Transportation Impact Assessment – Final Report (Revised)

Elginburg Quarry Expansion

Prepared for Coco Group Inc.
by IBI Group
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Table of Contents

Table of Contents (continued)

List of Tables

List of Figures

List of Appendices

1 Introduction

IBI Group (IBI) was retained by Coco Group to undertake a Traffic Impact Assessment (TIA) Brief in relation to the proposed expansion of the Elginburg Quarry on Unity Road near the rural hamlet of Elginburg, located in the City of Kingston, Ontario. The site location is shown in **Figure 1** below.

The purpose of the study is to supersede all previous transportation studies prepared for the site and provide a revised estimate of anticipated traffic impacts based on revisions to the application. The study will focus on recent improvements to the transportation network and highlight other measures that have been undertaken by Coco Group to minimize impacts to the surrounding communities.

The following items will be addressed as part of this TIA Brief in general accordance with the City of Kingston's Traffic Impact Study Guidelines (July 2016):

1) Summarize the existing and future transportation network within the vicinity of the site;
2) Identify any future developments within the vicinity of the site;
3) Summarize the expected number of new site-generated trips during the weekday morning and afternoon peak hours of adjacent street traffic;
4) Analyse future background and total traffic conditions and identify any necessary road improvements required to accommodate the proposed expansion to the quarry; and
5) Review the location of existing site access intersection to ensure conformance with the best practices established in the Transportation Association of Canada's Geometric Design Guide for Canadian Roads relating to auxiliary turn lanes or slip-around lanes.

Figure 1 - Site Location

2 Description of Proposed Development

The existing Elginburg Quarry produces a range of products including various sized aggregates and asphalt products. On-site operations include extraction, aggregate processing and asphalt production. The facility currently has a licensed annual extraction limit of 0.5 million tonnes per year and operates primarily during daytime hours (7am to 7pm) and occasionally during nighttime hours (7pm to 7am).

The proposed expansion of the Elginburg Quarry will be 73.8 hectares in size and will have a separate Aggregate Resources Act Licence. The proposed Aggregate Resources Act Site Plans that will govern this site include the following conditions:

- The aggregate from this site will be shipped to market from the existing Elginburg Quarry License Number 2901.
- No more that 1 million tonnes of material shall be removed from this site in combination with the existing Elginburg License Number 2901 in any calendar year.

The TIA Brief considers operations commencing in 2022 and the proposed expansion will only operate during daytime hours (7am to 7pm), however extraction for the existing quarry may continue to operate at night in accordance with the requirements of the existing quarry Aggregate Resources Act Site Plans. The site plan for the proposed expansion is shown in **Appendix A**.

The site of the proposed expansion is currently undeveloped, although a hydro corridor and gas pipeline cross the quarry lands. The existing quarry access will be used for access to/from the proposed expansion. Internal haul roads will connect the two properties.

3 Background

The Elginburg Quarry was purchased in 2018 by Coco Properties Corporation, a Division of Coco Group. Since purchasing the property, Coco Group has endeavoured to address community concerns by:

- Expressing to the City of Kingston Mayor and Council that Coco Group is supportive of speed limit reductions on Unity Road (if desired or warranted in the future);
- Making a commitment to the community to restrict truck traffic on Cordukes Road and Bur Brook Road to local deliveries only. As part of this commitment, Coco Group submitted a request to the City of Kingston Council on March 10, 2020, to pass a By-law to restrict truck traffic on Cordukes Road and Bur Brook Road to local deliveries only. This By-law was passed by City of Kingston Council on October 6, 2020;
- Adding signage and issuing a letter to all truck drivers that speed limits must be adhered to and that all haul trucks are to use provincial highway and regional roads only. The letter stated that Cordukes Road and Bur Brook Road were to be used for local deliveries only. Any truck caught violating these rules would be banned from entering the Elginburg Quarry; and
- Establishing a Community Liaison Committee to discuss any new/ongoing concerns and items of interest to the local community relating to the Elginburg Quarry.

In recent years, the City of Kingston has made changes to the transportation network that provide overall benefit to the community, including the signalization of the Highway 38 & Unity Road intersection and set-back stop bars at the Sydenham Road & Unity Road intersection to more safely accommodate truck movements.

Prior to the purchase of the Elginburg Quarry by Coco Group, two transportation studies were completed in support of the proposed expansion:

- Traffic Review Study (IBI Group, January 2014) summarized existing traffic conditions on Unity Road, estimated future site-generated traffic volumes, reviewed sightlines at the site access, reviewed the right-turn taper and slip-by lane at the site access, and analysed operating speeds on Unity Road. The study concluded that Average Annual Daily Traffic (AADT) on Unity Road in 2014 was approximately 2200 vehicles per day, sightlines at the site access were acceptable, the speeds on Unity Road were not expected to create significant conflicts with site-generated traffic, and the geometric layout of the right-turn taper and slip-by lane were consistent with a design speed of 70 to 80 km/h.
    - The 2014 Traffic Review Study and its results / recommendations are now superseded by this Transportation Impact Brief
- Truck Route Evaluation Study (IBI Group, July 2015, revised February 2018) evaluated a variety of potential trucking routes for delivering loads from the quarry. A total of six routes were evaluated, including a hypothetical route along a potential new road next to the gas pipeline. The results of the analysis indicated that the hypothetical new road next to the pipeline would provide the best balance of features to allow for safe and efficient transportation of materials from the quarry, however, the feasibility of such a corridor was unknown as it would require acquiring property for the new road. The remaining routes all

scored similarly indicating that none of the remaining routes were more optimal than the rest.

- The 2015 Truck Route Evaluation Study no longer has any relevance as the preferred route has been ruled out by the property owner and alternative routes utilizing Cordukes Road and Bur Brook Road are no longer viable due to heavy vehicle restrictions.

4 Study Analysis Years

Based on the City of Kingston Traffic Impact Study Guidelines, intersection capacity analysis must be completed under existing traffic conditions, future background and total traffic conditions at site build-out, and future background and total traffic conditions 5-years beyond full build-out. Extraction operations in the proposed expansion has been assumed to begin in 2022, therefore, the following analysis years will be assessed:

- 2020 – Existing conditions
- 2022 – Full build-out
- 2027 – 5 years beyond full build-out

5 Traffic Data and Analysis Periods

The COVID-19 pandemic has had a significant impact on traffic volumes and any data collected in 2020 would be unlikely to be representative of typical conditions. As such, the Existing (2020) Traffic analysis has estimated traffic volumes representative of 2020 traffic conditions by applying an annual 2% growth factor to historical, pre-pandemic traffic volumes. This approach was vetted and approved by City staff prior to the commencement of this study.

The analysis undertaken in this study will review traffic conditions on the adjacent roadways within the study area during the weekday morning and afternoon peak hours and will evaluate the relative impacts of the quarry using the highest hourly volume of truck traffic expected to be generated over the course of a day.

6 Existing Transportation Network

The following roadways are located within the vicinity of the proposed development:

- **Unity Road (Regional Road 19)** is a two-lane rural arterial road under the jurisdiction of the City of Kingston that extends east-west from Highway 401 in Odessa to Battersea Road in Kingston. The posted speed limit on Unity Road is 80 km/h, reducing to 50 km/h through the community of Elginburg.
- **Sydenham Road (Regional Road 9)** is a two-lane rural arterial road under the jurisdiction of the City of Kingston that extends north-south from Rutledge Road in Sydenham to Princess Street in Kingston. The posted speed limit on Sydenham Road is 60 km/h, increasing to 80 km/h north of Burbrook Road and reducing to 50 km/h through the community of Elginburg.

- **Cordukes Road** is a two-lane rural local road under the jurisdiction of the City of Kingston that extends north-south from Unity Road to Highway 38. Cordukes Road has a posted speed limit of 60 km/h and heavy vehicles are restricted from using this road.
- **Burbrook Road** is a two-lane rural arterial road under the jurisdiction of the City of Kingston that extends east-west from west of Highway 38 to Perth Road. It has a posted speed limit of 50 km/h and restricts heavy vehicle traffic between Highway 38 and Cordukes Road.
- **Highway 38** is a two-lane rural arterial road under the jurisdiction of the City of Kingston that extends from Highway 7 near Sharbot Lake to Kingston. The posted speed limit is 80 km/h, reducing to 60 km/h near Unity Road and 70 km/h south of Burbrook Road.
- **Highway 401** is a four-lane divided provincial highway under the jurisdiction of the Ontario Ministry of Transportation (MTO) that extends from Windsor, Ontario to the Quebec border where it transitions to Autoroute 20. The posted speed limit on Highway 401 is 100 km/h.

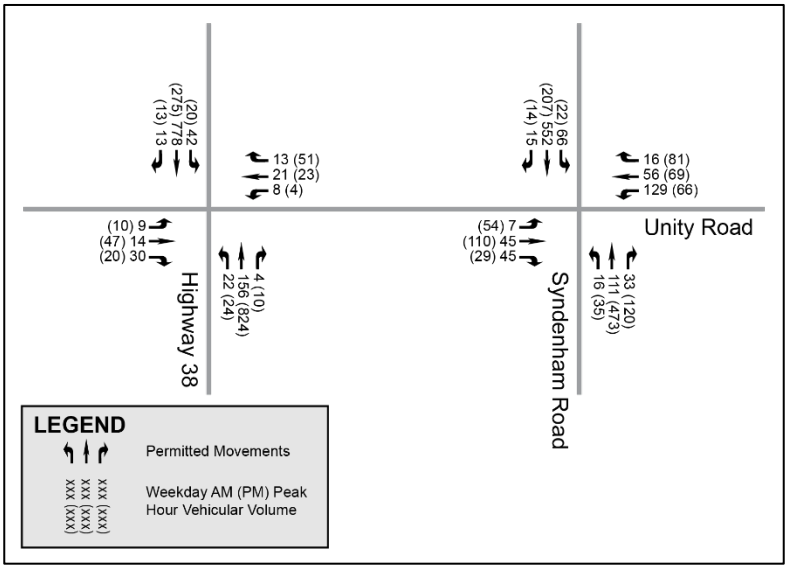
There are two key signalized intersections within the established study area:

- Highway 38 & Unity Road
- Sydenham Road & Unity Road

The intersection of Highway 38 & Unity Road has recently been upgraded from a two-way stop-controlled intersection to a signalized intersection.

Traffic volumes representative of Existing (2020) Traffic conditions are illustrated in **Figure 2**. The turning movement counts have been provided in **Appendix B**.

Figure 2 - Existing (2020) Traffic



Historical collision data has been provided by the City of Kingston for the segment of Unity Road along the site frontage and is included in **Appendix C**. Based on the data provided, there has only been one reported collision within proximity to the site access in recent years.

7 Future Conditions

7.1 Future Transportation Network

Based on the Kingston Transportation Master Plan (TMP), there are currently no roadway network modifications planned within the study area.

7.2 Adjacent Developments

The City of Kingston's Development and Services Hub (DASH) does not identify any development applications of significance within the study area that would have a direct impact on traffic volumes.

7.3 Background Traffic Growth

Based on discussions with City of Kingston staff, it was established that a 2% average annual growth rate would be used to estimate future background traffic volumes.

7.4 Site Traffic Generation

If the Elginburg Quarry Expansion is approved, a condition of approval will be to limit truck trips to a maximum of 22 inbound and outbound truck-trips per hour during daytime hours, for a total of 44 two-way trips per hour, with consideration that all trucks enter and exit the quarry within a period of less than 60 minutes. This hourly volume represents the worst-case hourly volume of truck traffic that can be generated by the site based on the limitations described in the Acoustic Assessment Report (Freefield Ltd., March 2020) regarding the proposed expansion. Despite the existing quarry only permitting 0.5 million tonnes a year, during a peak hour, this amount of traffic can already be generated at the existing quarry. The proposed quarry to permit 1.0 million tonnes in combination with the existing quarry will not increase peak hour shipping since limitations on-site restrict how many trucks can be loaded and shipped within any given hour. Any increased production will therefore be spread over the course of the quarry's operating hours. Based on a review of existing quarry traffic movements, the maximum hourly volume of truck trips described above would be rare. **Table 1** below illustrates the historical hourly truck-trip generation of the existing quarry based on ticket data provided by Coco Group.

Table 1 - Historical Hourly Trip Generation

	2012	2018	2019	2020
Average Hourly Truck Trips Observed	9.9	2.2	3.9	4.5
Hours per Year Truck Volumes Exceeded 44 (inbound and outbound)	N/A	0 hours	0 hours	7 hours

As **Table 1** illustrates, the average hourly truck generation of the quarry is typically well below the hourly truck limit identified in the Acoustic Assessment report. Further analysis of this data did not indicate any occurrences of hourly truck volumes exceeding 44, except for in 2020 when this occurred on only 7 individual hours between the months of January and September.

Table 2 summarizes total site-generated traffic upon opening of the proposed expansion. Each truck-trip includes one inbound trip and one outbound trip as trucks arrive at the quarry to pick up a load and leave the facility to deliver the load.

Table 2 – Total Site-Generated Traffic at Full Build-Out

PERIOD	INBOUND TRIPS	OUTBOUND TRIPS	TOTAL TRIPS
AM Peak Hour	22	22	44
PM Peak Hour	22	22	44

The above trip generation includes trips that may be generated by the existing quarry, however, to be conservative, no reductions have been applied to account for existing truck trips captured in the traffic volume data at intersections within the study area.

The quarry operates with only a nominal number of employees on site which are expected to arrive/depart outside the peak hours of adjacent traffic. As such, employee-related trips can be considered negligible and have not been included in this analysis.

As noted previously, the existing quarry is permitted to operate during nighttime hours; however, the combined volume of background and site-generated traffic is expected to be much lower than the combined volume during the daytime peak hours and therefore the weekday morning and afternoon peak hours are considered the critical hours for the purposes of this study.

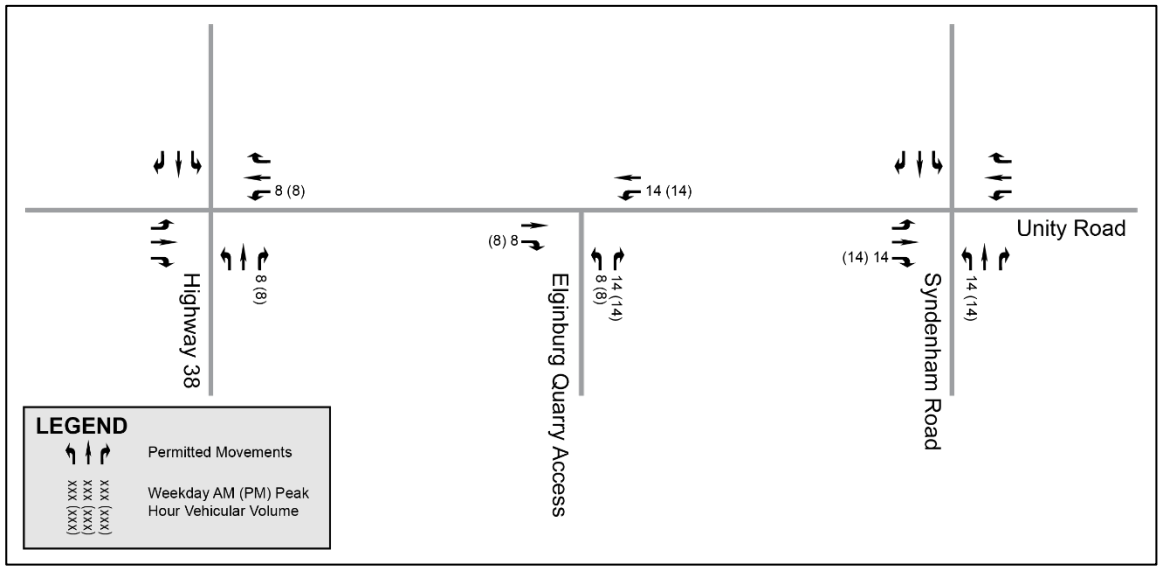
Based on the directional distribution of traffic on Unity Road, it is estimated that 65% of trucks head towards Kingston via Sydenham Road and the remainder use Highway 38. Site-generated truck-trips were distributed as follows:

- 65% to/from the south via Sydenham Road
- 35% to/from the south via Highway 38

Note: It is acknowledged that the distribution of quarry-related traffic is highly variable and based on customer demand, however the distribution presented in this study applies new trips to the most sensitive intersection movements as to avoid underestimating the traffic impacts of the quarry expansion.

Figure 3 illustrates future site-generated traffic volumes at full build-out of the site.

Figure 3 - Site-Generated Traffic



7.5 Future Background and Total Traffic

Future (2022 & 2027) Background Traffic volumes were estimated by applying the background traffic growth rate to all movements at the intersections of Unity Road & Highway 38 and Unity Road and Sydenham Road. **Figure 5** and **Figure 6** illustrate the projected Future (2022 & 2027) Background Traffic volumes, respectively.

Figure 4 - Future (2022) Background Traffic

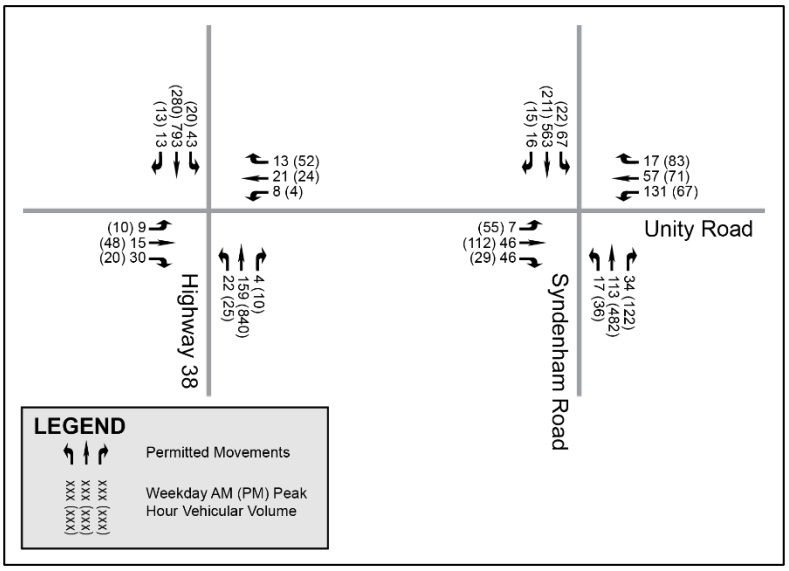
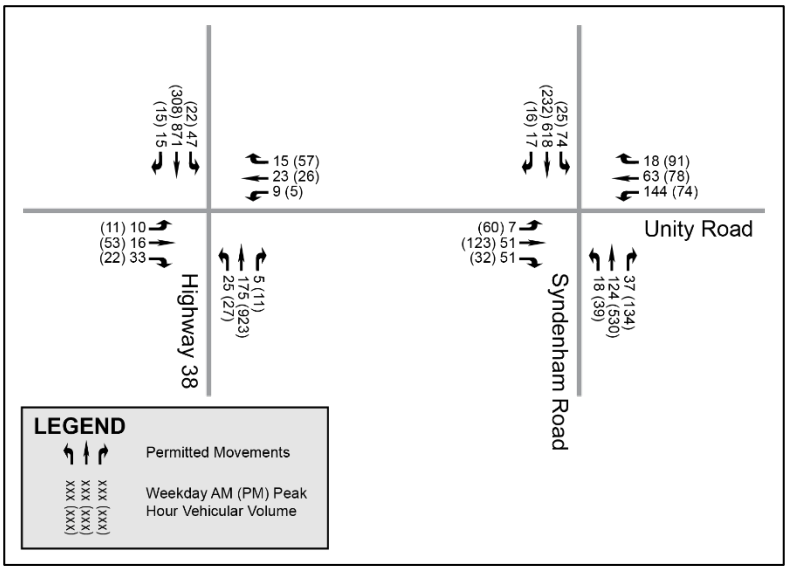


Figure 5 - Future (2027) Background Traffic



Future (2022 & 2027) Total Traffic volumes were estimated by superimposing site-generated traffic volumes onto background traffic volumes. **Figure 8** and **Figure 9** illustrate the projected Future (2022 & 2027) Total Traffic volumes, respectively.

