DURHAM – SCARBOROUGH
Bus Rapid Transit

Appendix B2 – Downtown Whitby Transportation and Traffic Impact Analysis

Prepared for Metrolinx
by IBI Group & Parsons

TABLE OF CONTENTS

INTRODUCTION **1**
Study Background and Objectives 1
Study Area and Methodology 2
EXISTING TRAVEL PATTERNS **3**
Traffic Volumes 3
Area-wide Travel Patterns 3
Dundas Street Turning Patterns 11
CHANGE OF TRAVEL PATTERNS **16**
Regional Trips 16
Local Trips 17
Town Center Trips 19
Critical Intersections/Movements 20
TRAFFIC IMPACT ANALYSIS **22**
Existing Conditions (2019) 22
Future Conditions (2041) 24
POTENTIAL MITIGATION MEASURES **33**
Future Full Transit Mall Conditions – Scenario 1 (Mitigation Measures) 33
Future Full Transit Mall Conditions – Scenario 2 (Mitigation Measures) 35
Future Northside Pedestrian Mall Conditions (Mitigation Measures) 37
Future Three-Lane Mixed Traffic Westbound Conditions 40
Summary 42
CONCLUSIONS AND RECOMMENDATIONS **45**
APPENDIX A – TRAFFIC VOLUME DIAGRAMS **51**
APPENDIX B – SYNCHRO REPORTS **52**
APPENDIX C – PUBLIC CONSULTATION MAPS **53**

LIST OF TABLES

Table 1 – Area-wide Travel Pattern Analysis – Summary 10
Table 2 – 2031 Future Base Case Network Screenline Analysis (Avergage Weekday P.M. Peak Hour Volumes) 21
Table 3 – Existing Traffic Operation Conditions 23
Table 4 – Existing Queues Exceeding Available Storage 23
Table 5 – Future Background Traffic Operation Conditions 24
Table 6 – Future Background Queues Exceeding Available Storage 25
Table 7 – Future Full Transit Mall (Scenario 1) Traffic Operation Cconditions 26
Table 8 – Future Transit Mall (Scenario 1) Queues Exceeding Available Storage 27
Table 9 – Future Full Transit Mall (Scenario 2) Traffic Operation Conditions 29
Table 10 – Future Full Transit Mall (Scenario 2) Queues Exceeding Available Storage 29
Table 11 – Future Northside Pedestrian Mall Traffic Operation Conditions 31
Table 12 – Future Northside Pedestrian Mall Queues Exceeding Available Storage 32
Table 13 – Future Full Transit Mall With Mitigation (Scenario 1) Traffic Operations Conditions 34
Table 14 – Future Full Transit Mall With Mitigation (Scenario 1) Queues Exceeding Available Storage 34
Table 15 – Future Full Transit Mall With Mitigation (Scenario 2) Traffic Operation Conditions 35
Table 16 – Future Full Transit Mall With Mitigation (Scenario 2) Queues Exceeding Available Storage 36
Table 17– Future Northside Pedestrian Mall With Mitigation Traffic Operation Conditions 38
Table 18 – Future Northside Pedestrian Mall With Mitigation Queues Exceeding Available Storage 38
Table 19 – Traffic Signal Justification 7 – Projected Volumes (Mary/Byron Intersection) 40
Table 20 – Traffic Signal Justification 7 – Projected Volumes (Mary/Hickory Intersection) 40
Table 21 – Future Three-Lane Mixed Traffic Westbound Operation Conditions 41
Table 22 – LOS Improvements with Mitigations For Full Transit Mall 42
Table 23 – LOS Improvements with Mitigations For Northside Pedestrian Mall 42
Table 24 – LOS Improvements with Mitigations For Three-Lane Mixed Traffic Westbound 43
Table 25 – Traffic Volumes And Travel Patterns Comparison (Full Transit Mall Vs. Northside Pedestrian Mall) 44
Table 26 – Traffic Impacts And Mitigation Measures Comparison (Full Transit Mall Vs. Northside Pedestrian Mall) 44

LIST OF FIGURES

Figure 1 – Transportation And Traffic Impact Analysis – Study Area (Overall Study) [Source: Google Maps 2019] 1
Figure 2 – Whitby Downtown Transportation And Traffic Impact Analysis – Study Area 2
Figure 3 – AM And PM Peak Hour Volumes..... 3
Figure 4 – Zones Defined For Top Route Analysis 4
Figure 5 – Area-Wide Travel Patterns Analysis – WB Green To Brock 6
Figure 6 – Area-Wide Travel Patterns Analysis – WB Brock To Byron..... 7
Figure 7 – Area-Wide Travel Patterns Analysis – EB Byron To Brock..... 9
Figure 8 – Area-Wide Travel Patterns Analysis – EB Brock To Green 10
Figure 9 – Dundas Street Turning Patterns Analysis – WB Green To Brock..... 12
Figure 10 – Dundas Street Turning Patterns Analysis – WB Brock To Byron..... 13
Figure 11 – Dundas Street Turning Patterns Analysis – EB Byron To Brock..... 14
Figure 12 – Dundas Street Turning Patterns Analysis – EB Brock To Green 15
Figure 13 – Town Of Whitby's Roadway Network Improvement Plan 16
Figure 14 – Change Of Travel Patterns – Regional Trips..... 17
Figure 15 – Change Of Travel Patterns – Local Trips (WB) 18
Figure 16 – Change Of Travel Patterns – Local Trips (EB) 19
Figure 17 – Change Of Travel Patterns – Town Center Trips 20
Figure 18 – Critical Intersections Turning Percentage 21
Figure 19 – Intersection Lane Configurations And Traffic Control – Existing Conditions 22
Figure 20 – Intersection Lane Configurations And Traffic Control – Future Full Transit Mall Conditions 26
Figure 21 – Critical Intersections Turning Percentage – Scenario 2 28
Figure 22 – Intersection Lane Configurations And Traffic Control – Future Northside Pedestrian Mall Conditions..... 31
Figure 23 – Intersection Lane Configuration And Traffic Control – Future Full Transit Mall With Mitigations 33
Figure 24 – Intersection Lane Configurations And Traffic Control – Future Northside Pedestrian Mall With Mitigations ... 37
Figure 25 – Intersection Lane Configuration – Three-Lane Mixed Traffic Westbound 41
Figure 26 – Town Center Traffic Volumes For Existing Conditions..... 47
Figure 27 – Town Center Traffic Volumes For Northside Pedestrian Mall Conditions..... 48
Figure 28 – Town Center Existing Conditions Vs. Northside Pedestrian Mall Conditions..... 49
Figure 29 – Town Center Existing Conditions Vs. Three-Lane Mixed Traffic Westbound Conditions..... 50

Executive Summary

This study is conducted to support the transportation assessment and preliminary design of the "transit mall" proposed in the Whitby downtown area. The goal of the study is to understand the potential change in travel patterns and the associated traffic impacts on the adjacent transportation network and systems if a Full Transit Mall or a Northside Pedestrian Mall in Downtown Whitby is implemented in the future.

The analysis was completed for an area that divide the Town of Whitby into three layers:

- Town of Whitby
- Whitby Downtown
- Whitby Town Center

The existing travel patterns were reviewed based on traffic data representing the Pre-Covid conditions. StreetLight Data, which uses smartphones and navigation devices as sensors to measure transportation and traffic activities, were utilized to augment the typical traffic counts.

The study examined trips using the four critical segments of Dundas Street:

- Dundas westbound from Green to Brock – 800 cars in the AM peak hour
- Dundas westbound from Brock to Byron – 765 cars in the AM peak hour
- Dundas eastbound from Byron to Brock – 1250 cars in the PM peak hour
- Dundas eastbound from Brock to Green – 1200 cars in the PM peak hour

The existing travel patterns analysis indicates that

- for trips in/out of the **Town of Whitby**,
    - the outbound trips are generally higher than the inbound trips during the AM peak period, and
    - the inbound trips are generally higher than the outbound trips during the PM peak period.
- for trips in/out of the **Whitby Downtown** during both AM and PM peak periods,
    - the inbound trips are higher than the outbound trips in the westbound direction, and
    - the outbound trips are higher than the inbound trips in the eastbound direction.
- for potential **bypass trips**, there is no significant difference between AM peak period and PM peak period,
    - approximately **18/20%** of the trips that currently take the segment between Byron Street and Green Street along Dundas Street go through the **Town of Whitby**, and
    - approximately **66/67%** of these trips go through the **Whitby Downtown**.

Turning movement patterns on and off Dundas Street were analyzed to determine the degree to which traffic on Dundas Street travels directly along the route or is either collected or dispersed within the Town through the side streets. A significant amount of traffic turns onto or off Dundas Street in the Town indicating that Dundas Street is used to distribute trips throughout town and performs less of a role as a through street for large volumes of traffic. In detail,

- For existing westbound trips in the east end of town:
    - 30% enter from Oshawa,
    - 25% turn right off a local street,
    - 22% turn right at Brock Street, and
    - 11% turn left off a local street.
- For existing westbound trips in the west end of town:
    - 6% turn right to head north on local streets,
    - 27% turn left to head south on local street,
    - 19% turn left at Lake Ridge Road, and
    - 32% continue westbound on Dundas Street.
- For existing eastbound trips in the west end of town:
    - 42% travel east on Dundas from Ajax,
    - 35% turn right from a local road, and

    - 16% turn left from a local road.
- For existing eastbound traffic in the east end of town:
    - 32% turn right to head south on local roads,
    - 26% turn left to head north on local roads, and
    - 34% head east into Oshawa along Dundas Street.

The analysis of future conditions assumes that:

- Local road network improvements are in place by 2041, including the extension of Dunlop easterly to Garden, Manning and Adelaide are connected, Bonacord connects easterly to Manning and westerly to Des Newman.
- The potential for trips to divert onto other routes is determined in part by trip length, but all cars can be classified into one of three diversion types:
    - Regional trips, which would tend to prefer arterial diversion routes such as Rossland or Highway 401,
    - Local trips, which would tend to prefer local arterial and major collector routes north and south of the town center, such as Manning, Bonacord and Burns, combined with the major north-south streets such as Thickson, Anderson, Hopkins, Garden, Brock, Cochrane, Annes, McQuay and Jeffrey.
    - Town Center trips, which would tend to prefer local streets in the downtown area such as Mary and Dunlop, combined with local north-south streets such as Garden, Hickory, Euclid, Henry, Cochrane and Annes.

For the Full Transit Mall, which would see the highest level of change to travel patterns, diverted traffic can be divided into six groups:

- Westbound Traffic would divert in the following pattern:
    - 10% (80 trips) north to Regional roads,
    - 29% (232 trips) north to Local roads,
    - 20% (160 trips) north to Town Center roads,
    - 14% (112 trips) south to Town Center roads,
    - 17% (136 trips) south to Local roads, and
    - 10% (80 trips) south to Regional roads.
- Eastbound traffic would divert in the following pattern:
    - 6% (82 trips) north to Regional roads,
    - 23% (287 trips) north to Local roads,
    - 13% (163 trips) north to Town Center roads,
    - 20% (250 trips) south to Town Center roads,
    - 25% (312 trips) south to Local roads, and
    - 13% (163 trips) south to Regional roads.

Critical intersections are analyzed to determine the impact of Full Transit Mall on the adjacent roadway network operations. Many of the stop-controlled intersections along Mary Street and Dunlop Street would see significant delays, with poor levels of service.

For the Northside Pedestrian Mall, which would see significantly less change to travel patterns, approximately 300 westbound trips (38%) would be accommodated on the designated detour route. The remaining 500 trips (62%) would be diverted.

- The total 800 westbound trips in general would be accommodated in the following pattern:
    - 10% (80 trips) north to Regional roads,
    - 27% (216 trips) north to Local roads,
    - 38% (300 trips) would use the designated downtown diversion route travelling west on Dundas, north on Brock, west on Mary and south on Byron to return westbound on Dundas, some trips may also choose to use Perry/Ash/Hickory to access Mary westbound,
    - 15% (120 trips) south to Local roads, and
    - 10% (80 trips) south to Regional roads.

Eastbound traffic in the Northside Pedestrian Mall conditions, will be accommodated with a through eastbound lane carrying approximately 750 trips (60%), leaving 500 trips (40%) to use the diversion routes.

- The total 1250 eastbound trips in general would be accommodated in the following pattern:
    - 6% (82 trips) north to Regional roads,
    - 6% (72 trips) north to Local roads,
    - 3% (40 trips) north to Town Center roads,
    - 60% (750 trips) continue to use Dundas Street,
    - 5% (64 trips) south to Town Center roads,
    - 6% (79 trips) south to Local roads, and
    - 13% (163 trips) south to Regional roads.

Critical intersections are analyzed to determine the impact of Northside Pedestrian Mall on the adjacent roadway network operations. Far fewer intersections see poor levels of service. Intersections of Brock Street and Dundas Street, Brock Street and Mary Street, and Mary Street and Byron Street are impacted; however, the impacts can be mitigated through improvements of lane configurations and traffic control types. In addition, the sensitivity analysis of the westbound diversion to Mary Street through alternative routes east of Brock Street indicate that the impacts might be lower than estimated within this study. Overall, the Northside Pedestrian Mall would result in some localized impacts, which can be managed.

For the Three-Lane Mixed Traffic Westbound, the change to travel patterns and the network-wide traffic impact are minimized. The eastbound traffic would follow a similar pattern of the Northside Pedestrian Mall conditions, and the westbound traffic would generally be accommodated in the following pattern:

- The 800 Westbound trips:
    - 10% (80 trips) north to Regional roads,
    - 2% (15 trips) north to Local roads,
    - 1% (10 trips) north to Town Center roads,
    - 75% (600) continue to use Dundas Street,
    - 1% (7 trips) south to Town Center roads,
    - 1% (8 trips) south to Local roads, and
    - 10% (80 trips) south to Regional roads.

The traffic is expected to operate in acceptable level of service similar to the Future Background conditions.

Finally, the report concludes that

- In the existing conditions, critical intersections/movements (LOS E/F) are mainly identified on Dundas Street, e.g., at Cochrane Street, Euclid Street, Hickory Street and Garden Street, whereas intersections on the parallel streets, i.e., Mary Street and Dunlop Street perform well with no worse than LOS C.
- For the 2041 background conditions, the results are found similar to the existing conditions which is expected, as the anticipated growth in traffic demand is not significant, and the intersection lane configurations and traffic signal control types remain the same as in the existing conditions.
- For the 2041 Full Transit Mall conditions, both scenarios analyzed, i.e., Scenario 1 considers the extensions on Mary Street and Dunlop Street, and Scenario 2 assumes these extensions would not be implemented, show significant deterioration of intersection operational performance in comparison with the future background conditions, especially for the stop-controlled intersections on Mary Street and Dunlop Street.
- However, with implementation of mitigation measures, the Full Transit Mall conditions can be improved. The measures assessed as part of this study include:
    - converting stop-controlled intersections to signalized intersections;
    - improving lane configurations to allow for dedicated left and right turning lanes; and
    - adding protected left turning phases where necessary.
- For the 2041 Northside Pedestrian Mall conditions, the assessment of traffic impacts on the westbound detour routes, and the sensitivity analysis of the alternative routes east of Brock Street indicate that performance of

intersections/movements along the detour routes would deteriorate due to the increased demand, however the impact can be mitigated through measures such as:

  - converting Mary Street and Byron Street from stop-controlled intersection to signalized intersection;
  - improving lane configurations to allow for dedicated left and right turning lanes at Mary Street and Brock Street, Mary Street and Byron Street; and
  - optimizing signal phasing and timings as applicable.

- The Three-Lane Mixed Traffic Westbound option minimizes the change of travel patterns. This option is expected to operate at acceptable level of service and close to the Future Background conditions. The Three-Lane Mixed Traffic Westbound has been selected as the preferred solution, which will be carried forward by the design team for further investigation and refinement.
- Traffic volumes for the town center area Existing conditions, Northside Pedestrian Mall conditions and Three-Lane Mixed Traffic Westbound conditions are presented in the report from **Figure 26** to **Figure 29**.

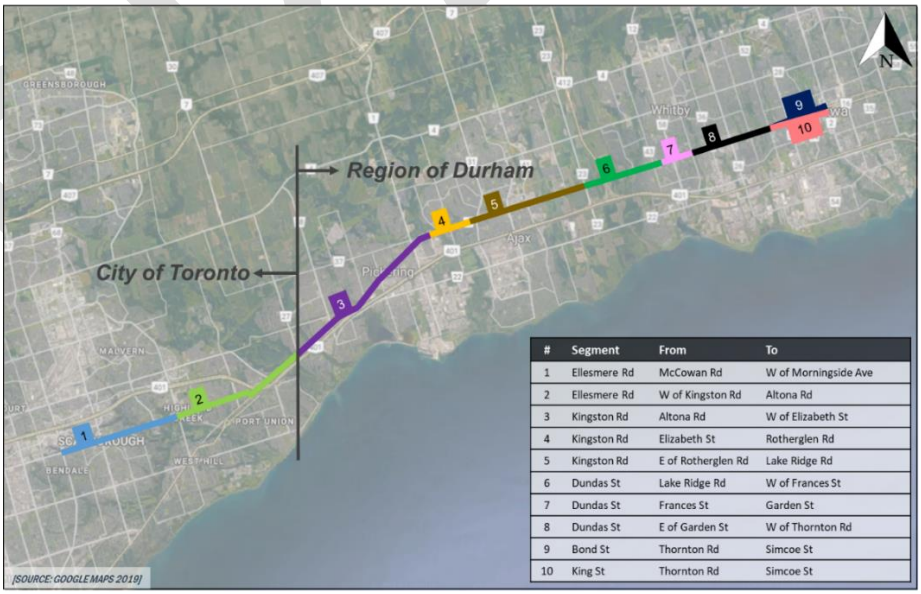
INTRODUCTION

Parsons and IBI Group were retained by Metrolinx to undertake the environmental assessment (EA) study and preliminary design for the Durham-Scarborough Bus Rapid Transit (DSBRT) project. This Downtown Whitby Transportation and Traffic Impact Analysis is a supplementary component of the transportation and traffic impact study to support the transportation assessment and preliminary design of the Full Transit Mall solution proposed in the Whitby downtown area.

Alternative solutions and mitigation measures are also examined to minimize the potential traffic impacts. These solutions/measures include: Northside Pedestrian Mall option that is expected to reduce impacts by permitting a single lane of eastbound traffic to continue through downtown and detoured a single lane of westbound traffic from Dundas Street north on Brock, west on Mary and south on Byron to return to Dundas; and Three-Lane Mixed Traffic Westbound option that keeps the eastbound traffic to continue using the general through lane, while allows the westbound traffic to mix with transit in a transit/traffic lane, and restricts right turns for the northbound, southbound and eastbound approaches at Dundas and Brock intersection.

Study Background and Objectives

A transportation and traffic impact analysis study work plan was developed and approved in March 2020 (“*TTQ_DSBRT_TrafficWorkPlan_2020-03-17*”). In this work plan, the DSBRT study corridor was divided into ten (10) segments (**Figure 1**). Dundas Street between Frances Street and Garden Street in downtown Whitby was identified as one of the “pinch point” locations, referring to sections of the corridor where available right-of-way is especially constrained. One of the solutions proposed for this section of the study corridor is a Full Transit Mall between Byron Street and Green Street. The Full Transit Mall would prohibit the general vehicular traffic and allow only public transit vehicles, bicycles, and pedestrians. Therefore, it would cause a change of vehicle travel patterns in the surrounding transportation network due to traffic rerouting.



#	Segment	From	To
1	Ellesmere Rd	McCowan Rd	W of Morningside Ave
2	Ellesmere Rd	W of Kingston Rd	Altona Rd
3	Kingston Rd	Altona Rd	W of Elizabeth St
4	Kingston Rd	Elizabeth St	Rotherglen Rd
5	Kingston Rd	E of Rotherglen Rd	Lake Ridge Rd
6	Dundas St	Lake Ridge Rd	W of Frances St
7	Dundas St	Frances St	Garden St
8	Dundas St	E of Garden St	W of Thornton Rd
9	Bond St	Thornton Rd	Simcoe St
10	King St	Thornton Rd	Simcoe St

FIGURE 1 – TRANSPORTATION AND TRAFFIC IMPACT ANALYSIS – STUDY AREA (OVERALL STUDY) [SOURCE: GOOGLE MAPS 2019]

To support the transportation assessment and preliminary design of the Full Transit Mall, the goal of the study is to understand the potential change in travel patterns and the associated traffic impacts on the adjacent transportation network and systems. Specifically, the study objectives include:

- analyzing the existing travel pattern in the surrounding transportation network,
- assessing the potential change of travel pattern,
- identifying the critical intersections and roadways where significant traffic impacts are anticipated, and
- developing and recommending the appropriate measures to eliminate or mitigate the impact.

