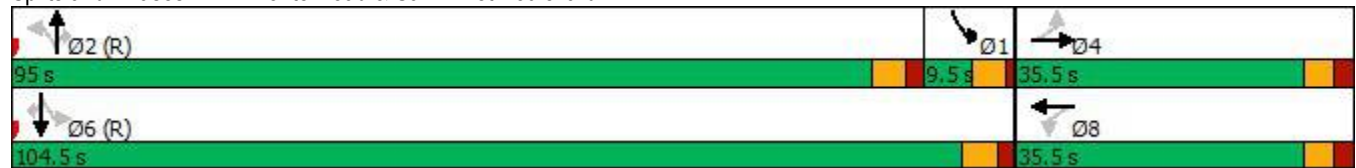
* User Entered Value

Lanes, Volumes, Timings 2: Bronte Road & Saw Whet Boulevard

2031 Future Background PM Peak Hour
1300 Bronte Enns

- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bronte Road & Saw Whet Boulevard



HCM Signalized Intersection Capacity Analysis

2: Bronte Road & Saw Whet Boulevard

2031 Future Background PM Peak Hour

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			  	
Traffic Volume (vph)	3	0	7	104	0	59	11	2921	174	99	1670	4
Future Volume (vph)	3	0	7	104	0	59	11	2921	174	99	1670	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	4.5	5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	*0.80	1.00	1.00	*0.80	1.00
Frt	1.00	0.85		1.00	0.85		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)	1770	1583		1770	1583		1770	4471	1583	1770	4471	1583
Flt Permitted	0.72	1.00		0.75	1.00		0.08	1.00	1.00	0.04	1.00	1.00
Satd. Flow (perm)	1332	1583		1402	1583		141	4471	1583	69	4471	1583
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)	3	0	8	113	0	64	12	3175	189	108	1815	4
RTOR Reduction (vph)	0	7	0	0	55	0	0	0	16	0	0	1
Lane Group Flow (vph)	3	1	0	113	9	0	12	3175	173	108	1815	3
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	16.6	16.6		16.6	16.6		102.9	102.9	102.9	113.4	112.4	112.4
Effective Green, g (s)	16.6	16.6		16.6	16.6		102.9	102.9	102.9	113.4	112.4	112.4
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.74	0.74	0.74	0.81	0.80	0.80
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	4.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	157	187		166	187		103	3286	1163	116	3589	1270
v/s Ratio Prot		0.00			0.01			c0.71		c0.03	0.41	
v/s Ratio Perm	0.00			c0.08			0.08		0.11	0.72		0.00
v/c Ratio	0.02	0.01		0.68	0.05		0.12	0.97	0.15	0.93	0.51	0.00
Uniform Delay, d1	54.5	54.4		59.2	54.7		5.4	17.0	5.5	60.8	4.6	2.7
Progression Factor	1.00	1.00		1.00	1.00		0.34	0.20	0.15	1.09	2.16	1.00
Incremental Delay, d2	0.0	0.0		10.9	0.1		0.8	4.2	0.1	55.2	0.4	0.0
Delay (s)	54.6	54.4		70.1	54.8		2.6	7.7	0.9	121.3	10.3	2.7
Level of Service	D	D		E	D		A	A	A	F	B	A
Approach Delay (s)		54.5			64.6			7.3			16.5	
Approach LOS		D			E			A			B	
Intersection Summary												
HCM 2000 Control Delay	12.5			HCM 2000 Level of Service			B					
HCM 2000 Volume to Capacity ratio	0.93											
Actuated Cycle Length (s)	140.0			Sum of lost time (s)			15.5					
Intersection Capacity Utilization	87.3%			ICU Level of Service			E					
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2031 Future Background PM Peak Hour

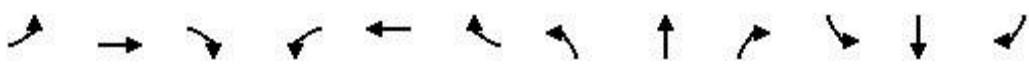
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	138	0	110	1	2997	175	89	1729	0
Future Volume (vph)	0	0	0	138	0	110	1	2997	175	89	1729	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		40.0	35.0		30.0	70.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			20.0			60.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	*0.80	1.00	1.00	*0.80	0.91
Ped Bike Factor						0.98			0.98			
Frt						0.850			0.850			
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	0	1863	0	1770	0	1583	1770	4427	1388	1770	4385	0
Flt Permitted				0.757			0.088			0.040		
Satd. Flow (perm)	0	1863	0	1410	0	1556	164	4427	1357	75	4385	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						64			56			
Link Speed (k/h)		20			20			60			60	
Link Distance (m)		78.7			109.0			435.9			458.5	
Travel Time (s)		14.2			19.6			26.2			27.5	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	14%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Adj. Flow (vph)	0	0	0	142	0	113	1	3090	180	92	1782	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	142	0	113	1	3090	180	92	1782	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.03	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1		1	1	2	1	1	2	
Detector Template	Left	Thru		Left		Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0		2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0		2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4						9.4			9.4	
Detector 2 Size(m)		0.6						0.6			0.6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2031 Future Background PM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type				Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8		8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0		10.0	15.0	15.0	15.0	5.0	15.0	
Minimum Split (s)	24.2	24.2		35.2		35.2	34.9	34.9	34.9	9.5	34.9	
Total Split (s)	35.2	35.2		35.2		35.2	95.3	95.3	95.3	9.5	104.8	
Total Split (%)	25.1%	25.1%		25.1%		25.1%	68.1%	68.1%	68.1%	6.8%	74.9%	
Maximum Green (s)	29.0	29.0		29.0		29.0	89.4	89.4	89.4	5.5	98.9	
Yellow Time (s)	3.1	3.1		3.1		3.1	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.1	3.1		3.1		3.1	2.2	2.2	2.2	1.0	2.2	
Lost Time Adjust (s)		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.2		6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.6	3.6	3.6	3.0	3.6	
Recall Mode	None	None		None		None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0		7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				22.0		22.0	22.0	22.0	22.0		22.0	
Pedestrian Calls (#/hr)				0		0	0	0	0		0	
Act Effect Green (s)				19.3		19.3	96.4	96.4	96.4	110.5	108.6	
Actuated g/C Ratio				0.14		0.14	0.69	0.69	0.69	0.79	0.78	
v/c Ratio				0.73		0.42	0.01	1.01	0.19	0.58	0.52	
Control Delay				78.3		28.9	1.0	25.3	0.7	44.8	2.4	
Queue Delay				0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay				78.3		28.9	1.0	25.3	0.7	44.8	2.4	
LOS				E		C	A	C	A	D	A	
Approach Delay					56.4			24.0			4.5	
Approach LOS					E			C			A	
Queue Length 50th (m)				40.2		12.9	0.0	~407.6	2.0	9.8	5.1	
Queue Length 95th (m)				61.1		30.9	m0.0	m340.3	m3.1	#34.6	47.4	
Internal Link Dist (m)		54.7			85.0			411.9			434.5	
Turn Bay Length (m)						40.0	35.0		30.0	70.0		
Base Capacity (vph)				292		373	112	3048	951	158	3400	
Starvation Cap Reductn				0		0	0	0	0	0	0	
Spillback Cap Reductn				0		0	0	0	0	0	0	
Storage Cap Reductn				0		0	0	0	0	0	0	
Reduced v/c Ratio				0.49		0.30	0.01	1.01	0.19	0.58	0.52	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 103.6 (74%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.01

Intersection Signal Delay: 18.8

Intersection LOS: B

Intersection Capacity Utilization 82.1%

ICU Level of Service E

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

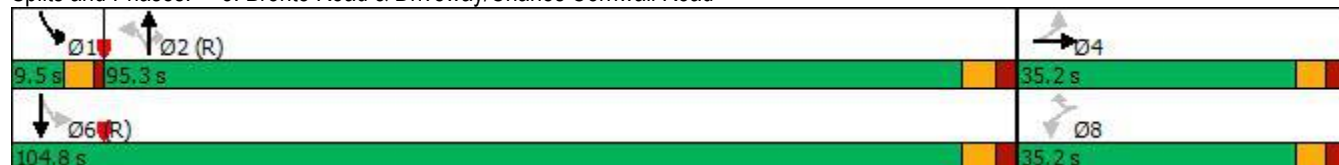
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Bronte Road & Driveway/Charles Cornwall Road



HCM Signalized Intersection Capacity Analysis

3: Bronte Road & Driveway/Charles Cornwall Road

2031 Future Background PM Peak Hour

1300 Bronte Enns

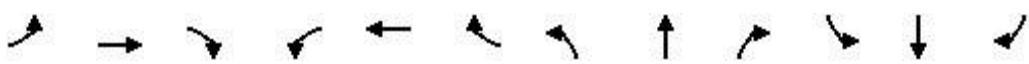
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	138	0	110	1	2997	175	89	1729	0
Future Volume (vph)	0	0	0	138	0	110	1	2997	175	89	1729	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Lane Util. Factor				1.00		1.00	1.00	*0.80	1.00	1.00	*0.80	
Frpb, ped/bikes				1.00		0.98	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes				1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Frt				1.00		0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected				0.95		1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1770		1552	1770	4427	1357	1770	4385	
Flt Permitted				0.76		1.00	0.09	1.00	1.00	0.04	1.00	
Satd. Flow (perm)				1410		1552	164	4427	1357	74	4385	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	142	0	113	1	3090	180	92	1782	0
RTOR Reduction (vph)	0	0	0	0	0	55	0	0	17	0	0	0
Lane Group Flow (vph)	0	0	0	142	0	58	1	3090	163	92	1782	0
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	14%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Turn Type				Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1		6
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)				19.3		19.3	96.4	96.4	96.4	108.6	108.6	
Effective Green, g (s)				19.3		19.3	96.4	96.4	96.4	108.6	108.6	
Actuated g/C Ratio				0.14		0.14	0.69	0.69	0.69	0.78	0.78	
Clearance Time (s)				6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Vehicle Extension (s)				3.0		3.0	3.6	3.6	3.6	3.0	3.6	
Lane Grp Cap (vph)				194		213	112	3048	934	156	3401	
v/s Ratio Prot								c0.70		0.03	c0.41	
v/s Ratio Perm				c0.10		0.04	0.01		0.12	0.42		
v/c Ratio				0.73		0.27	0.01	1.01	0.17	0.59	0.52	
Uniform Delay, d1				57.9		54.1	6.8	21.8	7.7	43.2	5.9	
Progression Factor				1.00		1.00	0.10	0.67	0.11	1.44	0.30	
Incremental Delay, d2				13.3		0.7	0.0	8.9	0.0	5.0	0.5	
Delay (s)				71.2		54.7	0.7	23.6	0.9	67.4	2.3	
Level of Service				E		D	A	C	A	E	A	
Approach Delay (s)		0.0			63.9			22.3			5.5	
Approach LOS		A			E			C			A	
Intersection Summary												
HCM 2000 Control Delay			18.4									
HCM 2000 Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			140.0									
Intersection Capacity Utilization			82.1%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

2031 Future Background PM Peak Hour

4: Bronte Road & Driveway/North Service Road West

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↔↔↔	↔	↔	↔↔↔	
Traffic Volume (vph)	0	0	0	129	0	154	0	2924	74	88	1776	2
Future Volume (vph)	0	0	0	129	0	154	0	2924	74	88	1776	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	45.0		0.0	35.0		70.0	115.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			50.0			65.0			65.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	*0.80	1.00	1.00	*0.80	0.91
Ped Bike Factor						0.98			0.97		1.00	
Frt						0.850			0.850			
Flt Protected				0.950	0.950					0.950		
Satd. Flow (prot)	0	1863	0	1681	1681	1583	1863	4427	1583	1770	4385	0
Flt Permitted				0.950	0.950					0.047		
Satd. Flow (perm)	0	1863	0	1681	1681	1553	1863	4427	1538	88	4385	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						159			106			
Link Speed (k/h)		20			50			60			60	
Link Distance (m)		52.6			84.3			299.0			435.9	
Travel Time (s)		9.5			6.1			17.9			26.2	
Confl. Peds. (#/hr)	2					2			2	2		
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	4%	2%
Adj. Flow (vph)	0	0	0	133	0	159	0	3014	76	91	1831	2
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	66	67	159	0	3014	76	91	1833	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

12-05-2021

NA

CGH Transportation

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Lanes, Volumes, Timings

2031 Future Background PM Peak Hour

4: Bronte Road & Driveway/North Service Road West

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8			4			2			1	6	
Permitted Phases	8			4		4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	15.0	15.0	15.0	6.0	15.0	
Minimum Split (s)	24.7	24.7		36.9	36.9	36.9	41.7	41.7	41.7	10.5	24.7	
Total Split (s)	24.7	24.7		40.0	40.0	40.0	64.8	64.8	64.8	10.5	75.3	
Total Split (%)	17.6%	17.6%		28.6%	28.6%	28.6%	46.3%	46.3%	46.3%	7.5%	53.8%	
Maximum Green (s)	18.0	18.0		34.1	34.1	34.1	58.1	58.1	58.1	6.5	68.6	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		2.2	2.2	2.2	3.0	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)	6.7			5.9	5.9	5.9	6.7	6.7	6.7	4.0	6.7	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0			
Flash Dont Walk (s)				24.0	24.0	24.0	28.0	28.0	28.0			
Pedestrian Calls (#/hr)				2	2	2	2	2	2			
Act Effect Green (s)				34.1	34.1	34.1		80.4	80.4	96.0	93.3	
Actuated g/C Ratio				0.24	0.24	0.24		0.57	0.57	0.69	0.67	
v/c Ratio				0.16	0.16	0.32		1.19	0.08	0.54	0.63	
Control Delay				43.0	43.1	7.8		105.3	0.6	30.4	13.0	
Queue Delay				0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay				43.0	43.1	7.8		105.3	0.6	30.4	13.0	
LOS				D	D	A		F	A	C	B	
Approach Delay				23.9			102.7			13.8		
Approach LOS				C			F			B		
Queue Length 50th (m)				16.1	16.3	0.0		~432.5	0.3	15.4	118.0	
Queue Length 95th (m)				30.4	30.7	18.5		m#394.3	m0.1	23.8	167.2	
Internal Link Dist (m)	28.6			60.3			275.0			411.9		
Turn Bay Length (m)				45.0			70.0			115.0		
Base Capacity (vph)				409	409	498		2542	928	167	2922	
Starvation Cap Reductn				0	0	0		0	0	0	0	
Spillback Cap Reductn				0	0	0		0	0	0	0	
Storage Cap Reductn				0	0	0		0	0	0	0	
Reduced v/c Ratio				0.16	0.16	0.32		1.19	0.08	0.54	0.63	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 85 (61%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.19

Intersection Signal Delay: 66.1

Intersection LOS: E

Intersection Capacity Utilization 84.8%

ICU Level of Service E

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

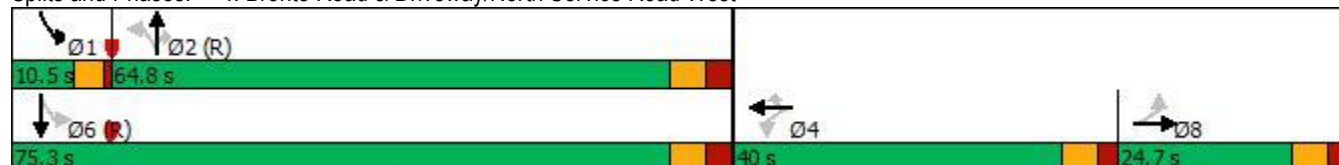
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 4: Bronte Road & Driveway/North Service Road West

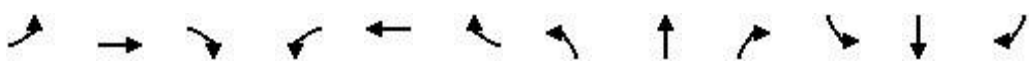


HCM Signalized Intersection Capacity Analysis

4: Bronte Road & Driveway/North Service Road West

2031 Future Background PM Peak Hour

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↑↑↑	↔	↔	↑↑↑	
Traffic Volume (vph)	0	0	0	129	0	154	0	2924	74	88	1776	2
Future Volume (vph)	0	0	0	129	0	154	0	2924	74	88	1776	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Lane Util. Factor				0.95	0.95	1.00		*0.80	1.00	1.00	*0.80	
Frpb, ped/bikes				1.00	1.00	0.98		1.00	0.97	1.00	1.00	
Flpb, ped/bikes				1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt				1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected				0.95	0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1681	1681	1553		4427	1540	1770	4384	
Flt Permitted				0.95	0.95	1.00		1.00	1.00	0.05	1.00	
Satd. Flow (perm)				1681	1681	1553		4427	1540	88	4384	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	133	0	159	0	3014	76	91	1831	2
RTOR Reduction (vph)	0	0	0	0	0	120	0	0	32	0	0	0
Lane Group Flow (vph)	0	0	0	66	67	39	0	3014	44	91	1833	0
Confl. Peds. (#/hr)	2					2			2	2		
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	4%	2%
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		8			4			2		1	6	
Permitted Phases	8			4		4	2		2	6		
Actuated Green, G (s)				34.1	34.1	34.1		80.4	80.4	93.3	93.3	
Effective Green, g (s)				34.1	34.1	34.1		80.4	80.4	93.3	93.3	
Actuated g/C Ratio				0.24	0.24	0.24		0.57	0.57	0.67	0.67	
Clearance Time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Vehicle Extension (s)				5.0	5.0	5.0		5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)				409	409	378		2542	884	165	2921	
v/s Ratio Prot								c0.68		0.03	c0.42	
v/s Ratio Perm				0.04	0.04	0.02			0.03	0.33		
v/c Ratio				0.16	0.16	0.10		1.19	0.05	0.55	0.63	
Uniform Delay, d1				41.7	41.7	41.1		29.8	13.1	33.4	13.4	
Progression Factor				1.00	1.00	1.00		0.63	0.57	1.04	0.89	
Incremental Delay, d2				0.4	0.4	0.2		84.0	0.0	3.4	0.9	
Delay (s)				42.1	42.1	41.3		102.7	7.4	38.1	12.8	
Level of Service				D	D	D		F	A	D	B	
Approach Delay (s)		0.0			41.7			100.4			14.0	
Approach LOS		A			D			F			B	
Intersection Summary												
HCM 2000 Control Delay			65.8				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)		23.3			
Intersection Capacity Utilization			84.8%				ICU Level of Service		E			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2031 Future Background PM Peak Hour