Figure 6 - Future (2022) Total Traffic

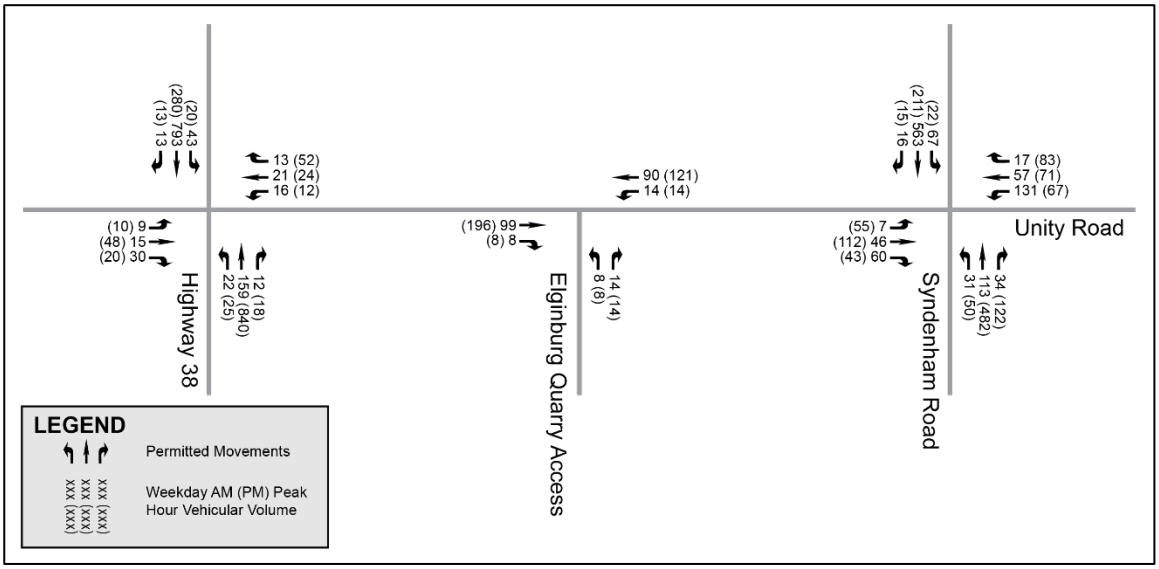
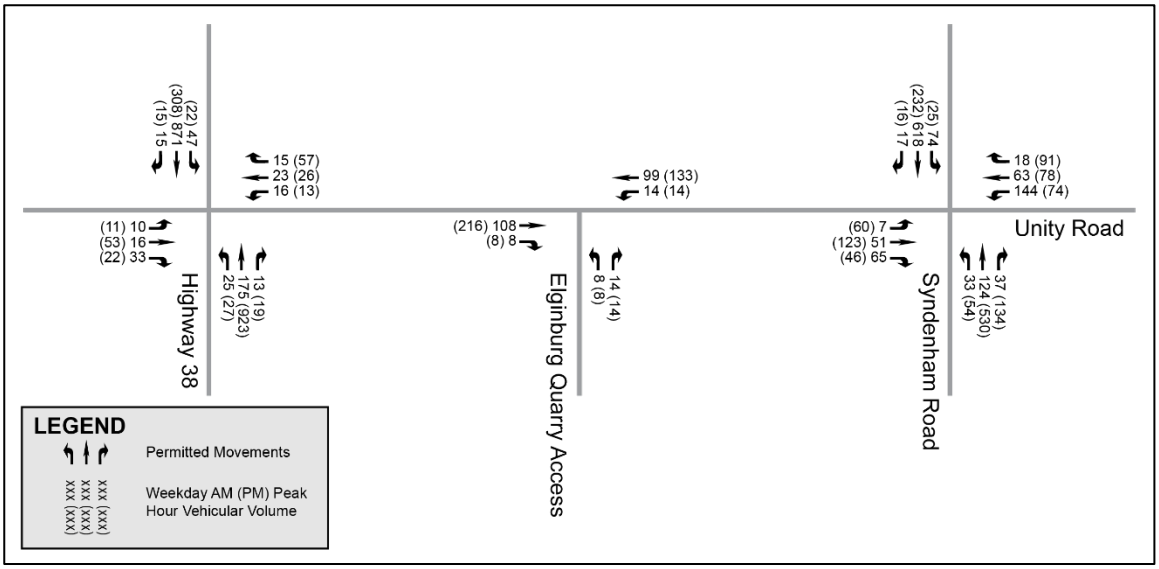


Figure 7 - Future (2027) Total Traffic



8 Intersection Capacity Analysis

An intersection capacity analysis has been conducted for all study area intersections under Existing (2020), Future (2022 & 2027) Background Traffic and Future (2022 & 2027) Total Traffic conditions. The results of these analyses have been summarized below in **Tables 3 to 9**. Synchro analysis reports have been provided in **Appendix D**.

Table 3 - Existing (2020) Traffic Results

Movement	Delay (s)	LOS	v/c Ratio	95th Percentile Queue (m)
1: Highway 38 & Unity Road – LOS 'B' (LOS 'B')				
EBT	37.8 (40.1)	D (D)	0.13 (0.32)	11.9 (22.7)
EBR	0.7 (0.6)	A (A)	0.10 (0.08)	0.0 (0.0)
WBT	36.7 (36.9)	D (D)	0.13 (0.14)	14.1 (12.9)
WBR	0.2 (2.8)	A (A)	0.04 (0.19)	0.0 (2.3)
NBL	3.0 (3.3)	A (A)	0.05 (0.03)	2.3 (2.9)
NBT	7.8 (15.1)	A (B)	0.13 (0.68)	21.3 (179.3)
NBR	0.0 (0.0)	A (A)	0.00 (0.01)	0.0 (0.0)
SBL	2.8 (3.6)	A (A)	0.05 (0.06)	3.7 (2.6)
SBT	11.4 (8.2)	B (A)	0.58 (0.24)	150.2 (40.3)
SBR	0.0 (0.0)	A (A)	0.01 (0.01)	0.0 (0.0)
3: Sydenham Road & Unity Road – LOS 'B' (LOS 'B')				
EBT	12.3 (22.0)	B (C)	0.25 (0.54)	15.3 (36.6)
WBT	27.3 (20.2)	C (C)	0.63 (0.57)	41.0 (37.0)
NBT	7.3 (16.6)	A (B)	0.22 (0.76)	17.0 (91.3)
SBT	18.7 (8.9)	B (A)	0.79 (0.32)	95.4 (28.7)

Note: AM (PM) Peak Hour Results

Table 4 - Future (2022) Background Traffic Results

Movement	Delay (s)	LOS	v/c Ratio	95th Percentile Queue (m)
1: Highway 38 & Unity Road – LOS 'B' (LOS 'B')				
EBT	38.5 (41.2)	D (D)	0.14 (0.34)	12.2 (23.1)
EBR	0.7 (0.6)	A (A)	0.11 (0.08)	0.0 (0.0)
WBT	37.6 (37.5)	D (D)	0.14 (0.16)	14.1 (13.3)
WBR	0.3 (3.4)	A (A)	0.05 (0.21)	0.0 (2.8)
NBL	3.0 (3.3)	A (A)	0.05 (0.03)	2.3 (3.0)
NBT	7.6 (15.3)	A (B)	0.13 (0.69)	21.7 (187.1)
NBR	0.0 (0.0)	A (A)	0.00 (0.01)	0.0 (0.0)
SBL	2.7 (3.6)	A (A)	0.05 (0.06)	3.7 (2.6)
SBT	11.5 (8.1)	B (A)	0.59 (0.24)	155.2 (41.2)
SBR	0.0 (0.0)	A (A)	0.01 (0.01)	0.0 (0.0)
3: Sydenham Road & Unity Road – LOS 'B' (LOS 'B')				
EBT	12.4 (22.8)	B (C)	0.26 (0.55)	15.4 (37.2)
WBT	28.0 (21.0)	C (C)	0.64 (0.59)	41.8 (37.9)
NBT	7.4 (16.8)	A (B)	0.22 (0.77)	17.5 (95.0)
SBT	19.3 (8.9)	B (A)	0.80 (0.33)	98.7 (29.4)

Note: AM (PM) Peak Hour Results

Table 5 - Future (2027) Background Traffic Results

Movement	Delay (s)	LOS	v/c Ratio	95th Percentile Queue (m)
1: Highway 38 & Unity Road – LOS 'B' (LOS 'B')				
EBT	41.9 (44.8)	D (D)	0.22 (0.41)	13.0 (25.1)
EBR	1.2 (0.7)	A (A)	0.15 (0.09)	0.0 (0.0)
WBT	40.9 (39.1)	D (D)	0.22 (0.19)	15.0 (14.2)
WBR	0.5 (4.5)	A (A)	0.07 (0.24)	0.0 (4.0)
NBL	2.9 (3.4)	A (A)	0.07 (0.03)	2.6 (3.2)
NBT	7.0 (17.3)	A (B)	0.14 (0.74)	23.9 (#251.1)
NBR	0.0 (0.0)	A (A)	0.00 (0.01)	0.0 (0.0)
SBL	2.6 (4.0)	A (A)	0.05 (0.08)	4.1 (2.9)
SBT	12.5 (9.2)	B (A)	0.64 (0.27)	#190.6 (46.3)
SBR	0.0 (0.0)	A (A)	0.01 (0.02)	0.0 (0.0)
3: Sydenham Road & Unity Road – LOS 'C' (LOS 'B')				
EBT	12.9 (25.5)	B (C)	0.28 (0.61)	16.5 (41.0)
WBT	33.9 (24.1)	C (C)	0.72 (0.65)	#52.5 (42.5)
NBT	7.5 (20.2)	A (C)	0.23 (0.81)	19.1 (#136.7)
SBT	21.9 (9.5)	C (A)	0.83 (0.35)	#135.8 (34.6)

Note: AM (PM) Peak Hour Results

Table 6 - Future (2022) Total Traffic Results

Movement	Delay (s)	LOS	v/c Ratio	95th Percentile Queue (m)
1: Highway 38 & Unity Road – LOS 'B' (LOS 'B')				
EBT	38.0 (41.2)	D (D)	0.14 (0.34)	12.0 (23.1)
EBR	0.7 (0.6)	A (A)	0.10 (0.08)	0.0 (0.0)
WBT	38.5 (40.4)	D (D)	0.21 (0.26)	16.8 (16.3)
WBR	0.2 (3.4)	A (A)	0.04 (0.21)	0.0 (2.8)
NBL	3.2 (3.3)	A (A)	0.05 (0.03)	2.6 (3.0)
NBT	8.0 (15.3)	A (B)	0.13 (0.69)	22.8 (187.1)
NBR	0.1 (0.1)	A (A)	0.02 (0.02)	0.0 (0.0)
SBL	3.0 (3.6)	A (A)	0.05 (0.06)	4.1 (2.6)
SBT	12.1 (8.1)	B (A)	0.59 (0.24)	163.3 (41.2)
SBR	0.0 (0.0)	A (A)	0.01 (0.01)	0.0 (0.0)
2: Elginburg Quarry & Unity Road – LOS 'A' (LOS 'A')				
NBT	10.7 (11.8)	B (B)	0.04 (0.04)	0.7 (0.7)
NBR	- (-)	- (-)	- (-)	- (-)
WBLn1	- (-)	- (-)	- (-)	- (-)
SBL	8.5 (8.9)	A (A)	0.02 (0.02)	0.0 (0.7)
SBT	0.0 (0.0)	A (A)	- (-)	- (-)
3: Sydenham Road & Unity Road – LOS 'B' (LOS 'B')				
EBT	12.1 (24.1)	B (C)	0.31 (0.60)	16.4 (39.7)
WBT	28.4 (20.9)	C (C)	0.65 (0.58)	42.0 (37.6)
NBT	8.1 (20.0)	A (B)	0.28 (0.81)	20.0 (#126.5)
SBT	19.4 (9.3)	B (A)	0.80 (0.32)	98.9 (31.5)

Note: AM (PM) Peak Hour Results

Table 7 - Future (2027) Total Traffic Results

Movement	Delay (s)	LOS	v/c Ratio	95th Percentile Queue (m)
1: Highway 38 & Unity Road – LOS 'B' (LOS 'B')				
EBT	40.9 (44.8)	D (D)	0.20 (0.41)	12.8 (25.1)
EBR	1.2 (0.7)	A (A)	0.14 (0.09)	0.0 (0.0)
WBT	42.9 (42.9)	D (D)	0.30 (0.30)	17.1 (17.1)
WBR	0.5 (4.5)	A (A)	0.06 (0.24)	0.0 (4.0)
NBL	3.2 (3.4)	A (A)	0.07 (0.03)	2.7 (3.2)
NBT	7.4 (17.3)	A (B)	0.14 (0.74)	25.0 (#251.1)
NBR	0.1 (0.1)	A (A)	0.02 (0.02)	0.0 (0.0)
SBL	2.8 (4.0)	A (A)	0.05 (0.08)	4.4 (2.9)
SBT	13.1 (9.2)	B (A)	0.64 (0.27)	#205.5 (46.3)
SBR	0.0 (0.0)	A (A)	0.01 (0.02)	0.0 (0.0)
2: Elginburg Quarry & Unity Road – LOS 'A' (LOS 'A')				
NBT	10.8 (12.1)	B (B)	0.04 (0.05)	0.7 (0.7)
NBR	- (-)	- (-)	- (-)	- (-)
WBLn1	- (-)	- (-)	- (-)	- (-)
SBL	8.6 (9.0)	A (A)	0.02 (0.02)	0.0 (0.7)
SBT	0.0 (0.0)	A (A)	- (-)	- (-)
3: Sydenham Road & Unity Road – LOS 'C' (LOS 'C')				
EBT	12.6 (28.0)	B (C)	0.34 (0.67)	17.4 (43.6)
WBT	32.1 (24.7)	C (C)	0.71 (0.66)	#48.2 (42.5)
NBT	8.3 (23.1)	A (C)	0.29 (0.84)	22.0 (#153.8)
SBT	21.9 (9.8)	C (A)	0.83 (0.34)	#136.1 (37.0)

Note: AM (PM) Peak Hour Results

As indicated in the above tables, all study area intersections are anticipated to operate at an acceptable level of service (i.e. LOS 'E' or better) throughout the timeframe of this study under both background and total traffic conditions. The overall impact of the proposed development on vehicle delays and queues has been shown to be minimal.

Supplementary analysis has also been completed to determine the maximum number of truck-trips the Elginburg Quarry could generate while maintaining all study intersections within City of Kingston targets. Based on this analysis, the Elginburg Quarry could generate up to 75 truck-trips per hour (inbound and outbound) during the weekday morning and afternoon peak hour without any of the study intersections exceeding LOS 'E' or a v/c ratio greater than 1.00. As the site is limited to approximately a third of this volume, it is not expected that site-generated traffic will result in any capacity issues at the study area intersections.

9 Haul Routes

As noted above, Coco Group Inc. has taken steps to ensure that truck traffic will be prohibited from using Cordukes Road and Bur Brook Road (except for local deliveries) to reduce community impacts. Access to the Kingston market area will continue to use Unity Road, Highway 138, Sydenham Road and Perth Road as the primary haul routes. It is important to acknowledge the constrained intersection geometry at the Unity/Sydenham intersection, however despite the increased annual extraction limit proposed by the quarry expansion, peak hour truck volumes are not expected to increase over existing conditions and therefore the impact of existing quarry traffic on the adjacent road network will not be exacerbated by the proposed expansion.

Figure 8 - Haul Routes

10 Site Access Review

An auxiliary left-turn lane warrant analysis was completed for the site access intersection under Future (2027) Total Traffic conditions. The results of the analysis indicate that an auxiliary left-turn lane is not warranted at this location based on the total hourly volume of trucks entering the quarry as compared with the through volume, the assumed design speed of the road and the opposing eastbound volume. The results of the left-turn lane warrant analysis are provided in **Appendix E**.

Although an auxiliary left-turn lane is not warranted at this location, a slip-around lane exists for westbound vehicles to maintain consistent operating speeds and to avoid hazard to decelerating quarry-related vehicles. The design of the westbound left-turn slip-around lane has been reviewed to ensure it is in conformance with the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads.

A speed survey was conducted on Unity Road by IBI Group on November 20, 2013. The survey found that the average operating speed on Unity Road was 80 km/h and the 85th percentile

operating speed was 88 km/h. A more recent speed survey was conducted by the City of Kingston in June 2017 which had observed an average operating speed of 83 km/h and an 85th percentile operating speed of 93 km/h. The observed operating speeds from the 2017 survey are therefore generally consistent with the observations from the 2013 survey.

As indicated in **Table 8**, the current geometry of the approach and departure tapers of the left-turn slip-around lane are consistent with a design speed of 80 km/h rather than the observed 85th percentile operating speed of approximately 90 km/h.

Table 8 – Left-Turn Slip-Around Lane Dimensions

SEGMENT	EXISTING LENGTH	RECOMMENDED LENGTH PER DESIGN SPEED	
		80 km/h	90 km/h
Approach Taper	50m	53m to 168m (~110m ideal)	95m to 189m (~140m ideal)
Parallel Lane	65m	45m	45m
Departure Taper	50m	53m to 168m (~110m ideal)	95m to 189m (~140m ideal)

Based on the recommended taper length range, both the approach and departure tapers are deficient by at least 45 meters for the observed operating speed of the road. A taper length of approximately 140m is recommended for both the approach and the departure tapers based on a 90 km/h design speed. It should also be noted that this taper length is also within the acceptable range for a 100 km/h design speed.

The eastbound right-turn taper has also been reviewed to ensure it is in conformance with the TAC Geometric Design Guide for Canadian Roads. The existing taper is approximately 70m in length which roughly corresponds to a design speed of 70 km/h. Although technically deficient by only 10 metres for a design speed of 90km/h, the existing right-turn taper length is appropriate for the slower approach speed of quarry-related vehicles and therefore no modifications are recommended.

11 Conclusion

The Elginburg Quarry was purchased in 2018 by Coco Properties Corporation, a Division of Coco Group. Since this time Coco has endeavoured to mitigate the social impacts of the quarry and work with the City and the local community to address concerns such as speeding, noise and haul routes. A Community Liaison Committee has also been established to maintain an open dialogue with the community to promptly address concerns as they arise.

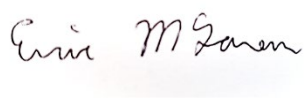
The City of Kingston has also recently made notable improvements within the study area, such as the signalization of the Highway 38 & Unity Road intersection, set-back stop bar locations at the Sydenham Road & Unity Road intersection to facilitate truck turning movements and an amendment to the Traffic By-law, based on a request by Coco Group, prohibiting heavy truck traffic on Cordukes Road and Bur Brook Road (Highway 38 to Cordukes Road).

The results of this study indicate that the Elginburg Quarry is expected to generate up to 22 truck-trips per hour (44 two-way) based on the established noise limitations for the site. A review of historical ticket data at the quarry indicated that this hourly volume of truck traffic is rare under current quarry operations and only occurs a few hours through the year. An intersection capacity analysis was completed for the intersections of Highway 38 & Unity Road, Sydenham Road & Unity Road, and the site access intersection on Unity Road. The results of the analysis indicate

that site-generated traffic has a negligible impact on traffic operations and all study area intersections are projected to operate at an acceptable Level of Service (i.e. LOS 'E' or better) within the timeframe of this study. Supplemental analysis has indicated that as many as 75 truck trips (in and out) can be accommodated before the study area intersections begin to experience any capacity limitations – a scenario that is not possible due to stipulated truck traffic noise thresholds and on-site processing limitations.

A geometric review of the site access intersection was undertaken. Based on the maximum hourly volume of truck traffic expected, exclusive auxiliary turning lanes were not found to be warranted at the site access. A westbound slip-around lane currently exists to help maintain the speed of through traffic along Unity Road and avoid hazard with trucks entering the quarry. The design of the left-turn slip-around lane was found to correspond with the *average* operating speed on Unity Road rather than the 85th percentile speed (*design/operating* speed). Based on the observed operating speed, the approach and departure taper lengths were found to be deficient by at least 45 metres each. It is therefore recommended that the approach and departure tapers in the westbound direction be lengthened to meet the ideal design standard of 140 metres each. The right-turn taper was also found to be substandard by only 10 metres, however with the reduced approach speed of quarry-related traffic, the existing right turn taper length can be considered appropriate and therefore no modifications are required.