Study Area and Methodology

The proposed study area, as shown in **Figure 2**, covers the entire Town of Whitby, but is divided into three layers:

- Town of Whitby – high-level analysis of the regional trips and travel patterns
- Whitby Downtown – high-level analysis of the Whitby local trips and travel patterns
- Whitby Town Center – detail analysis for identification of the critical intersections and movements

The trips that are of interest to this study are those trips currently using the section of Dundas Street between Byron Street and Green Street. Vehicles in this section would be prohibited and diverted to the alternative routes if the Full Transit Mall is implemented in the future.

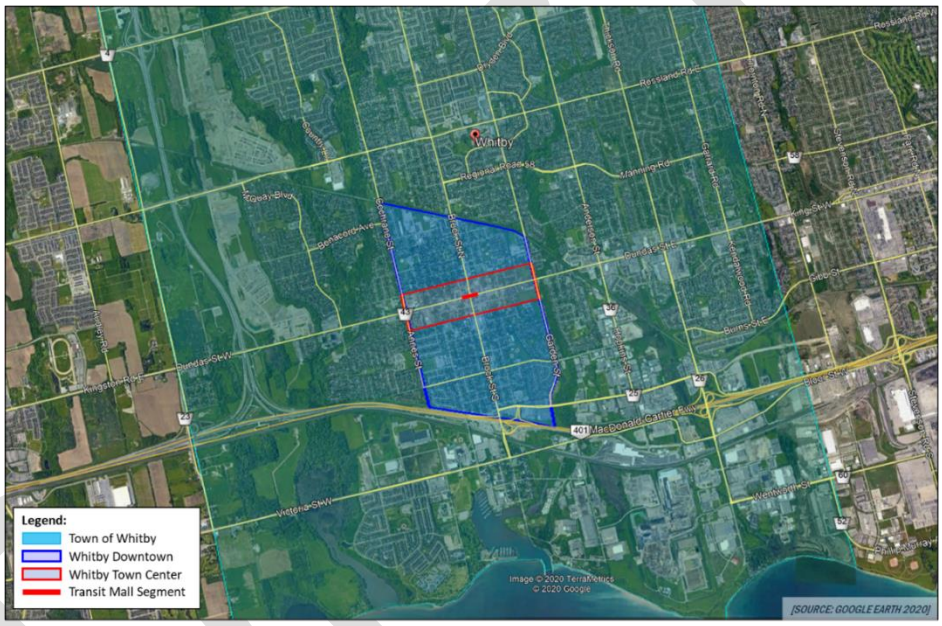


FIGURE 2 – WHITBY DOWNTOWN TRANSPORTATION AND TRAFFIC IMPACT ANALYSIS – STUDY AREA

To achieve the goal of the study, four (4) primary tasks were completed:

- **Task 1** analyze the existing travel patterns based on traffic volumes (i.e. intersection turning movement counts) and StreetLight Data (i.e. a platform that processes and analyzes the anonymized location records from smartphones and navigation devices in connected cars and trucks);
- **Task 2** assess the potential change of travel patterns due to the implementation of the Full Transit Mall solution. The assessments are conducted based on the understanding of existing travel patterns, the characteristics of the potential alternative routes (e.g. type of roadway, distance, travel time, etc.), the adjacent land use types (e.g. commercial, residential, etc.), and the future transportation network and infrastructure improvement plans;
- **Task 3** estimate and evaluate the traffic impact on the adjacent transportation networks/systems with focus on the major/critical intersections. The intersection capacity and operational performance (i.e. delay, level of service, v/c ratio, and 95th percentile queue) are analyzed using Synchro/SimTraffic software and compared between existing (2019) conditions and future (2041) conditions; and
- **Task 4** identify and evaluate the potential mitigation measures for the critical movements/intersections.

The following sections detail the methodologies and analysis results of these four (4) tasks.

EXISTING TRAVEL PATTERNS

The interest of this component of the study is to identify the travel patterns, including peak volumes, peak directions, origins and destinations, and travel routes, for trips that are currently using the section of Dundas Street between Byron Street and Green Street. To understand the existing travel patterns, traffic volumes (i.e. intersection turning movement counts) and StreetLight Data within the study area during AM and PM peak hours were examined.

Traffic Volumes

Figure 3 illustrates the peak hour volumes in 2019 conditions for the critical signalized intersections along Dundas Street within Whitby Town Centre. As the proposed Full Transit Mall is on Dundas Street between Byron Street (one block to the west of Brock Street) and Green Street (one block to the east of Brock Street), the east-west traffic passing through the Dundas Street and Brock Street intersection is the focus of the study. As seen from **Figure 3**, westbound is the peak direction in AM peak hour and eastbound is the peak direction in PM peak hour with hourly volumes of approximately 800 vehicles and 1250 vehicles respectively. These vehicles are expected to take the alternative routes if the Full Transit Mall is implemented in the future. By comparison, buses carry approximately 900 passengers per hour in both directions in each of the AM and PM peak hours, compared to 1366 vehicles in the AM and 1980 vehicles in the PM peak hours.

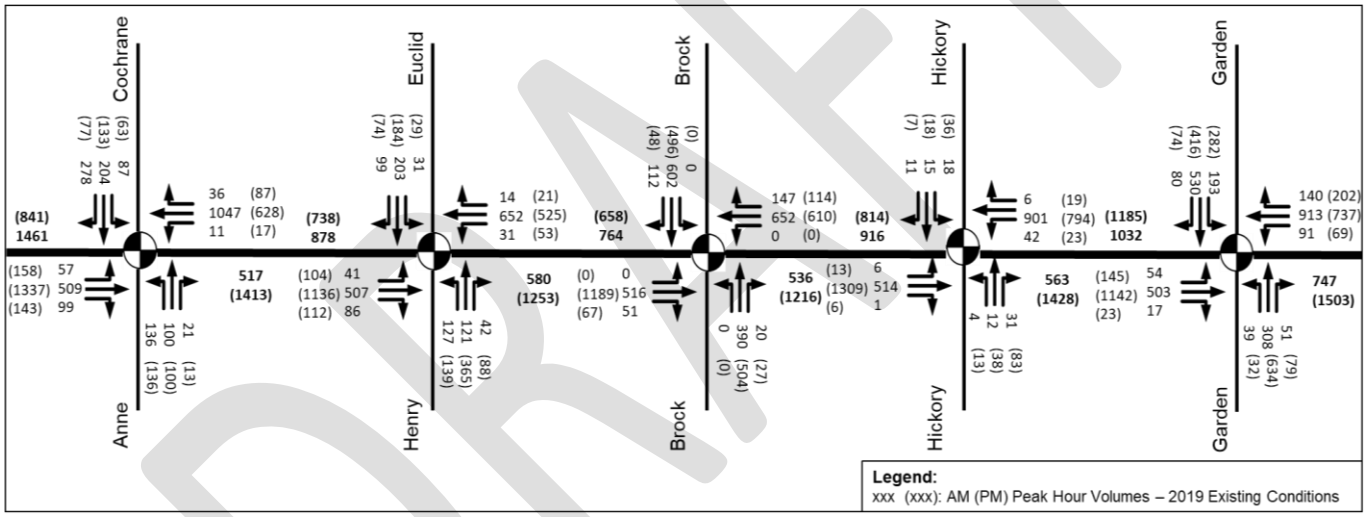


FIGURE 3 – AM AND PM PEAK HOUR VOLUMES

Area-wide Travel Patterns

The area-wide travel patterns analysis was conducted based on StreetLight Data. StreetLight Data uses smartphones and navigation devices as sensors to measure transportation and traffic activities. One of the analyses that StreetLight Data supports is the **Top Routes Analysis**. This analysis allows the identification of routes (i.e. road segments) that are mostly used by vehicles to/from a selected zone. For this study, the Top Routes Analysis was utilized to identify the road segments mostly used and to understand where these trips originate from and head to in the existing conditions.

As mentioned previously, the trips of interest are the ones passing through the proposed Full Transit Mall segment. To cover the trips to/from the Full Transit Mall segment in both westbound and eastbound directions, and the trips to/from Brock Street using right turns, four Pass-through zones were defined as shown in **Figure 4** and listed below:

- Dundas WB Green to Brock,
- Dundas WB Brock to Byron,
- Dundas EB Byron to Brock, and
- Dundas EB Brock to Green.

<u>Pass-through zone</u>: <u>a zone that usually covers a road, where the goal is to measure trips that are passing through, rather than trips that are originating from or destined to that zone.</u>

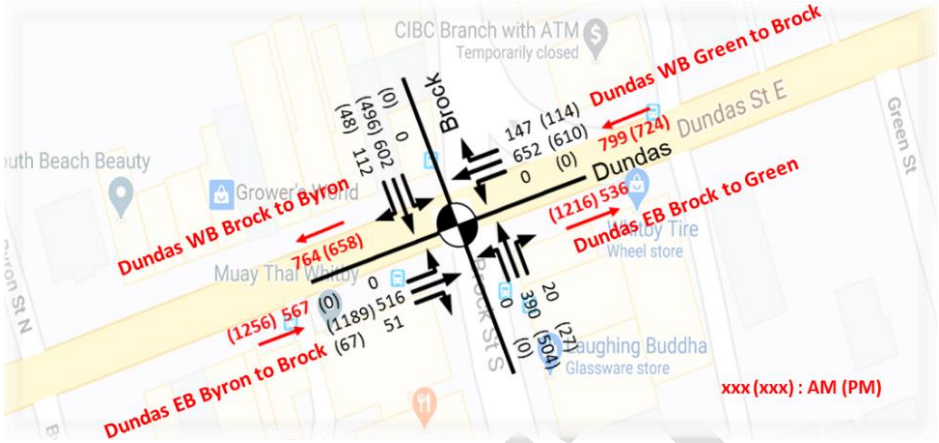


FIGURE 4 – ZONES DEFINED FOR TOP ROUTE ANALYSIS

The Top Routes Analysis was conducted for each of the above defined zones based on one-year of historical data, (Feb 2019 to January 2020, pre Covid), with a focus on AM (7:00–10:00 a.m.) and PM (4:00–7:00 p.m.) peak periods. The samples collected during these periods include approximately 16000–18000 devices and 61000–65000 trips. On the basis of the sample analysis, the routes/road segments that are mostly used by vehicles to (inbound trips) and from (outbound trips) the analyzed zones were identified, and the associated trips were analyzed at two levels: **Town of Whitby** and **Whitby Downtown**.

EXISTING WESTBOUND TRIPS

Two pass-through zones were defined to cover the existing westbound trips, i.e. **Dundas WB Green to Brock** and **Dundas WB Brock to Byron**. The analysis based on the zone from Green to Brock captured the east to north trips that run from Dundas Street to Brock Street, and the analysis based on the zone from Brock to Byron captured the north to west trips that run from Brock Street to Dundas Street. Given the westbound is the peak direction during the AM peak period, the analysis presented below focused on the **AM peak trips**.

Figure 5 illustrates the area-wide travel pattern analysis results based on westbound trips that pass through the segment between **Green Street** and **Brock Street**. As the results show, among the approximate **800 trips** that pass through this road segment during AM peak hour,

- about **45%** of the trips came from outside of Whitby,
- about **80%** of the trips came from outside of both Whitby (45% as above) and Whitby Downtown (an additional 35%), and
- about **20%** of the trips came from inside Whitby Downtown.

Most of these trips used Dundas Street (i.e. 37% out of 45% for trips originating outside of Whitby and 76% out of 80% for trips originating outside of Whitby Downtown).

After passing through this road segment,

- about **52%** of the trips went outside of Whitby,
- about **72%** of the trips went outside of both Whitby (52% as above) and Whitby Downtown (an additional 20%), and
- about **28%** of the trips went inside Whitby Downtown.

Most of these trips used Dundas Street as well (i.e. 50% out of 52% for trips destined outside of Whitby and 58% out of 72% for trips destinated outside of Whitby Downtown).

DRAFT

Figure 6 illustrates the area-wide travel pattern analysis results based on westbound trips that pass through the segment on Dundas Street between **Brock Street** and **Byron Street**. As the results show, among the approximate **800 trips** that pass through this road segment during AM peak hour,

- about **37%** of the trips came from outside of Whitby,
- about **91%** of the trips came from outside of both Whitby (37% as above) and Whitby Downtown (additional 54%), and
- about **9%** of the trips came from inside of Whitby Downtown.

Most of these trips used Dundas Street (i.e. 29% out of 37% for trips originating outside of Whitby and 60% out of 91% of trips originating outside of Whitby Downtown).

After passing through this road segment,

- about **55%** of the trips went outside of Whitby,
- about **74%** of the trips went outside of both Whitby (55% as above) and Whitby Downtown (an additional 19%), and
- about **26%** of the trips went inside of Whitby Downtown.

Most of these trips used Dundas Street as well, (i.e. 53% out of 55% for trips destined outside of Whitby and 62% out of 74% of trips destined outside of Whitby Downtown).

The difference between the two area-wide travel pattern analysis results indicate that the trips to and from Brock Street north of Dundas Street are not negligible, especially for the east to north trips.

DRAFT

FIGURE 5 – AREA-WIDE TRAVEL PATTERNS ANALYSIS – WB GREEN TO BROCK

DRAFT

FIGURE 6 – AREA-WIDE TRAVEL PATTERNS ANALYSIS – WB BROCK TO BYRON

EXISTING EASTBOUND TRIPS

Two pass-through zones were defined to cover the existing eastbound trips, i.e. **Dundas EB Byron to Brock** and **Dundas EB Brock to Green**. The analysis based on the zone from Byron to Brock captured the west to south trips that run from Dundas Street to Brock Street, and the analysis based on the zone from Brock to Green captured the south to east trips that run from Brock Street to Dundas Street. Given that eastbound is the peak direction during PM peak period, the analysis presented below focuses on the **PM peak trips**.

Figure 7 illustrates the area-wide travel pattern analysis results based on eastbound trips that pass through the segment between **Byron Street** and **Brock Street**. As the results show, among the approximate **1250 trips** that pass through this road segment during PM peak hour,

- about **52%** of the trips came from outside of Whitby,
- about **81%** of the trips came from outside of both Whitby (52% as above) and Whitby Downtown (an additional 29%), and
- about **19%** of the trips came from inside of Whitby Downtown.

Most of these trips used Dundas Street (i.e. 51% out of 52% of trips originating outside of Whitby and 69% out of 81% of trips originating outside Downtown Whitby).

After passing through this road segment,

- about **41%** of the trips went outside of Whitby,

- about **91%** of the trips went outside of both Whitby (41% as above) and Whitby Downtown (an additional 50%), and
- about **9%** of the trips went inside of Whitby Downtown.

Most of these trips used Dundas Street as well (i.e. 34% out of 41% of trips destined outside of Whitby and 74% out of 91% of trips destinated outside of Whitby Downtown).

Figure 8 illustrates the area-wide travel pattern analysis results based on eastbound trips that pass through the segment between **Brock Street** and **Green Street**. As the results show, among the approximate **1250 trips** that pass through this road segment during PM peak hour,

- about **51%** of the trips came from outside of Whitby,
- about **79%** of the trips came from outside of both Whitby (51% as above) and Whitby Downtown (an additional 28%), and
- about **21%** of the trips came from inside of Whitby Downtown.

Most of these trips used Dundas Street, (i.e. 47% out of 51% trips originating outside of Whitby and 62% out of 79% of trips originating outside of Whitby Downtown).

After passing through this road segment,

- about **42%** of the trips went outside of Whitby,
- about **93%** of the trips went outside of both Whitby (42% as above) and Whitby Downtown (an additional 51%), and
- about **7%** of the trips went inside of Whitby Downtown.

Most of these trips used Dundas Street as well (i.e. 35% out of 42% of trips destined outside of Whitby and 78% out of 93% trips destined outside Whitby Downtown).

The two area-wide travel pattern analysis results are not very different from each other, as the number of trips to or from Brock Street, south of Dundas Street is minimal.

DRAFT

FIGURE 7 – AREA-WIDE TRAVEL PATTERNS ANALYSIS – EB BYRON TO BROCK

FIGURE 8 – AREA-WIDE TRAVEL PATTERNS ANALYSIS – EB BROCK TO GREEN

SUMMARY

To summarize the area-wide travel patterns analysis, **Table 1** provides the results for both westbound and eastbound directions based on the trips during AM and PM peak periods.

TABLE 1 – AREA-WIDE TRAVEL PATTERN ANALYSIS – SUMMARY

		Peak AM (7am–10am)						Peak PM (4pm–7pm)					
		Town of Whitby			Whitby Downtown			Town of Whitby			Whitby Downtown		
		IN	OUT	bypass trips	IN	OUT	bypass trips	IN	OUT	bypass trips	IN	OUT	bypass trips
Westbound	Green to Brock	45%	52%	23%	80%	72%	58%	45%	34%	15%	85%	68%	58%
	Brock to Byron	37%	55%	20%	91%	74%	67%	40%	36%	14%	89%	73%	65%
Eastbound	Byron to Brock	37%	48%	18%	80%	85%	68%	52%	41%	21%	81%	91%	74%
	Brock to Green	37%	49%	18%	82%	89%	73%	51%	42%	21%	79%	93%	73%
Average		39%	51%	20%	83%	80%	66%	47%	38%	18%	84%	81%	67%

As can be seen from these results:

- for trips in/out of the **Town of Whitby**,
  - the outbound trips are generally higher than the inbound trips during the AM peak period, and
  - the inbound trips are generally higher than the outbound trips during the PM peak period.

- for trips in/out of the **Whitby Downtown** during both AM and PM peak periods,
    - the inbound trips are higher than the outbound trips in the westbound direction, and
    - the outbound trips are higher than the inbound trips in the eastbound direction.

As for the potential **bypass trips**, there is no significant difference between AM peak period and PM peak period:

- approximately **18/20%** of the trips that currently take the segment between Byron Street and Green Street along Dundas Street go through the **Town of Whitby**, and
- approximately **66/67%** of these trips go through the **Whitby Downtown**.

These trips have the potential to be diverted to alternative routes and bypass Whitby Downtown where the roadway network capacity is limited.

Dundas Street Turning Patterns

The Dundas Street turning patterns analysis was also conducted based on the results of Top Route Analysis using StreetLight Data. The turn percentage to and from each side street of Dundas Street was calculated based on the sample trips collected for the defined zones in both westbound and eastbound directions. Considering the missing trips (low percentage trips), trips taking U-Turns, and some minor data errors, the total percentage may not add up to, but is close to 100%.

EXISTING WESTBOUND TRIPS

Similar to the area-wide travel patterns analysis, the turning patterns for existing westbound trips were analyzed based on two pass-through zones, i.e. **Dundas WB Green to Brock** and **Dundas WB Brock to Byron**. The analysis was focused on AM peak results as the westbound is the peak direction during the **AM peak period**.

Figure 9 illustrates the results of the turning pattern analysis on Dundas Street based on westbound trips that pass through the segment between **Green Street** and **Brock Street**. As the results show, among the approximate **800 trips** that pass through this road segment during AM peak hour,

- about **37%** of the trips came from outside of Whitby directly through Dundas Street, and trips collected from the side streets within the Town of Whitby mostly used **Garden Street**, **Anderson Street**, **Hopkins Street**, and **Thickson Road** (circled in **Figure 9**).

After passing through this road segment,

- about **47%** of the trips went outside of Whitby directly through Dundas Street (diverge at Kingston Road and Lake Ridge Road), and trips dispersed through the side streets within the Town of Whitby mostly used **Brock Street** and **Henry Street** (circled in **Figure 9**).

DRAFT

FIGURE 9 – DUNDAS STREET TURNING PATTERNS ANALYSIS – WB GREEN TO BROCK

Figure 10 illustrates the results of the turning pattern analysis on Dundas Street based on westbound trips that pass through the segment between **Brock Street** and **Byron Street**. As the results show, among the approximate **800 trips** that pass through this road segment during AM peak hour,

- about **30%** of the trips came from outside of Whitby directly through Dundas Street, and trips collected from the side streets within the Town of Whitby mostly used **Brock Street**, **Garden Street**, **Anderson Street**, and **Thickson Road** (circled in **Figure 10**).

After passing through this road segment,

- about **51%** of the trips went outside of Whitby directly through Dundas Street (diverge at Kingston Road and Lake Ridge Road), and trips dispersed through the side streets within the Town of Whitby mostly used **Henry Street** (circled in **Figure 10**).

FIGURE 10 – DUNDAS STREET TURNING PATTERNS ANALYSIS – WB BROCK TO BYRON

EXISTING EASTBOUND TRIPS

The turning patterns for existing eastbound trips were analyzed based on two pass-through zones, i.e. **Dundas EB Byron to Brock** and **Dundas EB Brock to Green**. The analysis was focused on PM peak results as eastbound is the peak direction during the **PM peak period**.