1300 Bronte Enns

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	232	617	2266	0	0	1154
Future Volume (vph)	232	617	2266	0	0	1154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	90.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	1.00	*0.80	1.00	1.00	*0.80
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3433	1583	4427	0	0	4427
Flt Permitted	0.950					
Satd. Flow (perm)	3433	1583	4427	0	0	4427
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		1				
Link Speed (k/h)	60		60			60
Link Distance (m)	65.9		376.8			299.0
Travel Time (s)	4.0		22.6			17.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	3%	2%	2%	3%
Adj. Flow (vph)	252	671	2463	0	0	1254
Shared Lane Traffic (%)						
Lane Group Flow (vph)	252	671	2463	0	0	1254
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2031 Future Background PM Peak Hour
1300 Bronte Enns



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8					
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.7	24.7	36.5			26.5
Total Split (s)	61.0	61.0	79.0			79.0
Total Split (%)	43.6%	43.6%	56.4%			56.4%
Maximum Green (s)	54.3	54.3	72.5			72.5
Yellow Time (s)	3.7	3.7	3.7			3.7
All-Red Time (s)	3.0	3.0	2.8			2.8
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	6.7	6.7	6.5			6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	C-Max			C-Max
Act Effect Green (s)	54.3	54.3	72.5			72.5
Actuated g/C Ratio	0.39	0.39	0.52			0.52
v/c Ratio	0.19	1.09	1.07			0.55
Control Delay	28.8	104.6	52.2			19.6
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	28.8	104.6	52.2			19.6
LOS	C	F	D			B
Approach Delay	83.9		52.2			19.6
Approach LOS	F		D			B
Queue Length 50th (m)	24.7	~220.2	~338.5			93.2
Queue Length 95th (m)	35.1	#298.1	m48.0			84.9
Internal Link Dist (m)	41.9		352.8			275.0
Turn Bay Length (m)		90.0				
Base Capacity (vph)	1331	614	2292			2292
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.19	1.09	1.07			0.55

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 67 (48%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.09

Intersection Signal Delay: 49.7

Intersection LOS: D

Intersection Capacity Utilization 93.0%

ICU Level of Service F

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

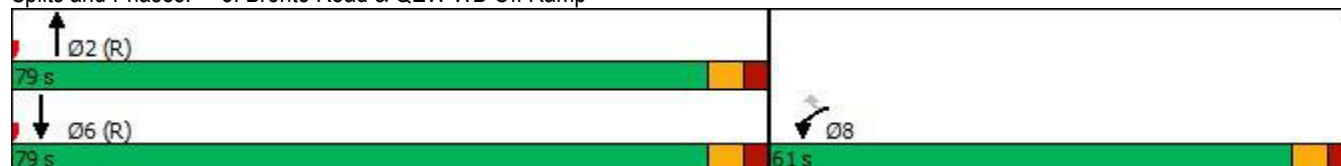
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 5: Bronte Road & QEW WB Off Ramp



HCM Signalized Intersection Capacity Analysis

5: Bronte Road & QEW WB Off Ramp

2031 Future Background PM Peak Hour
1300 Bronte Enns

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 		  			  
Traffic Volume (vph)	232	617	2266	0	0	1154
Future Volume (vph)	232	617	2266	0	0	1154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7	6.5			6.5
Lane Util. Factor	0.97	1.00	*0.80			*0.80
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3433	1583	4427			4427
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3433	1583	4427			4427
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	252	671	2463	0	0	1254
RTOR Reduction (vph)	0	1	0	0	0	0
Lane Group Flow (vph)	252	670	2463	0	0	1254
Heavy Vehicles (%)	2%	2%	3%	2%	2%	3%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	54.3	54.3	72.5			72.5
Effective Green, g (s)	54.3	54.3	72.5			72.5
Actuated g/C Ratio	0.39	0.39	0.52			0.52
Clearance Time (s)	6.7	6.7	6.5			6.5
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	1331	613	2292			2292
v/s Ratio Prot	0.07		c0.56			0.28
v/s Ratio Perm		c0.42				
v/c Ratio	0.19	1.09	1.07			0.55
Uniform Delay, d1	28.3	42.9	33.8			22.7
Progression Factor	1.00	1.00	0.46			0.82
Incremental Delay, d2	0.1	64.5	34.6			0.8
Delay (s)	28.4	107.4	50.1			19.5
Level of Service	C	F	D			B
Approach Delay (s)	85.8		50.1			19.5
Approach LOS	F		D			B
Intersection Summary						
HCM 2000 Control Delay			48.9		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.08			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	13.2
Intersection Capacity Utilization			93.0%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	0	4	214	1	851	1	1783	228	296	1083	3
Future Volume (vph)	6	0	4	214	1	851	1	1783	228	296	1083	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	10.0		0.0	130.0		125.0	120.0		95.0	255.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			65.0			95.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.91	0.95	1.00	*0.80	1.00	1.00	*0.80	0.91
Ped Bike Factor									0.97		1.00	
Frt		0.850			0.858	0.850			0.850			
Flt Protected	0.950			0.950	0.998		0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1681	1425	1475	1770	4471	1583	1770	4470	0
Flt Permitted	0.950			0.950	0.998		0.192			0.084		
Satd. Flow (perm)	1770	1583	0	1681	1425	1475	358	4471	1540	156	4470	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					453	472			135			
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		53.2			37.5			215.0			376.8	
Travel Time (s)		4.8			3.4			12.9			22.6	
Confl. Bikes (#/hr)									5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	7	0	4	233	1	925	1	1938	248	322	1177	3
Shared Lane Traffic (%)				10%		49%						
Lane Group Flow (vph)	7	4	0	210	477	472	1	1938	248	322	1180	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

2031 Future Background PM Peak Hour

6: Bronte Road & Parking Lot Access/QEW EB Ramps

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	36.7	36.7		36.7	36.7	36.7	36.5	36.5	36.5	11.5	36.5	
Total Split (s)	36.7	36.7		50.0	50.0	50.0	41.3	41.3	41.3	12.0	53.3	
Total Split (%)	26.2%	26.2%		35.7%	35.7%	35.7%	29.5%	29.5%	29.5%	8.6%	38.1%	
Maximum Green (s)	30.0	30.0		43.3	43.3	43.3	34.8	34.8	34.8	8.0	46.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.8	2.8	2.8	1.0	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)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				23.0	23.0	23.0	23.0	23.0	23.0		23.0	
Pedestrian Calls (#/hr)				0	0	0	0	0	0		0	
Act Effct Green (s)	7.1	7.1		25.6	25.6	25.6	47.5	47.5	47.5	98.1	95.6	
Actuated g/C Ratio	0.05	0.05		0.18	0.18	0.18	0.34	0.34	0.34	0.70	0.68	
v/c Ratio	0.08	0.05		0.68	0.76	0.72	0.01	1.28	0.41	0.52	0.39	
Control Delay	65.3	64.8		63.8	13.6	10.6	34.0	168.0	17.8	37.7	22.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	65.3	64.8		63.8	13.6	10.6	34.0	168.0	17.8	37.7	22.8	
LOS	E	E		E	B	B	C	F	B	D	C	
Approach Delay		65.1			21.5			150.9			26.0	
Approach LOS		E			C			F			C	
Queue Length 50th (m)	2.0	1.1		60.9	6.4	0.0	0.2	~233.1	19.9	65.0	70.4	
Queue Length 95th (m)	7.4	5.4		83.4	46.3	33.4	1.7	#360.6	52.8	122.1	130.1	
Internal Link Dist (m)		29.2			13.5			191.0			352.8	
Turn Bay Length (m)	10.0			130.0		125.0	120.0		95.0	255.0		
Base Capacity (vph)	379	339		519	753	782	121	1517	611	617	3053	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.02	0.01		0.40	0.63	0.60	0.01	1.28	0.41	0.52	0.39	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 66 (47%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.28

Intersection Signal Delay: 81.2

Intersection LOS: F

12-05-2021

NA

CGH Transportation

Page 22

Intersection Capacity Utilization 92.0%

ICU Level of Service F

Analysis Period (min) 15

* User Entered Value

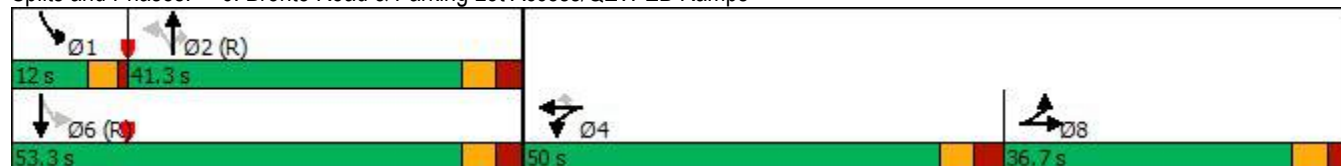
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 6: Bronte Road & Parking Lot Access/QEW EB Ramps



HCM Signalized Intersection Capacity Analysis

6: Bronte Road & Parking Lot Access/QEW EB Ramps

2031 Future Background PM Peak Hour

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	0	4	214	1	851	1	1783	228	296	1083	3
Future Volume (vph)	6	0	4	214	1	851	1	1783	228	296	1083	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lane Util. Factor	1.00	1.00		0.95	0.91	0.95	1.00	*0.80	1.00	1.00	*0.80	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97	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	
Frt	1.00	0.85		1.00	0.86	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1583		1681	1424	1475	1770	4471	1542	1770	4469	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.19	1.00	1.00	0.08	1.00	
Satd. Flow (perm)	1770	1583		1681	1424	1475	357	4471	1542	157	4469	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	0	4	233	1	925	1	1938	248	322	1177	3
RTOR Reduction (vph)	0	0	0	0	370	386	0	0	93	0	0	0
Lane Group Flow (vph)	7	4	0	210	107	86	1	1938	155	322	1180	0
Confl. Bikes (#/hr)									5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Actuated Green, G (s)	2.9	2.9		25.6	25.6	25.6	43.5	43.5	43.5	91.6	91.6	
Effective Green, g (s)	2.9	2.9		25.6	25.6	25.6	43.5	43.5	43.5	91.6	91.6	
Actuated g/C Ratio	0.02	0.02		0.18	0.18	0.18	0.31	0.31	0.31	0.65	0.65	
Clearance Time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	36	32		307	260	269	110	1389	479	610	2924	
v/s Ratio Prot	c0.00	0.00		c0.12	0.08			c0.43		c0.17	0.26	
v/s Ratio Perm						0.06	0.00		0.10	0.18		
v/c Ratio	0.19	0.12		0.68	0.41	0.32	0.01	1.40	0.32	0.53	0.40	
Uniform Delay, d1	67.4	67.3		53.4	50.5	49.7	33.4	48.2	37.0	28.7	11.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.24	1.96	
Incremental Delay, d2	2.6	1.8		6.2	1.1	0.7	0.2	182.3	1.8	0.7	0.4	
Delay (s)	70.0	69.1		59.6	51.6	50.3	33.5	230.6	38.8	36.4	22.7	
Level of Service	E	E		E	D	D	C	F	D	D	C	
Approach Delay (s)		69.7			52.5			208.7			25.6	
Approach LOS		E			D			F			C	
Intersection Summary												
HCM 2000 Control Delay			114.6									HCM 2000 Level of Service F
HCM 2000 Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			140.0									Sum of lost time (s) 23.9
Intersection Capacity Utilization			92.0%									ICU Level of Service F
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2031 FB MM PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	74	114	242	155	252	325	2172	408	265	1353	20
Future Volume (vph)	7	74	114	242	155	252	325	2172	408	265	1353	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	140.0		0.0	135.0		80.0	180.0		50.0
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (m)	65.0			100.0			70.0			70.0		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Ped Bike Factor	0.99		0.98			0.97			0.97			0.97
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	3400	1863	1583	1770	4471	1558	1770	4385	1473
Flt Permitted	0.653			0.578			0.081			0.059		
Satd. Flow (perm)	1209	1863	1556	2068	1863	1543	151	4471	1517	110	4385	1433
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			121			268			245			122
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		296.6			291.2			731.4			120.4	
Travel Time (s)		17.8			17.5			43.9			7.2	
Confl. Peds. (#/hr)	6					6	1		1	1		1
Confl. Bikes (#/hr)			5			5			5			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 (%)	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Adj. Flow (vph)	7	79	121	257	165	268	346	2311	434	282	1439	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	79	121	257	165	268	346	2311	434	282	1439	21
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.00	1.00	1.03
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2031 FB MM PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0	10.0	6.0	20.0	20.0	6.0	20.0	20.0
Minimum Split (s)	10.5	36.7	36.7	10.5	36.7	36.7	10.5	36.5	36.5	10.5	36.5	36.5
Total Split (s)	10.5	36.7	36.7	10.5	36.7	36.7	32.4	73.8	73.8	19.0	60.4	60.4
Total Split (%)	7.5%	26.2%	26.2%	7.5%	26.2%	26.2%	23.1%	52.7%	52.7%	13.6%	43.1%	43.1%
Maximum Green (s)	6.5	30.0	30.0	6.5	30.0	30.0	28.4	67.3	67.3	15.0	53.9	53.9
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	2.8	2.8	1.0	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	0.0	0.0
Total Lost Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
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	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)					7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)					23.0	23.0		23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)					6	6		1	1		1	1
Act Effct Green (s)	23.8	14.9	14.9	27.3	23.3	23.3	96.9	70.2	70.2	98.4	71.3	71.3
Actuated g/C Ratio	0.17	0.11	0.11	0.20	0.17	0.17	0.69	0.50	0.50	0.70	0.51	0.51
v/c Ratio	0.03	0.40	0.44	0.55	0.53	0.56	0.85	1.03	0.49	0.70	0.64	0.03
Control Delay	40.3	62.2	13.4	52.9	59.4	10.0	56.9	46.4	8.0	47.1	28.6	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	40.3	62.2	13.4	52.9	59.4	10.0	56.9	46.4	8.0	47.1	28.6	0.1
LOS	D	E	B	D	E	B	E	D	A	D	C	A
Approach Delay		32.9			37.8			42.2			31.3	
Approach LOS		C			D			D			C	
Queue Length 50th (m)	1.7	22.5	0.0	34.8	45.1	0.0	82.5	232.7	25.4	56.7	120.3	0.0
Queue Length 95th (m)	5.3	34.5	17.2	40.8	65.2	24.7	m83.9 m#328.7	m28.3	#146.5	183.2	0.0	
Internal Link Dist (m)		272.6			267.2			707.4			96.4	
Turn Bay Length (m)	70.0		70.0	140.0			135.0		80.0	180.0		50.0
Base Capacity (vph)	233	399	428	464	399	541	443	2241	882	400	2233	789
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.20	0.28	0.55	0.41	0.50	0.78	1.03	0.49	0.70	0.64	0.03

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 35 (25%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 1: Bronte Road & Upper Middle Road

2031 FB MM PM Peak Hour
1300 Bronte Enns

Maximum v/c Ratio: 1.03

Intersection Signal Delay: 38.0

Intersection LOS: D

Intersection Capacity Utilization 86.6%

ICU Level of Service E

Analysis Period (min) 15

* User Entered Value

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 1: Bronte Road & Upper Middle Road

 Ø1	 Ø2 (R)	 Ø3	 Ø4
19 s	73.8 s	10.5 s	36.7 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
32.4 s	60.4 s	10.5 s	36.7 s

HCM Signalized Intersection Capacity Analysis

1: Bronte Road & Upper Middle Road

2031 FB MM PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	74	114	242	155	252	325	2172	408	265	1353	20
Future Volume (vph)	7	74	114	242	155	252	325	2172	408	265	1353	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.97
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	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1762	1863	1551	3400	1863	1541	1770	4471	1517	1770	4385	1435
Flt Permitted	0.65	1.00	1.00	0.58	1.00	1.00	0.08	1.00	1.00	0.06	1.00	1.00
Satd. Flow (perm)	1211	1863	1551	2068	1863	1541	151	4471	1517	109	4385	1435
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)	7	79	121	257	165	268	346	2311	434	282	1439	21
RTOR Reduction (vph)	0	0	105	0	0	223	0	0	128	0	0	11
Lane Group Flow (vph)	7	79	16	257	165	45	346	2311	306	282	1439	10
Confl. Peds. (#/hr)	6					6	1		1	1		1
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	19.4	18.1	18.1	28.6	23.3	23.3	93.1	67.0	67.0	95.3	68.1	68.1
Effective Green, g (s)	19.4	18.1	18.1	28.6	23.3	23.3	93.1	67.0	67.0	95.3	68.1	68.1
Actuated g/C Ratio	0.14	0.13	0.13	0.20	0.17	0.17	0.66	0.48	0.48	0.68	0.49	0.49
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	172	240	200	484	310	256	402	2139	725	396	2132	698
v/s Ratio Prot	0.00	0.04		c0.02	c0.09		c0.16	c0.52		0.14	0.33	
v/s Ratio Perm	0.01		0.01	0.08		0.03	0.41		0.20	0.34		0.01
v/c Ratio	0.04	0.33	0.08	0.53	0.53	0.17	0.86	1.08	0.42	0.71	0.67	0.01
Uniform Delay, d1	52.2	55.4	53.6	49.1	53.4	50.1	38.8	36.5	23.9	41.7	27.5	18.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.38	0.74	0.78	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.8	0.2	1.1	1.8	0.3	6.3	39.5	0.6	6.0	1.7	0.0
Delay (s)	52.2	56.2	53.8	50.3	55.1	50.4	59.7	66.5	19.2	47.6	29.2	18.6
Level of Service	D	E	D	D	E	D	E	E	B	D	C	B
Approach Delay (s)		54.7			51.5			59.1			32.1	
Approach LOS		D			D			E			C	
Intersection Summary												
HCM 2000 Control Delay			49.8									
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			140.0									
Intersection Capacity Utilization			86.6%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
2: Bronte Road & Saw Whet Boulevard

2031 FB MM PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	7	104	0	59	11	2921	174	99	1670	4
Future Volume (vph)	3	0	7	104	0	59	11	2921	174	99	1670	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	15.0		15.0	15.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Frt		0.850			0.850				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1770	1583	0	1770	4471	1583	1770	4471	1583
Flt Permitted	0.715			0.752			0.076			0.037		
Satd. Flow (perm)	1332	1583	0	1401	1583	0	142	4471	1583	69	4471	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		62			62				62			19
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		42.5			50.2			458.5			731.4	
Travel Time (s)		3.1			3.6			27.5			43.9	
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)	3	0	8	113	0	64	12	3175	189	108	1815	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	8	0	113	64	0	12	3175	189	108	1815	4
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	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
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		6