Based on the findings of this study, it is the overall opinion of IBI Group that the continued use of the existing haul route can accommodate the proposed quarry expansion, subject to the recommended improvements at the site access.

Prepared by:	Reviewed by:
	
Eric McLaren, EIT Engineering Intern	David Hook, P.Eng. Transportation Engineer

Appendix A – Site Plan

OPERATIONAL PLAN NOTES

- NOTE NUMBERS BELOW REFER TO ARA CATEGORY 2 PROVINCIAL STANDARDS VERSION 1.0 -

1.2.1 SEQUENCE AND DIRECTION OF OPERATION
The expansion area will be developed from the adjacent Elginburg Quarry I in an east to west direction, in two separate area, north and south of the cross-site pipeline. The land north of the pipeline is called "Phase North of Pipeline", and the land south of the pipeline is called "Phase South of Pipeline". The order of the phasing will be dictated by rock quality and market demand.

1.2.2 STRIPPING AND STOCKPILING
Topsoil and overburden will be stripped seasonally, as required, to expose an area required for the season's production. Stripped material will be constructed into berms, used for progressive rehabilitation or stored in piles on site for future use.

1.2.3 LIFTS
The quarry will operate in up to 3 lifts, benched at approximate elevation 125 m ASL and 115 m ASL. Depending on rock quality, market demand, and to facilitate rehabilitation, the lower bench may be mined to a shear face provided the elevation does not exceed 25 meters in height and the upper bench can support a 2:1 slope to final water level.

1.2.4 INTERNAL HAUL ROADS
Internal haul routes will vary with the areas being developed. Only upon approval of the National Energy Board, one pipeline crossing is to be maintained between the north and south quarry in the expansion area. The location of the pipeline crossing may move as quarry operations advance.

1.2.5 PROPOSED ENTRANCE AND EXIT
Main entrance and exit from quarry will be through existing entrance on licence 2901. There will be an entrance from existing licence (2901) on both the north side of pipeline as well as south side. An accessway for use by Hydro One to access tower #1 will be in the northwest corner of the site.

1.2.6 GROUNDWATER TABLE AND DEPTH OF EXTRACTION
The groundwater table is sloped across the site in a mainly north to south direction. The water table elevation has been established at approximately 114 m ASL in the north to 106 m ASL at the south end of the site. The maximum depth of extraction will be 103 m A.S.L.

1.2.7 SURFACE WATER DIVERSION AND DISCHARGE
Water from the north expansion area will be pumped or will flow via gravity to the north sump on the east side of the existing quarry. From here it will flow via gravity or will be pumped through the culvert beneath the pipeline into the south quarry. This water and all other drainage from the south quarry (existing and expansion areas) will discharge via pumping from a sump or by gravity into the water course at the south side of the existing quarry. The enhanced permeability of the rock and the low water table at the south side of the quarry may allow for elimination of surface water discharge from the quarry. Discharge will be regulated under an Environmental Compliance Approval for an Industrial Sewage Works for the quarry.

Drainage from 2487 Unity Road must be allowed to discharge at the southern end of this property by way of a culvert(s) or break(s) in the berm

1.2.8 FENCING
The property is currently fenced with the exception of the south perimeter. Current page wire fencing will be maintained along the north and west boundary. The south boundary will be clearly demarked (refer to variation chart for details on other boundaries). Fencing along the south boundary will be installed within 6 months of licence being issued.

1.2.9 BUILDINGS AND STRUCTURES
No new buildings are currently planned for the site. Buildings including ready-mix concrete plant, and asphalt plant on existing quarry, may be added to, relocated or removed and new buildings may be added with prior approval of the MNR. A crushing plant may be located on the site and may be relocated from time to time also.

1.2.10 STOCKPILES
Topsoil and overburden will be stockpiled in perimeter berms. If the crushing plant is to be operated on the site, stockpiles may be located strategically to minimize operational noise.

1.2.11 AGGREGATE STOCKPILES AND RECYCLED MATERIALS
Stockpiles may be constructed on the floor of the excavation adjacent to portable processing equipment. Typically, stockpiles will rise no higher than 20 m above the original ground elevation. Imported recycle materials will include asphalt grindings, concrete with re-enforcement bar removed, glass and porcelain and sand materials to blend and feed portable crushing and screening plants.

1.2.12 SCRAP AREAS
Scrap will be kept in a designated area on site to be relocated as the quarry progresses and will be removed on an ongoing basis. Scrap will not be stored within a setback.

1.2.13 FUEL STORAGE
Fueling is restricted to mobile fuel bowsers and portable above ground fuel tanks in accordance with the Technical Standards and the Safety Act and regulations. Underground tanks are prohibited. If portable fuel tanks are required, they would be located a minimum of 30 m away from man-made ponds and natural open water bodies on original grade. Fuel tanks will be made up of double-walled as per the specification of TSSA – Technical Standard and Safety Act/Authority and carry approval certification.

1.2.14 AREA TO BE EXTRACTED
The total area of extraction is 62.6 hectares, broken down as follows:
- expansion area north of the pipeline: 16.0 hectares
- expansion area south of the pipeline: 46.0 hectares

1.215 LOCATION OF ALL EXCAVATION SETBACKS
See plan for location of setbacks. Setback from pipeline corridor may be reduced to 20 m from 40 m to match existing quarry, only upon approval from the National Energy Board.

1.2.16 FINAL ELEVATION
See plan for final elevation.

1.2.17 PROCESSING AREAS
All processing equipment on site will be portable and be relocated as the quarry progresses. Processing equipment on-site may include but not be limited to: crushing plant, screening plant, wash plant, rock drill, and associated hauling equipment.

1.2.18 BERMS
Berms will be constructed of overburden and topsoil. The topsoil and overburden will be constructed into berms to provide visual buffers along the north, west, and south property boundaries. The berms around residential lot and plant areas are noise attenuation berms to lessen impacts on residential receptor as per Acoustical report. Berms will be 3m high with a minimum side slope of 2:1or as recommended by the Acoustic Report, except where access roads, hydro lines and pipeline corridors restrict. Continuous berms on the north and west side of the north expansion area shall be established prior to rock drilling.

See berms on plan, this page.

1.2.19 BERM VEGETATION AND MAINTENANCE
Berms will be seeded with a suitable field grass mix upon development. Vegetation will be maintained as necessary to prevent erosion.

1.2.20 EQUIPMENT AND EQUIPMENT STORAGE
Equipment on-site may include but not be limited to: crushing plant, screening plant, wash plant, rock drill, and associated hauling equipment.

1.2.21 PROPOSED TREE SCREENS
Existing trees will be maintained where possible. Tree screens will be used to help control dust and noise.

1.2.22 HOURS OF OPERATION
Regular hours are 7 a.m. to 7 p.m Monday to Saturday, except statutory holidays subject to the provisions set out in the technical recommendations of the Acoustic Report as identified. The loading and shipping of asphalt and aggregate product may take place on a 24 hour basis as required by a specific contract in accordance with the provisions set out in the technical recommendations of the Acoustic Report.

1.2.23 TREE AND STUMP REMOVAL
Timber will be harvested and used where possible. Debris from the trees and stumps will either be control-burned with approval from Kingston Fire and Rescue, or ground into chips.

1.2.24 LOCATION OF CROSS-SECTIONS
See plan.

1.2.25 VARIATIONS FROM OPERATIONAL STANDARDS
A fence is maintained along the licensed boundary of the site, except for the east and south boundaries.

The south boundary is bordered by forest and the land is owned by the licensee. South boundary will be visually marked with stakes every 20 metres. A new fence will be installed along the southern boundary within 6 months of licence being issued

Fencing is relieved for the east common boundary with quarry licence number 2901.

The 15 metre setback along common boundary with licence number 2901 will be relieved to 0 to the same common floor elevation as that quarry. The 15m setback on the northwest boundary has been partially expanded to 30m to provide an accessway for Hydro One to Tower number 1. The required setback area along other licence boundaries and within the extraction area where pipelines pass will be maintained as per the ARA policy and standards.

Regular hours of operation may be enhanced to accommodate public authority contracts and emergencies with prior notice to MNRF and in accordance with the provisions set out in the technical recommendations of the Acoustic Report (refer to operational notes 1.2.22).

1.2.26 FREQUENCY AND TIMING OF BLASTS
Blasting will not occur on a statutory holiday or between 6 pm on any day and 8 am on the following day. All blasts will be monitored for vibration and over pressure levels.

1.2.27 MAXIMUM ANNUAL TONNAGE
No more than 1million tonnes of material shall be removed from this site in any calendar year.

1.2.28 MONITORING REQUIREMENTS

The recommendations and/or monitoring programs referenced in section 1.1.10 will be adhered to throughout the sites development. Graphical components of these key recommendations are shown on these plans.

Hydrogeological Impact Assessment

The following is a summary of recommendations made:

1. Monthly groundwater level monitoring is recommended in DOH 10-01, BH 11-02, BH 11-03, BH 11-04, BH 12-01, BH 12-02, BH 12-03, BH 13-01, the domestic well at 2528 Unity Road, and in the following three additional monitoring wells:
   a. Future Monitoring Well 1 (FMW-1) on the Lot 12-Lot 13 boundary, approximately 60 m south of BH 13-01, to be drilled prior to extraction within the western half of Lot 13,
   b. FMW-2 on the Lot 11-Lot 12 boundary at the northwest corner of the part of the expansion lands in Lot 12, to be drilled prior to extraction within Lot 12.
   c. FMW-3 on the Lot 11-Lot 12 boundary at the southwest corner of the part of the expansion lands in Lot 12, to be drilled prior to extraction within Lot 12.
2. Annual winter photographic seepage face monitoring is recommended on all available extraction faces within 250 m of Unity Road in the western half of Lot 13 and also in Lot 12. This would consist of taking one or more photographs of the rock face from static viewpoints, where possible based on quarry operations. The information will provide a record of seepage into the quarry in the winter when ice will form at key seepage locations.
3. No extraction of the third lift (i.e., below 115 mASL) should occur within 250 m of the property at 2528 Unity Road, and west of the Lot 12/Lot 13 lot line.
4. A grouting pilot study may be considered during extraction of Lift 3 in Lot 13, if suitable cavities exist. The terms of reference for the study are included in Appendix J.
5. In consultation with the property owner, drainage from 2487 Unity Road must be allowed to discharge at the southern end of this property by way of a culvert(s) or break(s) in the berm.
6. The existing PTTW will be sufficient for dewatering of the existing quarry and the expansion area until its expiry in 2022. Upon renewal, it is recommended to combine the monitoring programs proposed in this report for the quarry expansion with the monitoring program for the existing quarry.

Acoustic Assessment Report

1. The operation of the Portable Crushing and Screening Plant (Crusher), may take place only during the daytime period (07:00 – 19:00), and comply with the following:
   a. When operating in Phase North of Pipeline:
      i. The Portable Crushing and Screening Plant is to be located south of Line A-B at a maximum elevation of 125 m ASL with Lift Faces, located at a maximum of 25 m to the north and west of the Crusher, shielding receptors POR 1, 10 and 11.
      ii. A 7 m high noise barrier (Barrier 5) located at a maximum of 25 m from Crusher shielding POR 3 is to be provided. Barrier 5 can be reduced to 5 m high when operating the Crusher below 115 m ASL. Refer to Figure A4.3, Appendix 4 of the Acoustic Assessment Report (2014).
   b. When operating in Phase South of Pipeline:
      i. The Portable Crushing and Screening Plant is to be located at a maximum elevation of 125 m ASL when north of line C-D and 115 m ASL when south of Line C-D, with Lift Faces located at a maximum of 25 m to the west of the Crusher, shielding receptors POR 8 and POR 9.
2. The operation of a Standard Hydraulic Rock Drill (Drill), may take place only during the daytime period (07:00 – 19:00), and shall comply with the following:
   a. When operating in Phase North of Pipeline, the Standard Hydraulic Rock Drill is not to operate above grade north of Line A-B.
3. The operation of a Low Noise Rock Drill, such as the Atlas Copco Smart6g ROC D9C or similar, may take place only during the daytime period (07:00 – 19:00) anywhere in the extraction area, above or below grade.
4. The operation of the Wash Plant, may take place only during the daytime period (07:00 – 19:00), and is to be located below grade as shown in Figure A1.3 of the Acoustic Assessment Report (2014), on Licence #2901.
5. The operation of the Asphalt Plant and associated equipment on Licence #2901, may take place on 24 hour basis (24 hour), and comply with the following:
   a. The Asphalt Plant is to be located as shown in Figure A1.3 of the Acoustic Assessment Report (2014).
   b. When operating the Asphalt Plant during the Evening and Night time Period (19:00 to 07:00):
      i. a 4 m high noise barrier (Barrier 6), located as shown in Figure A4.1 of the Acoustic Assessment Report (2014), is to be provided shielding POR 9
      ii. a 4 m high noise barrier (Barrier 7), located as shown in Figure A4.1 of the Acoustic Assessment Report (2014), is to be provided shielding POR 3.
      iii. a 4 m high noise barrier (Barrier 8), located as shown in Figure A4.2 of the Acoustic Assessment Report (2014), is to be provided shielding POR 3.
6. The loading and shipping of Asphalt and Aggregate product using Highway Trucks, may take place on a 24 hour basis (24 hour). A maximum of two (2) Loaders may be in operation concurrently during the evening and night time period (19:00 to 07:00).
7. When operating on-site, Highway Trucks shall not exceed 20 kph and shall not use compression braking (Jake Brakes).
8. Noise Barriers or berms are to be provided as shown in Figures A4.1, A4.2 and A4.3 and as specified in Appendix 4 - Noise Abatement Schedule of the Acoustic Assessment Report (2014).
9. Noise barriers shielding portable equipment may be progressively established to provide shielding from location of operation to the identified noise sensitive point of reception (POR).
10. Noise barriers or berms are to be solid, having no gaps, and are to have a surface density of no less than 20 kg/m2. Examples of suitable barriers or berms are as follow:
    a. Lift face or existing terrain;
    b. Earth, gravel or aggregate berms or stockpiles;
    c. Concrete or brick walls;
    d. Commercial noise barriers;
    e. Shipping containers;
    f. A portable barrier such as a truck trailer equipped with movable flaps to block the space between the ground and the bottom of the trailer.

If requested by MNRF, the proponent will have a qualified professional confirm that the berms are constructed to code.

11. Portable construction equipment used for site preparation (e.g. land clearing and construction of berms) and rehabilitation shall comply with MoE Publication NPC 115, Construction Equipment, August 1978. (This publication gives noise standards to be met by construction equipment in Ontario.) Site preparation and rehabilitation activities shall take place only during daytime hours (07:00 – 19:00).
12. If a new process is introduced to the site, then this process shall be assessed by a qualified acoustical consultant as soon as possible after commissioning. Noise mitigation measures shall be reviewed, and altered if necessary, to ensure that MoE sound level limits are met at all points of reception.

Natural Environment Technical Report: Level I and II

1. No quarry activities within the identified significant woodland FOD 5-8 or its 30 metre buffer are proposed. A berm wall will be built between the quarry and the woodland (and its 30m buffer) on the southern edge of the property limits to help maintain woodland function. The edge of the woodland will be clearly demarcated to prevent intrusion during berm wall construction.
2. Any tree clearing will take place between September and March, outside of the bird breeding season (April 15 to July 31) in order to prevent the possible loss of active nests. It is possible to work within the breeding season, as long as the land is cleared prior to late April.
3. There will be no quarry activities (e.g., excavation, soil stripping, land clearing, etc.) in Lot 12 until at least 2024, or when extraction progresses to the point where stripping is required in Lot 12 to allow for extraction, whichever comes later.
4. To enhance succession of the shrub/early successional bird breeding habitat, large tree removal (i.e. trees greater than 2 m tall) will occur throughout the woodland in Lot 12. Removal will take place outside of the bird breeding season (April 15 to July 31) within the first two years after licensing. Lot 12 will be rehabilitated for wildlife use by laying down 20 cm of stockpiled berm soils and planting a commercial pasture seed mix and planted with scattered low-lying native shrubs, approved by the Ministry of Natural Resources and Forestry. The site will be allowed to succeed naturally to shrubland, and then to woodland and that human access to the site be restricted by fencing.

Blast Impact Analysis

1. Sequential blasting techniques will be used to ensure minimum explosives per delay period is initiated. These include:
   a. Non-electric blast initiation systems such as the EZ-Det / Handi-Det / Snap-Det systems or,
   b. Electronic initiation system with remote detonation.
2. Maximum drill-hole diameter for initial quarry blasting will be 102 mm (4").
3. Vibration and overpressure data acquired during initial blasting may allow for an increase in drill-hole diameter.
4. Minimum collar will be 1.5 m (5 ft.).
5. Bench height shall not exceed 13 m for initial quarry blasting.
6. Clear crushed stone will be used for stemming.
7. Primary and secondary dust collectors will be employed on the rock drills to keep the level of rock dust to a minimum.
8. Blasting should be avoided during overcast and temperature inversions.
9. Blast-hole detonation shall be limited to a single hole per delay period , and when boreholes are decked, a single explosive deck per period.
10. The amount of explosives per delay period for initial quarry blasting shall not exceed 76 kg.
11. Location of monitoring device.
12. Prior to making any changes to the site, MNRF should be informed ahead of introduction of any new steps to mitigate noise level.

Hydro Tower – Permanent Access*

15 x 30 M Setback

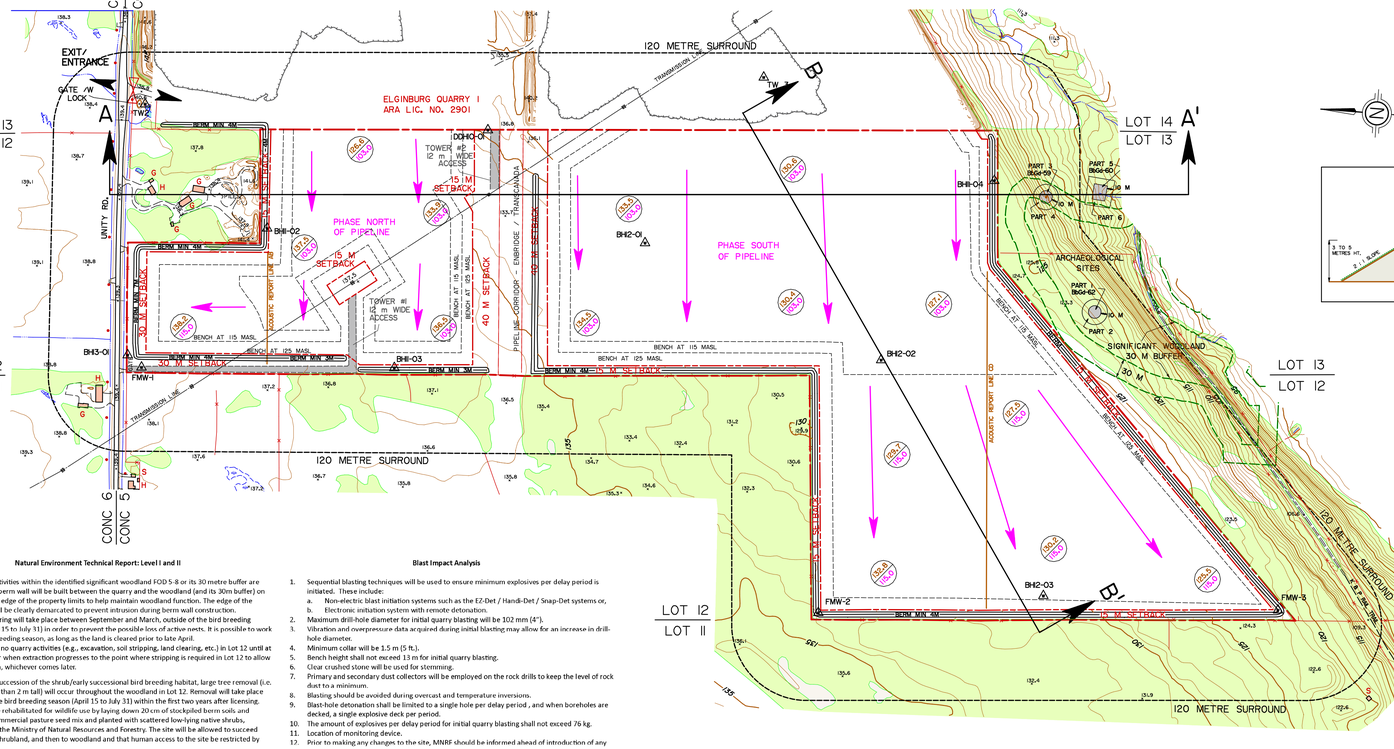
12 M wide access route

Hydro Towers each have a 15x30 metre setback around them. Each Tower will have a permanent access route to it. Access routes will have slopes not greater than 10% and will be at least 12 metres in width. See towers 1 thru 3 marked on this page.