Figure 11 illustrates the results of the turning pattern analysis on Dundas Street based on eastbound trips that pass through the segment between **Byron Street** and **Brock Street**. As the results show, among the approximate **1200 trips** that pass through this road segment during PM peak hour,

- about **52%** of the trips came from outside of Whitby directly through Dundas Street, and trips collected from the side streets within the Town of Whitby mostly used **Henry Street**, **Cochrane Street**, **McQuay Blvd**, and **White Oaks Court** (circled in **Figure 11**).

After passing through this road segment,

- about **34%** of the trips went outside of Whitby directly through Dundas Street, and trips dispersed through the side streets within the Town of Whitby mostly used **Brock Street**, **Garden Street**, **Anderson Street**, **Hopkins Street** and **Thickson Road** (circled in **Figure 11**).

FIGURE 11 – DUNDAS STREET TURNING PATTERNS ANALYSIS – EB BYRON TO BROCK

Figure 12 illustrates the results of the turning pattern analysis on Dundas Street based on eastbound trips that pass through the segment between **Brock Street** and **Green Street**. As the results show, among the approximate **1200 trips** that pass through this road segment during PM peak hour,

- about **48%** of the trips came from outside of Whitby directly through Dundas Street, and trips collected from the side streets within the Town of Whitby mostly used **Brock Street**, **Henry Street**, **McQuay Blvd**, and **White Oaks Court** (circled in **Figure 12**).

After passing through this road segment,

- about **35%** of the trips went outside of Whitby directly through Dundas Street, and trips dispersed through the side streets within the Town of Whitby mostly used **Garden Street**, **Anderson Street**, **Hopkins Street**, and **Thickson Road** (circled in **Figure 12**).

FIGURE 12 – DUNDAS STREET TURNING PATTERNS ANALYSIS – EB BROCK TO GREEN

SUMMARY

As seen from the Dundas Street turning patterns analysis, there are fewer than half of the trips that pass through the proposed Full Transit Mall segment heading for or leaving the Town of Whitby through Dundas Street, while majority of the trips either collected from or dispersed to the streets in Whitby, including:

- Brock Street within the Whitby town center,
- Garden Street, Anderson Street/Hopkins Street, and Thickson Road to the east, and
- Henry Street, Cochrane Street, McQuay Blvd, Jeffery Street, and White Oaks Court to the west.

CHANGE OF TRAVEL PATTERNS

The assessment of potential changes in travel patterns was conducted based on the understanding of existing travel patterns and the anticipated reduction of traffic capacity on Dundas Street due to the implementation of the Full Transit Mall between Byron Street and Green Street. It assumed that the origin and destination patterns will remain the same in 2041 as the existing conditions, but the path/route patterns will change due to the proposed Full Transit Mall solution.

The alternative routes were identified considering the route characteristics (e.g. type of roadway, distance, travel time, etc.) and the adjacent land use types (e.g. commercial, residential, etc.). In addition, the future roadway network improvements (as shown in **Figure 13**), and traffic restrictions (e.g. prohibition of left turn at unsignalized intersections where the BRT lanes are in the median) were considered in the process of the alternative route identification.

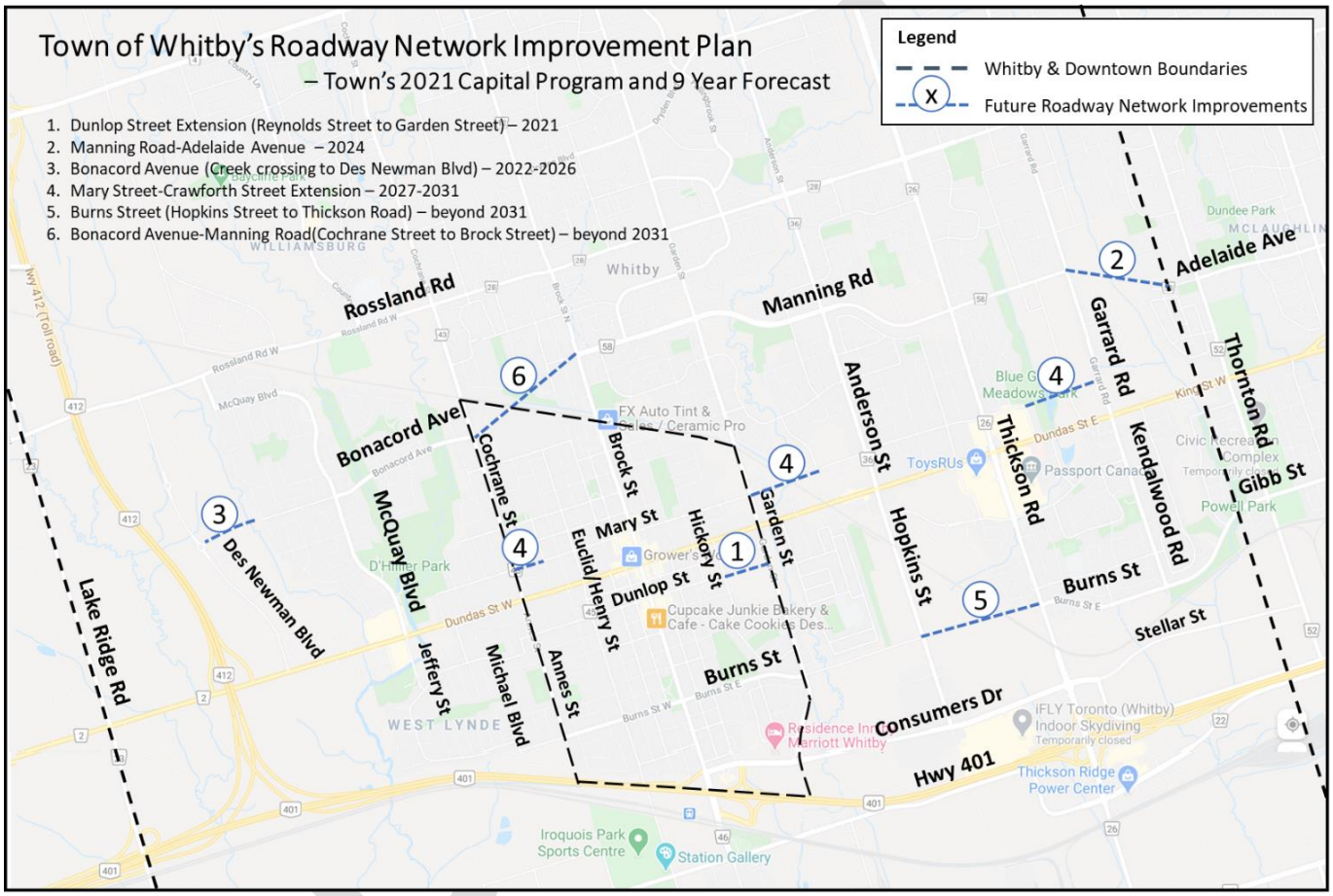


FIGURE 13 – TOWN OF WHITBY'S ROADWAY NETWORK IMPROVEMENT PLAN

Regional Trips

The regional trips were considered as those trips cutting through the Town of Whitby using Dundas Street and passing through segment between Byron Street and Green Street. As the results show in **Table 1**, this type of trips takes about **18/20%** of the total trips. If the vehicular traffic is prohibited from Dundas Street between Byron Street and Green Street, these trips may be diverted to the alternative routes, (e.g. **Rossland Road** to the north and **Highway 401** to the south).

As shown in **Figure 14**, the potential alternative routes and critical intersections for the regional trips were identified, and the proportion of the trips being diverted to these routes were estimated.

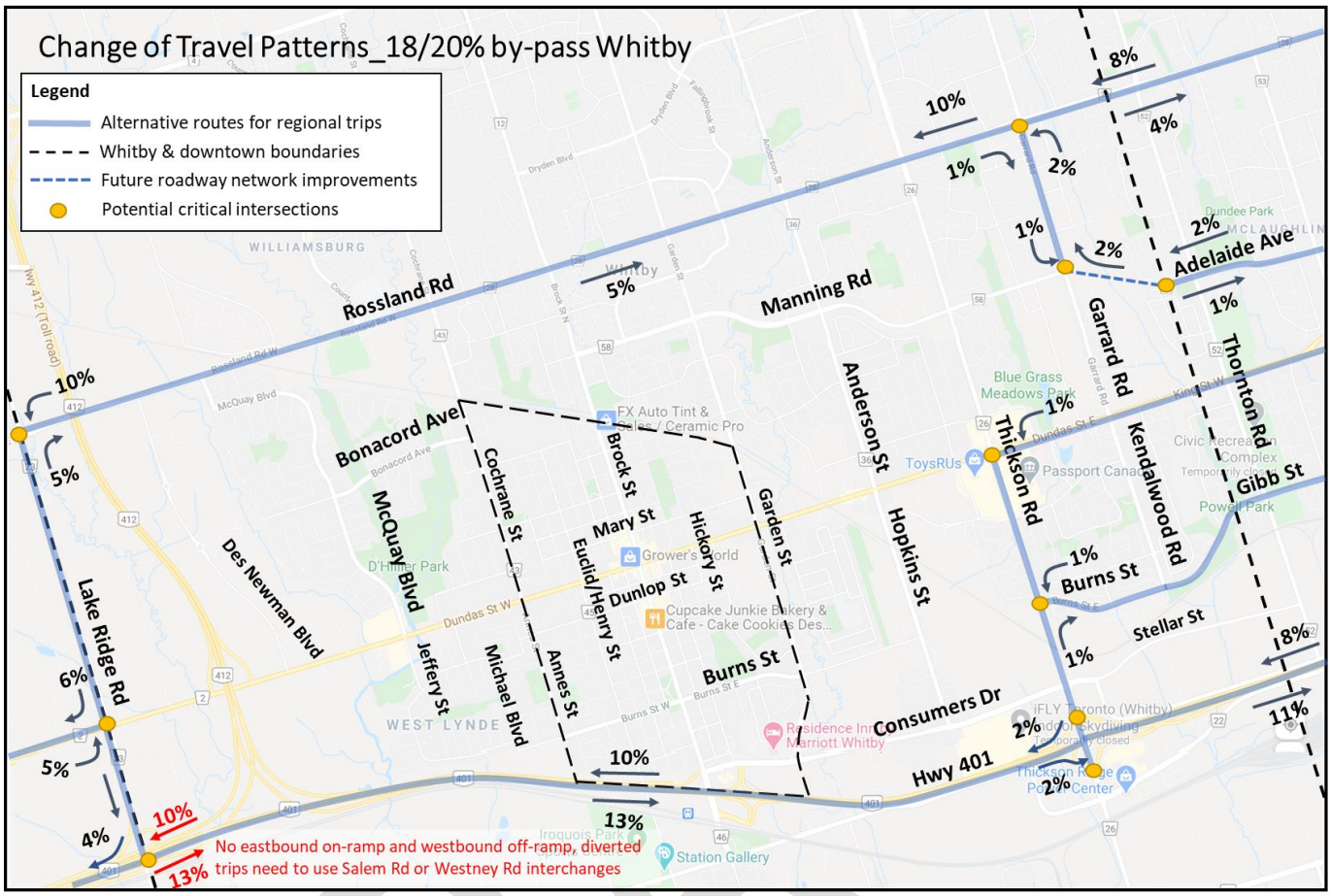


FIGURE 14 – CHANGE OF TRAVEL PATTERNS – REGIONAL TRIPS

Local Trips

The local trips were considered as those trips cutting through Whitby Downtown using Dundas Street and passing through the segment between Byron Street and Green Street (excluding the regional trips). As the results show in **Table 1**, this type of trips accounts for about **46/49%** of the total trips. If the vehicular traffic is prohibited from Dundas street between Byron Street and Green Street, the best alternative routes for these trips would be **Adelaide Avenue, Manning Road, Bonacord Avenue** to the north**, and Burns Street, Michael Boulevard, Jeffery Street** to the south.

There are several **gaps in terms of connectivity** for these alternative routes. For example, the gaps on the north side of Dundas Street include:

- connection between Adelaide Avenue and Manning Road,
- connection between Manning Road and Bonacord Avenue, and
- extension of Bonarcord Avenue to Des Newman Boulevard;

the gaps on the south side of Dundas Street include:

- connection of Burns Street between Hopkins Street and Thickson Road.

All of them are in the Town's future roadway network improvement plan as shown in **Figure 13**.

Figure 15 and **Figure 16** illustrate the potential alternative routes for the local trips that may bypass Whitby Downtown in the westbound direction and eastbound direction, respectively. The critical intersections were identified, and the proportion of the trips being diverted to the alternative routes were estimated.

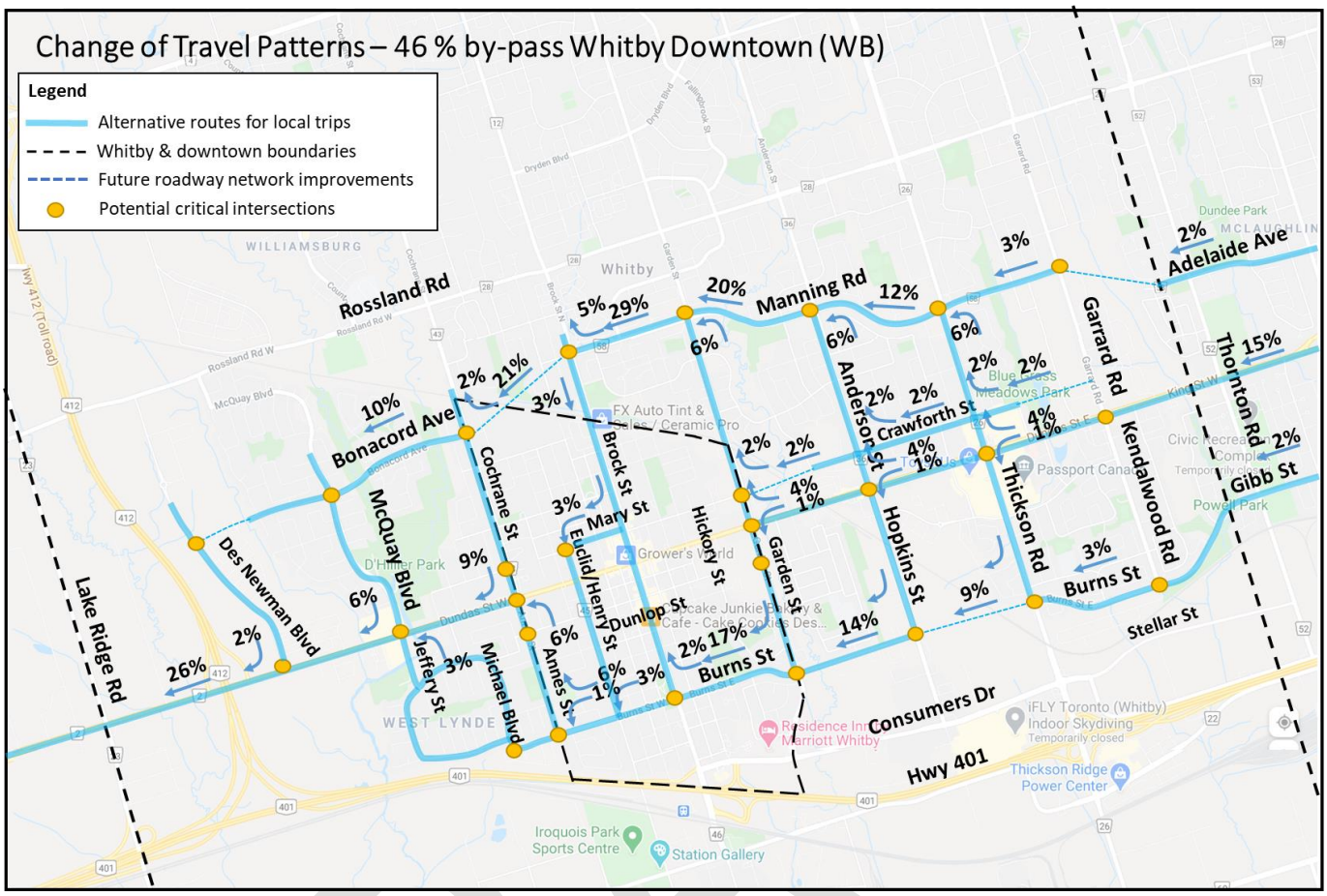


FIGURE 15 – CHANGE OF TRAVEL PATTERNS – LOCAL TRIPS (WB)

DRAFT

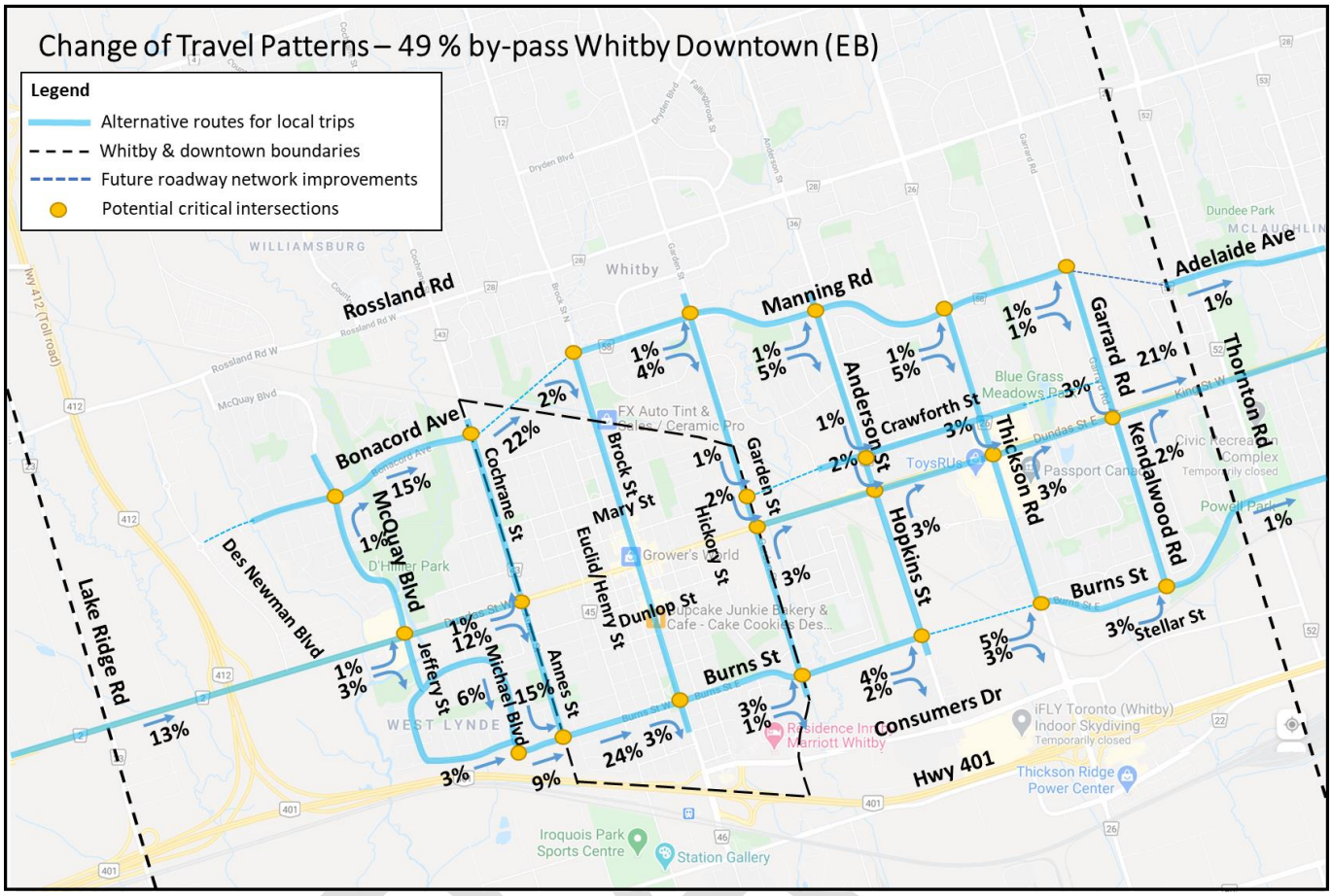


FIGURE 16 – CHANGE OF TRAVEL PATTERNS – LOCAL TRIPS (EB)

Town Center Trips

The town center trips were considered as the trips entering the center area of Whitby Downtown then spreading into the network, and the trips originating from the center area of Whitby Downtown then leaving from this area. As the results show in **Table 1**, this type of trips accounts for about **33/34%** of the total trips. If the vehicular traffic is prohibited from Dundas street between Byron Street and Green Street, these trips would likely take **Mary Street** to the north of Dundas Street and **Dunlop Street** to the south of Dundas Street as alternative routes.