Lanes, Volumes, Timings
2: Bronte Road & Saw Whet Boulevard

2031 FB MM PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	35.5	35.5		35.5	35.5		35.5	35.5	35.5	9.5	35.5	35.5
Total Split (s)	35.5	35.5		35.5	35.5		95.0	95.0	95.0	9.5	104.5	104.5
Total Split (%)	25.4%	25.4%		25.4%	25.4%		67.9%	67.9%	67.9%	6.8%	74.6%	74.6%
Maximum Green (s)	30.0	30.0		30.0	30.0		89.5	89.5	89.5	5.0	99.0	99.0
Yellow Time (s)	3.3	3.3		3.3	3.3		3.7	3.7	3.7	3.5	3.7	3.7
All-Red Time (s)	2.2	2.2		2.2	2.2		1.8	1.8	1.8	1.0	1.8	1.8
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)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	4.5	5.5	5.5
Lead/Lag							Lead	Lead	Lead	Lag		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	23.0	23.0		23.0	23.0		23.0	23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0		0	0
Act Effect Green (s)	16.6	16.6		16.6	16.6		102.9	102.9	102.9	113.4	112.4	112.4
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.74	0.74	0.74	0.81	0.80	0.80
v/c Ratio	0.02	0.03		0.68	0.26		0.12	0.97	0.16	0.93	0.51	0.00
Control Delay	51.0	0.3		78.3	15.3		3.4	9.7	0.7	101.2	11.3	2.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.0	0.3		78.3	15.3		3.4	9.7	0.7	101.2	11.3	2.5
LOS	D	A		E	B		A	A	A	F	B	A
Approach Delay		14.1			55.5			9.2			16.3	
Approach LOS		B			E			A			B	
Queue Length 50th (m)	0.8	0.0		32.1	0.5		0.3	29.6	0.0	12.3	72.3	0.0
Queue Length 95th (m)	3.7	0.0		51.4	14.3		m0.4 m#400.5		m0.6 m#55.5	213.3	m0.0	
Internal Link Dist (m)		18.5			26.2			434.5			707.4	
Turn Bay Length (m)	15.0			15.0			15.0		15.0	15.0		15.0
Base Capacity (vph)	285	387		300	387		104	3284	1179	116	3588	1274
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.02		0.38	0.17		0.12	0.97	0.16	0.93	0.51	0.00

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 127 (91%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 13.2

Intersection LOS: B

Intersection Capacity Utilization 87.3%

ICU Level of Service E

Analysis Period (min) 15

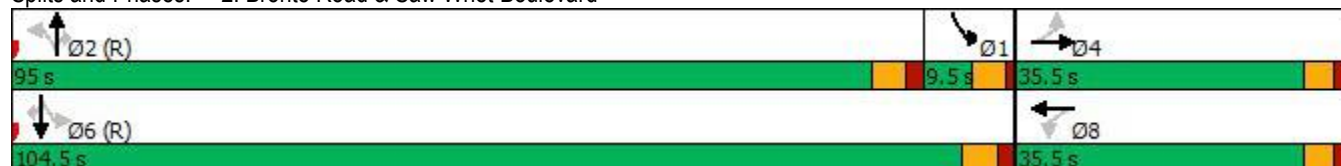
* User Entered Value

Lanes, Volumes, Timings
 2: Bronte Road & Saw Whet Boulevard

2031 FB MM PM Peak Hour
 1300 Bronte Enns

- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bronte Road & Saw Whet Boulevard



HCM Signalized Intersection Capacity Analysis

2: Bronte Road & Saw Whet Boulevard

2031 FB MM PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	7	104	0	59	11	2921	174	99	1670	4
Future Volume (vph)	3	0	7	104	0	59	11	2921	174	99	1670	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	4.5	5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	*0.80	1.00	1.00	*0.80	1.00
Frt	1.00	0.85		1.00	0.85		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)	1770	1583		1770	1583		1770	4471	1583	1770	4471	1583
Flt Permitted	0.72	1.00		0.75	1.00		0.08	1.00	1.00	0.04	1.00	1.00
Satd. Flow (perm)	1332	1583		1402	1583		141	4471	1583	69	4471	1583
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)	3	0	8	113	0	64	12	3175	189	108	1815	4
RTOR Reduction (vph)	0	7	0	0	55	0	0	0	16	0	0	1
Lane Group Flow (vph)	3	1	0	113	9	0	12	3175	173	108	1815	3
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	16.6	16.6		16.6	16.6		102.9	102.9	102.9	113.4	112.4	112.4
Effective Green, g (s)	16.6	16.6		16.6	16.6		102.9	102.9	102.9	113.4	112.4	112.4
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.74	0.74	0.74	0.81	0.80	0.80
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	4.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	157	187		166	187		103	3286	1163	116	3589	1270
v/s Ratio Prot		0.00			0.01			c0.71		c0.03	0.41	
v/s Ratio Perm	0.00			c0.08			0.08		0.11	0.72		0.00
v/c Ratio	0.02	0.01		0.68	0.05		0.12	0.97	0.15	0.93	0.51	0.00
Uniform Delay, d1	54.5	54.4		59.2	54.7		5.4	17.0	5.5	60.8	4.6	2.7
Progression Factor	1.00	1.00		1.00	1.00		0.34	0.20	0.15	1.09	2.16	1.00
Incremental Delay, d2	0.0	0.0		10.9	0.1		0.8	4.2	0.1	55.2	0.4	0.0
Delay (s)	54.6	54.4		70.1	54.8		2.6	7.7	0.9	121.3	10.3	2.7
Level of Service	D	D		E	D		A	A	A	F	B	A
Approach Delay (s)		54.5			64.6			7.3			16.5	
Approach LOS		D			E			A			B	
Intersection Summary												
HCM 2000 Control Delay	12.5			HCM 2000 Level of Service			B					
HCM 2000 Volume to Capacity ratio	0.93											
Actuated Cycle Length (s)	140.0			Sum of lost time (s)			15.5					
Intersection Capacity Utilization	87.3%			ICU Level of Service			E					
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2031 FB MM PM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	138	0	110	1	2997	175	89	1729	0
Future Volume (vph)	0	0	0	138	0	110	1	2997	175	89	1729	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		40.0	35.0		30.0	70.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			20.0			60.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	*0.80	1.00	1.00	*0.80	0.91
Ped Bike Factor						0.98			0.98			
Frt						0.850			0.850			
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	0	1863	0	1770	0	1583	1770	4427	1388	1770	4385	0
Flt Permitted				0.757			0.088			0.040		
Satd. Flow (perm)	0	1863	0	1410	0	1556	164	4427	1357	75	4385	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						64			56			
Link Speed (k/h)		20			20			60			60	
Link Distance (m)		78.7			109.0			435.9			458.5	
Travel Time (s)		14.2			19.6			26.2			27.5	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	14%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Adj. Flow (vph)	0	0	0	142	0	113	1	3090	180	92	1782	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	142	0	113	1	3090	180	92	1782	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.03	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1		1	1	2	1	1	2	
Detector Template	Left	Thru		Left		Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0		2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0		2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4						9.4			9.4	
Detector 2 Size(m)		0.6						0.6			0.6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												

12-05-2021

NA

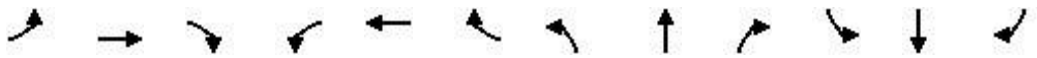
CGH Transportation

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Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2031 FB MM PM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type				Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8		8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0		10.0	15.0	15.0	15.0	5.0	15.0	
Minimum Split (s)	24.2	24.2		35.2		35.2	34.9	34.9	34.9	9.5	34.9	
Total Split (s)	35.2	35.2		35.2		35.2	95.3	95.3	95.3	9.5	104.8	
Total Split (%)	25.1%	25.1%		25.1%		25.1%	68.1%	68.1%	68.1%	6.8%	74.9%	
Maximum Green (s)	29.0	29.0		29.0		29.0	89.4	89.4	89.4	5.5	98.9	
Yellow Time (s)	3.1	3.1		3.1		3.1	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.1	3.1		3.1		3.1	2.2	2.2	2.2	1.0	2.2	
Lost Time Adjust (s)		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.2		6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.6	3.6	3.6	3.0	3.6	
Recall Mode	None	None		None		None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0		7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				22.0		22.0	22.0	22.0	22.0		22.0	
Pedestrian Calls (#/hr)				0		0	0	0	0		0	
Act Effect Green (s)				19.3		19.3	96.4	96.4	96.4	110.5	108.6	
Actuated g/C Ratio				0.14		0.14	0.69	0.69	0.69	0.79	0.78	
v/c Ratio				0.73		0.42	0.01	1.01	0.19	0.58	0.52	
Control Delay				78.3		28.9	1.0	25.3	0.7	44.8	2.4	
Queue Delay				0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay				78.3		28.9	1.0	25.3	0.7	44.8	2.4	
LOS				E		C	A	C	A	D	A	
Approach Delay					56.4			24.0			4.5	
Approach LOS					E			C			A	
Queue Length 50th (m)				40.2		12.9	0.0	~407.6	2.0	9.8	5.1	
Queue Length 95th (m)				61.1		30.9	m0.0	m340.4	m3.1	#34.6	47.4	
Internal Link Dist (m)		54.7			85.0			411.9			434.5	
Turn Bay Length (m)						40.0	35.0		30.0	70.0		
Base Capacity (vph)				292		373	112	3048	951	158	3400	
Starvation Cap Reductn				0		0	0	0	0	0	0	
Spillback Cap Reductn				0		0	0	0	0	0	0	
Storage Cap Reductn				0		0	0	0	0	0	0	
Reduced v/c Ratio				0.49		0.30	0.01	1.01	0.19	0.58	0.52	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 103.6 (74%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.01

Lanes, Volumes, Timings 3: Bronte Road & Driveway/Charles Cornwall Road

2031 FB MM PM Peak Hour
1300 Bronte Enns

Intersection Signal Delay: 18.8 Intersection LOS: B
Intersection Capacity Utilization 82.1% ICU Level of Service E
Analysis Period (min) 15
* User Entered Value
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

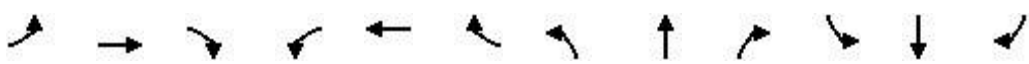
Splits and Phases: 3: Bronte Road & Driveway/Charles Cornwall Road



HCM Signalized Intersection Capacity Analysis

3: Bronte Road & Driveway/Charles Cornwall Road

2031 FB MM PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔		↔	↔	↑↑↑	↔	↔	↑↑↑	
Traffic Volume (vph)	0	0	0	138	0	110	1	2997	175	89	1729	0
Future Volume (vph)	0	0	0	138	0	110	1	2997	175	89	1729	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Lane Util. Factor				1.00		1.00	1.00	*0.80	1.00	1.00	*0.80	
Frpb, ped/bikes				1.00		0.98	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes				1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Frt				1.00		0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected				0.95		1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1770		1552	1770	4427	1357	1770	4385	
Flt Permitted				0.76		1.00	0.09	1.00	1.00	0.04	1.00	
Satd. Flow (perm)				1410		1552	164	4427	1357	74	4385	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	142	0	113	1	3090	180	92	1782	0
RTOR Reduction (vph)	0	0	0	0	0	55	0	0	17	0	0	0
Lane Group Flow (vph)	0	0	0	142	0	58	1	3090	163	92	1782	0
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	14%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Turn Type				Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4					2			1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)				19.3		19.3	96.4	96.4	96.4	108.6	108.6	
Effective Green, g (s)				19.3		19.3	96.4	96.4	96.4	108.6	108.6	
Actuated g/C Ratio				0.14		0.14	0.69	0.69	0.69	0.78	0.78	
Clearance Time (s)				6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Vehicle Extension (s)				3.0		3.0	3.6	3.6	3.6	3.0	3.6	
Lane Grp Cap (vph)				194		213	112	3048	934	156	3401	
v/s Ratio Prot								c0.70		0.03	c0.41	
v/s Ratio Perm				c0.10		0.04	0.01		0.12	0.42		
v/c Ratio				0.73		0.27	0.01	1.01	0.17	0.59	0.52	
Uniform Delay, d1				57.9		54.1	6.8	21.8	7.7	43.2	5.9	
Progression Factor				1.00		1.00	0.10	0.67	0.11	1.44	0.30	
Incremental Delay, d2				13.3		0.7	0.0	8.9	0.0	5.0	0.5	
Delay (s)				71.2		54.7	0.7	23.6	0.9	67.4	2.3	
Level of Service				E		D	A	C	A	E	A	
Approach Delay (s)		0.0			63.9			22.3			5.5	
Approach LOS		A			E			C			A	
Intersection Summary												
HCM 2000 Control Delay			18.4									
HCM 2000 Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			140.0									
Intersection Capacity Utilization			82.1%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Bronte Road & Driveway/North Service Road West

2031 FB MM PM Peak Hour

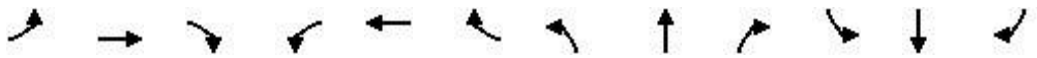
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↑↑↑	↔	↔	↑↑↑	
Traffic Volume (vph)	0	0	0	129	0	154	0	2924	74	88	1776	2
Future Volume (vph)	0	0	0	129	0	154	0	2924	74	88	1776	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	45.0		0.0	35.0		70.0	115.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			50.0			65.0			65.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	*0.80	1.00	1.00	*0.80	0.91
Ped Bike Factor						0.98			0.97		1.00	
Frt						0.850			0.850			
Flt Protected				0.950	0.950					0.950		
Satd. Flow (prot)	0	1863	0	1681	1681	1583	1863	4427	1583	1770	4385	0
Flt Permitted				0.950	0.950					0.047		
Satd. Flow (perm)	0	1863	0	1681	1681	1553	1863	4427	1538	88	4385	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						159			106			
Link Speed (k/h)		20			50			60			60	
Link Distance (m)		52.6			84.3			299.0			435.9	
Travel Time (s)		9.5			6.1			17.9			26.2	
Confl. Peds. (#/hr)	2					2			2	2		
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	4%	2%
Adj. Flow (vph)	0	0	0	133	0	159	0	3014	76	91	1831	2
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	66	67	159	0	3014	76	91	1833	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
4: Bronte Road & Driveway/North Service Road West

2031 FB MM PM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		8			4			2		1	6	
Permitted Phases	8			4		4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	15.0	15.0	15.0	6.0	15.0	
Minimum Split (s)	24.7	24.7		36.9	36.9	36.9	41.7	41.7	41.7	10.5	24.7	
Total Split (s)	24.7	24.7		40.0	40.0	40.0	64.8	64.8	64.8	10.5	75.3	
Total Split (%)	17.6%	17.6%		28.6%	28.6%	28.6%	46.3%	46.3%	46.3%	7.5%	53.8%	
Maximum Green (s)	18.0	18.0		34.1	34.1	34.1	58.1	58.1	58.1	6.5	68.6	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		2.2	2.2	2.2	3.0	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)		6.7		5.9	5.9	5.9	6.7	6.7	6.7	4.0	6.7	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		0.0	
Flash Dont Walk (s)				24.0	24.0	24.0	28.0	28.0	28.0		0.0	
Pedestrian Calls (#/hr)				2	2	2	2	2	2		0	
Act Effect Green (s)				34.1	34.1	34.1		80.4	80.4	96.0	93.3	
Actuated g/C Ratio				0.24	0.24	0.24		0.57	0.57	0.69	0.67	
v/c Ratio				0.16	0.16	0.32		1.19	0.08	0.54	0.63	
Control Delay				43.0	43.1	7.8		105.3	0.6	30.4	13.0	
Queue Delay				0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay				43.0	43.1	7.8		105.3	0.6	30.4	13.0	
LOS				D	D	A		F	A	C	B	
Approach Delay					23.9			102.7			13.8	
Approach LOS					C			F			B	
Queue Length 50th (m)				16.1	16.3	0.0		~432.5	0.3	15.4	118.0	
Queue Length 95th (m)				30.4	30.7	18.5		m#394.4	m0.1	23.8	167.2	
Internal Link Dist (m)		28.6			60.3			275.0			411.9	
Turn Bay Length (m)				45.0					70.0	115.0		
Base Capacity (vph)				409	409	498		2542	928	167	2922	
Starvation Cap Reductn				0	0	0		0	0	0	0	
Spillback Cap Reductn				0	0	0		0	0	0	0	
Storage Cap Reductn				0	0	0		0	0	0	0	
Reduced v/c Ratio				0.16	0.16	0.32		1.19	0.08	0.54	0.63	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 85 (61%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.19

Intersection Signal Delay: 66.1

Intersection LOS: E

Intersection Capacity Utilization 84.8%

ICU Level of Service E

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

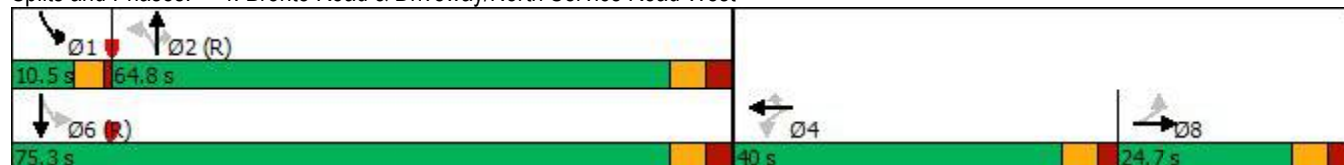
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 4: Bronte Road & Driveway/North Service Road West