Tower 1 – at grade access – either native rock or re-established after quarrying

Tower 2 – at grade access along 15 metre setback – north side of pipeline

*** Pending Hydro One Approval**



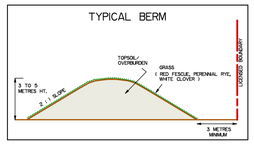
KEY MAP

OPERATION

NOTES

1. LICENCED AREA 73.8 HECTARES.
2. AREA OF OPERATION 62.6 HECTARES.
3. EXISTING DISTURBED AREA 0.5 HECTARES.
   THIS SITE PLAN IS PREPARED UNDER THE AGGREGATE RESOURCES ACT FOR A CLASS "A" LICENSE CATEGORY 2.
4. THIS PLAN WAS PREPARED USING PHOTOGRAMMETRIC METHODS FROM AERIAL PHOTOGRAPHS.
5. LOT, CONCESSION AND BOUNDARY LINES ON THIS PLAN ARE APPROXIMATE.
6. THIS IS NOT A LEGAL SURVEY DRAWING IN ACCORDANCE WITH THE PROVINCE OF ONTARIO SURVEYORS ACT 1987. THIS DRAWING WAS PRODUCED USING STANDARD PHOTOGRAMMETRIC PRACTICES.

TYPICAL BERM



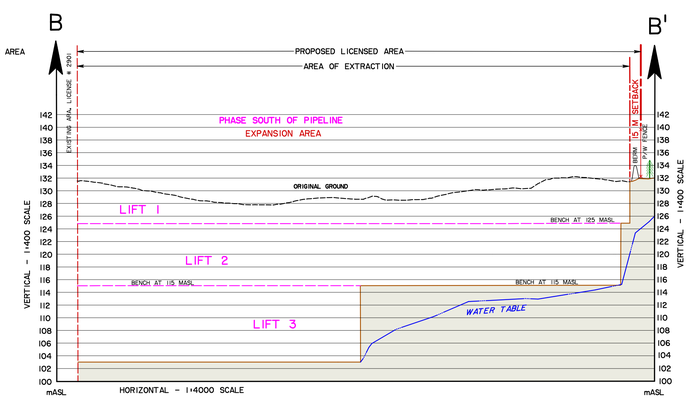
ELGINBURG QUARRY II

PT LOTS 12, 13 CONC 5
GEOGRAPHIC TOWNSHIP OF KINGSTON

CRUICKSHANK CONSTRUCTION LIMITED
751 DALTON AVENUE
KINGSTON, ONTARIO
K7M 8N6

LEGEND

- BOUNDARY OF AREA TO BE LICENSED
- SETBACK LIMIT/LIMIT OF EXTRACTION
- 120 M. SURROUND
- EXISTING GRADE / FINAL GRADE ELEVATIONS
- ENTRANCE AND OR EXIT
- PIT/QUARRY FACE
- BERM — EARTHEN BERM
- DIRECTION OF OPERATION
- PILE
- H S B S O — BUILDINGS: H-HOUSE, G-GARAGE, B-BARN, S-SHED, O-OFFICE
- P/W FENCE / GATE
- ROAD : PAVED
- ROAD : UNPAVED
- TRAIL / PATHWAY
- UTILITY POLE
- BH2-02 / TW3 — BOREHOLE / MONITORING WELL
- FUTURE MONITORING WELL FMW
- WATERCOURSE - DITCH / STREAM
- ROCK OUTCROP
- WETLAND
- W/L 35.5 — WATER BODY AND WATER LEVEL
- BRIDGE/CULVERT
- CONTOURS/INDEX CONTOURS
- SPOT ELEVATION
- WOODED AREA
- A A' — CROSS SECTION



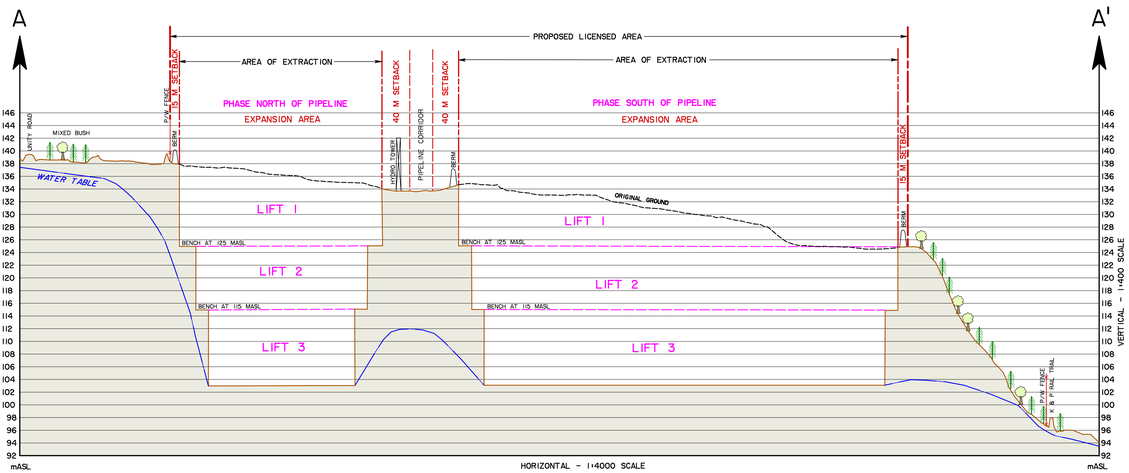


PHOTO SCALE 1:8000	ROLL NO. CAS09028	PHOTO DATE NOV. 2, 2009	SURVEY DATA NAD 83 UTM, ZN 18
MAP SCALE 1:4000	CONTOUR INTERVAL 1 METRE	DATE OF SITE PLAN SEPT 2016	

0 40 80 120 160 200 240 METRES

AMENDMENTS	DATE

SITE PLANS APPROVED BY MINISTRY OF NATURAL RESOURCES AND FORESTRY.

SIGNATURE DATE

PAGE 3 OF 4 | CONTRACT 2562-13

SIGNATURE OF APPLICANT/LICENSEE — DATE

MICHAEL J. MOULTON — DATE

THE BASE MAPPING CO. LTD.
102-15 CAPELLA COURT, OTTAWA, ON K2E 7X1
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Appendix B – Turning Movement Counts

Hwy #38 @ Unity Rd

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 10:00:00

One Hour Peak
From: 7:15:00
To: 8:15:00

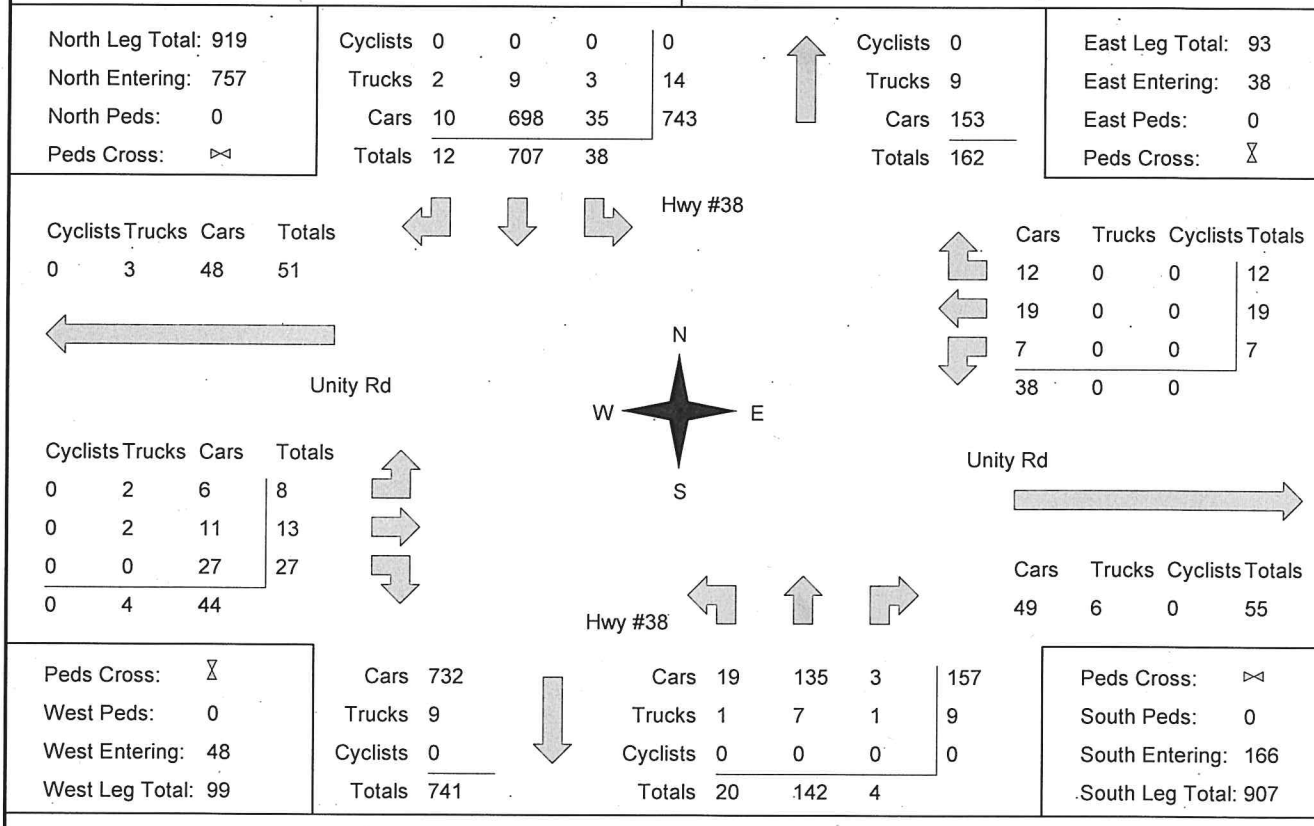
Municipality: City of Kingston
Site #: 0000000001
Intersection: Hwy #38 & Unity Rd
TFR File #: 1
Count date: 1-Dec-2015

Weather conditions:

Person(s) who counted:
Miovision

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

Major Road: Hwy #38 runs N/S



Comments

Hwy #38 @ Unity Rd

Afternoon Peak Diagram

Specified Period
From: 14:00:00
To: 18:00:00

One Hour Peak
From: 16:00:00
To: 17:00:00

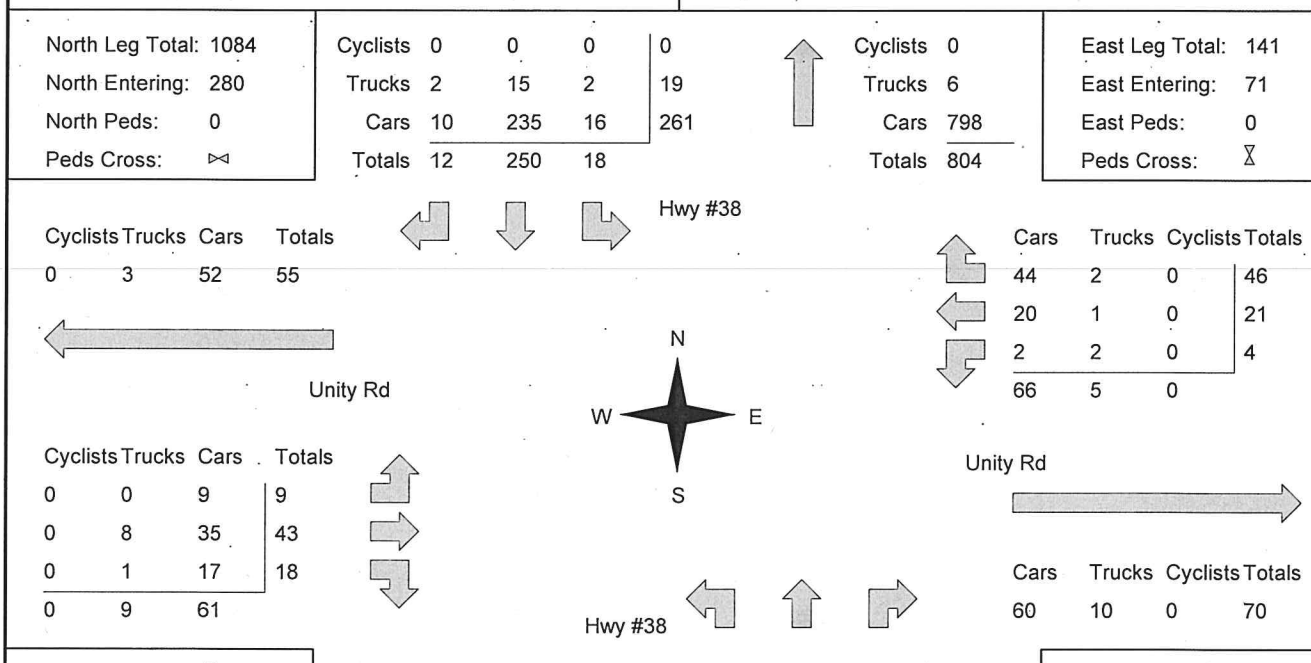
Municipality: City of Kingston
Site #: 0000000001
Intersection: Hwy #38 & Unity Rd
TFR File #: 1
Count date: 1-Dec-2015

Weather conditions:

Person(s) who counted:
Miovision

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

Major Road: Hwy #38 runs N/S



Comments

Sydenham Rd @ Unity Rd

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 10:00:00

One Hour Peak
From: 7:15:00
To: 8:15:00

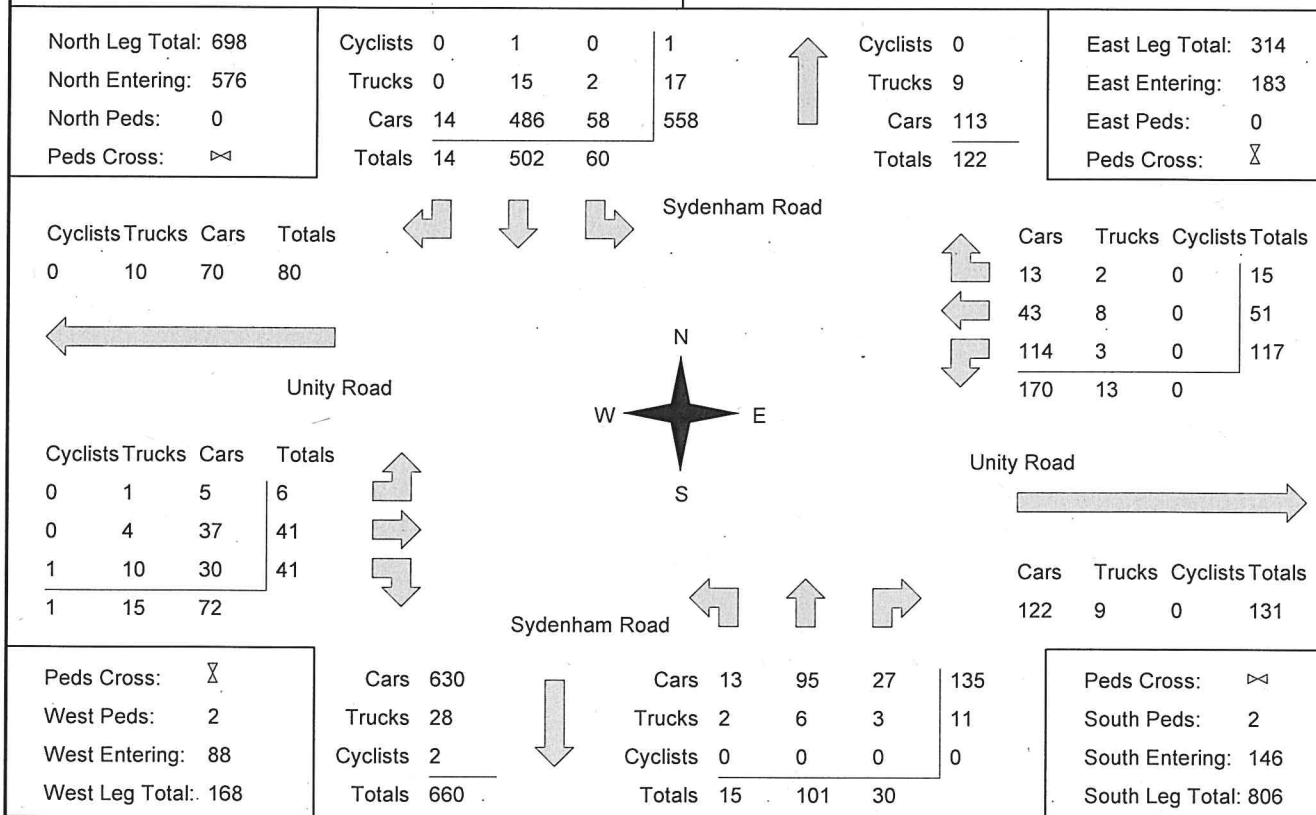
Municipality: City of Kingston
Site #: 0000000001
Intersection: Sydenham Road & Unity Road
TFR File #: 1
Count date: 10-Jun-2015

Weather conditions:

Person(s) who counted:
Miovision

**** Signalized Intersection ****

Major Road: Sydenham Road runs N/S



Comments

Sydenham Rd @ Unity Rd

Afternoon Peak Diagram

Specified Period
From: 14:00:00
To: 18:00:00

One Hour Peak
From: 16:15:00
To: 17:15:00

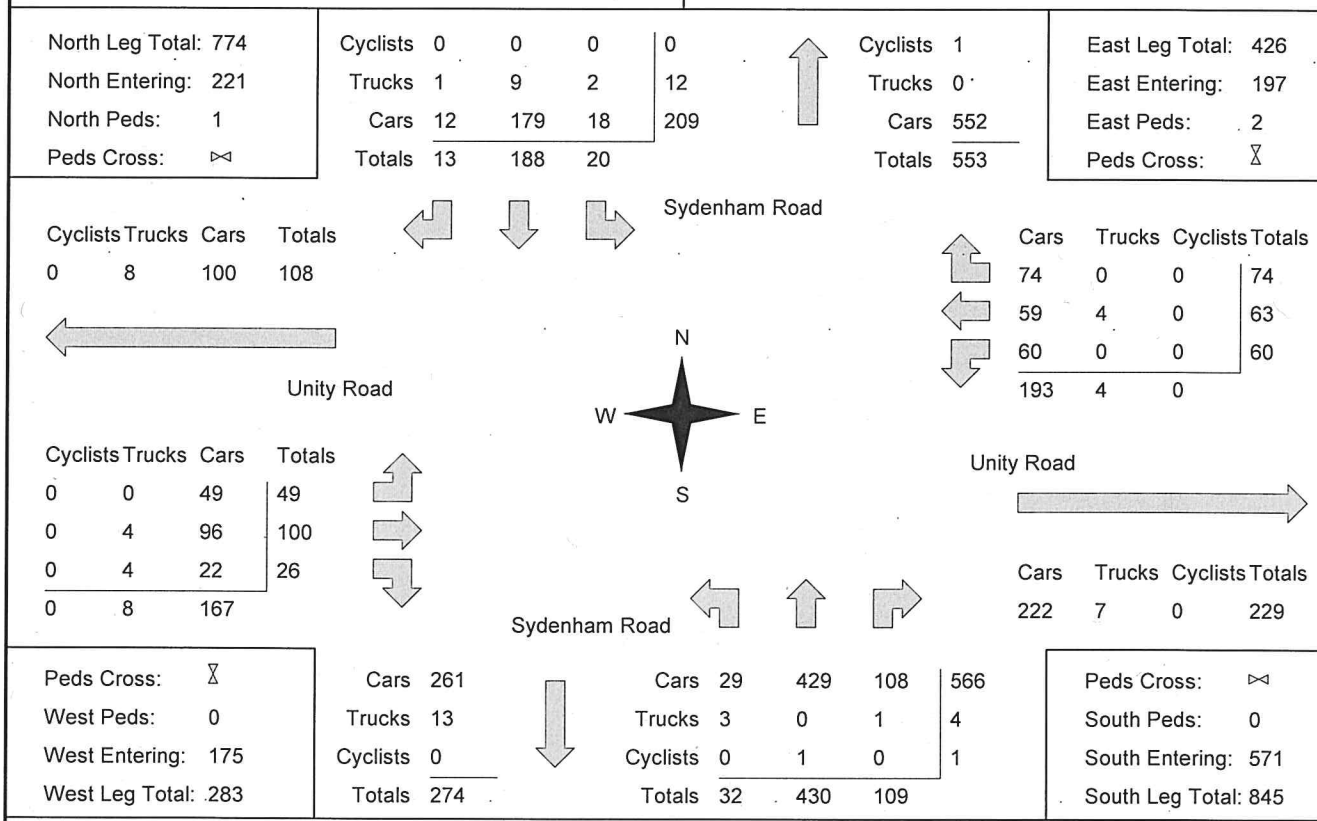
Municipality: City of Kingston
Site #: 0000000001
Intersection: Sydenham Road & Unity Road
TFR File #: 1
Count date: 10-Jun-2015