As per the Town's future roadway network improvement plan (**Figure 13**), the Mary Street west extension and Dunlop Street east extension are anticipated to be in place by 2031. These two roadway extensions would help to improve the connectivity of the surrounding network and reduce the pressure of the diverted traffic on the major/critical intersections or turns.

Figure 17 illustrates the alternative routes for town center trips. The critical intersections were identified, and the proportion of the trips being diverted to the alternative routes were estimated.

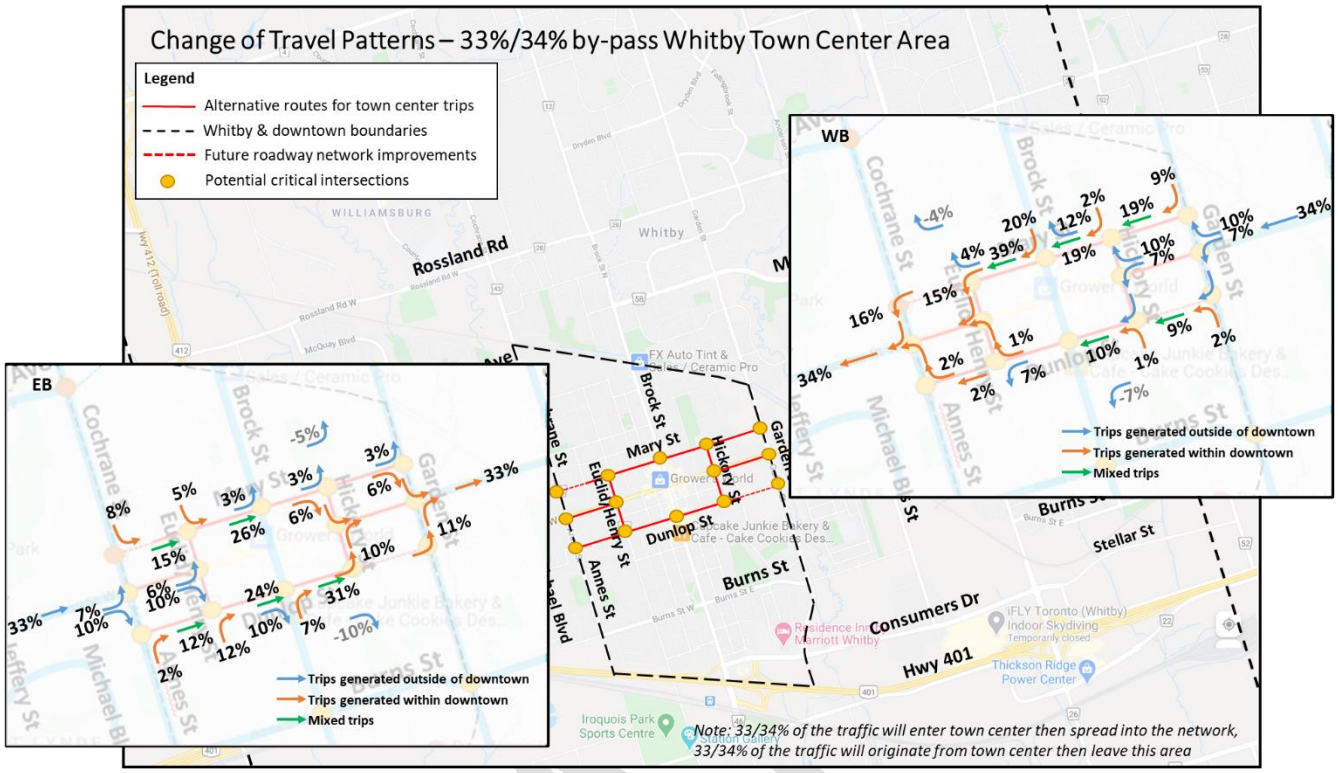


FIGURE 17 – CHANGE OF TRAVEL PATTERNS – TOWN CENTER TRIPS

Critical Intersections/Movements

Based on previous analysis, the intersections within Whitby town center area where high turning percentages were identified/estimated are most likely to be the critical intersections. These intersections include:

1. Dundas Street & Cochrane/Annes Street
2. Dundas Street & Euclid/Henry Street
3. Dundas Street & Hickory Street
4. Dundas Street & Garden Street
5. Mary Street & Cochrane Street (future intersection)
6. Mary Street & Euclid
7. Mary Street & Brock Street
8. Mary Street & Hickory Street
9. Mary Street & Garden Street
10. Dunlop Street & Annes Street
11. Dunlop Street & Henry Street
12. Dunlop Street & Brock Street
13. Dunlop Street & Hickory Street
14. Dunlop Street & Garden Street (future intersection)

Figure 18 combines the proportion of town center trips and the local trips that are anticipated to use these intersections as part of their alternative routes. As can be seen that the diverted traffic to Mary Street are up to 36% in the eastbound direction and 42% in the westbound direction; and the diverted traffic to Dunlop Street are up to 34% in the eastbound direction and 17% in the westbound direction.

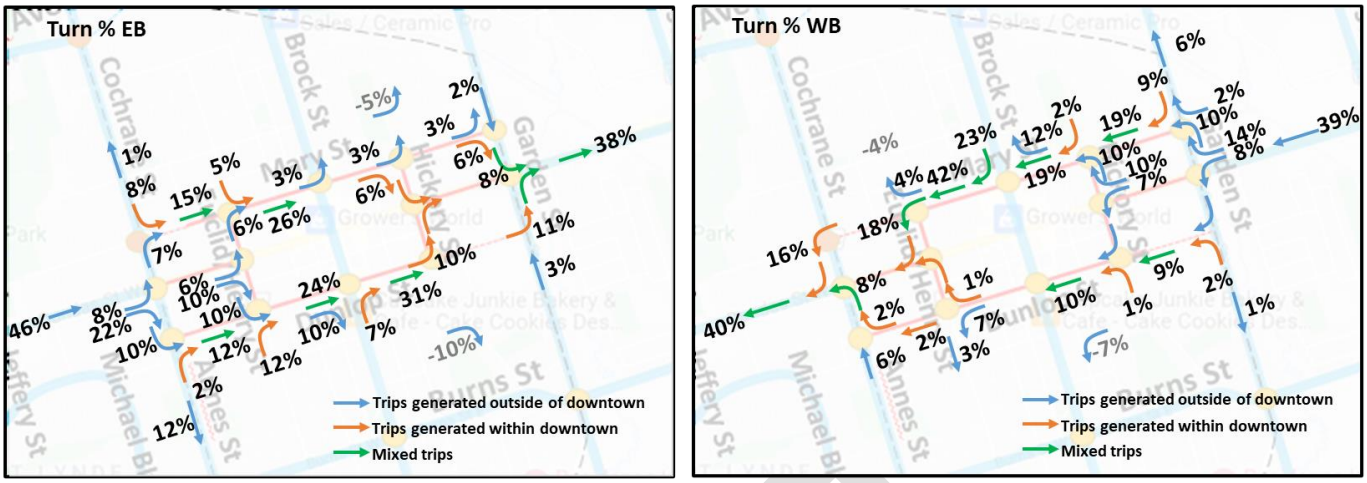


FIGURE 18 – CRITICAL INTERSECTIONS TURNING PERCENTAGE

In addition to the intersections within the town center area, the diverted traffic locally or regionally may have impacts on certain intersections or ramp terminals along Manning Road, Burns Street, Rossland Road and Highway 401. In general, the diverted traffic to these corridors are approximately estimated as:

- Manning Road, up to 30% in the westbound direction during AM peak hour, about 240 vehicles.
- Burns Street, up to 25% in the eastbound direction during PM peak hour, about 320 vehicles.
- Rossland Road, up to 10% in the westbound direction during AM peak hour, about 80 vehicles.
- Highway 401, up to 15% in the eastbound direction during PM peak hour, about 190 vehicles.

As per the *Town of Whitby's Transportation Master Plan Study*, which was completed in June 2010, the traffic volume forecasts and screenline analysis conducted for 2031 future base case network (**Table 2**) show that these corridors are anticipated to operate at "Good Capacity" level (i.e. v/c<0.85), except for eastbound Rossland Road west of Brock Street, and the eastbound Highway 401 on both sides of the Brock Street (i.e. v/c=0.9, Approaching Capacity). The added traffic volumes due to diversion estimated above would likely cause volume over capacity issues in the eastbound direction of Burns Street and aggravate the volume approaching capacity issues in the eastbound direction of Highway 401. Given the data shown in **Table 2** was based on PM peak hour volumes, and Manning Road extension was not considered in the analysis, the impacts of traffic diversions to Manning Road and Rossland Road are difficult to estimate.

TABLE 2 – 2031 FUTURE BASE CASE NETWORK SCREENLINE ANALYSIS (AVERGAGE WEEKDAY P.M. PEAK HOUR VOLUMES)

	Screenline											
	West of Brock St						East of Brock St					
	Eastbound			Westbound			Eastbound			Westbound		
Link	Volume	Capacity	V/C	Volume	Capacity	V/C	Volume	Capacity	V/C	Volume	Capacity	V/C
Rossland Rd	1,212	1,400	0.9	1,143	1,400	0.8	857	1,400	0.6	767	1,400	0.6
Manning Rd	-	-	-	-	-	-	441	1,200	0.4	288	1,200	0.2
Burns St	308	500	0.6	286	500	0.6	245	500	0.5	178	500	0.4
Highway 401	8,682	9,000	1	5,703	9,000	0.6	7,808	9,000	0.9	5,205	9,000	0.6

Considering there is some degree of uncertainty in the future infrastructure improvement plan at local and regional level, which affects the travel pattern changes and the future background traffic conditions, the detailed traffic impact analysis completed in the following section was focused only on the critical intersections identified within the Whitby Town Center area which is a developed area with relatively stable travel demand and travel patterns.

TRAFFIC IMPACT ANALYSIS

The traffic impact analysis was completed for the critical intersections identified within the Whitby Town Center area. The future intersections, i.e. Mary Street & Cochrane Street, and Dunlop Street & Garden Street, were not included in the analysis due to lack of information, (e.g. the future background traffic volumes and future intersection lane configurations).

Traffic volumes provided by the Durham Region and Town of Whitby were balanced to reconcile inconsistencies in counts between intersections. Counts were balanced by adjusting through volume to match latest/higher adjacent counts where differences were greater than 20% and there is no major access/egress accounting for the difference.

Town of Whitby provided the Synchro base models (AM and PM) that include all the signalized intersections identified within the Town Center area. For purpose of this study, the existing 2019 conditions models were developed based on the Town's models by adding the non-signalized intersections and balancing the traffic volumes.

The future 2041 conditions models were developed for the following scenarios:

- Future 2041 Background Conditions;
- Future 2041 Full Transit Mall Conditions – Scenario 1: with Mary Street and Dunlop Street extensions;
- Future 2041 Full Transit Mall Conditions – Scenario 2: without Mary Street and Dunlop Street extensions;
- Future 2041 Northside Pedestrian Mall Conditions – on north side (i.e. westbound) of Dundas Street only; and
- Future 2041 Three-Lane Mixed Traffic Westbound Conditions – westbound mixed traffic.

The following sections detail the models and analysis results of the existing and future study scenarios.

Existing Conditions (2019)

Figure 19 is a simplified representation of the study roadway network with information about the intersection lane configurations and traffic control types. Within the study area, most of the streets are under the Town of Whitby's jurisdiction, except the Cochrane Street which is under the Durham Region's jurisdiction. Dundas Street, Brock Street, Cochrane/Annes Street and Garden Street are arterial roads, while Mary Street, Dunlop Street, Euclid/Henry Street, and Hickory Street are collector roads.

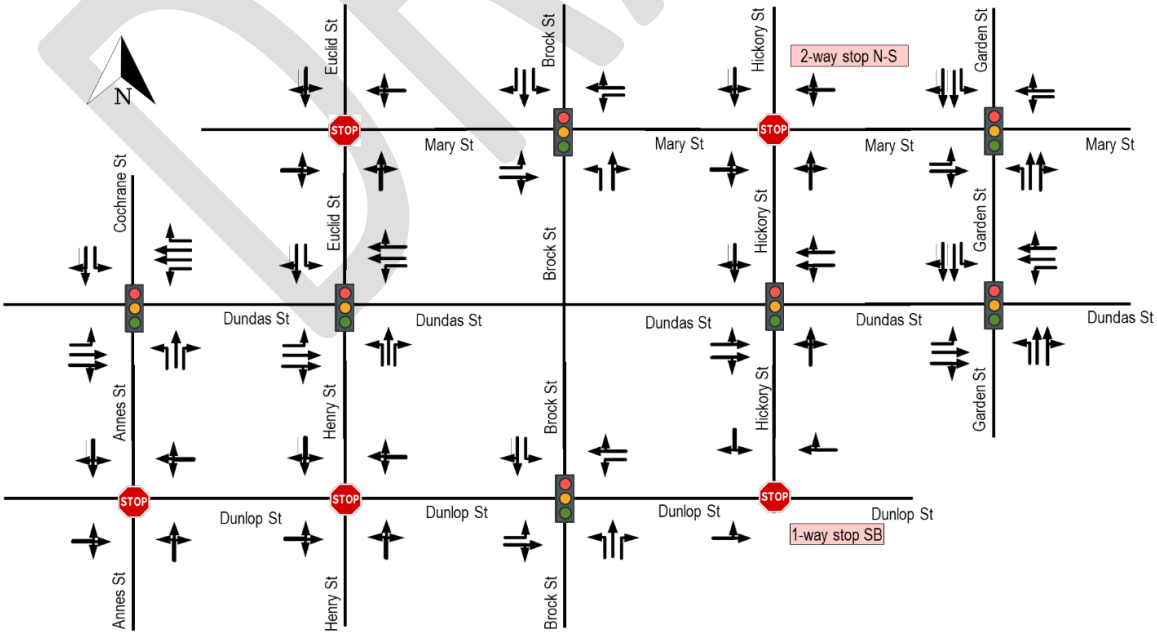


FIGURE 19 – INTERSECTION LANE CONFIGURATIONS AND TRAFFIC CONTROL – EXISTING CONDITIONS

DRAFT

Existing traffic operations were analyzed at the study intersections for the AM and PM peak hours. The results are summarized in **Table 3**, while queues exceeding available storage are summarized in **Table 4**. Traffic volume diagrams are provided in **Appendix A**. Detailed Synchro model outputs are provided in **Appendix B**.

TABLE 3 – EXISTING TRAFFIC OPERATION CONDITIONS

Intersection	AM Peak Hour		PM Peak Hour	
	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]
Mary St & Euclid St	B (0.54)	-	C (0.75)	-
Mary St & Brock St	C (0.89)	EBL (E) [0.74] WBT (D) [0.89]	C (0.96)	EBL (E) [0.96] NBT (B) [0.88]
Mary St & Hickory St	A (0.29)	-	A (0.26)	-
Mary St & Garden St	B (0.56)	-	C (0.81)	EBL (E) [0.81]
Dundas St & Cochrane St	F (2.38)	NBL (F) [2.38] SBT (F) [1.08]	C (0.90)	EBT (C) [0.90]
Dundas St & Euclid St/Henry St	B (0.78)	NBL (E) [0.78]	B (0.87)	EBL (E) [0.87]
Dundas St & Hickory St	A (0.56)	-	B (0.83)	-
Dundas St & Garden St	C (0.93)	WBT (D) [0.90] SBL (E) [0.93]	E (1.10)	EBL (E) [0.88] EBT (E) [1.10] WBT (C) [0.91] NBT (F) [1.02] SBL (E) [0.93]
Dunlop St & Annes St	C (0.74)	-	B (0.60)	-
Dunlop St & Henry St	B (0.45)	-	B (0.50)	-
Dunlop St & Brock St	B (0.65)	-	B (0.77)	-
Dunlop St & Hickory St	A (0.09)	-	A (0.08)	-

TABLE 4 – EXISTING QUEUES EXCEEDING AVAILABLE STORAGE

Intersections	AM Peak Hour			PM Peak Hour		
	Mvmt	95th Percentile Queues (m)	Storage Capacity (m)	Mvmt	95th Percentile Queues (m)	Storage Capacity (m)
Mary St & Euclid St	-	-	-	-	-	-
Mary St & Brock St	EBL	29	22	EBL SBL	74 27	22 25
Mary St & Hickory St	-	-	-	-	-	-
Mary St & Garden St	-	-	-	EBL	51	34
Dundas St & Cochrane St	NBL	48	23	NBL	27	23
Dundas St & Euclid St/Henry St	NBL	44	8	NBL NBR	35 14	8 11
Dundas St & Hickory St	-	-	-	-	-	-
Dundas St & Garden St	-	-	-	EBL	47	17
Dunlop St & Annes St	-	-	-	-	-	-
Dunlop St & Henry St	-	-	-	-	-	-
Dunlop St & Brock St	-	-	-	-	-	-
Dunlop St & Hickory St	-	-	-	-	-	-

As the above results show, existing performance is acceptable at most intersections, except at Dundas Street & Cochrane Street in the AM peak hour, and Dundas Street & Garden Street in the PM peak hour. The former intersection performs poorly with LOS F and volumes greatly exceeding capacity (i.e. v/c ratio of 2.38). The two critical movements at Dundas Street & Cochrane Street, namely the northbound left and southbound through movements, both have heavy demands that are competing. Due to high northbound and southbound demand and a relatively short cycle length, any changes to phasing structure without increases to cycle length could improve the operation of one of the critical movements but while simultaneously degrading the other.

DRAFT

In the PM peak, Dundas Street & Garden Street performs at LOS E with a maximum v/c of 1.10 corresponding to the eastbound through movement. It is likely that this issue is due to high eastbound through movement demand, and limited capacity at the intersection. Moreover, the northbound through movement is critical at this intersection as a result of a long protected plus permitted southbound left turn phase which limits the green time for the northbound through movement.

Within existing conditions, the queue of most concern is the northbound left turn movement at Dundas Street & Cochrane Street in the AM peak period which results from relatively high turning volumes and vehicular delays. Similarly, in the PM peak hour, the queues for the eastbound left turn movement at Dundas Street & Garden Street exceed storage because of high turning volumes, high delays, and relatively short storage capacity.

Future Conditions (2041)

FUTURE BACKGROUND CONDITIONS

For future background conditions, the intersection lane configurations and traffic signal control types remained the same as existing conditions, but signal phasing and timing were optimized to accommodate the change in traffic volumes.

By comparison, buses are predicted to carry approximately 1500 passengers per hour in both directions in each of the AM and PM peak hours, an increase of 67% over the 2019 volumes.

Traffic operations analysis results are summarized in **Table 5**, while queues exceeding available storage are summarized in **Table 6**. Traffic volume diagrams are provided in **Appendix A.** Detailed Synchro model outputs are provided in **Appendix B**.

TABLE 5 – FUTURE BACKGROUND TRAFFIC OPERATION CONDITIONS

Intersection	AM Peak Hour		PM Peak Hour	
	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]
Mary St & Euclid St	B (0.49)	-	B (0.67)	-
Mary St & Brock St	B (0.77)		B (0.89)	EBL (E) [0.89]
Mary St & Hickory St	A (0.13)	-	A (0.16)	-
Mary St & Garden St	A (0.50)	-	B (0.77)	EBL (E) [0.77]
Dundas St & Cochrane St	E (1.14)	WBT (E) [1.04] NBL (E) [0.94] SBT (F) [1.14]	C (1.02)	EBT (D) [1.02]
Dundas St & Euclid St/Henry St	D (0.82)	-	B (0.83)	-
Dundas St & Hickory St	B (0.70)	-	B (0.78)	EBT (C) [0.89]
Dundas St & Garden St	F (1.50)	EBL (F) [0.75] WBL (F) [1.18] WBT (F) [1.50]	D (1.06)	EBT (E) [1.06] WBT (C) [0.93] NBT (E) [0.96] SBL (F) [1.02]
Dunlop St & Annes St	B(0.56)	-	B (0.53)	-
Dunlop St & Henry St	B (0.40)	-	B (0.41)	-
Dunlop St & Brock St	A (0.58)	-	B (0.76)	-
Dunlop St & Hickory St	A (0.09)	-	A (0.08)	-

DRAFT

TABLE 6 – FUTURE BACKGROUND QUEUES EXCEEDING AVAILABLE STORAGE

Intersections	AM Peak Hour			PM Peak Hour		
	Mvmt	95th Percentile Queues (m)	Storage Capacity (m)	Mvmt	95th Percentile Queues (m)	Storage Capacity (m)
Mary St & Euclid St	-	-	-	-	-	-
Mary St & Brock St	-	-	-	EBL	68	22
Mary St & Hickory St	-	-	-	-	-	-
Mary St & Garden St	-	-	-	EBL	54	34
Dundas St & Cochrane St	NBL	42	23	EBL NBL	52 33	45 23
Dundas St & Euclid St/Henry St	NBL	43	8	NBL NBR	52 14	8 11
Dundas St & Hickory St	-	-	-	-	-	-
Dundas St & Garden St	-	-	-	EBL	38	17
Dunlop St & Annes St	-	-	-	-	-	-
Dunlop St & Henry St	-	-	-	-	-	-
Dunlop St & Brock St	-	-	-	-	-	-
Dunlop St & Hickory St	-	-	-	-	-	-

Results for the 2041 Background Conditions indicate that intersections along the adjacent streets of the network, (i.e. Mary Street and Dunlop Street) perform well with LOS B or better. Conversely, along Dundas Street, during both AM and PM peak hours, there are several intersections with poor LOS and high v/c ratios. Both Dundas Street & Cochrane Street and Dundas Street & Garden Street intersections have movements that exceed capacity with v/c ratio higher than 1.00.