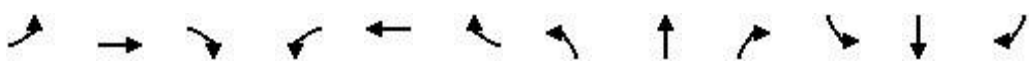


HCM Signalized Intersection Capacity Analysis

4: Bronte Road & Driveway/North Service Road West

2031 FB MM PM Peak Hour

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↑↑↑	↔	↔	↑↑↑	
Traffic Volume (vph)	0	0	0	129	0	154	0	2924	74	88	1776	2
Future Volume (vph)	0	0	0	129	0	154	0	2924	74	88	1776	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Lane Util. Factor				0.95	0.95	1.00		*0.80	1.00	1.00	*0.80	
Frpb, ped/bikes				1.00	1.00	0.98		1.00	0.97	1.00	1.00	
Flpb, ped/bikes				1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt				1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected				0.95	0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1681	1681	1553		4427	1540	1770	4384	
Flt Permitted				0.95	0.95	1.00		1.00	1.00	0.05	1.00	
Satd. Flow (perm)				1681	1681	1553		4427	1540	88	4384	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	133	0	159	0	3014	76	91	1831	2
RTOR Reduction (vph)	0	0	0	0	0	120	0	0	32	0	0	0
Lane Group Flow (vph)	0	0	0	66	67	39	0	3014	44	91	1833	0
Confl. Peds. (#/hr)	2					2			2	2		
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	4%	2%
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		8			4			2		1	6	
Permitted Phases	8			4		4	2		2	6		
Actuated Green, G (s)				34.1	34.1	34.1		80.4	80.4	93.3	93.3	
Effective Green, g (s)				34.1	34.1	34.1		80.4	80.4	93.3	93.3	
Actuated g/C Ratio				0.24	0.24	0.24		0.57	0.57	0.67	0.67	
Clearance Time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Vehicle Extension (s)				5.0	5.0	5.0		5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)				409	409	378		2542	884	165	2921	
v/s Ratio Prot								c0.68		0.03	c0.42	
v/s Ratio Perm				0.04	0.04	0.02			0.03	0.33		
v/c Ratio				0.16	0.16	0.10		1.19	0.05	0.55	0.63	
Uniform Delay, d1				41.7	41.7	41.1		29.8	13.1	33.4	13.4	
Progression Factor				1.00	1.00	1.00		0.63	0.57	1.04	0.89	
Incremental Delay, d2				0.4	0.4	0.2		84.0	0.0	3.4	0.9	
Delay (s)				42.1	42.1	41.3		102.8	7.4	38.1	12.8	
Level of Service				D	D	D		F	A	D	B	
Approach Delay (s)		0.0			41.7			100.4			14.0	
Approach LOS		A			D			F			B	
Intersection Summary												
HCM 2000 Control Delay			65.9				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)		23.3			
Intersection Capacity Utilization			84.8%				ICU Level of Service		E			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2031 FB MM PM Peak Hour

1300 Bronte Enns

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 		   			   
Traffic Volume (vph)	232	617	2266	0	0	1154
Future Volume (vph)	232	617	2266	0	0	1154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	90.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	1.00	*0.80	1.00	1.00	*0.80
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3433	1583	4427	0	0	4427
Flt Permitted	0.950					
Satd. Flow (perm)	3433	1583	4427	0	0	4427
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		1				
Link Speed (k/h)	60		60			60
Link Distance (m)	65.9		376.8			299.0
Travel Time (s)	4.0		22.6			17.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	3%	2%	2%	3%
Adj. Flow (vph)	252	671	2463	0	0	1254
Shared Lane Traffic (%)						
Lane Group Flow (vph)	252	671	2463	0	0	1254
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2031 FB MM PM Peak Hour
1300 Bronte Enns



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8				
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.7	24.7	36.5			26.5
Total Split (s)	61.0	61.0	79.0			79.0
Total Split (%)	43.6%	43.6%	56.4%			56.4%
Maximum Green (s)	54.3	54.3	72.5			72.5
Yellow Time (s)	3.7	3.7	3.7			3.7
All-Red Time (s)	3.0	3.0	2.8			2.8
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	6.7	6.7	6.5			6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	C-Max			C-Max
Act Effect Green (s)	54.3	54.3	72.5			72.5
Actuated g/C Ratio	0.39	0.39	0.52			0.52
v/c Ratio	0.19	1.09	1.07			0.55
Control Delay	28.8	104.6	50.5			19.6
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	28.8	104.6	50.5			19.6
LOS	C	F	D			B
Approach Delay	83.9		50.5			19.6
Approach LOS	F		D			B
Queue Length 50th (m)	24.7	~220.2	~337.1			93.2
Queue Length 95th (m)	35.1	#298.1	m79.4			84.9
Internal Link Dist (m)	41.9		352.8			275.0
Turn Bay Length (m)		90.0				
Base Capacity (vph)	1331	614	2292			2292
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.19	1.09	1.07			0.55

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 67 (48%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.09

Intersection Signal Delay: 48.8

Intersection LOS: D

Intersection Capacity Utilization 93.0%

ICU Level of Service F

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

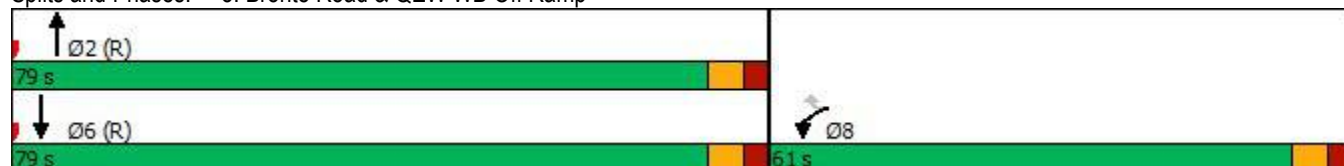
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 5: Bronte Road & QEW WB Off Ramp



HCM Signalized Intersection Capacity Analysis

5: Bronte Road & QEW WB Off Ramp

2031 FB MM PM Peak Hour
1300 Bronte Enns

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	232	617	2266	0	0	1154
Future Volume (vph)	232	617	2266	0	0	1154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7	6.5			6.5
Lane Util. Factor	0.97	1.00	*0.80			*0.80
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3433	1583	4427			4427
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3433	1583	4427			4427
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	252	671	2463	0	0	1254
RTOR Reduction (vph)	0	1	0	0	0	0
Lane Group Flow (vph)	252	670	2463	0	0	1254
Heavy Vehicles (%)	2%	2%	3%	2%	2%	3%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	54.3	54.3	72.5			72.5
Effective Green, g (s)	54.3	54.3	72.5			72.5
Actuated g/C Ratio	0.39	0.39	0.52			0.52
Clearance Time (s)	6.7	6.7	6.5			6.5
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	1331	613	2292			2292
v/s Ratio Prot	0.07		c0.56			0.28
v/s Ratio Perm		c0.42				
v/c Ratio	0.19	1.09	1.07			0.55
Uniform Delay, d1	28.3	42.9	33.8			22.7
Progression Factor	1.00	1.00	0.40			0.82
Incremental Delay, d2	0.1	64.5	34.6			0.8
Delay (s)	28.4	107.4	48.0			19.5
Level of Service	C	F	D			B
Approach Delay (s)	85.8		48.0			19.5
Approach LOS	F		D			B
Intersection Summary						
HCM 2000 Control Delay			47.8		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.08			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	13.2
Intersection Capacity Utilization			93.0%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
6: Bronte Road & Parking Lot Access/QEW EB Ramps

2031 FB MM PM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	0	4	214	1	851	1	1783	228	296	1083	3
Future Volume (vph)	6	0	4	214	1	851	1	1783	228	296	1083	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	10.0		0.0	130.0		125.0	120.0		95.0	255.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			65.0			95.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.91	0.95	1.00	*0.80	1.00	1.00	*0.80	0.91
Ped Bike Factor									0.97		1.00	
Frt		0.850			0.858	0.850			0.850			
Flt Protected	0.950			0.950	0.998		0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1681	1425	1475	1770	4471	1583	1770	4470	0
Flt Permitted	0.950			0.950	0.998		0.192			0.078		
Satd. Flow (perm)	1770	1583	0	1681	1425	1475	358	4471	1543	145	4470	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					453	469			154			
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		53.2			37.5			215.0			376.8	
Travel Time (s)		4.8			3.4			12.9			22.6	
Confl. Bikes (#/hr)									5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	7	0	4	233	1	925	1	1938	248	322	1177	3
Shared Lane Traffic (%)				10%		49%						
Lane Group Flow (vph)	7	4	0	210	477	472	1	1938	248	322	1180	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

12-05-2021

NA

CGH Transportation

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Lanes, Volumes, Timings
6: Bronte Road & Parking Lot Access/QEW EB Ramps

2031 FB MM PM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	36.7	36.7		36.7	36.7	36.7	36.5	36.5	36.5	11.5	36.5	
Total Split (s)	36.7	36.7		37.3	37.3	37.3	54.0	54.0	54.0	12.0	66.0	
Total Split (%)	26.2%	26.2%		26.6%	26.6%	26.6%	38.6%	38.6%	38.6%	8.6%	47.1%	
Maximum Green (s)	30.0	30.0		30.6	30.6	30.6	47.5	47.5	47.5	8.0	59.5	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.8	2.8	2.8	1.0	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)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				23.0	23.0	23.0	23.0	23.0	23.0		23.0	
Pedestrian Calls (#/hr)				0	0	0	0	0	0		0	
Act Effct Green (s)	7.1	7.1		24.5	24.5	24.5	51.5	51.5	51.5	99.3	96.8	
Actuated g/C Ratio	0.05	0.05		0.18	0.18	0.18	0.37	0.37	0.37	0.71	0.69	
v/c Ratio	0.08	0.05		0.72	0.77	0.73	0.01	1.18	0.37	0.55	0.38	
Control Delay	65.3	64.8		67.7	14.5	11.5	31.0	126.3	13.9	44.9	12.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	65.3	64.8		67.7	14.5	11.5	31.0	126.3	13.9	44.9	12.6	
LOS	E	E		E	B	B	C	F	B	D	B	
Approach Delay		65.1			22.9			113.5			19.5	
Approach LOS		E			C			F			B	
Queue Length 50th (m)	2.0	1.1		61.0	6.4	0.7	0.2	~233.1	16.3	75.0	36.8	
Queue Length 95th (m)	7.4	5.4		87.5	49.3	36.9	1.6	#331.7	43.5	119.5	91.2	
Internal Link Dist (m)		29.2			13.5			191.0			352.8	
Turn Bay Length (m)	10.0			130.0		125.0	120.0		95.0	255.0		
Base Capacity (vph)	379	339		367	665	688	131	1645	665	582	3090	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.02	0.01		0.57	0.72	0.69	0.01	1.18	0.37	0.55	0.38	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 66 (47%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.18

Intersection Signal Delay: 62.7

Intersection LOS: E

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NA

CGH Transportation

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Lanes, Volumes, Timings 6: Bronte Road & Parking Lot Access/QEW EB Ramps

2031 FB MM PM Peak Hour
1300 Bronte Enns

Intersection Capacity Utilization 92.0%

ICU Level of Service F

Analysis Period (min) 15

* User Entered Value

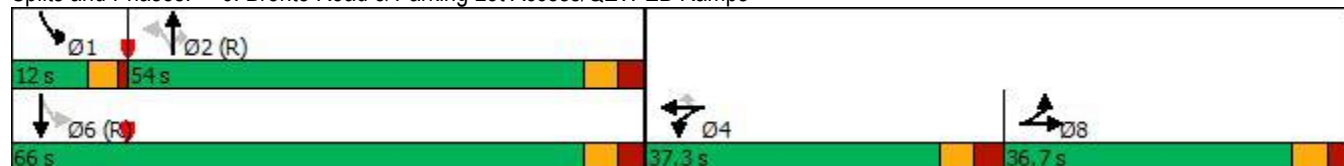
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 6: Bronte Road & Parking Lot Access/QEW EB Ramps



HCM Signalized Intersection Capacity Analysis

6: Bronte Road & Parking Lot Access/QEW EB Ramps

2031 FB MM PM Peak Hour

1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	0	4	214	1	851	1	1783	228	296	1083	3
Future Volume (vph)	6	0	4	214	1	851	1	1783	228	296	1083	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lane Util. Factor	1.00	1.00		0.95	0.91	0.95	1.00	*0.80	1.00	1.00	*0.80	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97	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	
Frt	1.00	0.85		1.00	0.86	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1583		1681	1424	1475	1770	4471	1543	1770	4469	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.19	1.00	1.00	0.08	1.00	
Satd. Flow (perm)	1770	1583		1681	1424	1475	357	4471	1543	145	4469	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	0	4	233	1	925	1	1938	248	322	1177	3
RTOR Reduction (vph)	0	0	0	0	374	387	0	0	102	0	0	0
Lane Group Flow (vph)	7	4	0	210	103	85	1	1938	146	322	1180	0
Confl. Bikes (#/hr)									5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Actuated Green, G (s)	2.9	2.9		24.5	24.5	24.5	47.4	47.4	47.4	92.7	92.7	
Effective Green, g (s)	2.9	2.9		24.5	24.5	24.5	47.4	47.4	47.4	92.7	92.7	
Actuated g/C Ratio	0.02	0.02		0.18	0.18	0.18	0.34	0.34	0.34	0.66	0.66	
Clearance Time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	36	32		294	249	258	120	1513	522	575	2959	
v/s Ratio Prot	c0.00	0.00		c0.12	0.07			c0.43		c0.17	0.26	
v/s Ratio Perm						0.06	0.00		0.09	0.21		
v/c Ratio	0.19	0.12		0.71	0.41	0.33	0.01	1.28	0.28	0.56	0.40	
Uniform Delay, d1	67.4	67.3		54.5	51.4	50.6	30.7	46.3	33.8	31.2	10.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.40	1.16	
Incremental Delay, d2	2.6	1.8		8.0	1.1	0.8	0.1	131.6	1.3	1.1	0.4	
Delay (s)	70.0	69.1		62.4	52.5	51.3	30.8	177.9	35.2	44.8	13.0	
Level of Service	E	E		E	D	D	C	F	D	D	B	
Approach Delay (s)		69.7			53.8			161.7			19.8	
Approach LOS		E			D			F			B	
Intersection Summary												
HCM 2000 Control Delay			91.9			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			23.9			
Intersection Capacity Utilization			92.0%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

Appendix L

2031 Future Total Conditions Synchro Worksheets

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2031 Future Total AM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	203	390	527	88	196	72	1074	280	289	2343	13
Future Volume (vph)	11	203	390	527	88	196	72	1074	280	289	2343	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	140.0		0.0	135.0		80.0	180.0		50.0
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (m)	65.0			100.0			70.0			70.0		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Ped Bike Factor	0.99		0.98			0.97			0.96	1.00		0.97
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1656	1863	1583	3433	1792	1553	1719	4222	1485	1770	4302	1336
Flt Permitted	0.698			0.422			0.068			0.124		
Satd. Flow (perm)	1200	1863	1556	1525	1792	1503	123	4222	1424	231	4302	1289
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			121			202			281			91
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		296.6			291.2			731.4			120.4	
Travel Time (s)		17.8			17.5			43.9			7.2	
Confl. Peds. (#/hr)	11					11	5		7	7		5
Confl. Bikes (#/hr)			5			5			5			5
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 (%)	9%	2%	2%	2%	6%	4%	5%	8%	7%	2%	6%	18%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Adj. Flow (vph)	11	209	402	543	91	202	74	1107	289	298	2415	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	209	402	543	91	202	74	1107	289	298	2415	13
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.00	1.00	1.03
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0	10.0	6.0	20.0	20.0	6.0	20.0	20.0
Minimum Split (s)	10.5	36.7	36.7	10.5	36.7	36.7	10.5	36.5	36.5	10.5	36.5	36.5
Total Split (s)	10.5	36.7	36.7	12.3	38.5	38.5	10.5	58.3	58.3	32.7	80.5	80.5
Total Split (%)	7.5%	26.2%	26.2%	8.8%	27.5%	27.5%	7.5%	41.6%	41.6%	23.4%	57.5%	57.5%
Maximum Green (s)	6.5	30.0	30.0	8.3	31.8	31.8	6.5	51.8	51.8	28.7	74.0	74.0
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	2.8	2.8	1.0	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	0.0	0.0
Total Lost Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
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	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)					7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)					23.0	23.0		23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)					11	11		7	7		5	5
Act Effct Green (s)	37.9	29.0	29.0	43.1	37.1	37.1	69.7	60.8	60.8	88.0	77.1	77.1
Actuated g/C Ratio	0.27	0.21	0.21	0.31	0.26	0.26	0.50	0.43	0.43	0.63	0.55	0.55
v/c Ratio	0.03	0.54	0.96	0.93	0.19	0.37	0.55	0.60	0.37	0.80	1.02	0.02
Control Delay	33.0	55.1	73.4	67.2	42.4	7.6	51.6	39.1	11.7	39.7	55.4	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	33.0	55.1	73.4	67.2	42.4	7.6	51.6	39.1	11.7	39.7	55.4	0.1
LOS	C	E	E	E	D	A	D	D	B	D	E	A
Approach Delay		66.5			50.1			34.3			53.4	
Approach LOS		E			D			C			D	
Queue Length 50th (m)	2.2	54.4	85.4	65.7	19.6	0.0	9.2	107.8	21.9	49.3	~322.0	0.0
Queue Length 95th (m)	7.1	81.7	#151.2	#99.3	38.3	21.2	#27.1	144.8	47.0	81.6	#354.2	0.0
Internal Link Dist (m)		272.6			267.2			707.4			96.4	
Turn Bay Length (m)	70.0		70.0	140.0			135.0		80.0	180.0		50.0
Base Capacity (vph)	349	399	428	583	475	547	135	1834	777	461	2368	750
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.52	0.94	0.93	0.19	0.37	0.55	0.60	0.37	0.65	1.02	0.02

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 82.6 (59%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 1: Bronte Road & Upper Middle Road

2031 Future Total AM Peak Hour
1300 Bronte Enns

Maximum v/c Ratio: 1.02

Intersection Signal Delay: 49.4

Intersection LOS: D

Intersection Capacity Utilization 98.8%

ICU Level of Service F

Analysis Period (min) 15

* User Entered Value

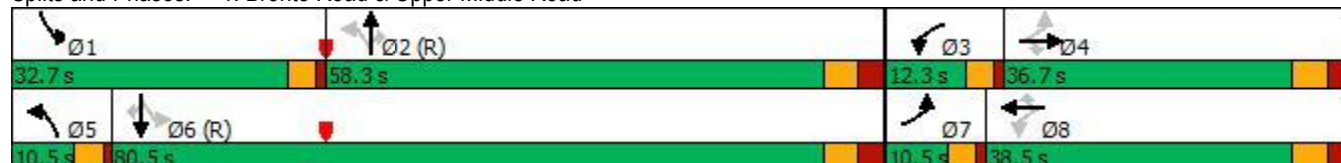
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Bronte Road & Upper Middle Road