Weather conditions:

Person(s) who counted:
Miovision

**** Signalized Intersection ****

Major Road: Sydenham Road runs N/S

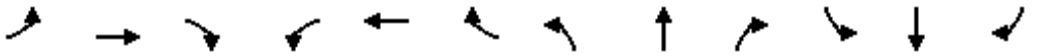


Comments

Appendix C – Historical Collision Data

Accident No.	Accident Date	Geo ID	Accident Location	Impact Location	Thru Lane No	Environment Condition 1	Environment Condition 2	Light	Traffic Control	Traffic Control Condition	Road 1 Surface Condition	Road 2 Surface Condition	Road 1 Alignment	Road 2 Alignment	Vehicle 1 Type	Vehicle 2 Type	Apparent Driver 1 Action	Apparent Driver 2 Action	Driver 1 Condition	Driver 2 Condition	Pedestrian 1 Condition	Pedestrian 2 Condition	Pedestrian 1 Action	Pedestrian 2 Action	Road Jurisdiction	Classification Of Accident	Initial Direction Of Travel One	Initial Direction Of Travel Two	Initial Impact Type	Vehicle 1 Manoeuver	Vehicle 2 Manoeuver
1623142	2016-08-08	9275	01 - Non intersection	02 - Thru lane	1	01 - Clear		01 - Daylight	10 - No control		01 - Dry			01 - Straight on level	08 - Truck - open	99 - Other			01 - Normal						01 - Municipal (excl. Twp. Rd.)	03 - P.D. only	South	None	07 - SMV other			

Appendix D – Intersection Capacity Analysis Results

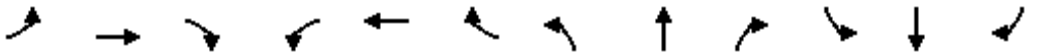


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	14	30	8	21	13	22	156	4	42	778	13
Future Volume (vph)	9	14	30	8	21	13	22	156	4	42	778	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		20.0	0.0		15.0	80.0		95.0	60.0		80.0
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.980			0.986		0.950			0.950		
Satd. Flow (prot)	0	1582	1633	0	1894	1633	1738	1830	1306	1690	1902	1396
Flt Permitted		0.855			0.896		0.219			0.633		
Satd. Flow (perm)	0	1380	1633	0	1721	1633	401	1830	1306	1126	1902	1396
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			103			103			89			89
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		239.2			79.7			274.8			248.0	
Travel Time (s)		14.4			4.8			16.5			14.9	
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
Heavy Vehicles (%)	25%	15%	0%	0%	0%	0%	5%	5%	25%	8%	1%	17%
Adj. Flow (vph)	10	15	33	9	23	14	24	170	4	46	846	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	25	33	0	32	14	24	170	4	46	846	14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.0	16.0	16.0	2.0	16.0	16.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	25.0	25.0	7.0	25.0	25.0
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	12.0	65.0	65.0	12.0	65.0	65.0
Total Split (%)	34.2%	34.2%	34.2%	34.2%	34.2%	34.2%	10.3%	55.6%	55.6%	10.3%	55.6%	55.6%
Maximum Green (s)	32.5	32.5	32.5	32.5	32.5	32.5	7.0	56.0	56.0	7.0	56.0	56.0
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	5.0	5.5	5.5	5.0	5.5	5.5
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	0.0	3.5	3.5	0.0	3.5	3.5
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)		7.5	7.5		7.5	7.5	5.0	9.0	9.0	5.0	9.0	9.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)		8.4	8.4		8.5	8.5	45.1	44.5	44.5	45.7	46.4	46.4
Actuated g/C Ratio		0.14	0.14		0.14	0.14	0.74	0.73	0.73	0.75	0.76	0.76
v/c Ratio		0.13	0.10		0.13	0.04	0.05	0.13	0.00	0.05	0.58	0.01
Control Delay		37.8	0.7		36.7	0.2	3.0	7.8	0.0	2.8	11.4	0.0
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		37.8	0.7		36.7	0.2	3.0	7.8	0.0	2.8	11.4	0.0
LOS		D	A		D	A	A	A	A	A	B	A
Approach Delay		16.7			25.6			7.0			10.8	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			C			A			B	
Queue Length 50th (m)		2.9	0.0		3.7	0.0	0.7	11.3	0.0	1.4	56.4	0.0
Queue Length 95th (m)		11.9	0.0		14.1	0.0	2.3	21.3	0.0	3.7	150.2	0.0
Internal Link Dist (m)		215.2			55.7			250.8			224.0	
Turn Bay Length (m)			20.0			15.0	80.0		95.0	60.0		80.0
Base Capacity (vph)		886	1086		1105	1086	500	1498	1085	935	1555	1158
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		0.03	0.03		0.03	0.01	0.05	0.11	0.00	0.05	0.54	0.01

Intersection Summary			
Area Type:	Other		
Cycle Length: 117			
Actuated Cycle Length: 60.7			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 11.0		Intersection LOS: B	
Intersection Capacity Utilization 67.6%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Highway 38 & Unity Road

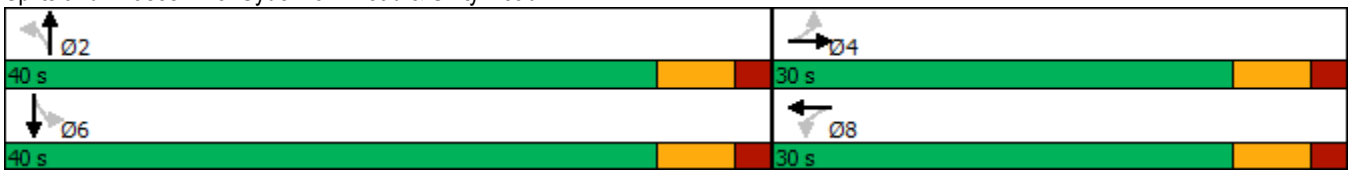


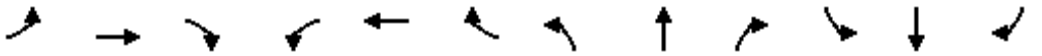
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	45	45	129	56	16	16	111	33	66	552	15
Future Volume (vph)	7	45	45	129	56	16	16	111	33	66	552	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7		45.7	45.7		45.7	45.7		45.7	45.7		45.7
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00			1.00			1.00	
Frt		0.938			0.989			0.972			0.997	
Flt Protected		0.996			0.969			0.995			0.995	
Satd. Flow (prot)	0	1517	0	0	1714	0	0	1728	0	0	1850	0
Flt Permitted		0.968			0.743			0.922			0.948	
Satd. Flow (perm)	0	1474	0	0	1311	0	0	1601	0	0	1763	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		49			7			26			2	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1540.0			468.9			449.7			438.0	
Travel Time (s)		110.9			33.8			32.4			31.5	
Confl. Peds. (#/hr)			2	2			2					2
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	17%	10%	24%	3%	16%	13%	13%	6%	10%	3%	3%	0%
Adj. Flow (vph)	8	49	49	140	61	17	17	121	36	72	600	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	106	0	0	218	0	0	174	0	0	688	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		14.0	14.0		14.0	14.0	
Minimum Split (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Total Split (s)	30.0	30.0		30.0	30.0		40.0	40.0		40.0	40.0	
Total Split (%)	42.9%	42.9%		42.9%	42.9%		57.1%	57.1%		57.1%	57.1%	
Maximum Green (s)	24.0	24.0		24.0	24.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		14.4			14.4			25.7			25.7	
Actuated g/C Ratio		0.27			0.27			0.49			0.49	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.24			0.60			0.22			0.80	
Control Delay		11.7			25.4			8.1			21.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		11.7			25.4			8.1			21.0	
LOS		B			C			A			C	
Approach Delay		11.7			25.4			8.1			21.0	
Approach LOS		B			C			A			C	
Queue Length 50th (m)		4.2			17.8			7.2			49.2	
Queue Length 95th (m)		14.7			40.0			20.1			#127.9	
Internal Link Dist (m)		1516.0			444.9			425.7			414.0	
Turn Bay Length (m)												
Base Capacity (vph)		740			639			1106			1209	
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		0.14			0.34			0.16			0.57	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 52.9			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 19.1		Intersection LOS: B	
Intersection Capacity Utilization 72.7%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Sydenham Road & Unity Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	47	20	4	23	51	24	824	10	20	275	13
Future Volume (vph)	10	47	20	4	23	51	24	824	10	20	275	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		20.0	0.0		15.0	80.0		95.0	60.0		80.0
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.991			0.993		0.950			0.950		
Satd. Flow (prot)	0	1646	1541	0	1715	1570	1825	1902	1633	1644	1812	1396
Flt Permitted		0.931			0.939		0.578			0.181		
Satd. Flow (perm)	0	1547	1541	0	1622	1570	1110	1902	1633	313	1812	1396
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			103			103			89			89
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		239.2			79.7			274.8			248.0	
Travel Time (s)		14.4			4.8			16.5			14.9	
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
Heavy Vehicles (%)	0%	19%	6%	50%	5%	4%	0%	1%	0%	11%	6%	17%
Adj. Flow (vph)	11	51	22	4	25	55	26	896	11	22	299	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	62	22	0	29	55	26	896	11	22	299	14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.0	16.0	16.0	2.0	16.0	16.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	25.0	25.0	7.0	25.0	25.0
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	12.0	65.0	65.0	12.0	65.0	65.0
Total Split (%)	34.2%	34.2%	34.2%	34.2%	34.2%	34.2%	10.3%	55.6%	55.6%	10.3%	55.6%	55.6%
Maximum Green (s)	32.5	32.5	32.5	32.5	32.5	32.5	7.0	56.0	56.0	7.0	56.0	56.0
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	5.0	5.5	5.5	5.0	5.5	5.5
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	0.0	3.5	3.5	0.0	3.5	3.5
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)		7.5	7.5		7.5	7.5	5.0	9.0	9.0	5.0	9.0	9.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)		9.1	9.1		9.0	9.0	52.7	49.8	49.8	52.7	49.8	49.8
Actuated g/C Ratio		0.13	0.13		0.12	0.12	0.73	0.69	0.69	0.73	0.69	0.69
v/c Ratio		0.32	0.08		0.14	0.19	0.03	0.68	0.01	0.06	0.24	0.01
Control Delay		40.1	0.6		36.9	2.8	3.3	15.1	0.0	3.6	8.2	0.0
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		40.1	0.6		36.9	2.8	3.3	15.1	0.0	3.6	8.2	0.0
LOS		D	A		D	A	A	B	A	A	A	A
Approach Delay		29.7			14.6			14.6			7.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B			B			A	
Queue Length 50th (m)		7.4	0.0		3.4	0.0	0.9	68.2	0.0	0.7	14.4	0.0
Queue Length 95th (m)		22.7	0.0		12.9	2.3	2.9	179.3	0.0	2.6	40.3	0.0
Internal Link Dist (m)		215.2			55.7			250.8			224.0	
Turn Bay Length (m)			20.0			15.0	80.0		95.0	60.0		80.0
Base Capacity (vph)		781	829		818	843	891	1467	1280	374	1397	1097
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	0.03		0.04	0.07	0.03	0.61	0.01	0.06	0.21	0.01

Intersection Summary			
Area Type:	Other		
Cycle Length: 117			
Actuated Cycle Length: 72.2			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 13.9		Intersection LOS: B	
Intersection Capacity Utilization 70.0%		ICU Level of Service C	
Analysis Period (min) 15			

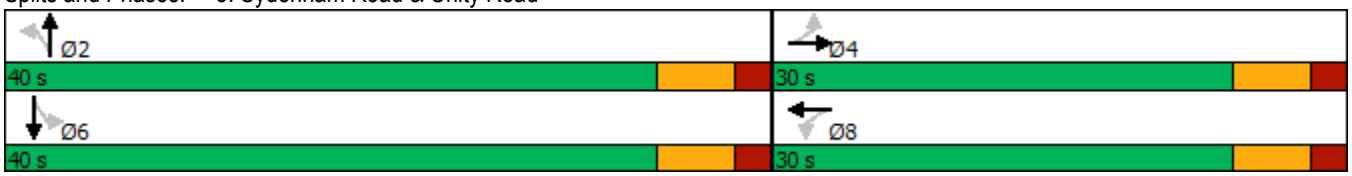
Splits and Phases: 1: Highway 38 & Unity Road

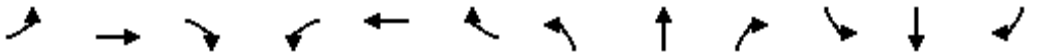
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	110	29	66	69	81	35	473	120	22	207	14
Future Volume (vph)	54	110	29	66	69	81	35	473	120	22	207	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7		45.7	45.7		45.7	45.7		45.7	45.7		45.7
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.99			1.00			1.00	
Frt		0.980			0.949			0.974			0.992	
Flt Protected		0.986			0.985			0.997			0.995	
Satd. Flow (prot)	0	1776	0	0	1748	0	0	1857	0	0	1795	0
Flt Permitted		0.849			0.850			0.970			0.918	
Satd. Flow (perm)	0	1528	0	0	1508	0	0	1807	0	0	1656	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			47			24			6	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1540.0			468.9			449.7			438.0	
Travel Time (s)		110.9			33.8			32.4			31.5	
Confl. Peds. (#/hr)	1					1			2	2		
Confl. Bikes (#/hr)									1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	4%	15%	0%	6%	0%	0%	0%	0%	10%	5%	8%
Adj. Flow (vph)	59	120	32	72	75	88	38	514	130	24	225	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	211	0	0	235	0	0	682	0	0	264	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		14.0	14.0		14.0	14.0	
Minimum Split (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Total Split (s)	30.0	30.0		30.0	30.0		40.0	40.0		40.0	40.0	
Total Split (%)	42.9%	42.9%		42.9%	42.9%		57.1%	57.1%		57.1%	57.1%	
Maximum Green (s)	24.0	24.0		24.0	24.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		12.3			12.3			23.6			23.6	
Actuated g/C Ratio		0.25			0.25			0.49			0.49	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.53			0.57			0.77			0.33	
Control Delay		21.5			19.7			17.0			9.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		21.5			19.7			17.0			9.1	
LOS		C			B			B			A	
Approach Delay		21.5			19.7			17.0			9.1	
Approach LOS		C			B			B			A	
Queue Length 50th (m)		14.2			13.5			39.9			11.7	
Queue Length 95th (m)		36.4			36.8			93.5			29.4	
Internal Link Dist (m)		1516.0			444.9			425.7			414.0	
Turn Bay Length (m)												
Base Capacity (vph)		808			813			1336			1220	
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		0.26			0.29			0.51			0.22	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 48.6			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 16.7		Intersection LOS: B	
Intersection Capacity Utilization 67.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: Sydenham Road & Unity Road



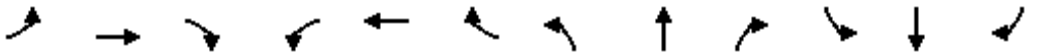


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	15	30	8	21	13	22	159	4	43	793	13
Future Volume (vph)	9	15	30	8	21	13	22	159	4	43	793	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		20.0	0.0		15.0	80.0		95.0	60.0		80.0
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.981			0.986		0.950			0.950		
Satd. Flow (prot)	0	1586	1633	0	1894	1633	1738	1830	1306	1690	1902	1396
Flt Permitted		0.860			0.896		0.216			0.632		
Satd. Flow (perm)	0	1390	1633	0	1721	1633	395	1830	1306	1124	1902	1396
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			103			103			89			89
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		239.2			79.7			274.8			248.0	
Travel Time (s)		14.4			4.8			16.5			14.9	
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
Heavy Vehicles (%)	25%	15%	0%	0%	0%	0%	5%	5%	25%	8%	1%	17%
Adj. Flow (vph)	10	16	33	9	23	14	24	173	4	47	862	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	26	33	0	32	14	24	173	4	47	862	14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.0	16.0	16.0	2.0	16.0	16.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	25.0	25.0	7.0	25.0	25.0
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	12.0	65.0	65.0	12.0	65.0	65.0
Total Split (%)	34.2%	34.2%	34.2%	34.2%	34.2%	34.2%	10.3%	55.6%	55.6%	10.3%	55.6%	55.6%
Maximum Green (s)	32.5	32.5	32.5	32.5	32.5	32.5	7.0	56.0	56.0	7.0	56.0	56.0
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	5.0	5.5	5.5	5.0	5.5	5.5
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	0.0	3.5	3.5	0.0	3.5	3.5
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)		7.5	7.5		7.5	7.5	5.0	9.0	9.0	5.0	9.0	9.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)		8.2	8.2		8.3	8.3	47.2	46.4	46.4	47.9	48.3	48.3
Actuated g/C Ratio		0.13	0.13		0.13	0.13	0.75	0.74	0.74	0.76	0.77	0.77
v/c Ratio		0.14	0.11		0.14	0.05	0.05	0.13	0.00	0.05	0.59	0.01
Control Delay		38.5	0.7		37.6	0.3	3.0	7.6	0.0	2.7	11.5	0.0
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		38.5	0.7		37.6	0.3	3.0	7.6	0.0	2.7	11.5	0.0
LOS		D	A		D	A	A	A	A	A	B	A
Approach Delay		17.4			26.2			6.9			10.8	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			C			A			B	
Queue Length 50th (m)		3.2	0.0		3.9	0.0	0.7	11.5	0.0	1.4	58.3	0.0
Queue Length 95th (m)		12.2	0.0		14.1	0.0	2.3	21.7	0.0	3.7	155.2	0.0
Internal Link Dist (m)		215.2			55.7			250.8			224.0	
Turn Bay Length (m)			20.0			15.0	80.0		95.0	60.0		80.0
Base Capacity (vph)		881	1072		1090	1072	488	1477	1071	940	1534	1143
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		0.03	0.03		0.03	0.01	0.05	0.12	0.00	0.05	0.56	0.01

Intersection Summary			
Area Type:	Other		
Cycle Length: 117			
Actuated Cycle Length: 62.7			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 11.1		Intersection LOS: B	
Intersection Capacity Utilization 68.4%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Highway 38 & Unity Road