During the AM peak hour, Dundas Street & Cochrane Street operates with LOS E and v/c ratio 1.14. The westbound through, northbound left turn, and southbound through movements are near or above capacity with high delays. This performance can be attributed to the high vehicular demand in the westbound direction in the AM peak hour, and a relatively long eastbound left turn protected/permitted movement. At Dundas Street & Garden Street, the traffic in the AM peak hour operates at LOS F with v/c ratio 1.50, and in the PM peak hour operates at LOS D with v/c of 1.06; these conditions are the result of overall high demand at each approach. Aside from these critical locations, most of the intersections operate adequately under future background conditions.

Queue lengths for future background conditions are similar to those in existing conditions. Along Dunlop Street, all of the queues remain within storage capacity. The most critical queues are still found along Mary Street and Dundas Street due to high demand and relatively short storage space. Critical queues form for the northbound left turn movement at Dundas Street & Cochrane Street in the AM peak hour, correlating to high volumes and delays. Additionally, the queues for the eastbound left turn movement at Dundas Street & Garden Street in the PM peak hour are shown to exceed storage capacity in future background conditions.

FUTURE FULL TRANSIT MALL CONDITIONS – SCENARIO 1

Scenario 1 for future Full Transit Mall conditions assumes that Mary Street and Dunlop Street extensions will be in place by the study horizon year 2041. Traffic volumes were estimated based on the future background volumes with adjustments made according to the anticipated diversion patterns. These adjustments/assumptions include:

- About 66% of the traffic being reduced from Dundas Street through movements to reflect the regional and local traffic diversions using Rossland Road, Manning Street, Burns Street and Highway 401;
- Eastbound and westbound left turn movement volumes being adjusted to reflect the U-turns at signalized intersections due to prohibited left turns at unsignalized intersections (center median BRT), i.e. matching volumes to the 2041 BRT scenarios as part of the original work plan for the left turns wherever the volumes are higher;
- Trips generated within downtown using Mary Street and Dunlop Street as alternative routes being reduced from Dundas Street through the side streets northbound and southbound turning movements; and

- Trips generated outside of downtown, in addition to those using signalized intersections as shown in **Figure 18**, are assumed to disperse into the downtown area through unsignalized intersections.

Detailed traffic volume diagrams are provided in **Appendix A**. The intersection lane configurations and traffic control types along the Dundas Street corridor were modified to accommodate the Full Transit Mall (i.e. lane reduction in both EB and WB direction, and protected left turn phases), as seen in **Figure 20**. Finally, signal phasing and timing were further optimized to accommodate the change of traffic volumes and patterns.

Table 7 summarizes the traffic operations conditions for the future Full Transit Mall Scenario 1 and **Table 8** delineates queues exceeding the available storage. Detailed Synchro model outputs are provided in **Appendix B**.

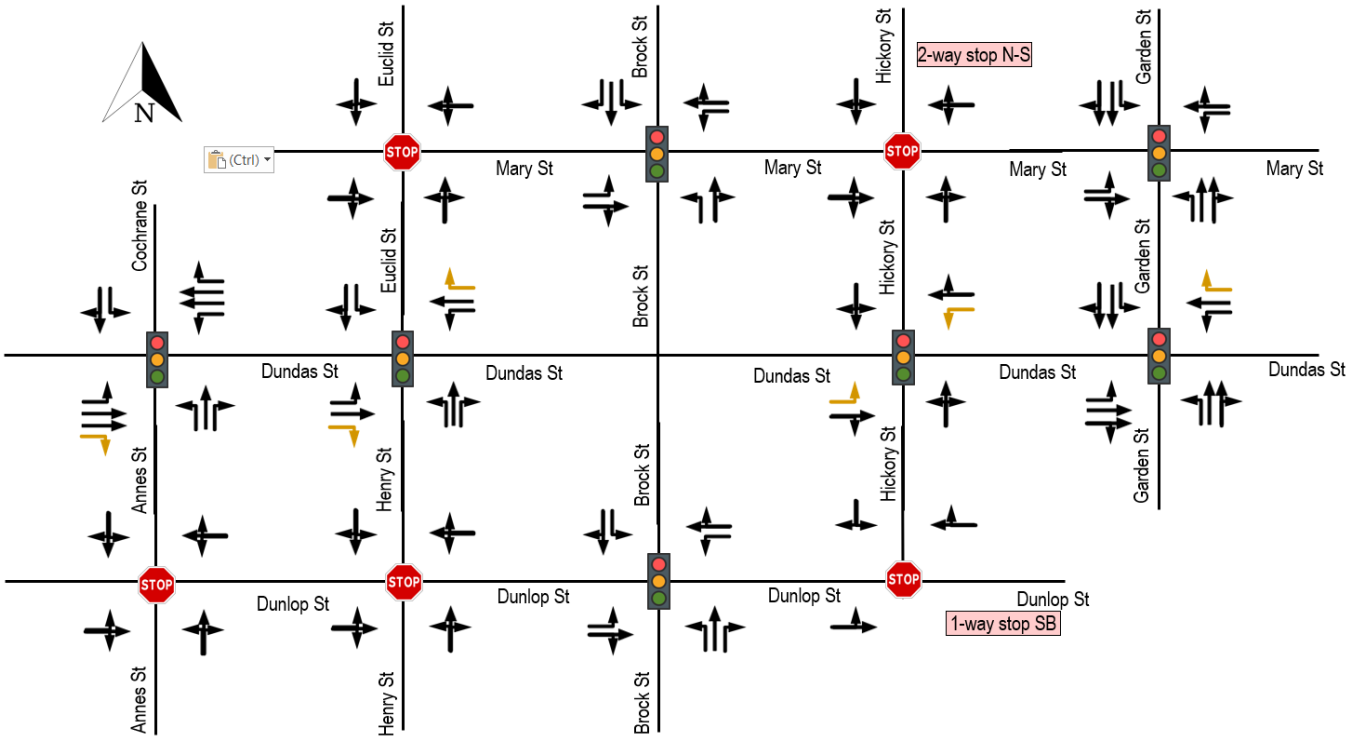


FIGURE 20 – INTERSECTION LANE CONFIGURATIONS AND TRAFFIC CONTROL – FUTURE FULL TRANSIT MALL CONDITIONS

TABLE 7 – FUTURE FULL TRANSIT MALL (SCENARIO 1) TRAFFIC OPERATION CCONDITIONS

Intersection	AM Peak Hour		PM Peak Hour	
	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]
Mary St & Euclid St	F (1.26)	WB (F) [1.26]	F (1.64)	WB (F) [1.64] NB (F) [1.15]
Mary St & Brock St	D (0.97)	EBL (F) [0.89] WBT (D) [0.97] NBT (D) [0.86]	F (1.38)	EBL (F) [1.38] EBT (D) [0.91] WBT (F) [1.36] NBT (F) [1.35] SBL (E) [0.85]
Mary St & Hickory St	E (1.24)	NB (F) [1.24]	F (2.07)	NB (F) [2.07] SB (F) [0.83]
Mary St & Garden St	B (0.77)	-	C (0.83)	EBL (E) [0.83] WBL (F) [0.34]
Dundas St & Cochrane St	F (1.52)	EBL (F) [1.52] WBL (E) [0.22] WBT (F) [1.08] NBL (F) [1.40]	F (1.22)	EBL (F) [0.99] EBT (F) [1.01] EBR (E) [0.97] NBL (F) [1.17]

Intersection	AM Peak Hour		PM Peak Hour	
	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]
		SBT (F) [1.30]		SBT (F) [1.22)
Dundas St & Euclid St/Henry St	D (0.87)	EBL (E) [0.67] EBT (F) [0.60] WBL (E) [0.76] SBT (D) [0.87]	E (1.15)	EBL (F) [0.60] EBT (E) [1.04] WBL (E) [0.65] WBT (E) [0.13] NBL (F) [0.98] SBT (F) [1.15]
Dundas St & Hickory St	D (0.99)	EBL (E) [0.85] WBT (D) [0.90] SBT (F) [0.99]	F (1.15)	EBL (F) [0.77] EBT (F) [1.01] WBL (F) [0.85] WBT (F) [1.14] SBT (F) [1.15]
Dundas St & Garden St	E (1.06)	WBL (F) [0.91] WBT (F) [1.06] SBL (F) [1.01]	F (1.26)	EBL (E) [0.59] EBT (E) [0.83] WBL (E) [0.73] WBT (F) [1.00] NBT (F) [1.18] SBL (F) [1.26]
Dunlop St & Annes St	F (1.15)	SB (F) [1.15]	F (1.29)	SB (F) [1.29]
Dunlop St & Henry St	E (1.09)	SB (F) [1.09]	F (1.29)	EB (F) [1.16] WB (F) [1.10] SB (F) [1.29]
Dunlop St & Brock St	C (0.95)	EBT (E) [0.95]	E (1.01)	EBT (E) [1.01] WBL (E) [0.76] NBT (F) [0.72] SBT (F) [1.01)
Dunlop St & Hickory St	A (0.17)	-	A (0.36)	-

TABLE 8 – FUTURE TRANSIT MALL (SCENARIO 1) QUEUES EXCEEDING AVAILABLE STORAGE

Intersections	AM Peak Hour			PM Peak Hour		
	Mvmt	95th Percentile Queues (m)	Storage Capacity (m)	Mvmt	95th Percentile Queues (m)	Storage Capacity (m)
Mary St & Euclid St	-	-	-	-	-	-
Mary St & Brock St	EBL	41	22	EBL SBL	151 33	22 25
Mary St & Hickory St	-	-	-	-	-	-
Mary St & Garden St	-	-	-	EBL	85	34
Dundas St & Cochrane St	EBL NBL	96 83	45 23	EBL EBR NBL	118 129 105	45 40 23
Dundas St & Euclid St/Henry St	EBL WBL NBL	39 47 26	25 30 8	EBL WBL NBL	61 59 74	25 30 8
Dundas St & Hickory St	EBL	37	30	EBL	32	30
Dundas St & Garden St	SBL	22	17	EBL SBL	50 192	17 102
Dunlop St & Annes St	-	-	-	-	-	-
Dunlop St & Henry St	-	-	-	-	-	-
Dunlop St & Brock St	-	-	-	-	-	-
Dunlop St & Hickory St	-	-	-	-	-	-

As shown in the Future Full Transit Mall Scenario 1 analysis results, the worsened traffic conditions can be seen throughout the network as compared to the future background conditions. This was expected as the changes in travel patterns result in a large amount of traffic being diverted to Mary Street and Dunlop Street through turning movements,

and in the meantime, lane reductions and protected-only left turn phases being implemented along Dundas Street to accommodate the bus rapid transit in the dedicated median right of way.

In general, traffic conditions in the AM peak hour are slightly better than the PM peak hour. Most intersections experience high levels of delay with LOS E or F, especially intersections along Mary Street and Dunlop Street that are stop-controlled.

The most critical example is at Dundas Street & Cochrane Street, which operates at LOS F with v/c ratios 1.52 and 1.22 in the AM and PM peak hours respectively. This is due to the increase in vehicles turning away from the Dundas Street corridor to the alternative routes. Generally, for intersections along Dundas Street west of the Full Transit Mall, the eastbound left turn and northbound left turn movements are critical, while for intersections along Dundas Street east of the Full Transit Mall, the southbound left turn and westbound left turn movements are critical.

Intersections in this Full Transit Mall Scenario 1 experience longer queues for turning movements along Dundas Street compared to the future background conditions. This is the result of traffic diversion to the parallel streets. In addition, the Mary Street & Brock Street eastbound left turn movement in the PM peak hour experiences critical queueing issues, which is mainly due to the increase of volumes on the westbound direction as the competing traffic.

FUTURE FULL TRANSIT MALL CONDITIONS – SCENARIO 2

Scenario 2 for the Full Transit Mall conditions is a sensitivity test to assess the operational performance of the study area network with the assumption that the Mary Street and Dunlop Street extensions will not be implemented by 2041. **Figure 21** illustrates the revised turn percentages at intersections assuming that the affected vehicles will make the turns at upstream intersections. Detailed traffic volume diagrams are provided in **Appendix A**.

The intersection lane configurations and traffic control types were maintained from the Full Transit Mall Scenario 1 conditions (**Figure 20**), and signal phasing and timing were further optimized to accommodate the change of traffic volumes and travel patterns.

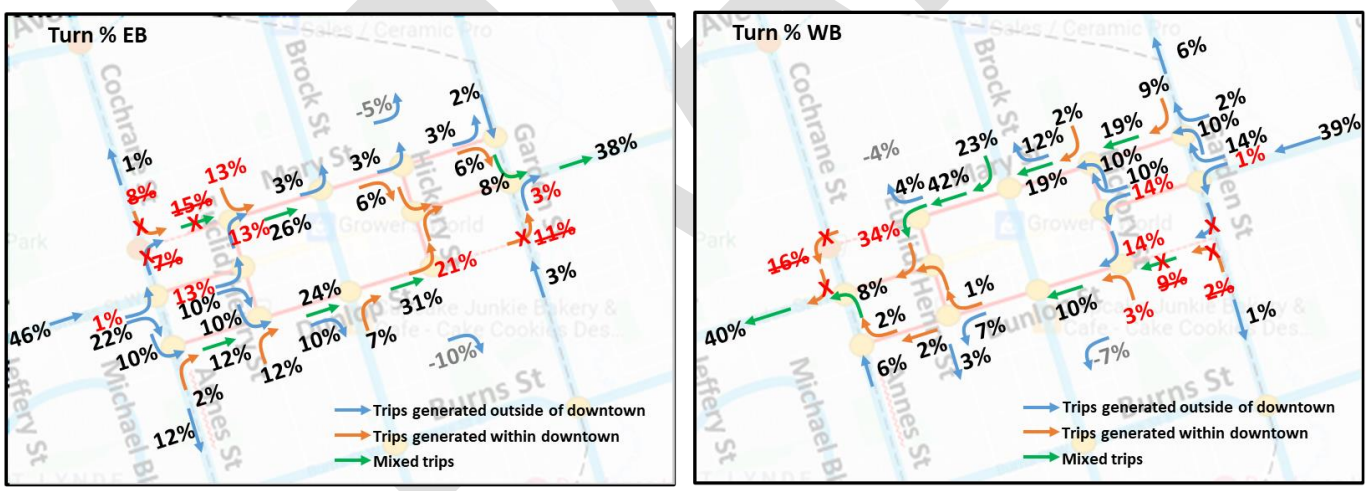


FIGURE 21 – CRITICAL INTERSECTIONS TURNING PERCENTAGE – SCENARIO 2

Table 9 summarizes the traffic operation conditions for the future Full Transit Mall Scenario 2, and **Table 10** summarizes the results where queues exceed the available storage capacity. Detailed Synchro model outputs are provided in **Appendix B.**

TABLE 9 – FUTURE FULL TRANSIT MALL (SCENARIO 2) TRAFFIC OPERATION CONDITIONS

Intersection	AM Peak Hour		PM Peak Hour	
	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]
Mary St & Euclid St	F (1.19)	WB (F) [1.19]	F (1.56)	WB (F) [1.56] NB (F) [1.22]
Mary St & Brock St	D (0.97)	EBL (F) [0.89] WBT (D) [0.97] NBT (D) [0.86]	F (1.38)	EBL (F) [1.38] EBT (D) [0.91] WBT (F) [1.36] NBT (F) [1.35] SBL (E) [0.85]
Mary St & Hickory St	E (1.24)	NB (F) [1.24]	F (2.07)	NB (F) [2.07] SB (F) [0.83]
Mary St & Garden St	B (0.77)	-	C (0.79)	WBL (F) [0.34]
Dundas St & Cochrane St	F (1.26)	EBL (F) [1.26] WBL (E) [0.29] WBT (E) [1.03] NBL (F) [1.26] SBT (F) [1.23]	E (0.90)	EBL (E) [0.80] EBT (E) [0.90] EBT (D) [0.87] WBT (E) [0.54] NBL (E) [0.89] SBT (E) [0.78]
Dundas St & Euclid St/Henry St	E (1.07)	EBL (F) [0.98] EBT (F) [0.60] WBL (E) [0.71] NBL (F) [1.07] SBT (F) [1.06]	F (1.21)	EBL (F) [1.16] EBT (F) [1.17] WBL (F) [0.86] WBT (E) [0.15] NBL (F) [1.21] SBT (F) [1.15]
Dundas St & Hickory St	E (1.05)	EBL (F) [1.05] WBL (E) [0.94] WBT (F) [1.04] SBT (F) [1.04]	F (1.37)	EBL (F) [0.81] EBT (F) [1.20] WBL (F) [1.31] WBT (F) [1.37] NBT (D) [0.90] SBT (F) [1.24]
Dundas St & Garden St	D (0.95)	WBL (F) [0.79] WBT (F) [0.94] SBL (E) [0.95]	E (1.01)	EBL (E) [0.95] EBT (E) [0.97] WBL (F) [0.63] WBT (F) [0.93] NBT (F) [1.01] SBL (E) [0.98]
Dunlop St & Annes St	F (1.15)	SB (F) [1.15]	F (1.29)	SB (F) [1.29]
Dunlop St & Henry St	E (1.09)	SB (F) [1.09]	F (1.29)	EB (F) [1.16] WB (F) [1.10] SB (F) [1.29]
Dunlop St & Brock St	C (0.91)	EBT (D) [0.87] SBT (D) [0.91]	E (1.01)	EBT (E) [1.01] WBL (E) [0.76] NBT (F) [0.72] SBT (F) [1.01]
Dunlop St & Hickory St	A (0.23)	-	A (0.47)	-

TABLE 10 – FUTURE FULL TRANSIT MALL (SCENARIO 2) QUEUES EXCEEDING AVAILABLE STORAGE

Intersections	AM Peak Hour			PM Peak Hour		
	Mvmt	95th Percentile Queues (m)	Storage Capacity (m)	Mvmt	95th Percentile Queues (m)	Storage Capacity (m)
Mary St & Euclid St	-	-	-	-	-	-
Mary St & Brock St	EBL	41	22	EBL SBL	151 33	22 25
Mary St & Hickory St	-	-	-	-	-	-
Mary St & Garden St	-	-	-	EBL	81	34
Dundas St & Cochrane St	NBL SBL	70 77	45 23	EBL EBR	81 109	45 40

DRAFT

Intersections	AM Peak Hour			PM Peak Hour		
	Mvmt	95th Percentile Queues (m)	Storage Capacity (m)	Mvmt	95th Percentile Queues (m)	Storage Capacity (m)
				NBL	76	23
Dundas St & Euclid St/Henry St	EBL WBL NBL	64 45 50	25 30 8	EBL WBL NBL	128 63 87	25 30 8
Dundas St & Hickory St	EBL	48	30	EBL WBL	34 120	30 80
Dundas St & Garden St	EBL	24	17	EBL SBL	45 163	17 102
Dunlop St & Annes St	-	-	-	-	-	-
Dunlop St & Henry St	-	-	-	-	-	-
Dunlop St & Brock St	-	-	-	WBL	37	35
Dunlop St & Hickory St	-	-	-	-	-	-

With the removal of the Mary Street and Dunlop Street extensions, the traffic operations are mostly similar to Full Transit Mall Conditions Scenario 1, but the primary difference lies along the Dundas Street corridor. At Dundas Street & Cochrane Street and Dundas Street & Garden Street traffic operations are expected to be better than Scenario 1. Conversely, without the Mary Street and Dunlop Street extensions, Dundas Street at Euclid Street and Hickory Street perform slightly worse in both the AM and PM peak hours due to higher turning movement volumes.