HCM Signalized Intersection Capacity Analysis

1: Bronte Road & Upper Middle Road

2031 Future Total AM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	203	390	527	88	196	72	1074	280	289	2343	13
Future Volume (vph)	11	203	390	527	88	196	72	1074	280	289	2343	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00	0.97
Flpb, ped/bikes	0.99	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	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	1863	1556	3433	1792	1504	1719	4222	1425	1769	4302	1289
Flt Permitted	0.70	1.00	1.00	0.42	1.00	1.00	0.07	1.00	1.00	0.12	1.00	1.00
Satd. Flow (perm)	1205	1863	1556	1526	1792	1504	124	4222	1425	230	4302	1289
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)	11	209	402	543	91	202	74	1107	289	298	2415	13
RTOR Reduction (vph)	0	0	94	0	0	148	0	0	164	0	0	6
Lane Group Flow (vph)	11	209	308	543	91	54	74	1107	125	298	2415	7
Confl. Peds. (#/hr)	11					11	5		7	7		5
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	9%	2%	2%	2%	6%	4%	5%	8%	7%	2%	6%	18%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	34.0	31.4	31.4	43.7	37.1	37.1	63.7	58.5	58.5	83.1	73.9	73.9
Effective Green, g (s)	34.0	31.4	31.4	43.7	37.1	37.1	63.7	58.5	58.5	83.1	73.9	73.9
Actuated g/C Ratio	0.24	0.22	0.22	0.31	0.27	0.27	0.46	0.42	0.42	0.59	0.53	0.53
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	300	417	348	589	474	398	115	1764	595	362	2270	680
v/s Ratio Prot	0.00	0.11		c0.05	0.05		0.02	0.26		c0.12	c0.56	
v/s Ratio Perm	0.01		0.20	c0.23		0.04	0.27		0.09	0.37		0.01
v/c Ratio	0.04	0.50	0.89	0.92	0.19	0.13	0.64	0.63	0.21	0.82	1.06	0.01
Uniform Delay, d1	40.4	47.5	52.6	46.9	39.8	39.2	32.8	32.2	26.0	28.6	33.0	15.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.63	1.18	2.84	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.0	22.5	20.0	0.2	0.2	10.9	1.6	0.7	14.0	38.6	0.0
Delay (s)	40.4	48.4	75.1	66.9	40.0	39.4	64.3	39.6	74.7	42.6	71.6	15.7
Level of Service	D	D	E	E	D	D	E	D	E	D	E	B
Approach Delay (s)		65.5			57.3			47.8			68.2	
Approach LOS		E			E			D			E	
Intersection Summary												
HCM 2000 Control Delay			61.0									
HCM 2000 Volume to Capacity ratio			1.04									
Actuated Cycle Length (s)			140.0									
Intersection Capacity Utilization			98.8%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
2: Bronte Road & Saw Whet Boulevard

2031 Future Total AM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	0	46	169	0	95	14	1311	52	30	3421	5
Future Volume (vph)	16	0	46	169	0	95	14	1311	52	30	3421	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	15.0		15.0	15.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Frt		0.850			0.850				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1770	1583	0	1770	4471	1583	1770	4471	1583
Flt Permitted	0.645			0.724			0.038			0.127		
Satd. Flow (perm)	1201	1583	0	1349	1583	0	71	4471	1583	237	4471	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			74				24			19
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		42.5			50.2			458.5			731.4	
Travel Time (s)		3.1			3.6			27.5			43.9	
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)	17	0	50	184	0	103	15	1425	57	33	3718	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	50	0	184	103	0	15	1425	57	33	3718	5
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	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
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6

Lanes, Volumes, Timings
2: Bronte Road & Saw Whet Boulevard

2031 Future Total AM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	35.5	35.5		35.5	35.5		35.5	35.5	35.5	35.5	35.5	35.5
Total Split (s)	35.5	35.5		35.5	35.5		104.5	104.5	104.5	104.5	104.5	104.5
Total Split (%)	25.4%	25.4%		25.4%	25.4%		74.6%	74.6%	74.6%	74.6%	74.6%	74.6%
Maximum Green (s)	30.0	30.0		30.0	30.0		99.0	99.0	99.0	99.0	99.0	99.0
Yellow Time (s)	3.3	3.3		3.3	3.3		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.2	2.2		2.2	2.2		1.8	1.8	1.8	1.8	1.8	1.8
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)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	23.0	23.0		23.0	23.0		23.0	23.0	23.0	23.0	23.0	23.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effect Green (s)	23.6	23.6		23.6	23.6		105.4	105.4	105.4	105.4	105.4	105.4
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.75	0.75	0.75	0.75	0.75	0.75
v/c Ratio	0.08	0.18		0.81	0.31		0.28	0.42	0.05	0.19	1.10	0.00
Control Delay	47.0	33.1		81.2	19.0		27.9	5.6	2.7	6.4	64.9	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	47.0	33.1		81.2	19.0		27.9	5.6	2.7	6.4	64.9	0.0
LOS	D	C		F	B		C	A	A	A	E	A
Approach Delay		36.6			58.9			5.7			64.3	
Approach LOS		D			E			A			E	
Queue Length 50th (m)	4.2	7.7		51.9	7.2		1.0	104.9	1.3	2.1	~529.2	0.0
Queue Length 95th (m)	11.1	19.2		76.9	23.5		m3.4	95.2	2.6	m2.8	m#548.7	m0.0
Internal Link Dist (m)		18.5			26.2			434.5			707.4	
Turn Bay Length (m)	15.0			15.0			15.0		15.0	15.0		15.0
Base Capacity (vph)	257	354		289	397		53	3365	1197	178	3365	1196
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.14		0.64	0.26		0.28	0.42	0.05	0.19	1.10	0.00

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 85 (61%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.10

Intersection Signal Delay: 48.1

Intersection LOS: D

Intersection Capacity Utilization 91.3%

ICU Level of Service F

Analysis Period (min) 15

* User Entered Value

Lanes, Volumes, Timings
 2: Bronte Road & Saw Whet Boulevard

2031 Future Total AM Peak Hour
 1300 Bronte Enns

~ Volume exceeds capacity, queue is theoretically infinite.

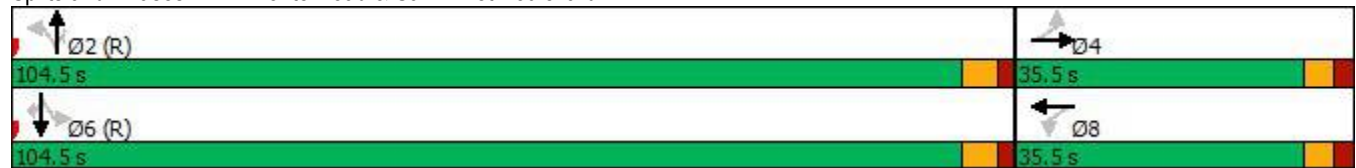
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Bronte Road & Saw Whet Boulevard



HCM Signalized Intersection Capacity Analysis

2: Bronte Road & Saw Whet Boulevard

2031 Future Total AM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	0	46	169	0	95	14	1311	52	30	3421	5
Future Volume (vph)	16	0	46	169	0	95	14	1311	52	30	3421	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	5.5	5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	*0.80	1.00	1.00	*0.80	1.00
Frt	1.00	0.85		1.00	0.85		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)	1770	1583		1770	1583		1770	4471	1583	1770	4471	1583
Flt Permitted	0.64	1.00		0.72	1.00		0.04	1.00	1.00	0.13	1.00	1.00
Satd. Flow (perm)	1201	1583		1349	1583		71	4471	1583	236	4471	1583
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)	17	0	50	184	0	103	15	1425	57	33	3718	5
RTOR Reduction (vph)	0	16	0	0	62	0	0	0	6	0	0	1
Lane Group Flow (vph)	17	34	0	184	41	0	15	1425	51	33	3718	4
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	23.6	23.6		23.6	23.6		105.4	105.4	105.4	105.4	105.4	105.4
Effective Green, g (s)	23.6	23.6		23.6	23.6		105.4	105.4	105.4	105.4	105.4	105.4
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.75	0.75	0.75	0.75	0.75	0.75
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	202	266		227	266		53	3366	1191	177	3366	1191
v/s Ratio Prot		0.02			0.03			0.32			c0.83	
v/s Ratio Perm	0.01			c0.14			0.21		0.03	0.14		0.00
v/c Ratio	0.08	0.13		0.81	0.16		0.28	0.42	0.04	0.19	1.10	0.00
Uniform Delay, d1	49.1	49.5		56.0	49.7		5.4	6.3	4.4	5.0	17.3	4.3
Progression Factor	1.00	1.00		1.00	1.00		1.61	0.77	0.73	0.79	0.70	0.00
Incremental Delay, d2	0.2	0.2		19.3	0.3		11.5	0.3	0.1	1.0	49.4	0.0
Delay (s)	49.3	49.7		75.3	50.0		20.3	5.2	3.3	4.9	61.5	0.0
Level of Service	D	D		E	D		C	A	A	A	E	A
Approach Delay (s)		49.6			66.2			5.3			60.9	
Approach LOS		D			E			A			E	
Intersection Summary												
HCM 2000 Control Delay	46.2			HCM 2000 Level of Service					D			
HCM 2000 Volume to Capacity ratio	1.05											
Actuated Cycle Length (s)	140.0			Sum of lost time (s)					11.0			
Intersection Capacity Utilization	91.3%			ICU Level of Service					F			
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2031 Future Total AM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	161	0	65	0	1362	78	149	3462	0
Future Volume (vph)	1	0	1	161	0	65	0	1362	78	149	3462	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		40.0	35.0		30.0	70.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			20.0			60.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	*0.80	1.00	1.00	*0.80	0.91
Ped Bike Factor		0.99				0.98			0.98			
Frt		0.932				0.850			0.850			
Flt Protected		0.976		0.950						0.950		
Satd. Flow (prot)	0	1680	0	1530	0	1392	1863	4302	1439	1770	4385	0
Flt Permitted		0.976		0.757						0.113		
Satd. Flow (perm)	0	1680	0	1219	0	1368	1863	4302	1405	210	4385	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		54				67			56			
Link Speed (k/h)		20			20			60			60	
Link Distance (m)		78.7			109.0			435.9			458.5	
Travel Time (s)		14.2			19.6			26.2			27.5	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	18%	2%	16%	2%	6%	10%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Adj. Flow (vph)	1	0	1	166	0	67	0	1404	80	154	3569	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2	0	166	0	67	0	1404	80	154	3569	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.03	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1		1	1	2	1	1	2	
Detector Template	Left	Thru		Left		Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0		2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0		2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4						9.4			9.4	
Detector 2 Size(m)		0.6						0.6			0.6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2031 Future Total AM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA		Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8		8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0		10.0	15.0	15.0	15.0	5.0	15.0	
Minimum Split (s)	24.2	24.2		35.2		35.2	34.9	34.9	34.9	9.5	34.9	
Total Split (s)	35.2	35.2		35.2		35.2	86.4	86.4	86.4	18.4	104.8	
Total Split (%)	25.1%	25.1%		25.1%		25.1%	61.7%	61.7%	61.7%	13.1%	74.9%	
Maximum Green (s)	29.0	29.0		29.0		29.0	80.5	80.5	80.5	14.4	98.9	
Yellow Time (s)	3.1	3.1		3.1		3.1	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.1	3.1		3.1		3.1	2.2	2.2	2.2	1.0	2.2	
Lost Time Adjust (s)		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.2		6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.6	3.6	3.6	3.0	3.6	
Recall Mode	None	None		None		None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0		7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				22.0		22.0	22.0	22.0	22.0		22.0	
Pedestrian Calls (#/hr)				0		0	0	0	0		0	
Act Effect Green (s)		23.3		23.3		23.3		91.2	91.2	106.5	104.6	
Actuated g/C Ratio		0.17		0.17		0.17		0.65	0.65	0.76	0.75	
v/c Ratio		0.01		0.82		0.24		0.50	0.09	0.58	1.09	
Control Delay		0.0		85.8		12.2		24.3	14.7	11.8	49.9	
Queue Delay		0.0		0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay		0.0		85.8		12.2		24.3	14.7	11.8	49.9	
LOS		A		F		B		C	B	B	D	
Approach Delay					64.6			23.8			48.4	
Approach LOS					E			C			D	
Queue Length 50th (m)		0.0		46.9		0.0		75.7	4.0	2.8	~488.3	
Queue Length 95th (m)		0.0		71.9		13.4		141.0	m22.1	m2.7	m#427.0	
Internal Link Dist (m)		54.7			85.0			411.9			434.5	
Turn Bay Length (m)						40.0			30.0	70.0		
Base Capacity (vph)		390		252		336		2802	934	320	3277	
Starvation Cap Reductn		0		0		0		0	0	0	0	
Spillback Cap Reductn		0		0		0		0	0	0	0	
Storage Cap Reductn		0		0		0		0	0	0	0	
Reduced v/c Ratio		0.01		0.66		0.20		0.50	0.09	0.48	1.09	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 128.8 (92%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.09

Lanes, Volumes, Timings 3: Bronte Road & Driveway/Charles Cornwall Road

2031 Future Total AM Peak Hour
1300 Bronte Enns

Intersection Signal Delay: 42.3	Intersection LOS: D
Intersection Capacity Utilization 108.1%	ICU Level of Service G
Analysis Period (min) 15	
* User Entered Value	
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 3: Bronte Road & Driveway/Charles Cornwall Road



HCM Signalized Intersection Capacity Analysis

3: Bronte Road & Driveway/Charles Cornwall Road

2031 Future Total AM Peak Hour
1300 Bronte Enns

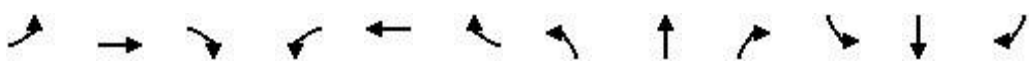
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	161	0	65	0	1362	78	149	3462	0
Future Volume (vph)	1	0	1	161	0	65	0	1362	78	149	3462	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.2		6.2		6.2		5.9	5.9	4.0	5.9	
Lane Util. Factor		1.00		1.00		1.00		*0.80	1.00	1.00	*0.80	
Frpb, ped/bikes		0.99		1.00		0.98		1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Frt		0.93		1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected		0.98		0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1679		1530		1366		4302	1406	1770	4385	
Flt Permitted		0.98		0.76		1.00		1.00	1.00	0.11	1.00	
Satd. Flow (perm)		1679		1218		1366		4302	1406	211	4385	
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)	1	0	1	166	0	67	0	1404	80	154	3569	0
RTOR Reduction (vph)	0	2	0	0	0	56	0	0	20	0	0	0
Lane Group Flow (vph)	0	0	0	166	0	11	0	1404	60	154	3569	0
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	18%	2%	16%	2%	6%	10%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Turn Type	Perm	NA		Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		23.3		23.3		23.3		91.2	91.2	104.6	104.6	
Effective Green, g (s)		23.3		23.3		23.3		91.2	91.2	104.6	104.6	
Actuated g/C Ratio		0.17		0.17		0.17		0.65	0.65	0.75	0.75	
Clearance Time (s)		6.2		6.2		6.2		5.9	5.9	4.0	5.9	
Vehicle Extension (s)		3.0		3.0		3.0		3.6	3.6	3.0	3.6	
Lane Grp Cap (vph)		279		202		227		2802	915	262	3276	
v/s Ratio Prot								0.33		0.04	c0.81	
v/s Ratio Perm		0.00		c0.14		0.01			0.04	0.40		
v/c Ratio		0.00		0.82		0.05		0.50	0.07	0.59	1.09	
Uniform Delay, d1		48.6		56.3		49.0		12.6	8.9	8.7	17.7	
Progression Factor		1.00		1.00		1.00		1.73	3.18	1.61	0.26	
Incremental Delay, d2		0.0		22.8		0.1		0.5	0.1	0.3	40.8	
Delay (s)		48.7		79.1		49.1		22.3	28.3	14.4	45.5	
Level of Service		D		E		D		C	C	B	D	
Approach Delay (s)		48.7			70.5			22.6			44.2	
Approach LOS		D			E			C			D	
Intersection Summary												
HCM 2000 Control Delay			39.4									HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio			1.07									
Actuated Cycle Length (s)			140.0							16.1		
Intersection Capacity Utilization			108.1%								G	
ICU Level of Service												
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

2031 Future Total AM Peak Hour

4: Bronte Road & Driveway/North Service Road West

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↔↔↔	↔	↔	↔↔↔	
Traffic Volume (vph)	0	0	0	17	0	44	0	1423	241	268	3352	1
Future Volume (vph)	0	0	0	17	0	44	0	1423	241	268	3352	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	45.0		0.0	35.0		70.0	115.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			50.0			65.0			65.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	*0.80	1.00	1.00	*0.80	0.91
Ped Bike Factor						0.98			0.98		1.00	
Frt						0.850			0.850			
Flt Protected				0.950	0.950					0.950		
Satd. Flow (prot)	0	1863	0	1681	1681	1583	1863	4343	1583	1770	4385	0
Flt Permitted				0.950	0.950					0.087		
Satd. Flow (perm)	0	1863	0	1681	1681	1555	1863	4343	1546	162	4385	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						112			205			
Link Speed (k/h)		20			50			60			60	
Link Distance (m)		52.6			84.3			299.0			435.9	
Travel Time (s)		9.5			6.1			17.9			26.2	
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	4%	2%
Adj. Flow (vph)	0	0	0	17	0	45	0	1452	246	273	3420	1
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	8	9	45	0	1452	246	273	3421	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

12-05-2021

NA

CGH Transportation

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Lanes, Volumes, Timings

2031 Future Total AM Peak Hour

4: Bronte Road & Driveway/North Service Road West

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8			4			2			1	6	
Permitted Phases	8			4		4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	15.0	15.0	15.0	6.0	15.0	
Minimum Split (s)	24.7	24.7		36.9	36.9	36.9	41.7	41.7	41.7	10.5	24.7	
Total Split (s)	13.0	13.0		39.0	39.0	39.0	77.0	77.0	77.0	11.0	88.0	
Total Split (%)	9.3%	9.3%		27.9%	27.9%	27.9%	55.0%	55.0%	55.0%	7.9%	62.9%	
Maximum Green (s)	6.3	6.3		33.1	33.1	33.1	70.3	70.3	70.3	7.0	81.3	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		2.2	2.2	2.2	3.0	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)	6.7			5.9	5.9	5.9	6.7	6.7	6.7	4.0	6.7	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0			
Flash Dont Walk (s)				24.0	24.0	24.0	28.0	28.0	28.0			
Pedestrian Calls (#/hr)				1	1	1	0	0	0			
Act Effect Green (s)				16.5	16.5	16.5		77.1	77.1	116.8	115.4	
Actuated g/C Ratio				0.12	0.12	0.12		0.55	0.55	0.83	0.82	
v/c Ratio				0.04	0.05	0.16		0.61	0.26	0.53	0.95	
Control Delay				49.1	49.3	1.2		20.1	3.9	32.6	6.2	
Queue Delay				0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay				49.1	49.3	1.2		20.1	3.9	32.6	6.2	
LOS				D	D	A		C	A	C	A	
Approach Delay				14.4			17.7			8.2		
Approach LOS				B			B			A		
Queue Length 50th (m)				2.3	2.5	0.0		79.8	7.3	37.6	19.2	
Queue Length 95th (m)				7.1	7.5	0.0		160.3	m9.0	m37.4	m#419.0	
Internal Link Dist (m)	28.6			60.3			275.0			411.9		
Turn Bay Length (m)				45.0						70.0	115.0	
Base Capacity (vph)				397	397	453		2390	943	514	3615	
Starvation Cap Reductn				0	0	0		0	0	0	0	
Spillback Cap Reductn				0	0	0		0	0	0	0	
Storage Cap Reductn				0	0	0		0	0	0	0	
Reduced v/c Ratio				0.02	0.02	0.10		0.61	0.26	0.53	0.95	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 27 (19%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 11.2