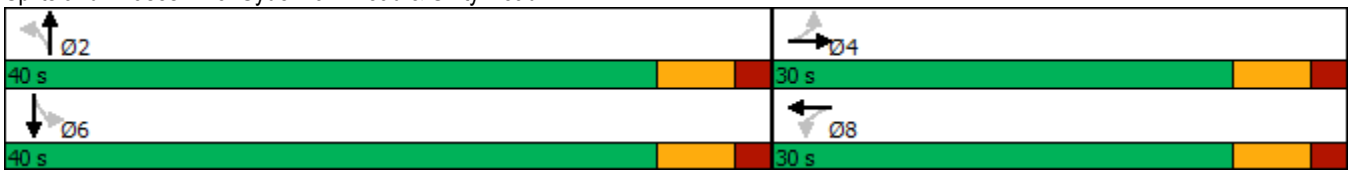
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	46	46	131	57	17	17	113	34	67	563	16
Future Volume (vph)	7	46	46	131	57	17	17	113	34	67	563	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7		45.7	45.7		45.7	45.7		45.7	45.7		45.7
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00			1.00			1.00	
Frt		0.937			0.989			0.972			0.997	
Flt Protected		0.996			0.969			0.995			0.995	
Satd. Flow (prot)	0	1515	0	0	1714	0	0	1728	0	0	1850	0
Flt Permitted		0.968			0.742			0.917			0.947	
Satd. Flow (perm)	0	1473	0	0	1309	0	0	1592	0	0	1761	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		50			7			26			2	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1540.0			468.9			449.7			438.0	
Travel Time (s)		110.9			33.8			32.4			31.5	
Confl. Peds. (#/hr)			2	2			2					2
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	17%	10%	24%	3%	16%	13%	13%	6%	10%	3%	3%	0%
Adj. Flow (vph)	8	50	50	142	62	18	18	123	37	73	612	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	108	0	0	222	0	0	178	0	0	702	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		14.0	14.0		14.0	14.0	
Minimum Split (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Total Split (s)	30.0	30.0		30.0	30.0		40.0	40.0		40.0	40.0	
Total Split (%)	42.9%	42.9%		42.9%	42.9%		57.1%	57.1%		57.1%	57.1%	
Maximum Green (s)	24.0	24.0		24.0	24.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		14.7			14.7			26.2			26.2	
Actuated g/C Ratio		0.27			0.27			0.49			0.49	

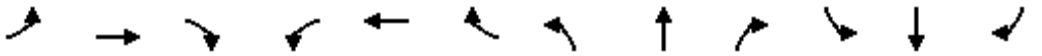
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.25			0.61			0.23			0.82	
Control Delay		11.7			25.8			8.2			22.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		11.7			25.8			8.2			22.0	
LOS		B			C			A			C	
Approach Delay		11.7			25.8			8.2			22.0	
Approach LOS		B			C			A			C	
Queue Length 50th (m)		4.4			18.8			7.5			51.7	
Queue Length 95th (m)		15.0			40.9			20.7			#133.5	
Internal Link Dist (m)		1516.0			444.9			425.7			414.0	
Turn Bay Length (m)												
Base Capacity (vph)		728			627			1083			1189	
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		0.15			0.35			0.16			0.59	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 53.7
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 19.7 Intersection LOS: B
Intersection Capacity Utilization 73.4% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Sydenham Road & Unity Road



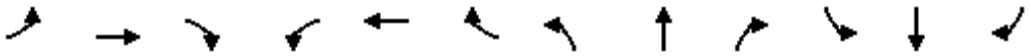


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	48	20	4	24	52	25	840	10	20	280	13
Future Volume (vph)	10	48	20	4	24	52	25	840	10	20	280	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		20.0	0.0		15.0	80.0		95.0	60.0		80.0
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.991			0.993		0.950			0.950		
Satd. Flow (prot)	0	1646	1541	0	1719	1570	1825	1902	1633	1644	1812	1396
Flt Permitted		0.932			0.941		0.574			0.179		
Satd. Flow (perm)	0	1548	1541	0	1629	1570	1103	1902	1633	310	1812	1396
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			103			103			89			89
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		239.2			79.7			274.8			248.0	
Travel Time (s)		14.4			4.8			16.5			14.9	
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
Heavy Vehicles (%)	0%	19%	6%	50%	5%	4%	0%	1%	0%	11%	6%	17%
Adj. Flow (vph)	11	52	22	4	26	57	27	913	11	22	304	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	63	22	0	30	57	27	913	11	22	304	14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.0	16.0	16.0	2.0	16.0	16.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	25.0	25.0	7.0	25.0	25.0
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	12.0	65.0	65.0	12.0	65.0	65.0
Total Split (%)	34.2%	34.2%	34.2%	34.2%	34.2%	34.2%	10.3%	55.6%	55.6%	10.3%	55.6%	55.6%
Maximum Green (s)	32.5	32.5	32.5	32.5	32.5	32.5	7.0	56.0	56.0	7.0	56.0	56.0
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	5.0	5.5	5.5	5.0	5.5	5.5
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	0.0	3.5	3.5	0.0	3.5	3.5
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)		7.5	7.5		7.5	7.5	5.0	9.0	9.0	5.0	9.0	9.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)		8.9	8.9		8.8	8.8	55.5	52.2	52.2	55.4	52.2	52.2
Actuated g/C Ratio		0.12	0.12		0.12	0.12	0.74	0.70	0.70	0.74	0.70	0.70
v/c Ratio		0.34	0.08		0.16	0.21	0.03	0.69	0.01	0.06	0.24	0.01
Control Delay		41.2	0.6		37.5	3.4	3.3	15.3	0.0	3.6	8.1	0.0
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		41.2	0.6		37.5	3.4	3.3	15.3	0.0	3.6	8.1	0.0
LOS		D	A		D	A	A	B	A	A	A	A
Approach Delay		30.7			15.1			14.8			7.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B			B			A	
Queue Length 50th (m)		7.9	0.0		3.7	0.0	0.9	70.5	0.0	0.7	14.7	0.0
Queue Length 95th (m)		23.1	0.0		13.3	2.8	3.0	187.1	0.0	2.6	41.2	0.0
Internal Link Dist (m)		215.2			55.7			250.8			224.0	
Turn Bay Length (m)			20.0			15.0	80.0		95.0	60.0		80.0
Base Capacity (vph)		723	775		761	788	891	1436	1255	364	1368	1076
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		0.09	0.03		0.04	0.07	0.03	0.64	0.01	0.06	0.22	0.01

Intersection Summary			
Area Type:	Other		
Cycle Length: 117			
Actuated Cycle Length: 75			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 14.0		Intersection LOS: B	
Intersection Capacity Utilization 70.9%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Highway 38 & Unity Road

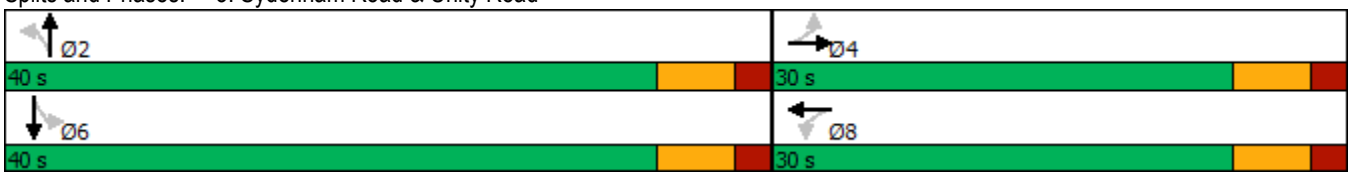


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	112	29	67	71	83	36	482	122	22	211	15
Future Volume (vph)	55	112	29	67	71	83	36	482	122	22	211	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7		45.7	45.7		45.7	45.7		45.7	45.7		45.7
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.99			1.00			1.00	
Frt		0.980			0.949			0.974			0.992	
Flt Protected		0.986			0.985			0.997			0.996	
Satd. Flow (prot)	0	1776	0	0	1747	0	0	1857	0	0	1797	0
Flt Permitted		0.844			0.848			0.970			0.919	
Satd. Flow (perm)	0	1520	0	0	1504	0	0	1807	0	0	1658	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			47			24			6	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1540.0			468.9			449.7			438.0	
Travel Time (s)		110.9			33.8			32.4			31.5	
Confl. Peds. (#/hr)	1					1			2	2		
Confl. Bikes (#/hr)									1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	4%	15%	0%	6%	0%	0%	0%	0%	10%	5%	8%
Adj. Flow (vph)	60	122	32	73	77	90	39	524	133	24	229	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	214	0	0	240	0	0	696	0	0	269	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		14.0	14.0		14.0	14.0	
Minimum Split (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Total Split (s)	30.0	30.0		30.0	30.0		40.0	40.0		40.0	40.0	
Total Split (%)	42.9%	42.9%		42.9%	42.9%		57.1%	57.1%		57.1%	57.1%	
Maximum Green (s)	24.0	24.0		24.0	24.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		12.5			12.5			24.3			24.3	
Actuated g/C Ratio		0.25			0.25			0.49			0.49	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.54			0.58			0.78			0.33	
Control Delay		22.2			20.5			17.4			9.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		22.2			20.5			17.4			9.1	
LOS		C			C			B			A	
Approach Delay		22.2			20.5			17.4			9.1	
Approach LOS		C			C			B			A	
Queue Length 50th (m)		14.9			14.4			42.0			12.2	
Queue Length 95th (m)		37.1			37.6			98.2			30.4	
Internal Link Dist (m)		1516.0			444.9			425.7			414.0	
Turn Bay Length (m)												
Base Capacity (vph)		789			797			1313			1200	
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		0.27			0.30			0.53			0.22	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 49.6			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 17.1		Intersection LOS: B	
Intersection Capacity Utilization 68.6%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: Sydenham Road & Unity Road



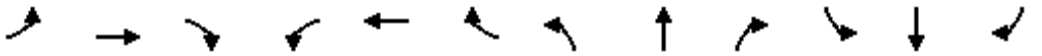
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	16	33	9	23	15	25	175	5	47	871	15
Future Volume (vph)	10	16	33	9	23	15	25	175	5	47	871	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		20.0	0.0		15.0	80.0		95.0	60.0		80.0
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.981			0.986		0.950			0.950		
Satd. Flow (prot)	0	1585	1633	0	1894	1633	1738	1830	1306	1690	1902	1396
Flt Permitted		0.856			0.894		0.195			0.625		
Satd. Flow (perm)	0	1383	1633	0	1717	1633	357	1830	1306	1112	1902	1396
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			103			103			89			89
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		239.2			79.7			274.8			248.0	
Travel Time (s)		14.4			4.8			16.5			14.9	
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
Heavy Vehicles (%)	25%	15%	0%	0%	0%	0%	5%	5%	25%	8%	1%	17%
Adj. Flow (vph)	11	17	36	10	25	16	27	190	5	51	947	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	28	36	0	35	16	27	190	5	51	947	16
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.0	16.0	16.0	2.0	16.0	16.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	25.0	25.0	7.0	25.0	25.0
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	12.0	65.0	65.0	12.0	65.0	65.0
Total Split (%)	34.2%	34.2%	34.2%	34.2%	34.2%	34.2%	10.3%	55.6%	55.6%	10.3%	55.6%	55.6%
Maximum Green (s)	32.5	32.5	32.5	32.5	32.5	32.5	7.0	56.0	56.0	7.0	56.0	56.0
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	5.0	5.5	5.5	5.0	5.5	5.5
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	0.0	3.5	3.5	0.0	3.5	3.5
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)		7.5	7.5		7.5	7.5	5.0	9.0	9.0	5.0	9.0	9.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)		7.3	7.3		7.3	7.3	61.8	58.6	58.6	62.5	60.7	60.7
Actuated g/C Ratio		0.09	0.09		0.09	0.09	0.80	0.75	0.75	0.80	0.78	0.78
v/c Ratio		0.22	0.15		0.22	0.07	0.07	0.14	0.00	0.05	0.64	0.01
Control Delay		41.9	1.2		40.9	0.5	2.9	7.0	0.0	2.6	12.5	0.0
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		41.9	1.2		40.9	0.5	2.9	7.0	0.0	2.6	12.5	0.0
LOS		D	A		D	A	A	A	A	A	B	A
Approach Delay		19.0			28.2			6.4			11.8	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			C			A			B	
Queue Length 50th (m)		4.0	0.0		5.0	0.0	0.8	12.9	0.0	1.5	70.7	0.0
Queue Length 95th (m)		13.0	0.0		15.0	0.0	2.6	23.9	0.0	4.1	#190.6	0.0
Internal Link Dist (m)		215.2			55.7			250.8			224.0	
Turn Bay Length (m)			20.0			15.0	80.0		95.0	60.0		80.0
Base Capacity (vph)		599	765		743	765	413	1368	999	949	1419	1064
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	0.05		0.05	0.02	0.07	0.14	0.01	0.05	0.67	0.02

Intersection Summary			
Area Type:	Other		
Cycle Length: 117			
Actuated Cycle Length: 77.7			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.64			
Intersection Signal Delay: 11.9		Intersection LOS: B	
Intersection Capacity Utilization 72.5%		ICU Level of Service C	
Analysis Period (min) 15			

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

Splits and Phases: 1: Highway 38 & Unity Road



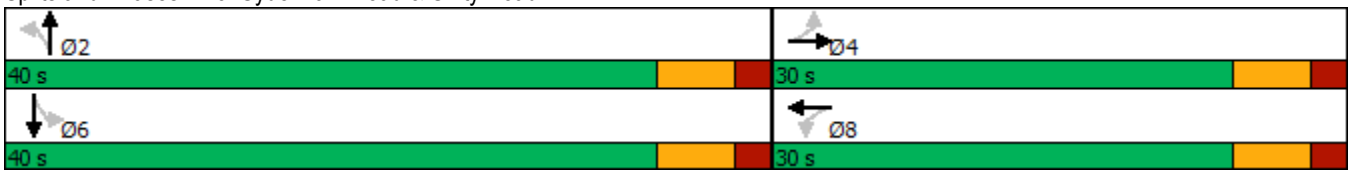
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	51	51	144	63	18	18	124	37	74	618	17
Future Volume (vph)	7	51	51	144	63	18	18	124	37	74	618	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7		45.7	45.7		45.7	45.7		45.7	45.7		45.7
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00			1.00			1.00	
Frt		0.937			0.989			0.972			0.997	
Flt Protected		0.997			0.969			0.995			0.995	
Satd. Flow (prot)	0	1517	0	0	1714	0	0	1728	0	0	1850	0
Flt Permitted		0.971			0.736			0.908			0.944	
Satd. Flow (perm)	0	1477	0	0	1299	0	0	1577	0	0	1756	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		55			7			26			2	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1540.0			468.9			449.7			438.0	
Travel Time (s)		110.9			33.8			32.4			31.5	
Confl. Peds. (#/hr)			2	2			2					2
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	17%	10%	24%	3%	16%	13%	13%	6%	10%	3%	3%	0%
Adj. Flow (vph)	8	55	55	157	68	20	20	135	40	80	672	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	118	0	0	245	0	0	195	0	0	770	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		14.0	14.0		14.0	14.0	
Minimum Split (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Total Split (s)	30.0	30.0		30.0	30.0		40.0	40.0		40.0	40.0	
Total Split (%)	42.9%	42.9%		42.9%	42.9%		57.1%	57.1%		57.1%	57.1%	
Maximum Green (s)	24.0	24.0		24.0	24.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		16.0			16.0			30.1			30.1	
Actuated g/C Ratio		0.27			0.27			0.51			0.51	

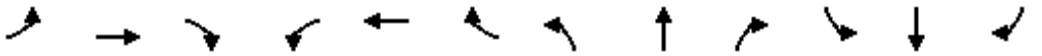
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.27			0.68			0.24			0.85	
Control Delay		12.0			29.6			8.6			25.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		12.0			29.6			8.6			25.2	
LOS		B			C			A			C	
Approach Delay		12.0			29.6			8.6			25.2	
Approach LOS		B			C			A			C	
Queue Length 50th (m)		5.6			24.6			9.0			64.7	
Queue Length 95th (m)		15.8			45.6			23.4			#157.2	
Internal Link Dist (m)		1516.0			444.9			425.7			414.0	
Turn Bay Length (m)												
Base Capacity (vph)		660			556			961			1059	
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		0.18			0.44			0.20			0.73	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 58.6
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 22.4 Intersection LOS: C
Intersection Capacity Utilization 79.4% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Sydenham Road & Unity Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	53	22	5	26	57	27	923	11	22	308	15
Future Volume (vph)	11	53	22	5	26	57	27	923	11	22	308	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		20.0	0.0		15.0	80.0		95.0	60.0		80.0
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.992			0.992		0.950			0.950		
Satd. Flow (prot)	0	1647	1541	0	1704	1570	1825	1902	1633	1644	1812	1396
Flt Permitted		0.932			0.932		0.547			0.143		
Satd. Flow (perm)	0	1547	1541	0	1601	1570	1051	1902	1633	247	1812	1396
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			103			103			89			89
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		239.2			79.7			274.8			248.0	
Travel Time (s)		14.4			4.8			16.5			14.9	
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
Heavy Vehicles (%)	0%	19%	6%	50%	5%	4%	0%	1%	0%	11%	6%	17%
Adj. Flow (vph)	12	58	24	5	28	62	29	1003	12	24	335	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	70	24	0	33	62	29	1003	12	24	335	16
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.0	16.0	16.0	2.0	16.0	16.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	25.0	25.0	7.0	25.0	25.0
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	12.0	65.0	65.0	12.0	65.0	65.0
Total Split (%)	34.2%	34.2%	34.2%	34.2%	34.2%	34.2%	10.3%	55.6%	55.6%	10.3%	55.6%	55.6%
Maximum Green (s)	32.5	32.5	32.5	32.5	32.5	32.5	7.0	56.0	56.0	7.0	56.0	56.0
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	5.0	5.5	5.5	5.0	5.5	5.5
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	0.0	3.5	3.5	0.0	3.5	3.5
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)		7.5	7.5		7.5	7.5	5.0	9.0	9.0	5.0	9.0	9.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)		9.2	9.2		9.1	9.1	63.4	59.5	59.5	62.3	57.2	57.2
Actuated g/C Ratio		0.11	0.11		0.11	0.11	0.76	0.71	0.71	0.74	0.68	0.68
v/c Ratio		0.41	0.09		0.19	0.24	0.03	0.74	0.01	0.08	0.27	0.02
Control Delay		44.8	0.7		39.1	4.5	3.4	17.3	0.0	4.0	9.2	0.0
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		44.8	0.7		39.1	4.5	3.4	17.3	0.0	4.0	9.2	0.0
LOS		D	A		D	A	A	B	A	A	A	A
Approach Delay		33.6			16.5			16.7			8.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B			B			A	
Queue Length 50th (m)		10.3	0.0		4.8	0.0	1.0	89.3	0.0	0.8	26.9	0.0
Queue Length 95th (m)		25.1	0.0		14.2	4.0	3.2	#251.1	0.0	2.9	46.3	0.0
Internal Link Dist (m)		215.2			55.7			250.8			224.0	
Turn Bay Length (m)			20.0			15.0	80.0		95.0	60.0		80.0
Base Capacity (vph)		612	672		634	684	865	1351	1186	304	1287	1017
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		0.11	0.04		0.05	0.09	0.03	0.74	0.01	0.08	0.26	0.02

Intersection Summary			
Area Type:	Other		
Cycle Length: 117			
Actuated Cycle Length: 83.7			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 15.7		Intersection LOS: B	
Intersection Capacity Utilization 75.5%		ICU Level of Service D	
Analysis Period (min) 15			