The queue lengths for turning movements are mostly similar with and without the Mary and Dunlop Street extensions except the eastbound left turns at Dundas Street & Cochrane Street and Dundas Street & Euclid Street. At Dundas Street & Cochrane Street, the reduction of the eastbound left turn queue is due to the redirection of traffic from the eastbound left turn to the eastbound through movement, consistent with the critical intersections turning percentage diagrams in **Figure 21**. Conversely, at Dundas Street & Euclid Street, the volumes and queue lengths for the eastbound left turn movement has increased due to traffic redirection without the Mary Street and Dunlop Street extension. It is recognized that without the Mary Street and Dunlop Street extensions, vehicles are required to drive further along Dundas Street before turning onto the parallel routes to reach their desired destinations, which results in minor variation in queue lengths.

FUTURE NORTHSIDE PEDESTRIAN MALL CONDITIONS

The Northside Pedestrian Mall is an option to prohibit the general vehicular traffic in the westbound direction only, and the pedestrian mall would be located on the north side of Dundas Street between Byron Street and Brock Street. To assess the operational performance and the potential traffic impact of the Northside Pedestrian Mall option, the following assumptions were made:

- The general vehicular traffic in the westbound direction would mainly be diverted to Mary Street through Brock Street, then return to Dundas Street through Byron Street.
- There would be less detour traffic using Mary Street in the eastbound direction (i.e., zero in an ideal condition, but assume half of the detour traffic shown in **Figure 18** for conservative analysis) considering Dundas Street is designed to have one eastbound lane open for general vehicular traffic in this pedestrian mall option;
- For the westbound direction:
    - 20% of the traffic would still bypass the Whitby town center and use the Rossland Road and Highway 401 as alternative routes;
    - The remaining 80% of the traffic (i.e. approximate 600-700 vehicles) would have opportunity to use the detour route as mentioned above, however, some preliminary test results indicated that this detour route is not able to accommodate 600-700 vehicles. Therefore, the analysis included in this report assessed the option of 300 vehicles using the detour route of Mary Street and Byron Street with sensitivity analysis (as part of the mitigation measures) testing the traffic operational performance and the potential of adding traffic signals at intersections along Mary Street;

- The additional traffic (i.e. approximate 300-400 vehicles) would use other detour routes assumed previously as part of the full transit mall solution, e.g. Manning Road and Burns Street.

The assessment of the Northside Pedestrian Mall conditions was conducted with focus on the intersections shown in **Figure 22**, which presents the intersection lane configurations and traffic control types. The existing configuration at intersections along Mary Street remained to assess the potential impact and identify the mitigation measures. Traffic volumes were estimated based on the assumptions described above, and detailed volume diagrams are provided in **Appendix A**.

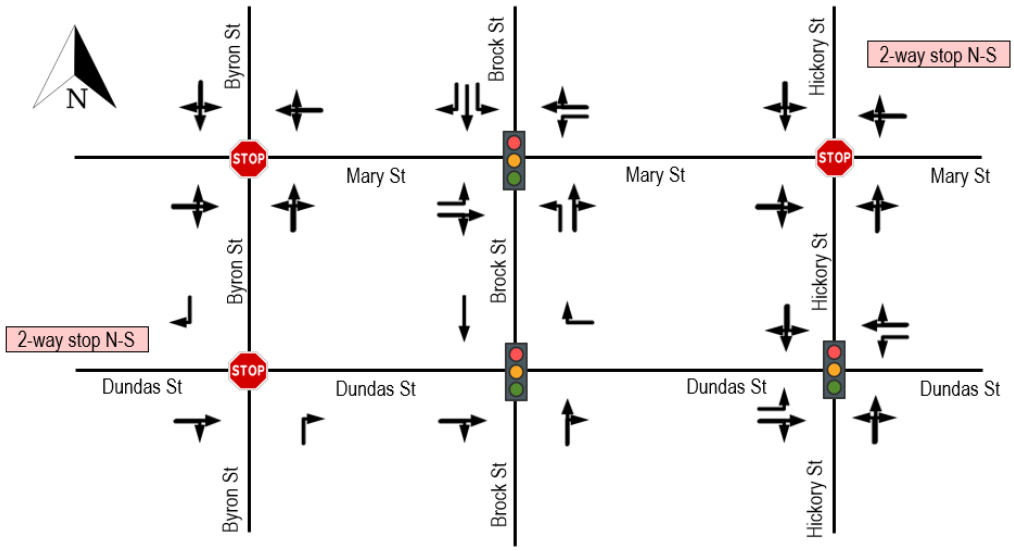


FIGURE 22 – INTERSECTION LANE CONFIGURATIONS AND TRAFFIC CONTROL – FUTURE NORTHSIDE PEDESTRIAN MALL CONDITIONS

Table 11 summarizes the traffic operations conditions for the Future Northside Pedestrian Mall Scenario and **Table 12** delineates queues exceeding the available storage. Detailed Synchro model outputs are provided in **Appendix B**.

TABLE 11 – FUTURE NORTHSIDE PEDESTRIAN MALL TRAFFIC OPERATION CONDITIONS

Intersection	AM Peak Hour		PM Peak Hour	
	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]
Dundas St & Hickory St	C (0.66)	SBT (E) [0.66]	D (0.89)	EBT (C) [0.85] SBT (F) [0.89]
Hickory St & Mary St	A (0.27)	-	A (0.35)	-
Dundas St & Brock St	D (0.94)	EBT (D) [0.89] SBT (D) [0.94]	E (1.08)	EBT (E) [1.07] NBT (E) [0.98] SBT (F) [1.08]
Mary St & Brock St	D (1.11)	EBL (E) [0.77] WBT (E) [0.93] NBL (F) [1.11] SBT (D) [0.94]	C (0.95)	EBL (E) [0.95] NBL (C) [0.86]
Mary St & Byron St	F (1.54)	WBT (F) [1.54]	F (1.47)	EBT (F) [1.15] WBT (F) [1.47]
Byron St & Dundas St	A (0.44)	-	A (0.50)	-

TABLE 12 – FUTURE NORTHSIDE PEDESTRIAN MALL QUEUES EXCEEDING AVAILABLE STORAGE

Intersections	AM Peak Hour			PM Peak Hour		
	Mvmt	95th Percentile Queues (m)	Storage Capacity (m)	Mvmt	95th Percentile Queues (m)	Storage Capacity (m)
Dundas St & Hickory St	EBL	44.6	30	EBL	37.1	30
Hickory St & Mary St	-	-	-	-	-	-
Dundas St & Brock St	-	-	-	-	-	-
Mary St & Brock St	NBL	73.2	34	EBL NBL	73.6 42	40 34
Mary St & Byron St	-	-	-	-	-	-
Byron St & Dundas St	-	-	-	-	-	-

As shown in Table 11, the most critical movements are along the proposed diversion route, e.g., the stop-controlled intersection of Mary Street and Byron Street operates well-above capacity with LOS F and v/c approx. 1.50 in both AM and PM peak hours, the northbound left turn of Mary Street and Brock Street operates above capacity with LOS F and v/c 1.11 in the AM peak hour. The traffic volumes of eastbound left turn movement at Mary Street and Brock Street are high in existing conditions, therefore it performs approaching the capacity in both the AM and PM peak hours, at LOS E and v/c 0.77 and 0.95 respectively. Dundas Street and Brock Street operates above capacity in the PM peak hour due to high traffic demands of the competing movements.

From Table 12, we can see the northbound left turn movement at Mary Street and Brock Street experiences queues exceeding the available storage, which relates to the traffic diversion that increases demand on this movement. In addition, the eastbound left turn movement at Mary Street and Brock Street in the PM peak hour experiences queueing issue due to high demand and limited storage space. The diverted traffic returning Dundas Street from Byron Street using the southbound right turn movement is not expected to experience queuing issue and block the Elm Street, as this movement only conflicts with the crossing pedestrians, and the available pedestrian volumes are relatively low (average about 20 pedestrians observed at the adjacent intersections).

DRAFT

POTENTIAL MITIGATION MEASURES

To mitigate the impact of traffic diversions on the critical intersections within the Whitby Town center area, measures such as converting non-signalized intersections to signalized intersections, improving intersection lane configurations by adding exclusive turning lanes and associated protected turning phases, as well as an alternative solution that allows westbound buses and vehicles to operate in mixed-traffic lane were investigated and tested from a traffic operations perspective.

Future Full Transit Mall Conditions – Scenario 1 (Mitigation Measures)

Figure 23 illustrates the study roadway network with improved intersection lane configurations and traffic control types for Scenario 1. In order to mitigate the issues found in the future Full Transit Mall conditions, improvement measures were implemented to a new set of models to evaluate their success at enhancing operations throughout the network. These measures include converting the unsignalized intersections to signalized intersections and implementing dedicated left turn lanes in all directions. The intersections involved in these measures are:

- Mary Street at Euclid Street,
- Mary Street at Hickory Street,
- Dunlop Street at Annes Street,
- Dunlop Street at Henry Street
- Dunlop Street at Hickory Street

which are all highlighted using coloured arrows for movements and coloured outlines for traffic signals in **Figure 23** below. Where best fit, protected turning phases were implemented to improve the left turn movement performance, auxiliary right turning lanes were investigated at intersections with high right turning volumes. Signal timing splits were further optimized to accommodate the change of intersection lane configurations and traffic control types.

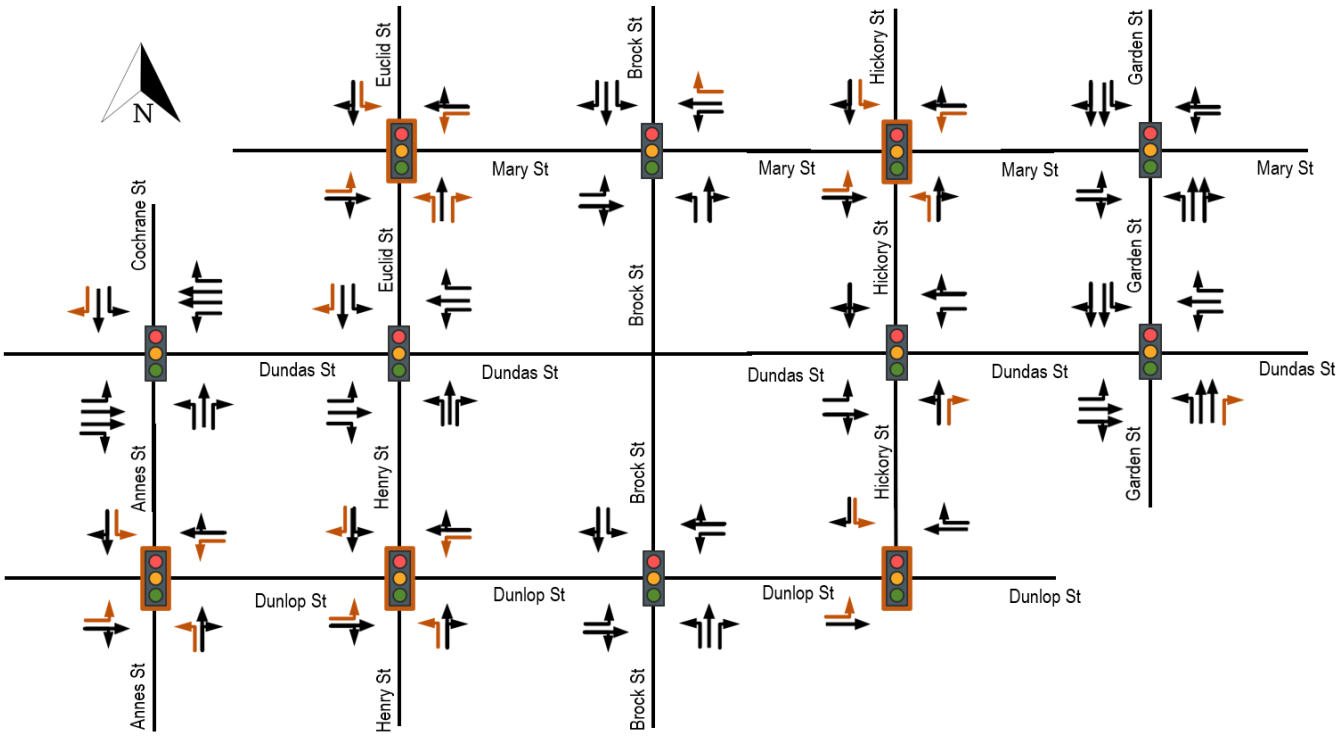


FIGURE 23 – INTERSECTION LANE CONFIGURATION AND TRAFFIC CONTROL – FUTURE FULL TRANSIT MALL WITH MITIGATIONS

Traffic operation analysis results are summarized in Table 13, while queues exceeding available storage are summarized in Table 14. Detailed Synchro model outputs are provided in Appendix B.

TABLE 13 – FUTURE FULL TRANSIT MALL WITH MITIGATION (SCENARIO 1) TRAFFIC OPERATIONS CONDITIONS

Intersection	AM Peak Hour		PM Peak Hour	
	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]
Mary St & Euclid St	B (0.51)	-	D (0.65)	NBT (E) [0.39]
Mary St & Brock St	C (0.88)	WBT (D) [0.88]	F (1.14)	EBL (F) [1.14] EBT (F) [1.06] WBL (F) [0.66] WBT (F) [1.04] NBT (F) [1.07] SBL (E) [0.86]
Mary St & Hickory St	B (0.51)	-	C (0.61)	NBL (E) [0.56] SBL (E) [0.21]
Mary St & Garden St	B (0.77)	-	B (0.84)	WBL (F) [0.34]
Dundas St & Cochrane St	D (0.88)	EBL (E) [0.83] WBT (D) [0.88] SBR (C) [0.87]	D (0.99)	EBL (F) [0.99] EBT (E) [0.89] EBR (D) [0.89] SBT (E) [0.61]
Dundas St & Euclid St/Henry St	D (0.61)	EBL (E) [0.46] EBT (F) [0.47]	D (0.73)	EBL (F) [0.63] WBL (E) [0.70]
Dundas St & Hickory St	D (0.81)	EBL (E) [0.80]	D (0.92)	EBL (F) [0.79] WBL (F) [0.87] WBT (D) [0.92]
Dundas St & Garden St	D (1.04)	WBL (E) [0.83] WBT (F) [1.04] SBL (E) [0.91]	E (0.97)	EBL (E) [0.72] EBT (E) [0.75] WBL (F) [0.92] WBT (E) [0.90] NBT (E) [0.96] SBL (E) [0.97]
Dunlop St & Annes St	B (0.51)	-	C (0.45)	-
Dunlop St & Henry St	B (0.41)	-	C (0.53)	-
Dunlop St & Brock St	C (0.90)	EBT (D) [0.88] SBT (D) [0.90]	E (1.01)	EBT (E) [1.01] WBL (E) [0.76] NBT (F) [0.72] SBT (F) [1.01]
Dunlop St & Hickory St	B (0.21)	-	B (0.34)	-

TABLE 14 – FUTURE FULL TRANSIT MALL WITH MITIGATION (SCENARIO 1) QUEUES EXCEEDING AVAILABLE STORAGE

Intersections	AM Peak Hour			PM Peak Hour		
	Mvmt	95th Percentile Queues (m)	Storage Capacity (m)	Mvmt	95th Percentile Queues (m)	Storage Capacity (m)
Mary St & Euclid St	WBL	38	19	WBL NBR SBL	102 100 51	19 20 25
Mary St & Brock St	EBL	32	22	EBL WBL WBR SBL	144 20 53 34	22 19 25 25
Mary St & Hickory St	NBL	20	16	NBL	32	16
Mary St & Garden St	-	-	-	EBL	57	34
Dundas St & Cochrane St	EBL NBL	96 83	45 23	EBL EBR NBL	128 129 103	45 40 23
Dundas St & Euclid St/Henry St	EBL WBL	39 47	25 30	EBL WBL	61 59	25 30

DRAFT

Intersections	AM Peak Hour			PM Peak Hour		
	Mvmt	95th Percentile Queues (m)	Storage Capacity (m)	Mvmt	95th Percentile Queues (m)	Storage Capacity (m)
	NBL	26	8	NBL	75	8
Dundas St & Hickory St	EBL	37	30	EBL	32	30
Dundas St & Garden St	EBL	22	17	EBL NBR SBL	50 64 193	17 30 102
Dunlop St & Annes St	SBL	17	16	SBL	19	16
Dunlop St & Henry St	SBL	21	16	SBL	36	16
Dunlop St & Brock St	-	-	-	-	-	-
Dunlop St & Hickory St	-	-	-	EBL SBR	39 34	35 16

Mitigation measures for Full Transit Mall Scenario 1 improved performance for multiple intersections in the network. Overall, the intersections which were converted from stop-controlled to signalized operate much better (most of them are under LOS C or better) with the mitigation measures. The performance of intersections along Dundas Street corridor has also been improved from LOS F in both AM and PM peaks, to LOS D with the addition of auxiliary right turning lanes on the side streets and further signal optimization. The remaining critical operations mainly occur during the PM peak hour at Mary Street & Brock Street, Dunlop Street & Brock Street, and Dundas Street & Garden Street.

There isn't significant improvement of queue lengths observed with implementation of the mitigation measures, as queues exceeding available storage were only reported for the movements with exclusive turning lanes which do not exist for many intersections prior to the implementation of mitigations. The long queues are expected to be a critical issue during the PM peak hour, especially along Mary Street due to high traffic volumes. It should be noted that the storage lengths for the added exclusive left or right turn lanes at the newly signalized intersections and the existing intersections were assumed based on the characteristics of adjacent intersections, and thus these storage lengths could be further evaluated in future design studies.

Future Full Transit Mall Conditions – Scenario 2 (Mitigation Measures)

Figure 23, shown previously, also represents the study roadway network with the improved intersections and lane configurations as well as traffic control types for Scenario 2. As mentioned previously, Scenario 2 is a sensitivity test which assumes that the extensions along Mary Street and Dunlop Street are not implemented.

The same improvement methods used for Scenario 1 (i.e., converting the critical minor intersections from stop-controlled to signalized intersections, adding dedicated left and right turn lanes and protected phasing) were used for assessing the Scenario 2 with mitigations. Signal timing splits were further optimized to accommodate the change of intersection lane configurations and traffic control types.

Traffic operation analysis results are summarized in Table 15, while queues exceeding available storage are summarized in Table 16. Detailed Synchro model outputs are provided in Appendix B.

TABLE 15 – FUTURE FULL TRANSIT MALL WITH MITIGATION (SCENARIO 2) TRAFFIC OPERATION CONDITIONS

Intersection	AM Peak Hour		PM Peak Hour	
	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]
Mary St & Euclid St	C (0.72)	-	D (0.82)	-
Mary St & Brock St	C (0.88)	-	E (1.12)	EBL (F) [1.12] EBT (F) [1.04] WBL (F) [0.59] WBT (F) [1.01] NBT (F) [1.08] SBL (F) [0.90]

Intersection	AM Peak Hour		PM Peak Hour	
	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]
Mary St & Hickory St	B (0.51)	-	C (0.67)	-
Mary St & Garden St	B (0.77)	-	C (0.77)	WBL (F) [0.34]
Dundas St & Cochrane St	D (0.89)	EBL (E) [0.76] WBT (D) [0.89] SBT (E) [0.82]	D (0.80)	EBL (E) [0.80] SBT (E) [0.57]
Dundas St & Euclid St/Henry St	D (0.64)	EBL (E) [0.60] EBT (E) [0.51]	D (0.83)	EBL (E) [0.75] EBT (F) [0.78] SBT (E) [0.83]
Dundas St & Hickory St	D (0.82)	EBL (E) [0.80] SBT (E) [0.73]	D (0.88)	EBL (F) [0.77] EBT (E) [0.88] WBL (F) [0.88] WBT (D) [0.88] NBR (C) [0.86] SBT (E) [0.84]
Dundas St & Garden St	C (0.82)	-	E (0.93)	EBL (F) [0.90] EBT (E) [0.93] WBL (F) [0.67] WBT (E) [0.92] NBT (E) [0.91] SBL (D) [0.90]
Dunlop St & Annes St	B (0.51)	-	C (0.45)	-
Dunlop St & Henry St	B (0.50)	-	C (0.53)	-
Dunlop St & Brock St	C (0.90)	EBT (D) [0.90] SBT (D) [0.89]	E (1.01)	EBT (E) [1.01] WBL (E) [0.76] NBT (F) [0.72] SBT (F) [1.00]
Dunlop St & Hickory St	A (0.31)	-	B (0.47)	-

TABLE 16 – FUTURE FULL TRANSIT MALL WITH MITIGATION (SCENARIO 2) QUEUES EXCEEDING AVAILABLE STORAGE

Intersections	AM Peak Hour			PM Peak Hour		
	Mvmt	95th Percentile Queues (m)	Storage Capacity (m)	Mvmt	95th Percentile Queues (m)	Storage Capacity (m)
Mary St & Euclid St	-	-	-	-	-	-
Mary St & Brock St	EBL	41	22	EBL SBL	111 33	22 25
Mary St & Hickory St	-	-	-	-	-	-
Mary St & Garden St	-	-	-	EBL	81	34
Dundas St & Cochrane St	EBL NBL	70 77	45 23	EBL EBR NBL	81 109 76	15 40 23
Dundas St & Euclid St/Henry St	EBL WBL NBL	64 45 50	25 30 8	EBL WBL NBL	128 63 87	25 30 8
Dundas St & Hickory St	EBL	48	30	EBL WBL	34 120	30 80
Dundas St & Garden St	EBL	24	17	EBL SBL	45 163	17 102
Dunlop St & Annes St	-	-	-	-	-	-
Dunlop St & Henry St	-	-	-	-	-	-
Dunlop St & Brock St	-	-	-	WBL	37	35
Dunlop St & Hickory St	-	-	-	-	-	-

Similar to the mitigations performed for Full Transit Mall Scenario 1, the intersections which were converted from stop-controlled to signalized show significant improvement with mitigations in Full Transit Mall Scenario 2; intersections along Dundas Street were also improved with the addition of auxiliary right turning lanes on the side streets and further signal

optimization. Mary Street & Euclid Street operates slightly worse in Scenario 2 with mitigations than in Scenario 1 with mitigations. This is because the absence of Mary Street extension results in an increase in demand for turning movements, although the same measures were implemented in Scenario 2 as compared to Scenario 1.