Intersection LOS: B

Intersection Capacity Utilization 102.3%

ICU Level of Service G

Analysis Period (min) 15

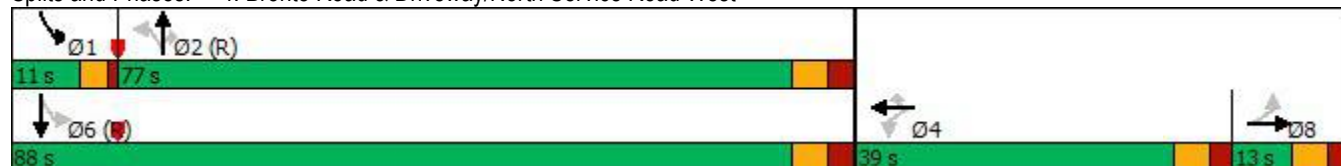
* User Entered Value

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 4: Bronte Road & Driveway/North Service Road West



HCM Signalized Intersection Capacity Analysis

4: Bronte Road & Driveway/North Service Road West

2031 Future Total AM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↑↑↑	↔	↔	↑↑↑	
Traffic Volume (vph)	0	0	0	17	0	44	0	1423	241	268	3352	1
Future Volume (vph)	0	0	0	17	0	44	0	1423	241	268	3352	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Lane Util. Factor				0.95	0.95	1.00		*0.80	1.00	1.00	*0.80	
Frpb, ped/bikes				1.00	1.00	0.98		1.00	0.98	1.00	1.00	
Flpb, ped/bikes				1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt				1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected				0.95	0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1681	1681	1545		4343	1546	1770	4384	
Flt Permitted				0.95	0.95	1.00		1.00	1.00	0.09	1.00	
Satd. Flow (perm)				1681	1681	1545		4343	1546	161	4384	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	17	0	45	0	1452	246	273	3420	1
RTOR Reduction (vph)	0	0	0	0	0	40	0	0	94	0	0	0
Lane Group Flow (vph)	0	0	0	8	9	5	0	1452	152	273	3421	0
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	4%	2%
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		8			4			2		1	6	
Permitted Phases	8			4		4	2		2	6		
Actuated Green, G (s)				14.5	14.5	14.5		75.9	75.9	112.9	112.9	
Effective Green, g (s)				14.5	14.5	14.5		75.9	75.9	112.9	112.9	
Actuated g/C Ratio				0.10	0.10	0.10		0.54	0.54	0.81	0.81	
Clearance Time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Vehicle Extension (s)				5.0	5.0	5.0		5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)				174	174	160		2354	838	509	3535	
v/s Ratio Prot								0.33		0.13	c0.78	
v/s Ratio Perm				0.00	0.01	0.00			0.10	0.31		
v/c Ratio				0.05	0.05	0.03		0.62	0.18	0.54	0.97	
Uniform Delay, d1				56.5	56.6	56.4		22.0	16.3	25.6	11.9	
Progression Factor				1.00	1.00	1.00		0.88	0.93	1.37	0.20	
Incremental Delay, d2				0.2	0.3	0.2		1.0	0.4	0.1	1.3	
Delay (s)				56.7	56.8	56.6		20.4	15.6	35.3	3.7	
Level of Service				E	E	E		C	B	D	A	
Approach Delay (s)		0.0			56.6			19.7			6.0	
Approach LOS		A			E			B			A	
Intersection Summary												
HCM 2000 Control Delay			10.9									
HCM 2000 Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			140.0							23.3		
Intersection Capacity Utilization			102.3%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2031 Future Total AM Peak Hour
1300 Bronte Enns

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	193	296	1368	0	0	2113
Future Volume (vph)	193	296	1368	0	0	2113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	90.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	1.00	*0.80	1.00	1.00	*0.80
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3335	1568	4385	0	0	4427
Flt Permitted	0.950					
Satd. Flow (perm)	3335	1568	4385	0	0	4427
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		29				
Link Speed (k/h)	60		60			60
Link Distance (m)	65.9		376.8			299.0
Travel Time (s)	4.0		22.6			17.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	3%	4%	2%	2%	3%
Adj. Flow (vph)	210	322	1487	0	0	2297
Shared Lane Traffic (%)						
Lane Group Flow (vph)	210	322	1487	0	0	2297
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2031 Future Total AM Peak Hour
1300 Bronte Enns



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8					
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.7	24.7	36.5			26.5
Total Split (s)	24.7	24.7	45.3			45.3
Total Split (%)	35.3%	35.3%	64.7%			64.7%
Maximum Green (s)	18.0	18.0	38.8			38.8
Yellow Time (s)	3.7	3.7	3.7			3.7
All-Red Time (s)	3.0	3.0	2.8			2.8
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	6.7	6.7	6.5			6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	C-Max			C-Max
Act Effect Green (s)	16.4	16.4	40.4			40.4
Actuated g/C Ratio	0.23	0.23	0.58			0.58
v/c Ratio	0.27	0.83	0.59			0.90
Control Delay	22.3	42.5	17.9			17.4
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	22.3	42.5	17.9			17.4
LOS	C	D	B			B
Approach Delay	34.5		17.9			17.4
Approach LOS	C		B			B
Queue Length 50th (m)	11.8	37.3	104.2			166.8
Queue Length 95th (m)	20.1	#76.0	m113.8			203.5
Internal Link Dist (m)	41.9		352.8			275.0
Turn Bay Length (m)		90.0				
Base Capacity (vph)	857	424	2533			2557
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.25	0.76	0.59			0.90

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 14 (20%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 19.7

Intersection LOS: B

Intersection Capacity Utilization 60.2%

ICU Level of Service B

Analysis Period (min) 15

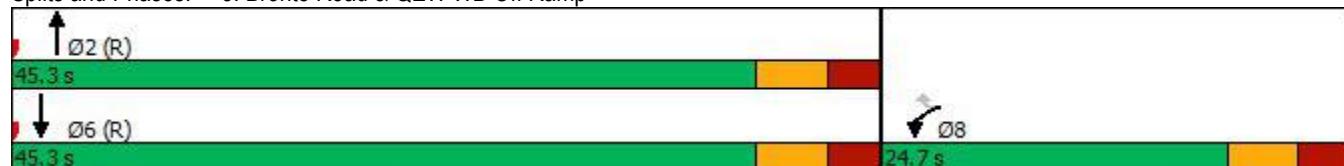
* User Entered Value

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 5: Bronte Road & QEW WB Off Ramp



HCM Signalized Intersection Capacity Analysis

5: Bronte Road & QEW WB Off Ramp

2031 Future Total AM Peak Hour
1300 Bronte Enns

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	193	296	1368	0	0	2113
Future Volume (vph)	193	296	1368	0	0	2113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7	6.5			6.5
Lane Util. Factor	0.97	1.00	*0.80			*0.80
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3335	1568	4385			4427
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3335	1568	4385			4427
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	210	322	1487	0	0	2297
RTOR Reduction (vph)	0	22	0	0	0	0
Lane Group Flow (vph)	210	300	1487	0	0	2297
Heavy Vehicles (%)	5%	3%	4%	2%	2%	3%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	16.4	16.4	40.4			40.4
Effective Green, g (s)	16.4	16.4	40.4			40.4
Actuated g/C Ratio	0.23	0.23	0.58			0.58
Clearance Time (s)	6.7	6.7	6.5			6.5
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	781	367	2530			2555
v/s Ratio Prot	0.06		0.34			c0.52
v/s Ratio Perm		c0.19				
v/c Ratio	0.27	0.82	0.59			0.90
Uniform Delay, d1	21.9	25.4	9.5			13.0
Progression Factor	1.00	1.00	1.77			1.11
Incremental Delay, d2	0.2	13.1	0.5			2.0
Delay (s)	22.1	38.5	17.3			16.5
Level of Service	C	D	B			B
Approach Delay (s)	32.0		17.3			16.5
Approach LOS	C		B			B
Intersection Summary						
HCM 2000 Control Delay			18.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.88			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	13.2
Intersection Capacity Utilization			60.2%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings

2031 Future Total AM Peak Hour

6: Bronte Road & Parking Lot Access/QEW EB Ramps

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1	2	359	2	603	3	911	232	676	1552	9
Future Volume (vph)	7	1	2	359	2	603	3	911	232	676	1552	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	10.0		0.0	130.0		125.0	120.0		95.0	255.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			65.0			95.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.91	0.95	1.00	*0.80	1.00	1.00	*0.80	0.91
Ped Bike Factor									0.97		1.00	
Frt		0.900			0.868	0.850			0.850		0.999	
Flt Protected	0.950			0.950	0.994		0.950			0.950		
Satd. Flow (prot)	1770	1676	0	1665	1424	1461	1770	4262	1583	1770	4380	0
Flt Permitted	0.950			0.950	0.994		0.150			0.130		
Satd. Flow (perm)	1770	1676	0	1665	1424	1461	279	4262	1538	242	4380	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					280	347			252		1	
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		53.2			37.5			215.0			376.8	
Travel Time (s)		4.8			3.4			12.9			22.6	
Confl. Bikes (#/hr)									5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	3%	2%	5%	2%	7%	2%	2%	4%	2%
Adj. Flow (vph)	8	1	2	390	2	655	3	990	252	735	1687	10
Shared Lane Traffic (%)				10%		47%						
Lane Group Flow (vph)	8	3	0	351	349	347	3	990	252	735	1697	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

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NA

CGH Transportation

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Lanes, Volumes, Timings
6: Bronte Road & Parking Lot Access/QEW EB Ramps

2031 Future Total AM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	36.7	36.7		36.7	36.7	36.7	36.5	36.5	36.5	11.5	36.5	
Total Split (s)	36.7	36.7		50.0	50.0	50.0	37.3	37.3	37.3	16.0	53.3	
Total Split (%)	26.2%	26.2%		35.7%	35.7%	35.7%	26.6%	26.6%	26.6%	11.4%	38.1%	
Maximum Green (s)	30.0	30.0		43.3	43.3	43.3	30.8	30.8	30.8	12.0	46.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.8	2.8	2.8	1.0	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)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				23.0	23.0	23.0	23.0	23.0	23.0		23.0	
Pedestrian Calls (#/hr)				0	0	0	0	0	0		0	
Act Effect Green (s)	7.1	7.1		35.8	35.8	35.8	30.8	30.8	30.8	88.0	85.5	
Actuated g/C Ratio	0.05	0.05		0.26	0.26	0.26	0.22	0.22	0.22	0.63	0.61	
v/c Ratio	0.09	0.04		0.83	0.61	0.55	0.05	1.06	0.47	1.04	0.63	
Control Delay	65.6	64.0		65.1	13.9	7.1	45.7	97.2	8.2	72.2	24.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	65.6	64.0		65.1	13.9	7.1	45.7	97.2	8.2	72.2	24.1	
LOS	E	E		E	B	A	D	F	A	E	C	
Approach Delay		65.1			28.8			79.1			38.6	
Approach LOS		E			C			E			D	
Queue Length 50th (m)	2.3	0.9		101.4	17.2	0.0	0.7	~131.3	0.0	211.3	139.5	
Queue Length 95th (m)	8.3	4.3		133.2	50.9	25.1	3.6	#165.8	23.6	m#332.5	159.9	
Internal Link Dist (m)		29.2			13.5			191.0			352.8	
Turn Bay Length (m)	10.0			130.0		125.0	120.0		95.0	255.0		
Base Capacity (vph)	379	359		514	633	691	61	937	534	704	2674	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.02	0.01		0.68	0.55	0.50	0.05	1.06	0.47	1.04	0.63	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 88 (63%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.06

Intersection Signal Delay: 47.2

Intersection LOS: D

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NA

CGH Transportation

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Intersection Capacity Utilization 92.2%

ICU Level of Service F

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

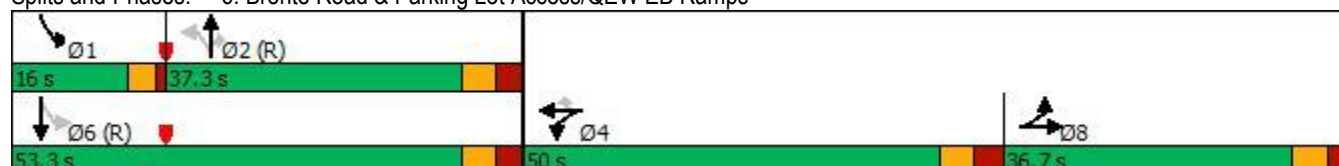
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 6: Bronte Road & Parking Lot Access/QEW EB Ramps



HCM Signalized Intersection Capacity Analysis

6: Bronte Road & Parking Lot Access/QEW EB Ramps

2031 Future Total AM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1	2	359	2	603	3	911	232	676	1552	9
Future Volume (vph)	7	1	2	359	2	603	3	911	232	676	1552	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lane Util. Factor	1.00	1.00		0.95	0.91	0.95	1.00	*0.80	1.00	1.00	*0.80	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97	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	
Frt	1.00	0.90		1.00	0.87	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1676		1665	1424	1461	1770	4262	1536	1770	4381	
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.15	1.00	1.00	0.13	1.00	
Satd. Flow (perm)	1770	1676		1665	1424	1461	279	4262	1536	243	4381	
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)	8	1	2	390	2	655	3	990	252	735	1687	10
RTOR Reduction (vph)	0	0	0	0	208	258	0	0	204	0	0	0
Lane Group Flow (vph)	8	3	0	351	141	89	3	990	48	735	1697	0
Confl. Bikes (#/hr)									5			5
Heavy Vehicles (%)	2%	2%	2%	3%	2%	5%	2%	7%	2%	2%	4%	2%
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Actuated Green, G (s)	2.9	2.9		35.8	35.8	35.8	26.7	26.7	26.7	81.4	81.4	
Effective Green, g (s)	2.9	2.9		35.8	35.8	35.8	26.7	26.7	26.7	81.4	81.4	
Actuated g/C Ratio	0.02	0.02		0.26	0.26	0.26	0.19	0.19	0.19	0.58	0.58	
Clearance Time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	36	34		425	364	373	53	812	292	694	2547	
v/s Ratio Prot	c0.00	0.00		c0.21	0.10			c0.23		c0.38	0.39	
v/s Ratio Perm						0.06	0.01		0.03	0.23		
v/c Ratio	0.22	0.09		0.83	0.39	0.24	0.06	1.22	0.16	1.06	0.67	
Uniform Delay, d1	67.4	67.3		49.2	43.0	41.3	46.3	56.6	47.3	38.1	20.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.19	
Incremental Delay, d2	3.1	1.1		12.4	0.7	0.3	2.0	109.7	1.2	41.7	0.7	
Delay (s)	70.6	68.4		61.5	43.7	41.6	48.4	166.4	48.5	81.3	24.4	
Level of Service	E	E		E	D	D	D	F	D	F	C	
Approach Delay (s)		70.0			49.0			142.2			41.6	
Approach LOS		E			D			F			D	
Intersection Summary												
HCM 2000 Control Delay			69.8			HCM 2000 Level of Service				E		
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			23.9			
Intersection Capacity Utilization			92.2%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2031 Future Total PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	74	114	252	155	252	325	2173	414	265	1355	20
Future Volume (vph)	7	74	114	252	155	252	325	2173	414	265	1355	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	140.0		0.0	135.0		80.0	180.0		50.0
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (m)	65.0			100.0			70.0			70.0		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Ped Bike Factor	0.99		0.98			0.97			0.97			0.97
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	3400	1863	1583	1770	4471	1558	1770	4385	1473
Flt Permitted	0.653			0.578			0.081			0.059		
Satd. Flow (perm)	1209	1863	1556	2068	1863	1543	151	4471	1517	110	4385	1433
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			121			268			249			122
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		296.6			291.2			731.4			120.4	
Travel Time (s)		17.8			17.5			43.9			7.2	
Confl. Peds. (#/hr)	6					6	1		1	1		1
Confl. Bikes (#/hr)			5			5			5			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 (%)	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Adj. Flow (vph)	7	79	121	268	165	268	346	2312	440	282	1441	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	79	121	268	165	268	346	2312	440	282	1441	21
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.00	1.00	1.03
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
1: Bronte Road & Upper Middle Road

2031 Future Total PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0	10.0	6.0	20.0	20.0	6.0	20.0	20.0
Minimum Split (s)	10.5	36.7	36.7	10.5	36.7	36.7	10.5	36.5	36.5	10.5	36.5	36.5
Total Split (s)	10.5	36.7	36.7	10.5	36.7	36.7	32.4	73.8	73.8	19.0	60.4	60.4
Total Split (%)	7.5%	26.2%	26.2%	7.5%	26.2%	26.2%	23.1%	52.7%	52.7%	13.6%	43.1%	43.1%
Maximum Green (s)	6.5	30.0	30.0	6.5	30.0	30.0	28.4	67.3	67.3	15.0	53.9	53.9
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	2.8	2.8	1.0	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	0.0	0.0
Total Lost Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
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	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)					7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)					23.0	23.0		23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)					6	6		1	1		1	1
Act Effct Green (s)	23.8	14.9	14.9	27.3	23.3	23.3	96.9	70.2	70.2	98.4	71.3	71.3
Actuated g/C Ratio	0.17	0.11	0.11	0.20	0.17	0.17	0.69	0.50	0.50	0.70	0.51	0.51
v/c Ratio	0.03	0.40	0.44	0.58	0.53	0.56	0.85	1.03	0.50	0.70	0.65	0.03
Control Delay	40.3	62.2	13.4	53.6	59.4	10.0	56.0	62.1	11.4	47.1	28.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.3	62.2	13.4	53.6	59.4	10.0	56.0	62.1	11.4	47.1	28.7	0.1
LOS	D	E	B	D	E	B	E	E	B	D	C	A
Approach Delay		32.9			38.3			54.3			31.3	
Approach LOS		C			D			D			C	
Queue Length 50th (m)	1.7	22.5	0.0	36.4	45.1	0.0	70.3	272.4	32.1	56.7	120.6	0.0
Queue Length 95th (m)	5.3	34.5	17.2	42.5	65.2	24.7	#124.4	#344.5	66.1	#146.5	183.6	0.0
Internal Link Dist (m)		272.6			267.2			707.4			96.4	
Turn Bay Length (m)	70.0		70.0	140.0			135.0		80.0	180.0		50.0
Base Capacity (vph)	233	399	428	464	399	541	443	2241	884	400	2233	789
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.20	0.28	0.58	0.41	0.50	0.78	1.03	0.50	0.70	0.65	0.03