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

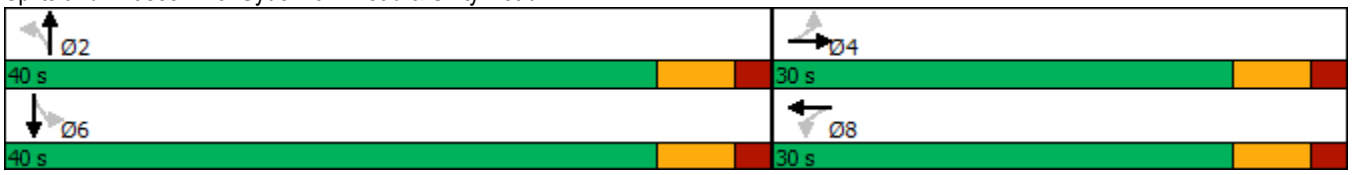
Splits and Phases: 1: Highway 38 & Unity Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	123	32	74	78	91	39	530	134	25	232	16
Future Volume (vph)	60	123	32	74	78	91	39	530	134	25	232	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7		45.7	45.7		45.7	45.7		45.7	45.7		45.7
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.99			1.00			1.00	
Frt		0.980			0.949			0.974			0.992	
Flt Protected		0.986			0.985			0.997			0.995	
Satd. Flow (prot)	0	1776	0	0	1747	0	0	1857	0	0	1795	0
Flt Permitted		0.819			0.827			0.968			0.908	
Satd. Flow (perm)	0	1475	0	0	1467	0	0	1803	0	0	1638	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			47			24			6	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1540.0			468.9			449.7			438.0	
Travel Time (s)		110.9			33.8			32.4			31.5	
Confl. Peds. (#/hr)	1					1			2	2		
Confl. Bikes (#/hr)									1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	4%	15%	0%	6%	0%	0%	0%	0%	10%	5%	8%
Adj. Flow (vph)	65	134	35	80	85	99	42	576	146	27	252	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	234	0	0	264	0	0	764	0	0	296	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		14.0	14.0		14.0	14.0	
Minimum Split (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Total Split (s)	30.0	30.0		30.0	30.0		40.0	40.0		40.0	40.0	
Total Split (%)	42.9%	42.9%		42.9%	42.9%		57.1%	57.1%		57.1%	57.1%	
Maximum Green (s)	24.0	24.0		24.0	24.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		13.9			13.9			27.6			27.6	
Actuated g/C Ratio		0.26			0.26			0.51			0.51	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.60			0.64			0.82			0.35	
Control Delay		24.8			23.5			20.9			9.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		24.8			23.5			20.9			9.8	
LOS		C			C			C			A	
Approach Delay		24.8			23.5			20.9			9.8	
Approach LOS		C			C			C			A	
Queue Length 50th (m)		19.8			19.5			53.8			14.9	
Queue Length 95th (m)		40.6			42.2			#141.6			36.2	
Internal Link Dist (m)		1516.0			444.9			425.7			414.0	
Turn Bay Length (m)												
Base Capacity (vph)		694			708			1198			1083	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.34			0.37			0.64			0.27	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 54.1			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 19.8		Intersection LOS: B	
Intersection Capacity Utilization 74.1%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Sydenham Road & Unity Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	15	30	16	21	13	22	159	12	43	793	13
Future Volume (vph)	9	15	30	16	21	13	22	159	12	43	793	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		20.0	0.0		15.0	80.0		95.0	60.0		80.0
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.981			0.979		0.950			0.950		
Satd. Flow (prot)	0	1586	1633	0	1551	1633	1738	1830	949	1690	1902	1396
Flt Permitted		0.857			0.850		0.213			0.632		
Satd. Flow (perm)	0	1385	1633	0	1347	1633	390	1830	949	1124	1902	1396
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			103			103			89			89
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		239.2			79.7			274.8			248.0	
Travel Time (s)		14.4			4.8			16.5			14.9	
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
Heavy Vehicles (%)	25%	15%	0%	50%	0%	0%	5%	5%	72%	8%	1%	17%
Adj. Flow (vph)	10	16	33	17	23	14	24	173	13	47	862	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	26	33	0	40	14	24	173	13	47	862	14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.0	16.0	16.0	2.0	16.0	16.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	25.0	25.0	7.0	25.0	25.0
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	12.0	65.0	65.0	12.0	65.0	65.0
Total Split (%)	34.2%	34.2%	34.2%	34.2%	34.2%	34.2%	10.3%	55.6%	55.6%	10.3%	55.6%	55.6%
Maximum Green (s)	32.5	32.5	32.5	32.5	32.5	32.5	7.0	56.0	56.0	7.0	56.0	56.0
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	5.0	5.5	5.5	5.0	5.5	5.5
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	0.0	3.5	3.5	0.0	3.5	3.5
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)		7.5	7.5		7.5	7.5	5.0	9.0	9.0	5.0	9.0	9.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)		8.9	8.9		9.1	9.1	47.8	47.1	47.1	48.5	49.0	49.0
Actuated g/C Ratio		0.14	0.14		0.14	0.14	0.75	0.74	0.74	0.76	0.77	0.77
v/c Ratio		0.14	0.10		0.21	0.04	0.05	0.13	0.02	0.05	0.59	0.01
Control Delay		38.0	0.7		38.5	0.2	3.2	8.0	0.1	3.0	12.1	0.0
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		38.0	0.7		38.5	0.2	3.2	8.0	0.1	3.0	12.1	0.0
LOS		D	A		D	A	A	A	A	A	B	A
Approach Delay		17.1			28.5			7.0			11.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			C			A			B	
Queue Length 50th (m)		3.3	0.0		5.1	0.0	0.7	11.9	0.0	1.5	61.4	0.0
Queue Length 95th (m)		12.0	0.0		16.8	0.0	2.6	22.8	0.0	4.1	163.3	0.0
Internal Link Dist (m)		215.2			55.7			250.8			224.0	
Turn Bay Length (m)			20.0			15.0	80.0		95.0	60.0		80.0
Base Capacity (vph)		870	1064		846	1064	481	1459	775	934	1516	1131
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		0.03	0.03		0.05	0.01	0.05	0.12	0.02	0.05	0.57	0.01

Intersection Summary			
Area Type:	Other		
Cycle Length: 117			
Actuated Cycle Length: 63.9			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 11.7		Intersection LOS: B	
Intersection Capacity Utilization 68.4%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Highway 38 & Unity Road

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	99	8	14	90	8	14
Future Vol, veh/h	99	8	14	90	8	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	17	100	100	12	100	100
Mvmt Flow	108	9	15	98	9	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	117	0	241	113
Stage 1	-	-	-	-	113	-
Stage 2	-	-	-	-	128	-
Critical Hdwy	-	-	5.1	-	7.4	7.2
Critical Hdwy Stg 1	-	-	-	-	6.4	-
Critical Hdwy Stg 2	-	-	-	-	6.4	-
Follow-up Hdwy	-	-	3.1	-	4.4	4.2
Pot Cap-1 Maneuver	-	-	1034	-	576	730
Stage 1	-	-	-	-	717	-
Stage 2	-	-	-	-	704	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1034	-	567	730
Mov Cap-2 Maneuver	-	-	-	-	567	-
Stage 1	-	-	-	-	717	-
Stage 2	-	-	-	-	693	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.1	10.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	661	-	-	1034	-
HCM Lane V/C Ratio	0.036	-	-	0.015	-
HCM Control Delay (s)	10.7	-	-	8.5	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

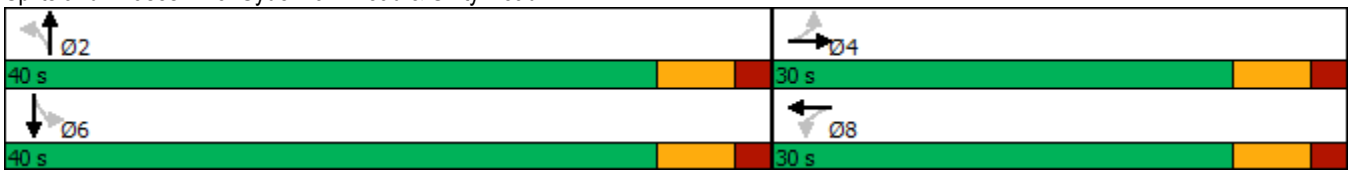
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	46	60	131	57	17	31	113	34	67	563	16
Future Volume (vph)	7	46	60	131	57	17	31	113	34	67	563	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7		45.7	45.7		45.7	45.7		45.7	45.7		45.7
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00			1.00			1.00	
Frt		0.929			0.989			0.974			0.997	
Flt Protected		0.997			0.969			0.991			0.995	
Satd. Flow (prot)	0	1379	0	0	1714	0	0	1612	0	0	1850	0
Flt Permitted		0.972			0.734			0.843			0.945	
Satd. Flow (perm)	0	1345	0	0	1295	0	0	1371	0	0	1757	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		65			7			24			2	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1540.0			468.9			449.7			438.0	
Travel Time (s)		110.9			33.8			32.4			31.5	
Confl. Peds. (#/hr)			2	2			2					2
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	17%	10%	42%	3%	16%	13%	53%	6%	10%	3%	3%	0%
Adj. Flow (vph)	8	50	65	142	62	18	34	123	37	73	612	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	123	0	0	222	0	0	194	0	0	702	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		14.0	14.0		14.0	14.0	
Minimum Split (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Total Split (s)	30.0	30.0		30.0	30.0		40.0	40.0		40.0	40.0	
Total Split (%)	42.9%	42.9%		42.9%	42.9%		57.1%	57.1%		57.1%	57.1%	
Maximum Green (s)	24.0	24.0		24.0	24.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		14.6			14.6			26.3			26.3	
Actuated g/C Ratio		0.27			0.27			0.49			0.49	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.30			0.62			0.28			0.82	
Control Delay		11.4			26.2			9.0			22.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		11.4			26.2			9.0			22.0	
LOS		B			C			A			C	
Approach Delay		11.4			26.3			9.0			22.0	
Approach LOS		B			C			A			C	
Queue Length 50th (m)		4.4			18.9			8.6			51.7	
Queue Length 95th (m)		15.8			41.0			23.8			#133.4	
Internal Link Dist (m)		1516.0			444.9			425.7			414.0	
Turn Bay Length (m)												
Base Capacity (vph)		674			620			932			1186	
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		0.18			0.36			0.21			0.59	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 53.7
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 19.7 Intersection LOS: B
Intersection Capacity Utilization 68.5% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Sydenham Road & Unity Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	48	20	12	24	52	25	840	18	20	280	13
Future Volume (vph)	10	48	20	12	24	52	25	840	18	20	280	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		20.0	0.0		15.0	80.0		95.0	60.0		80.0
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.991			0.984		0.950			0.950		
Satd. Flow (prot)	0	1646	1541	0	1447	1570	1825	1902	1142	1644	1812	1396
Flt Permitted		0.930			0.864		0.574			0.179		
Satd. Flow (perm)	0	1544	1541	0	1270	1570	1103	1902	1142	310	1812	1396
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			103			103			89			89
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		239.2			79.7			274.8			248.0	
Travel Time (s)		14.4			4.8			16.5			14.9	
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
Heavy Vehicles (%)	0%	19%	6%	82%	5%	4%	0%	1%	43%	11%	6%	17%
Adj. Flow (vph)	11	52	22	13	26	57	27	913	20	22	304	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	63	22	0	39	57	27	913	20	22	304	14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.0	16.0	16.0	2.0	16.0	16.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	25.0	25.0	7.0	25.0	25.0
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	12.0	65.0	65.0	12.0	65.0	65.0
Total Split (%)	34.2%	34.2%	34.2%	34.2%	34.2%	34.2%	10.3%	55.6%	55.6%	10.3%	55.6%	55.6%
Maximum Green (s)	32.5	32.5	32.5	32.5	32.5	32.5	7.0	56.0	56.0	7.0	56.0	56.0
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	5.0	5.5	5.5	5.0	5.5	5.5
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	0.0	3.5	3.5	0.0	3.5	3.5
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)		7.5	7.5		7.5	7.5	5.0	9.0	9.0	5.0	9.0	9.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)		8.9	8.9		8.8	8.8	55.5	52.2	52.2	55.4	52.2	52.2
Actuated g/C Ratio		0.12	0.12		0.12	0.12	0.74	0.70	0.70	0.74	0.70	0.70
v/c Ratio		0.34	0.08		0.26	0.21	0.03	0.69	0.02	0.06	0.24	0.01
Control Delay		41.2	0.6		40.4	3.4	3.3	15.3	0.1	3.6	8.1	0.0
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		41.2	0.6		40.4	3.4	3.3	15.3	0.1	3.6	8.1	0.0
LOS		D	A		D	A	A	B	A	A	A	A
Approach Delay		30.7			18.4			14.6			7.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B			B			A	
Queue Length 50th (m)		7.9	0.0		4.9	0.0	0.9	70.5	0.0	0.7	14.7	0.0
Queue Length 95th (m)		23.1	0.0		16.3	2.8	3.0	187.1	0.0	2.6	41.2	0.0
Internal Link Dist (m)		215.2			55.7			250.8			224.0	
Turn Bay Length (m)			20.0			15.0	80.0		95.0	60.0		80.0
Base Capacity (vph)		721	775		593	788	891	1436	884	364	1368	1076
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		0.09	0.03		0.07	0.07	0.03	0.64	0.02	0.06	0.22	0.01

Intersection Summary			
Area Type:	Other		
Cycle Length: 117			
Actuated Cycle Length: 75			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 14.2		Intersection LOS: B	
Intersection Capacity Utilization 70.9%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Highway 38 & Unity Road

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	196	8	14	121	8	14
Future Vol, veh/h	196	8	14	121	8	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	100	100	5	100	100
Mvmt Flow	213	9	15	132	9	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	222	0	380	218
Stage 1	-	-	-	-	218	-
Stage 2	-	-	-	-	162	-
Critical Hdwy	-	-	5.1	-	7.4	7.2
Critical Hdwy Stg 1	-	-	-	-	6.4	-
Critical Hdwy Stg 2	-	-	-	-	6.4	-
Follow-up Hdwy	-	-	3.1	-	4.4	4.2
Pot Cap-1 Maneuver	-	-	932	-	468	628
Stage 1	-	-	-	-	633	-
Stage 2	-	-	-	-	676	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	932	-	460	628
Mov Cap-2 Maneuver	-	-	-	-	460	-
Stage 1	-	-	-	-	633	-
Stage 2	-	-	-	-	665	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	11.8
HCM LOS			B

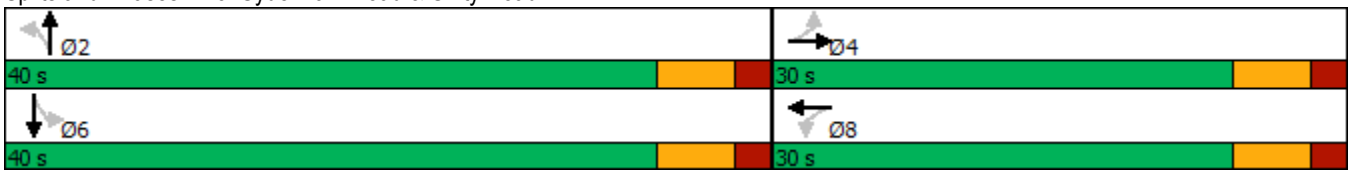
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	554	-	-	932	-
HCM Lane V/C Ratio	0.043	-	-	0.016	-
HCM Control Delay (s)	11.8	-	-	8.9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

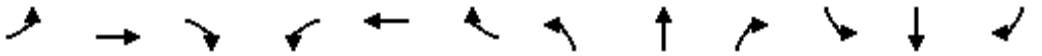
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	112	43	67	71	83	50	482	122	22	211	15
Future Volume (vph)	55	112	43	67	71	83	50	482	122	22	211	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7		45.7	45.7		45.7	45.7		45.7	45.7		45.7
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.99			1.00			1.00	
Frt		0.972			0.949			0.975			0.992	
Flt Protected		0.987			0.985			0.996			0.996	
Satd. Flow (prot)	0	1661	0	0	1747	0	0	1818	0	0	1797	0
Flt Permitted		0.851			0.834			0.956			0.918	
Satd. Flow (perm)	0	1432	0	0	1480	0	0	1745	0	0	1656	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			47			23			6	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1540.0			468.9			449.7			438.0	
Travel Time (s)		110.9			33.8			32.4			31.5	
Confl. Peds. (#/hr)	1					1			2	2		
Confl. Bikes (#/hr)									1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	4%	43%	0%	6%	0%	28%	0%	0%	10%	5%	8%
Adj. Flow (vph)	60	122	47	73	77	90	54	524	133	24	229	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	229	0	0	240	0	0	711	0	0	269	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		14.0	14.0		14.0	14.0	
Minimum Split (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Total Split (s)	30.0	30.0		30.0	30.0		40.0	40.0		40.0	40.0	
Total Split (%)	42.9%	42.9%		42.9%	42.9%		57.1%	57.1%		57.1%	57.1%	
Maximum Green (s)	24.0	24.0		24.0	24.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		13.4			13.4			26.0			26.0	
Actuated g/C Ratio		0.26			0.26			0.50			0.50	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.60			0.58			0.81			0.32	
Control Delay		24.1			20.9			20.0			9.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		24.1			20.9			20.0			9.3	
LOS		C			C			C			A	
Approach Delay		24.1			20.9			20.0			9.3	
Approach LOS		C			C			C			A	
Queue Length 50th (m)		17.5			15.9			47.8			13.0	
Queue Length 95th (m)		39.7			37.6			#126.5			31.5	
Internal Link Dist (m)		1516.0			444.9			425.7			414.0	
Turn Bay Length (m)												
Base Capacity (vph)		711			749			1216			1149	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.32			0.32			0.58			0.23	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 52.1			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 18.8		Intersection LOS: B	
Intersection Capacity Utilization 72.7%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Sydenham Road & Unity Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	16	33	16	23	15	25	175	13	47	871	15
Future Volume (vph)	10	16	33	16	23	15	25	175	13	47	871	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		20.0	0.0		15.0	80.0		95.0	60.0		80.0
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.981			0.980		0.950			0.950		
Satd. Flow (prot)	0	1585	1633	0	1582	1633	1738	1830	955	1690	1902	1396
Flt Permitted		0.853			0.856		0.192			0.626		
Satd. Flow (perm)	0	1378	1633	0	1382	1633	351	1830	955	1114	1902	1396
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			103			103			89			89
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		239.2			79.7			274.8			248.0	
Travel Time (s)		14.4			4.8			16.5			14.9	
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
Heavy Vehicles (%)	25%	15%	0%	47%	0%	0%	5%	5%	71%	8%	1%	17%
Adj. Flow (vph)	11	17	36	17	25	16	27	190	14	51	947	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	28	36	0	42	16	27	190	14	51	947	16
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.0	16.0	16.0	2.0	16.0	16.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	25.0	25.0	7.0	25.0	25.0
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	12.0	65.0	65.0	12.0	65.0	65.0
Total Split (%)	34.2%	34.2%	34.2%	34.2%	34.2%	34.2%	10.3%	55.6%	55.6%	10.3%	55.6%	55.6%
Maximum Green (s)	32.5	32.5	32.5	32.5	32.5	32.5	7.0	56.0	56.0	7.0	56.0	56.0
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	5.0	5.5	5.5	5.0	5.5	5.5
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	0.0	3.5	3.5	0.0	3.5	3.5
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)		7.5	7.5		7.5	7.5	5.0	9.0	9.0	5.0	9.0	9.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)		7.9	7.9		8.0	8.0	62.0	58.8	58.8	62.7	60.9	60.9
Actuated g/C Ratio		0.10	0.10		0.10	0.10	0.79	0.75	0.75	0.80	0.78	0.78
v/c Ratio		0.20	0.14		0.30	0.06	0.07	0.14	0.02	0.05	0.64	0.01
Control Delay		40.9	1.2		42.9	0.5	3.2	7.4	0.1	2.8	13.1	0.0
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		40.9	1.2		42.9	0.5	3.2	7.4	0.1	2.8	13.1	0.0
LOS		D	A		D	A	A	A	A	A	B	A
Approach Delay		18.5			31.2			6.5			12.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			C			A			B	
Queue Length 50th (m)		4.0	0.0		6.1	0.0	0.8	13.3	0.0	1.6	73.7	0.0
Queue Length 95th (m)		12.8	0.0		17.1	0.0	2.7	25.0	0.0	4.4	#205.5	0.0
Internal Link Dist (m)		215.2			55.7			250.8			224.0	
Turn Bay Length (m)			20.0			15.0	80.0		95.0	60.0		80.0
Base Capacity (vph)		592	760		593	760	405	1357	731	944	1408	1056
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	0.05		0.07	0.02	0.07	0.14	0.02	0.05	0.67	0.02