Improvement of queuing issues were not observed based on the analysis results and reasons have been discussed previously in Scenario 1 mitigation conditions. Storage lengths could be further evaluated in future design studies.

Future Northside Pedestrian Mall Conditions (Mitigation Measures)

To mitigate the impacts identified in the future Northside Pedestrian Mall conditions, improvement measures were implemented to a new set of models to evaluate their success at enhancing operations throughout the network. These measures include signalizing the Mary Street and Byron Street intersections, adding a dedicated westbound left turn lane at Mary Street and Byron Street and a dedicated westbound right turn lane at Mary Street and Brock Street. **Figure 24** highlights the proposed improvement measures. The westbound left turning movement at Mary Street and Byron Street was also provided a protected phase to accommodate the high traffic volumes from the diversion. In addition, the turning movements storage lengths were extended/adjusted at the northbound left and eastbound left turns of Mary Street and Brock Street, the protected left turning phase was implemented at the eastbound left turn of Mary Street and Brock Street, and signal timing splits were further optimized to accommodate the change of intersection lane configurations and traffic control types.

As mentioned previously, the 300 vehicles using detour route of Mary Street and Byron Street through right turn at Brock Street was an assumption and represents the worst case. In reality, drivers have options to use the upstream intersections, e.g., Perry Street, Ash Street, and Hickory Street to divert to Mary Street then return to Dundas Street via Byron Street. To assess the performance of traffic using these alternative routes, sensitivity tests were conducted using Hickory Street as an example (traffic data along Perry Street and Ash Street are not available). The tests assumed 250 and 200 vehicles instead of 300 vehicles using the Brock Street, and the additional vehicles, i.e., 50 and 100 vehicles, would take Hickory Street to get to Mary Street. For each of the sensitivity test scenarios, further signal optimization was conducted but no changes were made to lane configurations and traffic control types.

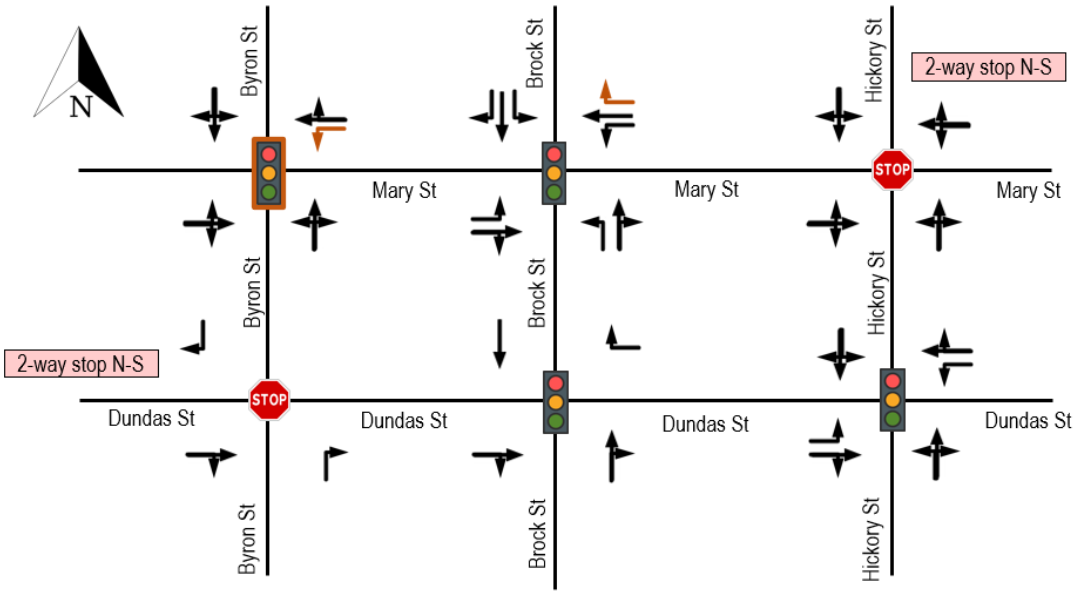


FIGURE 24 – INTERSECTION LANE CONFIGURATIONS AND TRAFFIC CONTROL – FUTURE NORTHSIDE PEDESTRIAN MALL WITH MITIGATIONS

Traffic operation analysis results are summarized in Table 17, while queues exceeding available storage are listed in Table 18. Detailed Synchro model outputs are provided in Appendix B.

TABLE 17– FUTURE NORTHSIDE PEDESTRIAN MALL WITH MITIGATION TRAFFIC OPERATION CONDITIONS

	AM Peak Hour					
Intersection	300 Diversion		250 Diversion		200 Diversion	
	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]
Dundas St & Hickory St	C (0.64)	SBT (E) [0.64]	C (0.64)	SBT (E) [0.64]	C (0.64)	SBT (E) [0.64]
Hickory St & Mary St	A (0.27)	-	A (0.41)	-	A (0.55)	-
Dundas St & Brock St	C (0.94)	EBT (D) [0.89] SBT (D) [0.94]	C (0.94)	EBT (D) [0.89] SBT (D) [0.94]	C (0.94)	EBT (D) [0.89] SBT (D) [0.94]
Mary St & Brock St	D (1.02)	NBL (E) [1.02] SBT (E) [1.01]	D (1.01)	NBL (D) [0.93] SBT (E) [1.01]	C (0.98)	NBL (D) [0.88] SBT (E) [0.98]
Mary St & Byron St	C (0.74)	-	C (0.74)	-	C (0.74)	-
Byron St & Dundas St	A (0.44)	-	A (0.44)	-	A (0.44)	-
	PM Peak Hour					
Intersection	300 Diversion		250 Diversion		200 Diversion	
	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]
Dundas St & Hickory St	D (0.89)	EBT (C) [0.85] SBT (F) [0.89]	D (0.89)	EBT (C) [0.85] SBT (F) [0.89]	D (0.89)	EBT (C) [0.85] SBT (F) [0.89]
Hickory St & Mary St	A (0.35)	-	A (0.52)	-	A (0.71)	NBT (E) [0.71]
Dundas St & Brock St	E (1.08)	EBT (F) [1.09] NBT (D) [0.95] SBT (E) [1.05]	E (1.08)	EBT (E) [1.07] NBT (E) [0.98] SBT (F) [1.08]	E (1.08)	EBT (E) [1.07] NBT (E) [0.98] SBT (F) [1.08]
Mary St & Brock St	C (0.85)	EBT (D) [0.85]	C (0.85)	EBL (D) [0.85]	C (0.85)	EBL (D) [0.85]
Mary St & Byron St	C (0.92)	EBT (D) [0.92]	C (0.92)	EBT (D) [0.92]	C (0.92)	EBT (D) [0.92]
Byron St & Dundas St	A (0.50)	-	A (0.50)	-	A (0.50)	-

TABLE 18 – FUTURE NORTHSIDE PEDESTRIAN MALL WITH MITIGATION QUEUES EXCEEDING AVAILABLE STORAGE

	AM Peak Hour								
Intersections	300 Diversion			250 Diversion			200 Diversion		
	Mvmt	95th Percentile Queues (m)	Storage Capacity (m)	Mvmt	95th Percentile Queues (m)	Storage Capacity (m)	Mvmt	95th Percentile Queues (m)	Storage Capacity (m)
Dundas St & Hickory St	EBL	43.2	30	EBL	44	30	EBL	44	30
Hickory St & Mary St	-	-	-	-	-	-	-	-	-
Dundas St & Brock St	-	-	-	-	-	-	-	-	-
Mary St & Brock St	NBL	93	80	-	-	-	-	-	-
Mary St & Byron St	-	-	-	-	-	-	-	-	-
Byron St & Dundas St	-	-	-	-	-	-	-	-	-
	PM Peak Hour								
Intersections	300 Diversion			250 Diversion			200 Diversion		
	Mvmt	95th Percentile Queues (m)	Storage Capacity (m)	Mvmt	95th Percentile Queues (m)	Storage Capacity (m)	Mvmt	95th Percentile Queues (m)	Storage Capacity (m)
Dundas St & Hickory St	EBL	37.1	30	EBL	36.9	30	EBL	37.1	30
Hickory St & Mary St	-	-	-	-	-	-	-	-	-
Dundas St & Brock St	-	-	-	-	-	-	-	-	-
Mary St & Brock St	-	-	-	-	-	-	-	-	-
Mary St & Byron St	WBL	64.1	50	WBL	64.2	50	WBL	59	50
Byron St & Dundas St	-	-	-	-	-	-	-	-	-

DRAFT

Comparing the 300 vehicle diversion scenario before and after implementing mitigation measures, the overall performance of the critical intersections/movements have been improved. Adding signal control at Mary Street and Byron Street, as well as the dedicated WBL turning lane has improved the intersection LOS from F to C in both AM and PM peak hours; the WBT movement in the AM and PM peak is no longer critical and the EBT movement in the PM peak is improved from LOS F and v/c >1.00 to LOS D and v/c <1.00. The extension of northbound left turn lane storage and further signal optimization at Brock Street and Mary Street have improved the overall intersection performance in both AM and PM peak hours; the northbound left turn movement in the PM peak hour is no longer critical and not expected to experience significant queues; while in the AM peak hour, the northbound left turn movement is still performing critically with LOS E and v/c 1.02, and queues for this movement are expected to exceed the 80m extended storage.

The 300 vehicle diversion was assumed to be the worse-case scenario, while the 250 and 200 vehicle diversions were investigated as sensitivity tests to assess the network performance if drivers opt for the upstream alternative routes. The results of **Table 17** and **Table 18** show a progressive improvement to the northbound left turn movement at Brock Street and Mary Street as more of the diversion volumes are re-directed through Hickory Street. In the 200 and 250 vehicle diversion scenarios, the northbound left turn movement at Brock Street and Mary Street is no longer experiencing queueing issue in the AM peak hour; and the southbound through movement as a competing movement to the northbound left turn is also improved as traffic being diverted through upstream intersections. The alternate scenarios do not compromise the performance of the westbound through movement at Brock Street and Mary Street, nor does it worsen performance at Dundas Street and Hickory Street. Hickory Street and Mary Street on the other hand does slowly worsen in performance under the two-way stop control, however the overall intersection performance remain in good and acceptable level except the northbound approach in the PM peak hour for the 200 vehicle diversion scenario. The northbound approach starts to show signs of critical operation in the PM peak hour with LOS E and v/c 0.71, although the level of service is considered critical, the volumes are still within capacity and queues are not expected to spill back onto the upstream intersection of Dundas Street and Hickory Street. Also, it should be noted that Hickory Street was analyzed as an example, drivers do have options to use Perry Street and Ash Street as the alternative routes.

JUSTIFICATION OF TRAFFIC SIGNALS

Converting stop-controlled intersections to signalized intersections was one of the mitigation measures tested for all the future study scenarios. The recommendations for signalizing the existing stop-controlled intersections on Mary Street or Dunlop Street to accommodate the future BRT lanes on Dundas Street need further confirmation through signal warrant/justification analysis. According to the OTM Book 12 Section 4, an assessment of whether or not a signal is technically justified is made using the following criteria:

- Justification 1 – Minimum Eight-Hour Vehicle Volume (Section 4.4)
- Justification 2 – Delay to Cross Traffic (Section 4.5)
- Justification 3 – Combination Warrant (Section 4.6)
- Justification 4 – Minimum Four-Hour Vehicle Volume (Section 4.7)
- Justification 5 – Collision Experience (Section 4.8)
- Justification 6 – Pedestrian Volume (Section 4.9)
- Justification 7 – Projected Volumes (Section 4.10)

Justification 7 is applicable for the cases in this study, as it is to determine future need for traffic signals at existing intersections. The preferred approach for signal justification analysis is using eight-hour volume projections, however, this information is difficult to predict with necessary accuracy. An alternative solution is to use Average Hourly Volumes (AHV) estimated based on Peak Hour Volumes (PHV), which is also the estimations of future conditions. Overall, the approach of estimating future traffic volumes increases uncertainty, therefore, the thresholds for traffic signals to be considered are raised from 100% to 120% over the required volumes.

Given the limitation of traffic data, the signal justification analyses were conducted for two intersections identified as part of the Northside Pedestrian Mall scenario to demonstrate the approach and the anticipated outputs. **Table 19** and **Table 20** present the analysis results. As seen, none of these intersections justify the installation traffic signal based on the

available traffic information and the assumptions used for predicting traffic volumes. The thresholds to be considered for adding traffic signals are:

- Both Justification 1A and Justification 1B are 120% fulfilled; or
- Both Justification 2A and Justification 2B are 120% fulfilled; or
- Neither Justification 1 or Justification 2 is satisfied, but both justifications are at least 80% satisfied.

TABLE 19 – TRAFFIC SIGNAL JUSTIFICATION 7 – PROJECTED VOLUMES (MARY/BYRON INTERSECTION)

Justification	Description	Minimum Requirement 1 Lane Highways	Mary/Byron Intersection	Compliance		
				Sectional		Entire %
		Restricted Flow		Numerical	%	
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	720	764[1]	1.06	106%	106%
	B. Vehicle volume, along minor streets (average hour)	170	115[1]	0.68	68%	68%
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	720	649	0.90	90%	90%
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	75	75[1,2]	1.00	100%	100%

Note: 1. Vehicle volume along minor street, i.e. Byron Street, was unknown, and it was assumed as 100 veh/h for both directions; 2. Pedestrian volume crossing Mary Street at Byron Street was unknown, it was estimated as an average of the pedestrian volumes in the adjacent intersections, i.e. 18 ped/h; 3. No background traffic growth was assumed/applied to the existing volumes for intersections along Mary Street considering it's in a developed area with relatively stable travel demand and travel patterns and the Mary Street extension information was unknown.

TABLE 20 – TRAFFIC SIGNAL JUSTIFICATION 7 – PROJECTED VOLUMES (MARY/HICKORY INTERSECTION)

Justification	Description	Minimum Requirement 1 Lane Highways	Mary/Hickory Intersection	Compliance		
				Sectional		Entire %
		Restricted Flow		Numerical	%	
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	720	442	0.61	61%	61%
	B. Vehicle volume, along minor streets (average hour)	170	137	0.81	81%	81%
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	720	305	0.42	42%	42%
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	75	119	1.59	159%	159%

Note: 1. No background traffic growth was assumed/applied to the existing volumes for intersections along Mary Street considering it's in a developed area with relatively stable travel demand and travel patterns and the Mary Street extension information was unknown.

Future Three-Lane Mixed Traffic Westbound Conditions

The Three-Lane Mixed Traffic Westbound option was investigated and examined to minimize traffic impacts on the surrounding transportation network and systems. This option provides an eastbound dedicated transit lane and an eastbound general traffic lane at Dundas Street and Brock Street intersection, but the westbound transit and traffic would operate in a mixed through lane with dedicated right turn lane at Dundas and Brock. All left turns and right turns would be restricted at this intersection except the westbound right turn. This option is expected to have minimal network-wide impact; therefore, detailed operation conditions were examined at Dundas and Brock intersection, and local impacts were evaluated and discussed.

The lane configuration proposed for Dundas Street and Brock Street intersection is illustrated in **Figure 25**. Traffic operation analysis results are summarized in **Table 21**. The analysis was conducted using the forecasted 2041

DRAFT

background traffic volumes with assumptions that all the right turn volumes associated with the restricted turns (note that all the left turns are already restricted in the existing conditions) would turn using the adjacent intersections/side streets. Detailed volumes are provided in **Appendix A.**

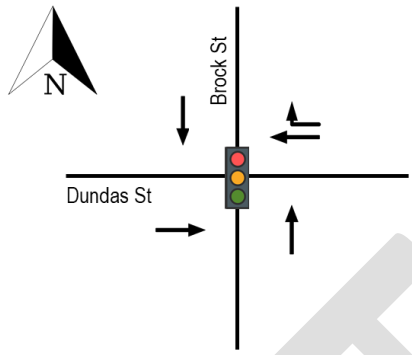


FIGURE 25 – INTERSECTION LANE CONFIGURATION – THREE-LANE MIXED TRAFFIC WESTBOUND

Given the right turn volumes are low, ranging from 25 vehicles to maximum 113 vehicles, and there are many alternative routes in a close distance to Dundas Street and Brock Street, the restricted right turn volumes would spread into the local network and use different routes depending on the destinations; therefore, the right turn restrictions are not expected to cause significant traffic operational impact on the local transportation network and systems.

The eastbound and westbound through movements at Dundas and Brock intersection are expected to experience congestion without traffic diversion, which is mainly due to the increase of traffic volumes in 2041. A sensitivity test was conducted assuming that 20% of the through traffic (i.e., regional trips) would still bypass the Whitby town center and use the Rossland Road and Highway 401 as alternative routes. In addition, the eastbound through traffic during PM peak hour requires higher level of diversion (approximately 42%) in order to maintain volumes within Capacity. In general, the travel patterns and traffic operation conditions in the eastbound direction are expected to be similar to the Northside Pedestrian Mall conditions. Comparisons of the analysis results between No Thru Diversion and WB&EB Thru Diversion scenarios are shown in **Table 21**.

TABLE 21 – FUTURE THREE-LANE MIXED TRAFFIC WESTBOUND OPERATION CONDITIONS

	AM Peak Hour				PM Peak Hour			
Intersection	No Thru Diversion		WB & EB Thru Diversion 20% for both WB & EB		No Thru Diversion		WB & EB Thru Diversion 20% WB and 42% EB	
	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]	Overall Intersection LOS (v/c)	Critical Movements (LOS) [v/c]
Dundas St & Brock St	D (0.98)	EBT (D) [0.94] WBT (D) [0.95] SBT (E) [0.98]	D (0.97)	EBT (D) [0.95] WBT (D) [0.97] SBT (D) [0.94]	F (1.36)	EBT (F) [1.36] NBT (F) [1.11] SBT (F) [1.23]	D (0.96)	EBT (D) [0.95] NBT (D) [0.86] SBT (D) [0.96]

The Three-Lane Mixed Traffic Westbound option is expected to operate well during AM peak hour, especially when the 20% of regional trips would bypass the Whitby downtown. During PM peak hour, the estimated traffic volumes are higher, and the Dundas and Brock intersection is expected to experience congestion if there is no traffic diversion. With 20% of through traffic in the westbound direction and 42% of through traffic in the eastbound direction taking the alternative routes through regional and local network, the intersection of Dundas and Brock during PM peak hour would operate at acceptable level of service or close to the Future Background Conditions (see comparisons in the following Summary section).

Summary

In summary, the results in Table 22 indicate that the deterioration of traffic operations from future background conditions to future Full Transit Mall conditions can be mitigated by a few potential measures such as:

- converting stop-controlled intersections to signalized intersections;
- improving lane configurations to allow for dedicated left and right turning lanes; and
- adding protected left turning phases where necessary.

As seen in Table 22 (highlighted in green), the proposed mitigation measures can improve traffic operational conditions for the intersections along Mary Street and Dunlop Street as compared to the results of the Full Transit Mall scenarios. The intersections along Dundas Street were also improved from the mitigation efforts by adding auxiliary right turning lanes and optimizing signal timings. Other measures could be investigated to further improve the intersection operational conditions, and these measures include but are not limited to:

- increasing storage length;
- adding dual left/right turning lanes;
- widening the roadway section; and
- investigating actuated and coordinated signal controls.