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 35 (25%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 1: Bronte Road & Upper Middle Road

2031 Future Total PM Peak Hour
1300 Bronte Enns

Maximum v/c Ratio: 1.03

Intersection Signal Delay: 44.6

Intersection LOS: D

Intersection Capacity Utilization 86.9%

ICU Level of Service E

Analysis Period (min) 15

* User Entered Value

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Bronte Road & Upper Middle Road

 Ø1	 Ø2 (R) 	 Ø3	 Ø4
19 s	73.8 s	10.5 s	36.7 s
 Ø5	 Ø6 (R) 	 Ø7	 Ø8
32.4 s	60.4 s	10.5 s	36.7 s

HCM Signalized Intersection Capacity Analysis

1: Bronte Road & Upper Middle Road

2031 Future Total PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	74	114	252	155	252	325	2173	414	265	1355	20
Future Volume (vph)	7	74	114	252	155	252	325	2173	414	265	1355	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.97
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	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1762	1863	1551	3400	1863	1541	1770	4471	1517	1770	4385	1435
Flt Permitted	0.65	1.00	1.00	0.58	1.00	1.00	0.08	1.00	1.00	0.06	1.00	1.00
Satd. Flow (perm)	1211	1863	1551	2068	1863	1541	150	4471	1517	109	4385	1435
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)	7	79	121	268	165	268	346	2312	440	282	1441	21
RTOR Reduction (vph)	0	0	105	0	0	223	0	0	130	0	0	11
Lane Group Flow (vph)	7	79	16	268	165	45	346	2312	310	282	1441	10
Confl. Peds. (#/hr)	6					6	1		1	1		1
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	4	0	0	6
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	19.4	18.1	18.1	28.6	23.3	23.3	93.1	67.0	67.0	95.3	68.1	68.1
Effective Green, g (s)	19.4	18.1	18.1	28.6	23.3	23.3	93.1	67.0	67.0	95.3	68.1	68.1
Actuated g/C Ratio	0.14	0.13	0.13	0.20	0.17	0.17	0.66	0.48	0.48	0.68	0.49	0.49
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	4.0	6.5	6.5	4.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	172	240	200	484	310	256	401	2139	725	396	2132	698
v/s Ratio Prot	0.00	0.04		c0.03	0.09		c0.16	c0.52		0.14	0.33	
v/s Ratio Perm	0.01		0.01	c0.09		0.03	0.41		0.20	0.34		0.01
v/c Ratio	0.04	0.33	0.08	0.55	0.53	0.17	0.86	1.08	0.43	0.71	0.68	0.01
Uniform Delay, d1	52.2	55.4	53.6	49.5	53.4	50.1	38.8	36.5	23.9	41.7	27.5	18.6
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	0.1	0.8	0.2	1.4	1.8	0.3	17.1	45.4	1.8	6.0	1.7	0.0
Delay (s)	52.2	56.2	53.8	50.8	55.1	50.4	56.0	81.9	25.8	47.6	29.2	18.6
Level of Service	D	E	D	D	E	D	E	F	C	D	C	B
Approach Delay (s)		54.7			51.7			71.0			32.1	
Approach LOS		D			D			E			C	
Intersection Summary												
HCM 2000 Control Delay			56.3									
HCM 2000 Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			140.0									
Intersection Capacity Utilization			86.9%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
2: Bronte Road & Saw Whet Boulevard

2031 Future Total PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	29	104	0	59	47	2921	174	99	1670	17
Future Volume (vph)	10	0	29	104	0	59	47	2921	174	99	1670	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	15.0		15.0	15.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Frt		0.850			0.850				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1770	1583	0	1770	4471	1583	1770	4471	1583
Flt Permitted	0.715			0.736			0.088			0.037		
Satd. Flow (perm)	1332	1583	0	1371	1583	0	164	4471	1583	69	4471	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		51			54				51			18
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		42.5			50.2			458.5			731.4	
Travel Time (s)		3.1			3.6			27.5			43.9	
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)	11	0	32	113	0	64	51	3175	189	108	1815	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	32	0	113	64	0	51	3175	189	108	1815	18
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	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
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		6

Lanes, Volumes, Timings
2: Bronte Road & Saw Whet Boulevard

2031 Future Total PM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	35.5	35.5		35.5	35.5		35.5	35.5	35.5	9.5	35.5	35.5
Total Split (s)	35.5	35.5		35.5	35.5		104.5	104.5	104.5	9.5	104.5	104.5
Total Split (%)	23.7%	23.7%		23.7%	23.7%		69.9%	69.9%	69.9%	6.4%	69.9%	69.9%
Maximum Green (s)	30.0	30.0		30.0	30.0		99.0	99.0	99.0	5.0	99.0	99.0
Yellow Time (s)	3.3	3.3		3.3	3.3		3.7	3.7	3.7	3.5	3.7	3.7
All-Red Time (s)	2.2	2.2		2.2	2.2		1.8	1.8	1.8	1.0	1.8	1.8
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)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	4.5	5.5	5.5
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	23.0	23.0		23.0	23.0		23.0	23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0		0	0
Act Effect Green (s)	17.6	17.6		17.6	17.6		104.8	104.8	104.8	121.9	120.9	120.9
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.70	0.70	0.70	0.82	0.81	0.81
v/c Ratio	0.07	0.14		0.70	0.27		0.45	1.01	0.17	0.57	0.50	0.01
Control Delay	56.3	6.7		85.0	20.4		26.7	42.3	6.4	41.4	5.6	1.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.3	6.7		85.0	20.4		26.7	42.3	6.4	41.4	5.6	1.6
LOS	E	A		F	C		C	D	A	D	A	A
Approach Delay		19.4			61.7			40.0			7.5	
Approach LOS		B			E			D			A	
Queue Length 50th (m)	3.1	0.0		34.5	2.8		6.5	~436.2	13.2	15.6	63.9	0.0
Queue Length 95th (m)	9.2	5.1		54.3	17.0		24.1	#481.5	25.3	#41.3	94.9	2.0
Internal Link Dist (m)		18.5			26.2			434.5			707.4	
Turn Bay Length (m)	15.0			15.0			15.0		15.0	15.0		15.0
Base Capacity (vph)	267	358		275	360		114	3132	1124	188	3615	1283
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.09		0.41	0.18		0.45	1.01	0.17	0.57	0.50	0.01

Intersection Summary

Area Type: Other

Cycle Length: 149.5

Actuated Cycle Length: 149.5

Offset: 128 (86%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.01

Intersection Signal Delay: 29.3

Intersection LOS: C

Intersection Capacity Utilization 87.3%

ICU Level of Service E

Analysis Period (min) 15

* User Entered Value

Lanes, Volumes, Timings 2: Bronte Road & Saw Whet Boulevard

2031 Future Total PM Peak Hour
1300 Bronte Enns

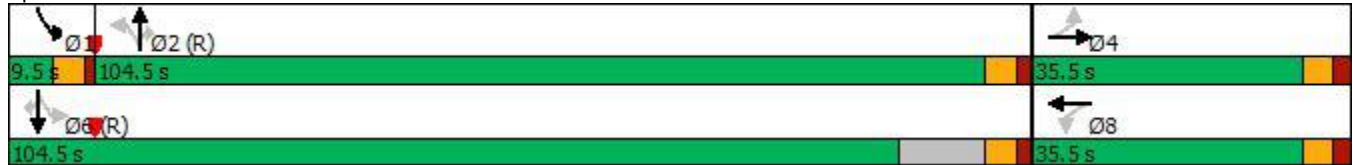
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Bronte Road & Saw Whet Boulevard



HCM Signalized Intersection Capacity Analysis

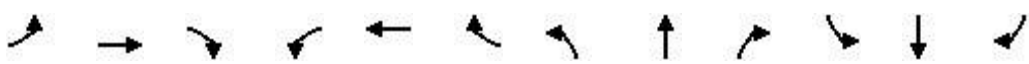
2: Bronte Road & Saw Whet Boulevard

2031 Future Total PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			  	
Traffic Volume (vph)	10	0	29	104	0	59	47	2921	174	99	1670	17
Future Volume (vph)	10	0	29	104	0	59	47	2921	174	99	1670	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	4.5	5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	*0.80	1.00	1.00	*0.80	1.00
Frt	1.00	0.85		1.00	0.85		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)	1770	1583		1770	1583		1770	4471	1583	1770	4471	1583
Flt Permitted	0.72	1.00		0.74	1.00		0.09	1.00	1.00	0.04	1.00	1.00
Satd. Flow (perm)	1332	1583		1372	1583		165	4471	1583	68	4471	1583
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)	11	0	32	113	0	64	51	3175	189	108	1815	18
RTOR Reduction (vph)	0	28	0	0	48	0	0	0	15	0	0	3
Lane Group Flow (vph)	11	4	0	113	16	0	51	3175	174	108	1815	15
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	17.6	17.6		17.6	17.6		104.8	104.8	104.8	120.9	120.9	120.9
Effective Green, g (s)	17.6	17.6		17.6	17.6		104.8	104.8	104.8	120.9	120.9	120.9
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.70	0.70	0.70	0.81	0.81	0.81
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	5.5	5.5	4.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	156	186		161	186		115	3134	1109	187	3615	1280
v/s Ratio Prot		0.00			0.01			c0.71		0.04	c0.41	
v/s Ratio Perm	0.01			c0.08			0.31		0.11	0.42		0.01
v/c Ratio	0.07	0.02		0.70	0.09		0.44	1.01	0.16	0.58	0.50	0.01
Uniform Delay, d1	58.7	58.3		63.4	58.8		9.7	22.4	7.5	50.5	4.6	2.8
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	0.2	0.0		13.0	0.2		11.9	19.4	0.3	4.3	0.5	0.0
Delay (s)	58.9	58.4		76.4	59.0		21.6	41.7	7.8	54.8	5.1	2.8
Level of Service	E	E		E	E		C	D	A	D	A	A
Approach Delay (s)		58.5			70.1			39.6			7.8	
Approach LOS		E			E			D			A	
Intersection Summary												
HCM 2000 Control Delay	29.6			HCM 2000 Level of Service					C			
HCM 2000 Volume to Capacity ratio	0.94											
Actuated Cycle Length (s)	149.5			Sum of lost time (s)					15.5			
Intersection Capacity Utilization	87.3%			ICU Level of Service					E			
Analysis Period (min)	15											
c Critical Lane Group												

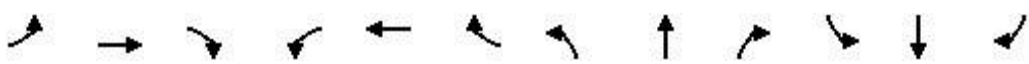
Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2031 Future Total PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔		↔	↔	↑↑↑	↔	↔	↑↑↑	
Traffic Volume (vph)	0	0	0	138	0	110	1	3033	175	89	1751	0
Future Volume (vph)	0	0	0	138	0	110	1	3033	175	89	1751	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		40.0	35.0		30.0	70.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			20.0			60.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	*0.80	1.00	1.00	*0.80	0.91
Ped Bike Factor						0.98			0.98			
Frt						0.850			0.850			
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	0	1863	0	1770	0	1583	1770	4427	1388	1770	4385	0
Flt Permitted				0.757			0.085			0.040		
Satd. Flow (perm)	0	1863	0	1410	0	1556	158	4427	1357	75	4385	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						64			56			
Link Speed (k/h)		20			20			60			60	
Link Distance (m)		78.7			109.0			435.9			458.5	
Travel Time (s)		14.2			19.6			26.2			27.5	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	14%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Adj. Flow (vph)	0	0	0	142	0	113	1	3127	180	92	1805	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	142	0	113	1	3127	180	92	1805	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.03	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1		1	1	2	1	1	2	
Detector Template	Left	Thru		Left		Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0		2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0		2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4						9.4			9.4	
Detector 2 Size(m)		0.6						0.6			0.6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
3: Bronte Road & Driveway/Charles Cornwall Road

2031 Future Total PM Peak Hour
1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type				Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8		8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0		10.0	15.0	15.0	15.0	5.0	15.0	
Minimum Split (s)	24.2	24.2		35.2		35.2	34.9	34.9	34.9	9.5	34.9	
Total Split (s)	35.2	35.2		35.2		35.2	95.3	95.3	95.3	9.5	104.8	
Total Split (%)	25.1%	25.1%		25.1%		25.1%	68.1%	68.1%	68.1%	6.8%	74.9%	
Maximum Green (s)	29.0	29.0		29.0		29.0	89.4	89.4	89.4	5.5	98.9	
Yellow Time (s)	3.1	3.1		3.1		3.1	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.1	3.1		3.1		3.1	2.2	2.2	2.2	1.0	2.2	
Lost Time Adjust (s)		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.2		6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.6	3.6	3.6	3.0	3.6	
Recall Mode	None	None		None		None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0		7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				22.0		22.0	22.0	22.0	22.0		22.0	
Pedestrian Calls (#/hr)				0		0	0	0	0		0	
Act Effect Green (s)				19.3		19.3	96.4	96.4	96.4	110.5	108.6	
Actuated g/C Ratio				0.14		0.14	0.69	0.69	0.69	0.79	0.78	
v/c Ratio				0.73		0.42	0.01	1.03	0.19	0.58	0.53	
Control Delay				78.3		28.9	1.0	30.2	0.7	36.9	7.2	
Queue Delay				0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay				78.3		28.9	1.0	30.2	0.7	36.9	7.2	
LOS				E		C	A	C	A	D	A	
Approach Delay					56.4			28.6			8.6	
Approach LOS					E			C			A	
Queue Length 50th (m)				40.2		12.9	0.0	~417.3	2.0	9.2	72.6	
Queue Length 95th (m)				61.1		30.9	m0.0	m340.7	m3.1	#33.0	106.4	
Internal Link Dist (m)		54.7			85.0			411.9			434.5	
Turn Bay Length (m)						40.0	35.0		30.0	70.0		
Base Capacity (vph)				292		373	108	3048	951	158	3400	
Starvation Cap Reductn				0		0	0	0	0	0	0	
Spillback Cap Reductn				0		0	0	0	0	0	0	
Storage Cap Reductn				0		0	0	0	0	0	0	
Reduced v/c Ratio				0.49		0.30	0.01	1.03	0.19	0.58	0.53	

Intersection Summary

Area Type: Other
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 103.6 (74%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.03

Intersection Signal Delay: 22.9

Intersection LOS: C

Intersection Capacity Utilization 82.8%

ICU Level of Service E

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

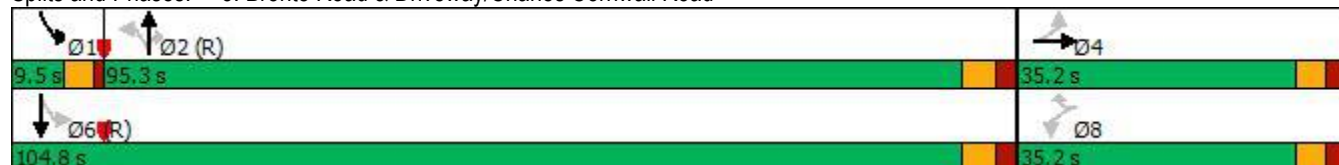
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Bronte Road & Driveway/Charles Cornwall Road



HCM Signalized Intersection Capacity Analysis

3: Bronte Road & Driveway/Charles Cornwall Road

2031 Future Total PM Peak Hour
1300 Bronte Enns

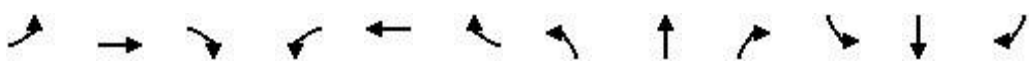
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔		↔	↔	↑↑↑	↔	↔	↑↑↑	
Traffic Volume (vph)	0	0	0	138	0	110	1	3033	175	89	1751	0
Future Volume (vph)	0	0	0	138	0	110	1	3033	175	89	1751	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Lane Util. Factor				1.00		1.00	1.00	*0.80	1.00	1.00	*0.80	
Frpb, ped/bikes				1.00		0.98	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes				1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Frt				1.00		0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected				0.95		1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1770		1552	1770	4427	1357	1770	4385	
Flt Permitted				0.76		1.00	0.09	1.00	1.00	0.04	1.00	
Satd. Flow (perm)				1410		1552	159	4427	1357	74	4385	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	142	0	113	1	3127	180	92	1805	0
RTOR Reduction (vph)	0	0	0	0	0	55	0	0	17	0	0	0
Lane Group Flow (vph)	0	0	0	142	0	58	1	3127	163	92	1805	0
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	14%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	5	0	0	6
Turn Type				Perm		Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)				19.3		19.3	96.4	96.4	96.4	108.6	108.6	
Effective Green, g (s)				19.3		19.3	96.4	96.4	96.4	108.6	108.6	
Actuated g/C Ratio				0.14		0.14	0.69	0.69	0.69	0.78	0.78	
Clearance Time (s)				6.2		6.2	5.9	5.9	5.9	4.0	5.9	
Vehicle Extension (s)				3.0		3.0	3.6	3.6	3.6	3.0	3.6	
Lane Grp Cap (vph)				194		213	109	3048	934	156	3401	
v/s Ratio Prot								c0.71		0.03	c0.41	
v/s Ratio Perm				c0.10		0.04	0.01		0.12	0.42		
v/c Ratio				0.73		0.27	0.01	1.03	0.17	0.59	0.53	
Uniform Delay, d1				57.9		54.1	6.8	21.8	7.7	43.2	6.0	
Progression Factor				1.00		1.00	0.10	0.68	0.11	1.00	1.00	
Incremental Delay, d2				13.3		0.7	0.0	13.5	0.0	5.6	0.6	
Delay (s)				71.2		54.7	0.7	28.3	0.9	48.8	6.6	
Level of Service				E		D	A	C	A	D	A	
Approach Delay (s)		0.0			63.9			26.8			8.6	
Approach LOS		A			E			C			A	
Intersection Summary												
HCM 2000 Control Delay			22.2									
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			140.0							16.1		
Intersection Capacity Utilization			82.8%							E		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