Intersection Summary			
Area Type:	Other		
Cycle Length: 117			
Actuated Cycle Length: 78.5			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.64			
Intersection Signal Delay: 12.5		Intersection LOS: B	
Intersection Capacity Utilization 72.5%		ICU Level of Service C	
Analysis Period (min) 15			

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

Splits and Phases: 1: Highway 38 & Unity Road

Intersection	
Int Delay, s/veh	1.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	108	8	14	99	8	14
Future Vol, veh/h	108	8	14	99	8	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	17	100	100	12	100	100
Mvmt Flow	117	9	15	108	9	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	126	0	260	122
Stage 1	-	-	-	-	122	-
Stage 2	-	-	-	-	138	-
Critical Hdwy	-	-	5.1	-	7.4	7.2
Critical Hdwy Stg 1	-	-	-	-	6.4	-
Critical Hdwy Stg 2	-	-	-	-	6.4	-
Follow-up Hdwy	-	-	3.1	-	4.4	4.2
Pot Cap-1 Maneuver	-	-	1025	-	560	720
Stage 1	-	-	-	-	709	-
Stage 2	-	-	-	-	696	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1025	-	551	720
Mov Cap-2 Maneuver	-	-	-	-	551	-
Stage 1	-	-	-	-	709	-
Stage 2	-	-	-	-	685	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.1	10.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	648	-	-	1025	-
HCM Lane V/C Ratio	0.037	-	-	0.015	-
HCM Control Delay (s)	10.8	-	-	8.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

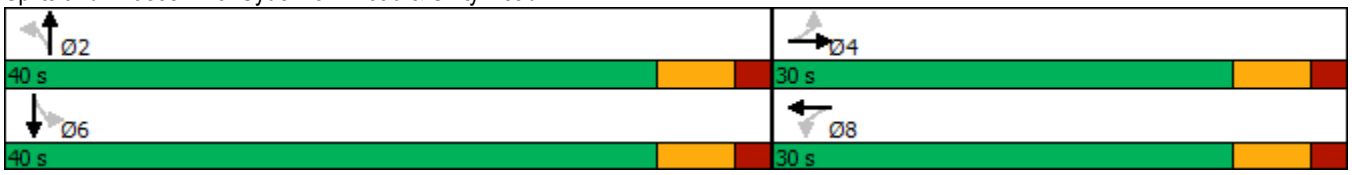
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	51	65	144	63	18	33	124	37	74	618	17
Future Volume (vph)	7	51	65	144	63	18	33	124	37	74	618	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7		45.7	45.7		45.7	45.7		45.7	45.7		45.7
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00			1.00			1.00	
Frt		0.928			0.989			0.974			0.997	
Flt Protected		0.997			0.969			0.992			0.995	
Satd. Flow (prot)	0	1384	0	0	1714	0	0	1622	0	0	1850	0
Flt Permitted		0.974			0.757			0.834			0.942	
Satd. Flow (perm)	0	1352	0	0	1336	0	0	1363	0	0	1752	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		71			7			23			2	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1540.0			468.9			449.7			438.0	
Travel Time (s)		110.9			33.8			32.4			31.5	
Confl. Peds. (#/hr)			2	2			2					2
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	17%	10%	41%	3%	16%	13%	51%	6%	10%	3%	3%	0%
Adj. Flow (vph)	8	55	71	157	68	20	36	135	40	80	672	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	134	0	0	245	0	0	211	0	0	770	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		14.0	14.0		14.0	14.0	
Minimum Split (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Total Split (s)	30.0	30.0		30.0	30.0		40.0	40.0		40.0	40.0	
Total Split (%)	42.9%	42.9%		42.9%	42.9%		57.1%	57.1%		57.1%	57.1%	
Maximum Green (s)	24.0	24.0		24.0	24.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		15.8			15.8			30.1			30.1	
Actuated g/C Ratio		0.27			0.27			0.52			0.52	

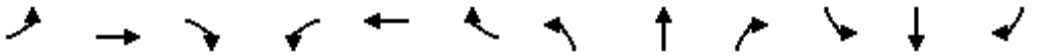
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.32			0.67			0.30			0.85	
Control Delay		11.7			28.8			9.4			25.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		11.7			28.8			9.4			25.0	
LOS		B			C			A			C	
Approach Delay		11.7			28.8			9.4			25.0	
Approach LOS		B			C			A			C	
Queue Length 50th (m)		5.6			24.5			10.2			63.8	
Queue Length 95th (m)		16.8			45.1			26.8			#157.4	
Internal Link Dist (m)		1516.0			444.9			425.7			414.0	
Turn Bay Length (m)												
Base Capacity (vph)		618			574			833			1061	
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		0.22			0.43			0.25			0.73	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 58.3
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 22.0 Intersection LOS: C
Intersection Capacity Utilization 73.8% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Sydenham Road & Unity Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	53	22	13	26	57	27	923	19	22	308	15
Future Volume (vph)	11	53	22	13	26	57	27	923	19	22	308	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		20.0	0.0		15.0	80.0		95.0	60.0		80.0
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.992			0.984		0.950			0.950		
Satd. Flow (prot)	0	1647	1541	0	1454	1570	1825	1902	1158	1644	1812	1396
Flt Permitted		0.930			0.862		0.547			0.143		
Satd. Flow (perm)	0	1544	1541	0	1274	1570	1051	1902	1158	247	1812	1396
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			103			103			89			89
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		239.2			79.7			274.8			248.0	
Travel Time (s)		14.4			4.8			16.5			14.9	
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
Heavy Vehicles (%)	0%	19%	6%	80%	5%	4%	0%	1%	41%	11%	6%	17%
Adj. Flow (vph)	12	58	24	14	28	62	29	1003	21	24	335	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	70	24	0	42	62	29	1003	21	24	335	16
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.0	16.0	16.0	2.0	16.0	16.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	25.0	25.0	7.0	25.0	25.0
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	12.0	65.0	65.0	12.0	65.0	65.0
Total Split (%)	34.2%	34.2%	34.2%	34.2%	34.2%	34.2%	10.3%	55.6%	55.6%	10.3%	55.6%	55.6%
Maximum Green (s)	32.5	32.5	32.5	32.5	32.5	32.5	7.0	56.0	56.0	7.0	56.0	56.0
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	5.0	5.5	5.5	5.0	5.5	5.5
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	0.0	3.5	3.5	0.0	3.5	3.5
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)		7.5	7.5		7.5	7.5	5.0	9.0	9.0	5.0	9.0	9.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)		9.2	9.2		9.1	9.1	63.4	59.5	59.5	62.3	57.2	57.2
Actuated g/C Ratio		0.11	0.11		0.11	0.11	0.76	0.71	0.71	0.74	0.68	0.68
v/c Ratio		0.41	0.09		0.30	0.24	0.03	0.74	0.02	0.08	0.27	0.02
Control Delay		44.8	0.7		42.9	4.5	3.4	17.3	0.1	4.0	9.2	0.0
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		44.8	0.7		42.9	4.5	3.4	17.3	0.1	4.0	9.2	0.0
LOS		D	A		D	A	A	B	A	A	A	A
Approach Delay		33.6			20.0			16.5			8.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			B			A	
Queue Length 50th (m)		10.3	0.0		6.1	0.0	1.0	89.3	0.0	0.8	26.9	0.0
Queue Length 95th (m)		25.1	0.0		17.1	4.0	3.2	#251.1	0.0	2.9	46.3	0.0
Internal Link Dist (m)		215.2			55.7			250.8			224.0	
Turn Bay Length (m)			20.0			15.0	80.0		95.0	60.0		80.0
Base Capacity (vph)		611	672		504	684	865	1351	848	304	1287	1017
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		0.11	0.04		0.08	0.09	0.03	0.74	0.02	0.08	0.26	0.02

Intersection Summary			
Area Type:	Other		
Cycle Length: 117			
Actuated Cycle Length: 83.7			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 15.9		Intersection LOS: B	
Intersection Capacity Utilization 75.5%		ICU Level of Service D	
Analysis Period (min) 15			

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

Splits and Phases: 1: Highway 38 & Unity Road

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	216	8	14	133	8	14
Future Vol, veh/h	216	8	14	133	8	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	100	100	5	100	100
Mvmt Flow	235	9	15	145	9	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	244	0	415	240
Stage 1	-	-	-	-	240	-
Stage 2	-	-	-	-	175	-
Critical Hdwy	-	-	5.1	-	7.4	7.2
Critical Hdwy Stg 1	-	-	-	-	6.4	-
Critical Hdwy Stg 2	-	-	-	-	6.4	-
Follow-up Hdwy	-	-	3.1	-	4.4	4.2
Pot Cap-1 Maneuver	-	-	911	-	444	608
Stage 1	-	-	-	-	616	-
Stage 2	-	-	-	-	666	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	911	-	436	608
Mov Cap-2 Maneuver	-	-	-	-	436	-
Stage 1	-	-	-	-	616	-
Stage 2	-	-	-	-	654	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	12.1
HCM LOS			B

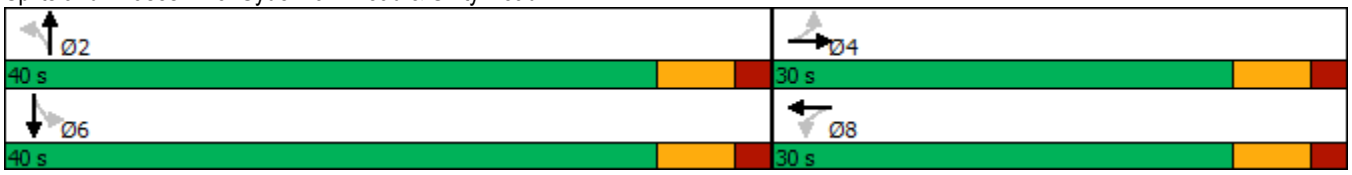
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	532	-	-	911	-
HCM Lane V/C Ratio	0.045	-	-	0.017	-
HCM Control Delay (s)	12.1	-	-	9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	123	46	74	78	91	54	530	134	25	232	16
Future Volume (vph)	60	123	46	74	78	91	54	530	134	25	232	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7		45.7	45.7		45.7	45.7		45.7	45.7		45.7
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.99			1.00			1.00	
Frt		0.973			0.949			0.975			0.992	
Flt Protected		0.987			0.985			0.996			0.995	
Satd. Flow (prot)	0	1668	0	0	1747	0	0	1820	0	0	1795	0
Flt Permitted		0.824			0.807			0.953			0.907	
Satd. Flow (perm)	0	1392	0	0	1432	0	0	1741	0	0	1636	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			47			23			6	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1540.0			468.9			449.7			438.0	
Travel Time (s)		110.9			33.8			32.4			31.5	
Confl. Peds. (#/hr)	1					1			2	2		
Confl. Bikes (#/hr)									1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	4%	42%	0%	6%	0%	27%	0%	0%	10%	5%	8%
Adj. Flow (vph)	65	134	50	80	85	99	59	576	146	27	252	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	249	0	0	264	0	0	781	0	0	296	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		14.0	14.0		14.0	14.0	
Minimum Split (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Total Split (s)	30.0	30.0		30.0	30.0		40.0	40.0		40.0	40.0	
Total Split (%)	42.9%	42.9%		42.9%	42.9%		57.1%	57.1%		57.1%	57.1%	
Maximum Green (s)	24.0	24.0		24.0	24.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		14.6			14.6			30.1			30.1	
Actuated g/C Ratio		0.26			0.26			0.53			0.53	

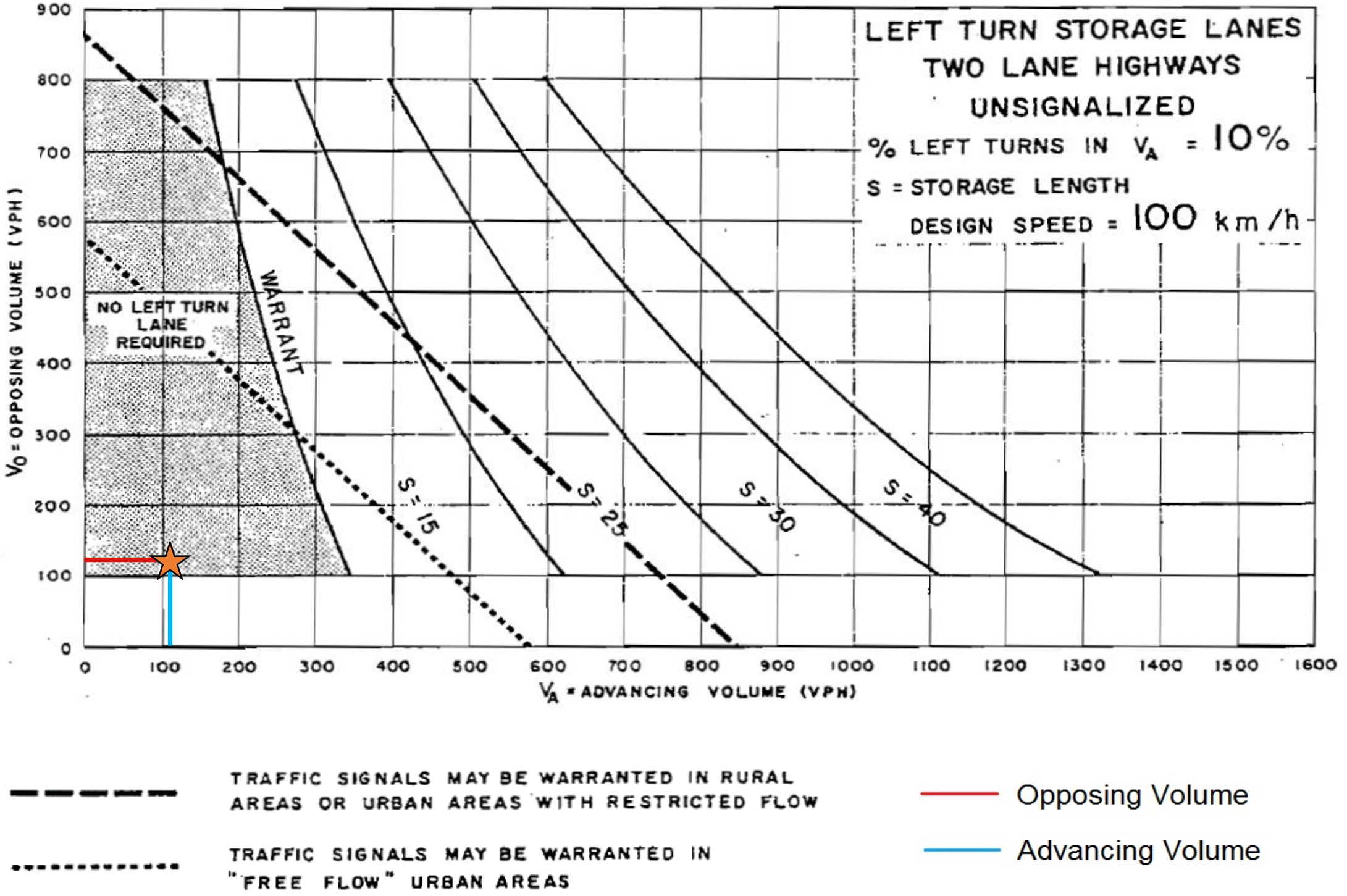
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.67			0.66			0.84			0.34	
Control Delay		28.0			24.7			23.1			9.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		28.0			24.7			23.1			9.8	
LOS		C			C			C			A	
Approach Delay		28.0			24.7			23.1			9.8	
Approach LOS		C			C			C			A	
Queue Length 50th (m)		23.3			21.8			59.6			15.4	
Queue Length 95th (m)		43.6			42.5			#153.8			37.0	
Internal Link Dist (m)		1516.0			444.9			425.7			414.0	
Turn Bay Length (m)												
Base Capacity (vph)		618			651			1136			1062	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.40			0.41			0.69			0.28	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 57.1			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 21.7		Intersection LOS: C	
Intersection Capacity Utilization 78.4%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

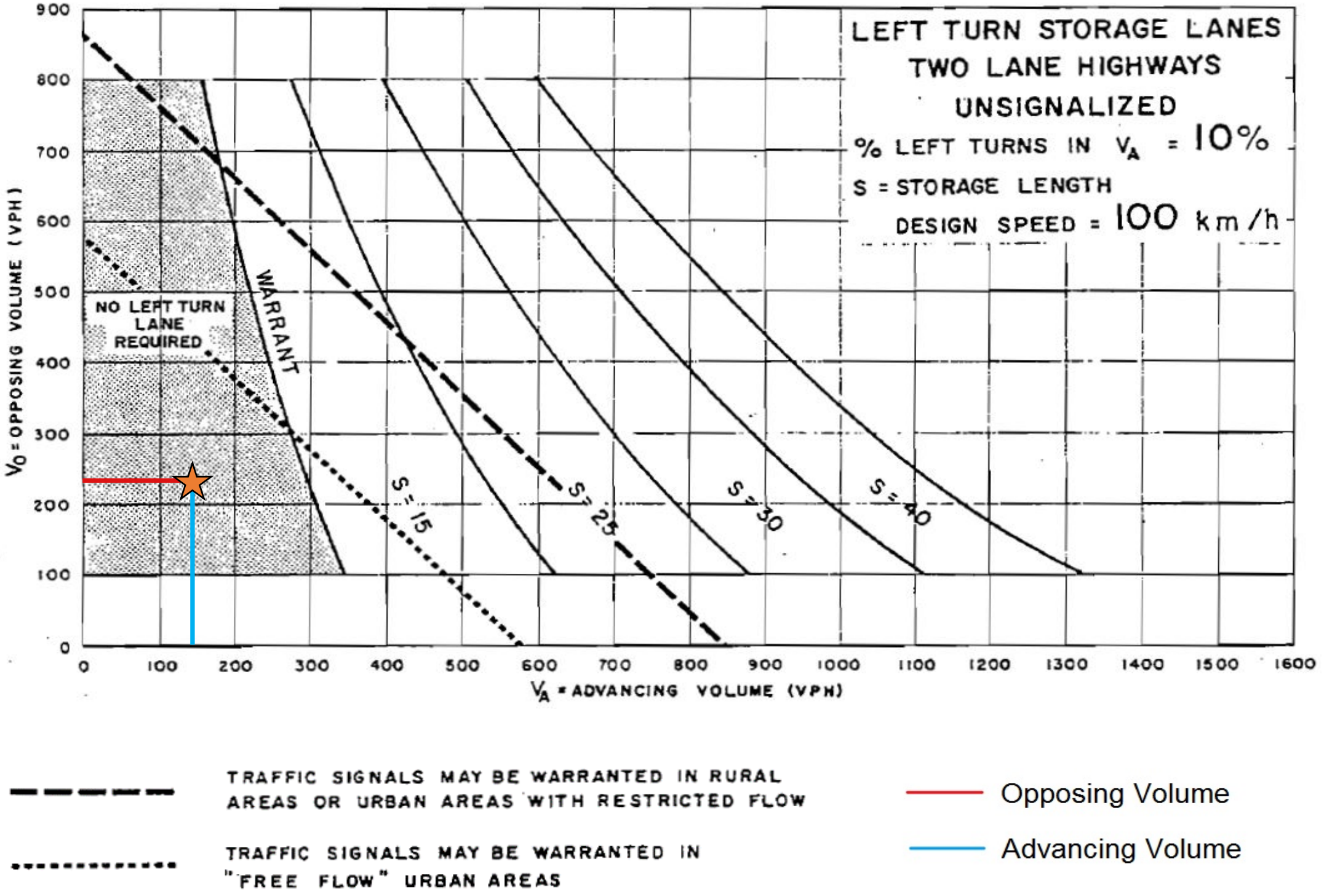
Splits and Phases: 3: Sydenham Road & Unity Road



Appendix E – Left-Turn Lane Warrant Analysis Results



Unity Road @ Elginburg Quarry - Westbound Left-Turn - AM Peak Hour



Unity Road @ Elginburg Quarry - Westbound Left-Turn - PM Peak Hour