2031 Future Total PM Peak Hour

4: Bronte Road & Driveway/North Service Road West

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↑↑↑	↔	↔	↑↑↑	
Traffic Volume (vph)	0	0	0	129	0	154	0	2960	74	88	1798	2
Future Volume (vph)	0	0	0	129	0	154	0	2960	74	88	1798	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	45.0		0.0	35.0		70.0	115.0		0.0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (m)	7.5			50.0			65.0			65.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	*0.80	1.00	1.00	*0.80	0.91
Ped Bike Factor						0.98			0.97		1.00	
Frt						0.850			0.850			
Flt Protected				0.950	0.950					0.950		
Satd. Flow (prot)	0	1863	0	1681	1681	1583	1863	4427	1583	1770	4385	0
Flt Permitted				0.950	0.950					0.047		
Satd. Flow (perm)	0	1863	0	1681	1681	1553	1863	4427	1538	88	4385	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						159			106			
Link Speed (k/h)		20			50			60			60	
Link Distance (m)		52.6			84.3			299.0			435.9	
Travel Time (s)		9.5			6.1			17.9			26.2	
Confl. Peds. (#/hr)	2					2			2	2		
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	4%	2%
Adj. Flow (vph)	0	0	0	133	0	159	0	3052	76	91	1854	2
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	66	67	159	0	3052	76	91	1856	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

12-05-2021

NA

CGH Transportation

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Lanes, Volumes, Timings

2031 Future Total PM Peak Hour

4: Bronte Road & Driveway/North Service Road West

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		8			4			2		1	6	
Permitted Phases	8			4		4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	15.0	15.0	15.0	6.0	15.0	
Minimum Split (s)	24.7	24.7		36.9	36.9	36.9	41.7	41.7	41.7	10.5	24.7	
Total Split (s)	24.7	24.7		40.0	40.0	40.0	64.8	64.8	64.8	10.5	75.3	
Total Split (%)	17.6%	17.6%		28.6%	28.6%	28.6%	46.3%	46.3%	46.3%	7.5%	53.8%	
Maximum Green (s)	18.0	18.0		34.1	34.1	34.1	58.1	58.1	58.1	6.5	68.6	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		2.2	2.2	2.2	3.0	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)		6.7		5.9	5.9	5.9	6.7	6.7	6.7	4.0	6.7	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		0.0	
Flash Dont Walk (s)				24.0	24.0	24.0	28.0	28.0	28.0		0.0	
Pedestrian Calls (#/hr)				2	2	2	2	2	2		0	
Act Effect Green (s)				34.1	34.1	34.1		80.4	80.4	96.0	93.3	
Actuated g/C Ratio				0.24	0.24	0.24		0.57	0.57	0.69	0.67	
v/c Ratio				0.16	0.16	0.32		1.20	0.08	0.54	0.64	
Control Delay				43.0	43.1	7.8		111.2	0.5	32.9	14.3	
Queue Delay				0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay				43.0	43.1	7.8		111.2	0.5	32.9	14.3	
LOS				D	D	A		F	A	C	B	
Approach Delay					23.9			108.5			15.1	
Approach LOS					C			F			B	
Queue Length 50th (m)				16.1	16.3	0.0		~442.2	0.3	12.5	106.9	
Queue Length 95th (m)				30.4	30.7	18.5		m#389.6	m0.0	30.2	149.5	
Internal Link Dist (m)		28.6			60.3			275.0			411.9	
Turn Bay Length (m)				45.0					70.0	115.0		
Base Capacity (vph)				409	409	498		2542	928	167	2922	
Starvation Cap Reductn				0	0	0		0	0	0	0	
Spillback Cap Reductn				0	0	0		0	0	0	0	
Storage Cap Reductn				0	0	0		0	0	0	0	
Reduced v/c Ratio				0.16	0.16	0.32		1.20	0.08	0.54	0.64	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 85 (61%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.20

Intersection Signal Delay: 70.0

Intersection LOS: E

Intersection Capacity Utilization 85.5%

ICU Level of Service E

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

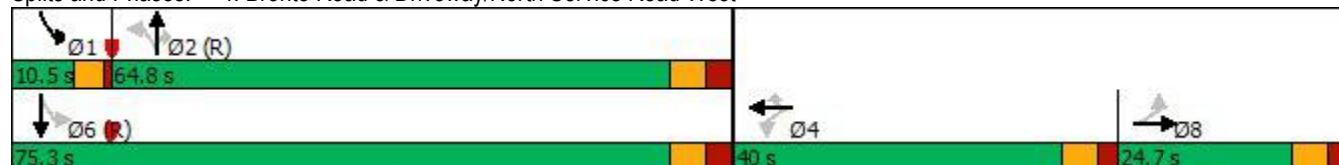
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 4: Bronte Road & Driveway/North Service Road West



HCM Signalized Intersection Capacity Analysis

4: Bronte Road & Driveway/North Service Road West

2031 Future Total PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↑↑↑	↔	↔	↑↑↑	
Traffic Volume (vph)	0	0	0	129	0	154	0	2960	74	88	1798	2
Future Volume (vph)	0	0	0	129	0	154	0	2960	74	88	1798	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Lane Util. Factor				0.95	0.95	1.00		*0.80	1.00	1.00	*0.80	
Frpb, ped/bikes				1.00	1.00	0.98		1.00	0.97	1.00	1.00	
Flpb, ped/bikes				1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt				1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected				0.95	0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1681	1681	1553		4427	1540	1770	4384	
Flt Permitted				0.95	0.95	1.00		1.00	1.00	0.05	1.00	
Satd. Flow (perm)				1681	1681	1553		4427	1540	88	4384	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	133	0	159	0	3052	76	91	1854	2
RTOR Reduction (vph)	0	0	0	0	0	120	0	0	32	0	0	0
Lane Group Flow (vph)	0	0	0	66	67	39	0	3052	44	91	1856	0
Confl. Peds. (#/hr)	2					2			2	2		
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	4%	2%
Turn Type				Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		8			4			2		1	6	
Permitted Phases	8			4		4	2		2	6		
Actuated Green, G (s)				34.1	34.1	34.1		80.4	80.4	93.3	93.3	
Effective Green, g (s)				34.1	34.1	34.1		80.4	80.4	93.3	93.3	
Actuated g/C Ratio				0.24	0.24	0.24		0.57	0.57	0.67	0.67	
Clearance Time (s)				5.9	5.9	5.9		6.7	6.7	4.0	6.7	
Vehicle Extension (s)				5.0	5.0	5.0		5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)				409	409	378		2542	884	165	2921	
v/s Ratio Prot								c0.69		0.03	c0.42	
v/s Ratio Perm				0.04	0.04	0.02			0.03	0.33		
v/c Ratio				0.16	0.16	0.10		1.20	0.05	0.55	0.64	
Uniform Delay, d1				41.7	41.7	41.1		29.8	13.1	33.4	13.5	
Progression Factor				1.00	1.00	1.00		0.59	0.49	1.17	0.97	
Incremental Delay, d2				0.4	0.4	0.2		90.7	0.0	3.4	0.9	
Delay (s)				42.1	42.1	41.3		108.2	6.5	42.5	14.1	
Level of Service				D	D	D		F	A	D	B	
Approach Delay (s)		0.0			41.7			105.7			15.4	
Approach LOS		A			D			F			B	
Intersection Summary												
HCM 2000 Control Delay			69.5				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)		23.3			
Intersection Capacity Utilization			85.5%				ICU Level of Service		E			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2031 Future Total PM Peak Hour
1300 Bronte Enns

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	232	642	2277	0	0	1176
Future Volume (vph)	232	642	2277	0	0	1176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	90.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	0.97	1.00	*0.80	1.00	1.00	*0.80
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3433	1583	4427	0	0	4427
Flt Permitted	0.950					
Satd. Flow (perm)	3433	1583	4427	0	0	4427
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		1				
Link Speed (k/h)	60		60			60
Link Distance (m)	65.9		376.8			299.0
Travel Time (s)	4.0		22.6			17.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	3%	2%	2%	3%
Adj. Flow (vph)	252	698	2475	0	0	1278
Shared Lane Traffic (%)						
Lane Group Flow (vph)	252	698	2475	0	0	1278
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.2		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	2.0	2.0	10.0			10.0
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	2.0	2.0	0.6			0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	0.0	0.0	0.0			0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
5: Bronte Road & QEW WB Off Ramp

2031 Future Total PM Peak Hour
1300 Bronte Enns



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8					
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0			20.0
Minimum Split (s)	24.7	24.7	36.5			26.5
Total Split (s)	62.0	62.0	78.0			78.0
Total Split (%)	44.3%	44.3%	55.7%			55.7%
Maximum Green (s)	55.3	55.3	71.5			71.5
Yellow Time (s)	3.7	3.7	3.7			3.7
All-Red Time (s)	3.0	3.0	2.8			2.8
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	6.7	6.7	6.5			6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	C-Max			C-Max
Act Effect Green (s)	55.3	55.3	71.5			71.5
Actuated g/C Ratio	0.40	0.40	0.51			0.51
v/c Ratio	0.19	1.12	1.10			0.57
Control Delay	28.1	111.9	65.8			22.4
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	28.1	111.9	65.8			22.4
LOS	C	F	E			C
Approach Delay	89.7		65.8			22.4
Approach LOS	F		E			C
Queue Length 50th (m)	24.5	~233.3	~345.3			95.2
Queue Length 95th (m)	34.6	#311.8 m	#351.1			128.2
Internal Link Dist (m)	41.9		352.8			275.0
Turn Bay Length (m)		90.0				
Base Capacity (vph)	1356	625	2260			2260
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.19	1.12	1.10			0.57

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 67 (48%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.12

Intersection Signal Delay: 58.8

Intersection LOS: E

Intersection Capacity Utilization 94.7%

ICU Level of Service F

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 5: Bronte Road & QEW WB Off Ramp



HCM Signalized Intersection Capacity Analysis

5: Bronte Road & QEW WB Off Ramp

2031 Future Total PM Peak Hour
1300 Bronte Enns

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	232	642	2277	0	0	1176
Future Volume (vph)	232	642	2277	0	0	1176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7	6.5			6.5
Lane Util. Factor	0.97	1.00	*0.80			*0.80
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3433	1583	4427			4427
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3433	1583	4427			4427
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	252	698	2475	0	0	1278
RTOR Reduction (vph)	0	1	0	0	0	0
Lane Group Flow (vph)	252	697	2475	0	0	1278
Heavy Vehicles (%)	2%	2%	3%	2%	2%	3%
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	55.3	55.3	71.5			71.5
Effective Green, g (s)	55.3	55.3	71.5			71.5
Actuated g/C Ratio	0.39	0.39	0.51			0.51
Clearance Time (s)	6.7	6.7	6.5			6.5
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	1356	625	2260			2260
v/s Ratio Prot	0.07		c0.56			0.29
v/s Ratio Perm		c0.44				
v/c Ratio	0.19	1.12	1.10			0.57
Uniform Delay, d1	27.7	42.4	34.2			23.6
Progression Factor	1.00	1.00	0.51			0.91
Incremental Delay, d2	0.1	72.2	46.3			0.8
Delay (s)	27.7	114.5	63.7			22.3
Level of Service	C	F	E			C
Approach Delay (s)	91.5		63.7			22.3
Approach LOS	F		E			C
Intersection Summary						
HCM 2000 Control Delay			58.1		HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio			1.10			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	13.2
Intersection Capacity Utilization			94.7%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
6: Bronte Road & Parking Lot Access/QEW EB Ramps

2031 Future Total PM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	0	4	214	1	860	1	1785	228	311	1084	3
Future Volume (vph)	6	0	4	214	1	860	1	1785	228	311	1084	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	10.0		0.0	130.0		125.0	120.0		95.0	255.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			65.0			95.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.91	0.95	1.00	*0.80	1.00	1.00	*0.80	0.91
Ped Bike Factor									0.97		1.00	
Frt		0.850			0.857	0.850			0.850			
Flt Protected	0.950			0.950	0.998		0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1681	1423	1475	1770	4471	1583	1770	4470	0
Flt Permitted	0.950			0.950	0.998		0.191			0.067		
Satd. Flow (perm)	1770	1583	0	1681	1423	1475	356	4471	1543	125	4470	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					423	423			152			
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		53.2			37.5			215.0			376.8	
Travel Time (s)		4.8			3.4			12.9			22.6	
Confl. Bikes (#/hr)									5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	7	0	4	233	1	935	1	1940	248	338	1178	3
Shared Lane Traffic (%)				10%		49%						
Lane Group Flow (vph)	7	4	0	210	482	477	1	1940	248	338	1181	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	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	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

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NA

CGH Transportation

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Lanes, Volumes, Timings
6: Bronte Road & Parking Lot Access/QEW EB Ramps

2031 Future Total PM Peak Hour

1300 Bronte Enns

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Detector Phase	8	8		4	4	4	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	36.7	36.7		36.7	36.7	36.7	36.5	36.5	36.5	11.5	36.5	
Total Split (s)	18.0	18.0		45.0	45.0	45.0	53.0	53.0	53.0	24.0	77.0	
Total Split (%)	12.9%	12.9%		32.1%	32.1%	32.1%	37.9%	37.9%	37.9%	17.1%	55.0%	
Maximum Green (s)	11.3	11.3		38.3	38.3	38.3	46.5	46.5	46.5	20.0	70.5	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.8	2.8	2.8	1.0	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)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)				23.0	23.0	23.0	23.0	23.0	23.0		23.0	
Pedestrian Calls (#/hr)				0	0	0	0	0	0		0	
Act Effect Green (s)	7.1	7.1		26.1	26.1	26.1	60.2	60.2	60.2	97.7	95.2	
Actuated g/C Ratio	0.05	0.05		0.19	0.19	0.19	0.43	0.43	0.43	0.70	0.68	
v/c Ratio	0.08	0.05		0.67	0.79	0.77	0.01	1.01	0.33	0.75	0.39	
Control Delay	65.3	64.8		62.6	17.7	16.2	31.0	61.8	13.3	53.2	14.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	65.3	64.8		62.6	17.7	16.2	31.0	61.8	13.3	53.2	14.8	
LOS	E	E		E	B	B	C	E	B	D	B	
Approach Delay		65.1			25.1			56.3			23.3	
Approach LOS		E			C			E			C	
Queue Length 50th (m)	2.0	1.1		60.9	16.3	14.2	0.2	215.1	15.5	80.8	46.2	
Queue Length 95th (m)	7.4	5.4		81.2	60.6	54.0	1.6	#335.9	44.6	#149.5	97.0	
Internal Link Dist (m)		29.2			13.5			191.0			352.8	
Turn Bay Length (m)	10.0			130.0		125.0	120.0		95.0	255.0		
Base Capacity (vph)	142	127		459	696	710	153	1922	750	451	3039	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.05	0.03		0.46	0.69	0.67	0.01	1.01	0.33	0.75	0.39	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 66 (47%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.01

Intersection Signal Delay: 38.6

Intersection LOS: D

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NA

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Intersection Capacity Utilization 92.4%

ICU Level of Service F

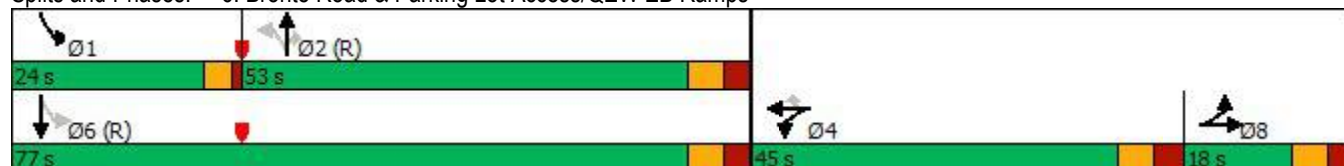
Analysis Period (min) 15

* User Entered Value

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

Queue shown is maximum after two cycles.

Splits and Phases: 6: Bronte Road & Parking Lot Access/QEW EB Ramps



HCM Signalized Intersection Capacity Analysis

6: Bronte Road & Parking Lot Access/QEW EB Ramps

2031 Future Total PM Peak Hour
1300 Bronte Enns

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	0	4	214	1	860	1	1785	228	311	1084	3
Future Volume (vph)	6	0	4	214	1	860	1	1785	228	311	1084	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Lane Util. Factor	1.00	1.00		0.95	0.91	0.95	1.00	*0.80	1.00	1.00	*0.80	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98	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	
Frt	1.00	0.85		1.00	0.86	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1583		1681	1424	1475	1770	4471	1544	1770	4469	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.19	1.00	1.00	0.07	1.00	
Satd. Flow (perm)	1770	1583		1681	1424	1475	357	4471	1544	124	4469	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	0	4	233	1	935	1	1940	248	338	1178	3
RTOR Reduction (vph)	0	0	0	0	344	344	0	0	91	0	0	0
Lane Group Flow (vph)	7	4	0	210	138	133	1	1940	157	338	1181	0
Confl. Bikes (#/hr)									5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	8	8		4	4			2		1	6	
Permitted Phases						4	2		2	6		
Actuated Green, G (s)	2.9	2.9		26.1	26.1	26.1	56.1	56.1	56.1	91.1	91.1	
Effective Green, g (s)	2.9	2.9		26.1	26.1	26.1	56.1	56.1	56.1	91.1	91.1	
Actuated g/C Ratio	0.02	0.02		0.19	0.19	0.19	0.40	0.40	0.40	0.65	0.65	
Clearance Time (s)	6.7	6.7		6.7	6.7	6.7	6.5	6.5	6.5	4.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	36	32		313	265	274	143	1791	618	445	2908	
v/s Ratio Prot	c0.00	0.00		c0.12	0.10			c0.43		c0.17	0.26	
v/s Ratio Perm						0.09	0.00		0.10	0.33		
v/c Ratio	0.19	0.12		0.67	0.52	0.48	0.01	1.08	0.25	0.76	0.41	
Uniform Delay, d1	67.4	67.3		53.0	51.3	50.9	25.2	42.0	28.0	40.8	11.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.22	1.22	
Incremental Delay, d2	2.6	1.8		5.6	1.8	1.4	0.1	47.7	1.0	6.5	0.4	
Delay (s)	70.0	69.1		58.5	53.1	52.3	25.3	89.7	29.0	56.3	14.6	
Level of Service	E	E		E	D	D	C	F	C	E	B	
Approach Delay (s)		69.7			53.8			82.8			23.9	
Approach LOS		E			D			F			C	
Intersection Summary												
HCM 2000 Control Delay			57.5									HCM 2000 Level of Service E
HCM 2000 Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			140.0									Sum of lost time (s) 23.9
Intersection Capacity Utilization			92.4%									ICU Level of Service F
Analysis Period (min)			15									
c Critical Lane Group												