TABLE 22 – LOS IMPROVEMENTS WITH MITIGATIONS FOR FULL TRANSIT MALL

LOS Improvements with Mitigations	2041 Future Conditions									
	Background		Scenario 1				Scenario 2			
			2041 Transit Mall		2041 Mitigations		2041 Transit Mall		2041 Mitigations	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Mary St & Euclid St	B	C	F	F	B	D	F	F	C	D
Mary St & Brock St	C	C	D	F	C	F	D	F	C	E
Mary St & Hickory St	A	A	E	F	B	C	E	F	B	C
Mary St & Garden St	B	B	B	C	B	B	B	C	B	C
Dundas St & Cochrane St	E	C	F	F	D	D	F	E	D	D
Dundas St & Euclid St/Henry St	C	C	D	E	D	D	E	F	D	D
Dundas St & Hickory St	A	C	D	F	D	D	E	F	D	D
Dundas St & Garden St	D	E	E	F	D	E	D	E	C	E
Dunlop St & Annes St	C	B	F	F	B	C	F	F	B	C
Dunlop St & Henry St	B	B	E	F	B	C	E	F	B	C
Dunlop St & Brock St	B	B	C	E	C	E	C	E	C	E
Dunlop St & Hickory St	A	A	A	A	B	B	A	A	A	B

For the option of Northside Pedestrian Mall, Table 23 summarizes the results for comparison of different scenarios. The results indicate that the westbound traffic diversion with 300 vehicles using Brock Street to access to Mary Street would deteriorate traffic operations for intersections/movements along the detour route as compared to the future background conditions. Mitigation efforts similar to those listed above for the Full Transit Mall option would improve the performance of the critical intersections/movements identified as part of this Northside Pedestrian Mall option (highlighted in green). The improvements of queueing issues which are not shown at the overall intersection level are also expected with implementation of mitigation measures.

TABLE 23 – LOS IMPROVEMENTS WITH MITIGATIONS FOR NORTHSIDE PEDESTRIAN MALL

LOS Improvements with Mitigations/Scenarios	Background		2041 Northside Pedestrian Mall		2041 Mitigations 300-Diverison		2041 Mitigations 250-Diverison		2041 Mitigations 200-Diverison	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Dundas St & Hickory St	A	C	C	D	C	D	C	D	C	D
Hickory St & Mary St	A	A	A	A	A	A	A	A	A	A
Dundas St & Brock St	D	D	D	E	C	E	C	E	C	E
Mary St & Brock St	C	C	D	C	D	C	D	C	C	C
Mary St & Byron St	-	-	F	F	C	C	C	C	C	C
Byron St & Dundas St	-	-	A	A	A	A	A	A	A	A

For the Three-Lane Mixed Traffic Westbound option, based on the results of Table 24, we can see that the PM peak hour conditions are critical without traffic diversion. However, it is expected that drivers would take alternative routes to avoid passing through a congested area, therefore, the PM peak hour conditions can be improved with traffic diversion, and the intersection operational performance is expected to be similar to the future Background conditions.

TABLE 24 – LOS IMPROVEMENTS WITH MITIGATIONS FOR THREE-LANE MIXED TRAFFIC WESTBOUND

LOS Improvements with Mitigations/Scenarios	Background		2041 Three-Lane Mixed Traffic Westbound – No Diversion		2041 Mitigations 300-Diverison	
	AM	PM	AM	PM	AM	PM
Dundas St & Brock St	D	D	D	F	D	D

As an overall comparison among the three options, i.e., Full Transit Mall, Northside Pedestrian Mall, and Three-Lane Mixed Traffic Westbound, Table 25 summarizes the difference of the anticipated traffic volumes and travel patterns; and Table 26 summarizes the difference of the estimated traffic operations/impacts and the potential mitigation measures.

DRAFT

TABLE 25 – TRAFFIC VOLUMES AND TRAVEL PATTERNS COMPARISON (FULL TRANSIT MALL VS. NORTHSIDE PEDESTRIAN MALL)

	Full Transit Mall		Northside Pedestrian Mall		Three-Lane Mixed Traffic Westbound	
	EB Direction	**WB Direction**	**EB Direction**	**WB Direction**	**EB Direction**	**WB Direction**
Regional Trips (AM/PM)	~90/160 vehicles -> Highway 401 ~40/80 vehicles -> Rossland Rd	~80/90 vehicles -> Highway 401 ~80/90 vehicles -> Rossland Rd	Same as the full transit mall	Same as the full transit mall	Same as the full transit mall	Same as the full transit mall
Local Trips (AM/PM)	~160/290 vehicles -> Manning Rd ~180/310 vehicles -> Burns St	~230/250 vehicles -> Manning Rd ~140/150 vehicles -> Burns St	~0/120 vehicles -> Manning Rd ~0/140 vehicles -> Burns St	~220/240 vehicles -> Manning Rd ~120/130 vehicles -> Burns St	~0/120 vehicles -> Manning Rd ~0/140 vehicles -> Burns St	~0/0 vehicles -> Manning Rd ~0/0 vehicles -> Burns St
Town Center Trips (AM/PM)	~90/160 vehicles -> Mary St ~140/250 vehicles -> Dunlop St	~160/180 vehicles -> Mary St ~110/120 vehicles ->Dunlop St	~500/700 vehicles -> Dundas St	~200-300 -> (Dundas-Brock-Mary-Byron) additional vehicles -> Mary St/ Dunlop St through alternative routes east of Brock St	~500/700 vehicles -> Dundas St	~550/600 vehicles -> Dundas St

TABLE 26 – TRAFFIC IMPACTS AND MITIGATION MEASURES COMPARISON (FULL TRANSIT MALL VS. NORTHSIDE PEDESTRIAN MALL)

	Full Transit Mall		Northside Pedestrian Mall		Three-Lane Mixed Traffic Westbound	
	EB Direction	**WB Direction**	**EB Direction**	**WB Direction**	**EB Direction**	**WB Direction**
Impacts on Highway 401 and Rossland Rd	Volumes would be over capacity on Highway 401 Volumes would be within Capacity on Rossland Rd	Volumes would be within Capacity on both Highway 401 and Rossland Rd	Same as the full transit mall	Same as the full transit mall	Same as the full transit mall	Same as the full transit mall
Impacts on Manning Rd and Burns St	Manning Rd extension information is unknown Volumes would be over capacity on Burns St	Manning Rd extension information is unknown Volumes would be within Capacity on Burns St	Less impact on Manning Rd Less impact on Burns St, volumes would be within Capacity	Similar impact on Manning Rd Similar impact on Burns St	Less impact on Manning Rd Less impact on Burns St, volumes would be within Capacity	No impact on Manning Rd and Burns St
Impacts within the Town Center Area	Significant impact on Mary St and Dunlop St in both eastbound and westbound directions, the potential mitigation measures include: Signalizing intersections of • Mary St & Euclid St • Mary St & Hickory St • Dunlop St & Annes St • Dunlop St & Henry St • Dunlop St & Hickory St Adding dedicated left/right turning lanes at: • Mary St & Euclid St • Mary St & Brock St • Mary St & Hickory St • Dunlop St & Annes St • Dunlop St & Henry St • Dunlop St & Hickory St Signal phasing and timing optimization		Do not anticipate impact or expect only minor impact on the parallel routes, i.e., Mary St and Dunlop St. Therefore, no additional mitigation measures are recommended, other than the measures needed to accommodate the general BRT configurations.	Vehicles may experience queuing issues at the northbound and eastbound of Brock St and Mary St, and westbound of Mary St and Byron St. The potential mitigation measures include: Signalizing intersection of • Mary St & Byron St Adding dedicated left/right turning lanes or extending the existing turning storage length at: • Mary St & Byron St WBL • Mary St & Brock St NBL, WBR, and EBL Signal phasing and timing optimization	Do not anticipate impact or expect only minor impact on the parallel routes, i.e., Mary St and Dunlop St. Therefore, no additional mitigation measures are recommended, other than the measures needed to accommodate the general BRT configurations.	Do not anticipate impact or expect only minor impact on the parallel routes, i.e., Mary St and Dunlop St. Therefore, no additional mitigation measures are recommended, other than the measures needed to accommodate the general BRT configurations.

CONCLUSIONS AND RECOMMENDATIONS

This report summarized the transportation and traffic analysis results for the BRT Full Transit Mall solution proposed within downtown Whitby. The study analyzed the existing travel patterns based on traffic volumes and StreetLight Data, assessed the potential change of travel patterns due to the implementation of the Full Transit Mall solution, evaluated the traffic impact on the critical intersections in the Whitby town center area, and identified potential measures to mitigate the associated impacts.

The analysis of existing travel patterns indicate that the potential bypass trips include:

- approximately 20% regional trips that cut through the Town of Whitby, which may be diverted to the alternative routes of Rossland Road to the north and Highway 401 to the south, and
- approximately 46% local trips that cut through the Whitby Downtown, for which the best alternative routes would be Adelaide Avenue, Manning Road, Bonacord Avenue to the north, and Burns Street, Michael Boulevard, Jeffery Street to the south.

According to information from the *Town of Whitby Transportation Master Plan (TMP) Study,* the regional and local trips diversion would likely cause capacity issues in the eastbound direction of Burns Street and Highway 401. Given the limited information from the Town's TMP Study, the impacts of traffic diversions to Manning Road and Rossland Road are difficult to estimate.

The remaining town center trips, approximately 34%, would likely take Mary Street to the north of Dundas Street and Dunlop Street to the south of Dundas Street as alternative routes. Detailed traffic impact analysis was conducted for the town center area. The analysis included assessment of traffic operations in the existing (2019) conditions, future (2041) background conditions, future (2041) full transit mall and northside pedestrian mall conditions, and future (2041) full transit mall and northside pedestrian mall conditions with potential mitigation measures.

The analysis of existing conditions identified some critical movements (LOS E/F) for intersections on Dundas Street at Cochrane Street, Euclid Street, Hickory Street and Garden Street, whereas intersections on the parallel streets, i.e. Mary Street and Dunlop Street performed well with no worse than LOS C. The 2041 background conditions show very similar results to the existing conditions which was expected, as the anticipated growth in traffic demand was not significant, and the intersection lane configurations and traffic signal control types remained the same as in the existing conditions.

For the 2041 Full Transit Mall conditions, two scenarios were evaluated. Scenario 1 considered the extensions on Mary Street and Dunlop Street, while Scenario 2 is a sensitivity test with assumptions that these extensions would not be implemented. The results of both Scenario 1 and Scenario 2 show significant deterioration of intersection operational performance in comparison with the future background conditions, especially for the stop-controlled intersections on Mary Street and Dunlop Street.

The results of the Full Transit Mall scenarios with mitigation measures show significant improvements of traffic operational conditions for the intersections on Mary Street and Dunlop Street as well as on Dundas Street. The mitigation measures have been assessed as part of this study include:

- converting stop-controlled intersections to signalized intersections;
- improving lane configurations to allow for dedicated left and right turning lanes; and
- adding protected left turning phases where necessary.

For the 2041 Northside Pedestrian Mall conditions, the traffic impacts on the westbound detour routes were assessed, and sensitivity analysis was conducted to analyze the alternative scenarios. The results show that the performance of intersections/movements along the detour routes would deteriorate due to the increased demand, however the impacts can be mitigated through measures such as:

- converting Mary Street and Byron Street from stop-controlled intersection to signalized intersection;
- improving lane configurations to allow for dedicated left and right turning lanes at Mary Street and Brock Street,

Mary Street and Byron Street; and
- optimizing signal phasing and timings as applicable.

In addition, for both Full Transit Mall and Northside Pedestrian Mall, other mitigation measures as listed below could be investigated to further improve the network operation conditions:

- increasing storage length;
- adding dual left/right turning lanes;
- widening the roadway section; and
- investigating actuated and coordinated signal controls.

As an alternative solution to minimize the traffic impacts on the surrounding transportation network and systems, the Three-Lane Mixed Traffic Westbound option was investigated and analyzed. The analysis results show that this option is expected to operate well during AM peak hour without significant traffic impact, however, in the PM peak hour, traffic diversions are anticipated. With about 20% - 40% traffic using alternative routes through regional and local transportation network, the PM peak hour conditions can be maintained at an acceptable level of service and close to the Future Background conditions.

Figure 26 to **Figure 29** depict the 2019 traffic volumes for Existing conditions, 2041 estimated traffic volumes for Northside Pedestrian Mall and Three-Lane Mixed Traffic Westbound conditions, and compare volumes between the Existing conditions and the estimated future Northside Pedestrian Mall and Three-Lane Mixed Traffic Westbound conditions.

The Three-Lane Mixed Traffic Westbound option has been selected as the preferred solution, which will be carried forward by the design team for further investigation and refinement.

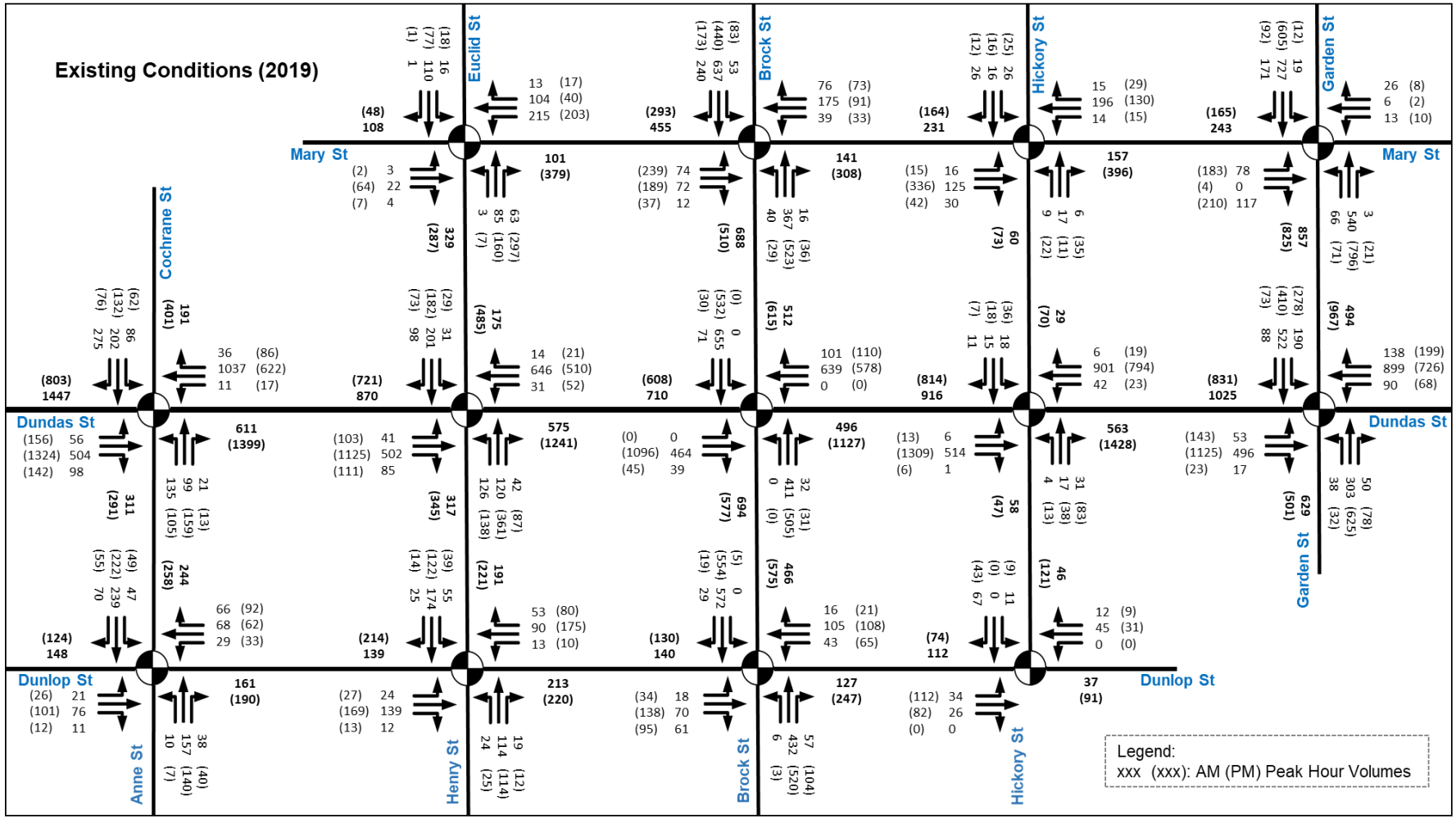


FIGURE 26 – TOWN CENTER TRAFFIC VOLUMES FOR EXISTING CONDITIONS

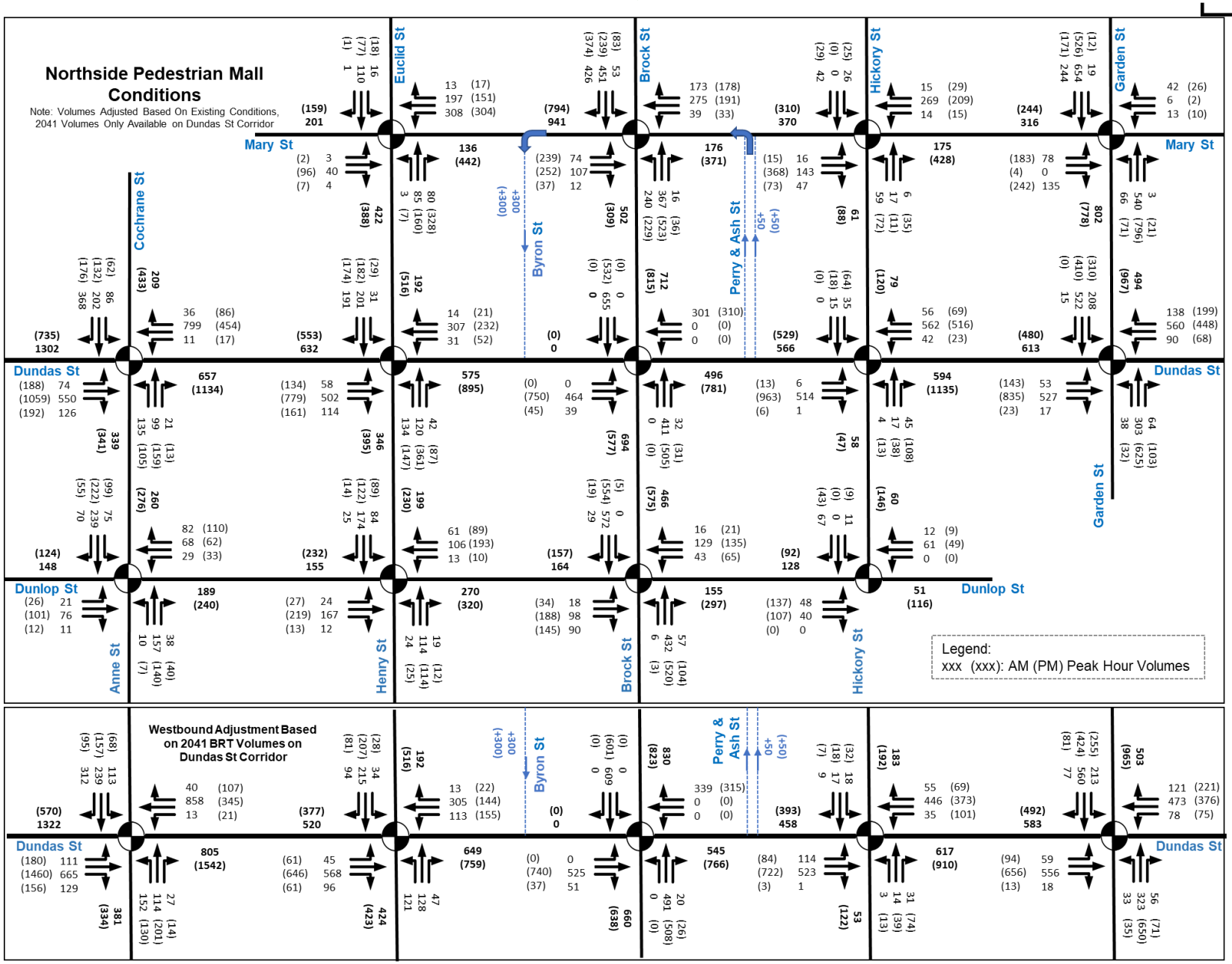


FIGURE 27 – TOWN CENTER TRAFFIC VOLUMES FOR NORTHSIDE PEDESTRIAN MALL CONDITIONS

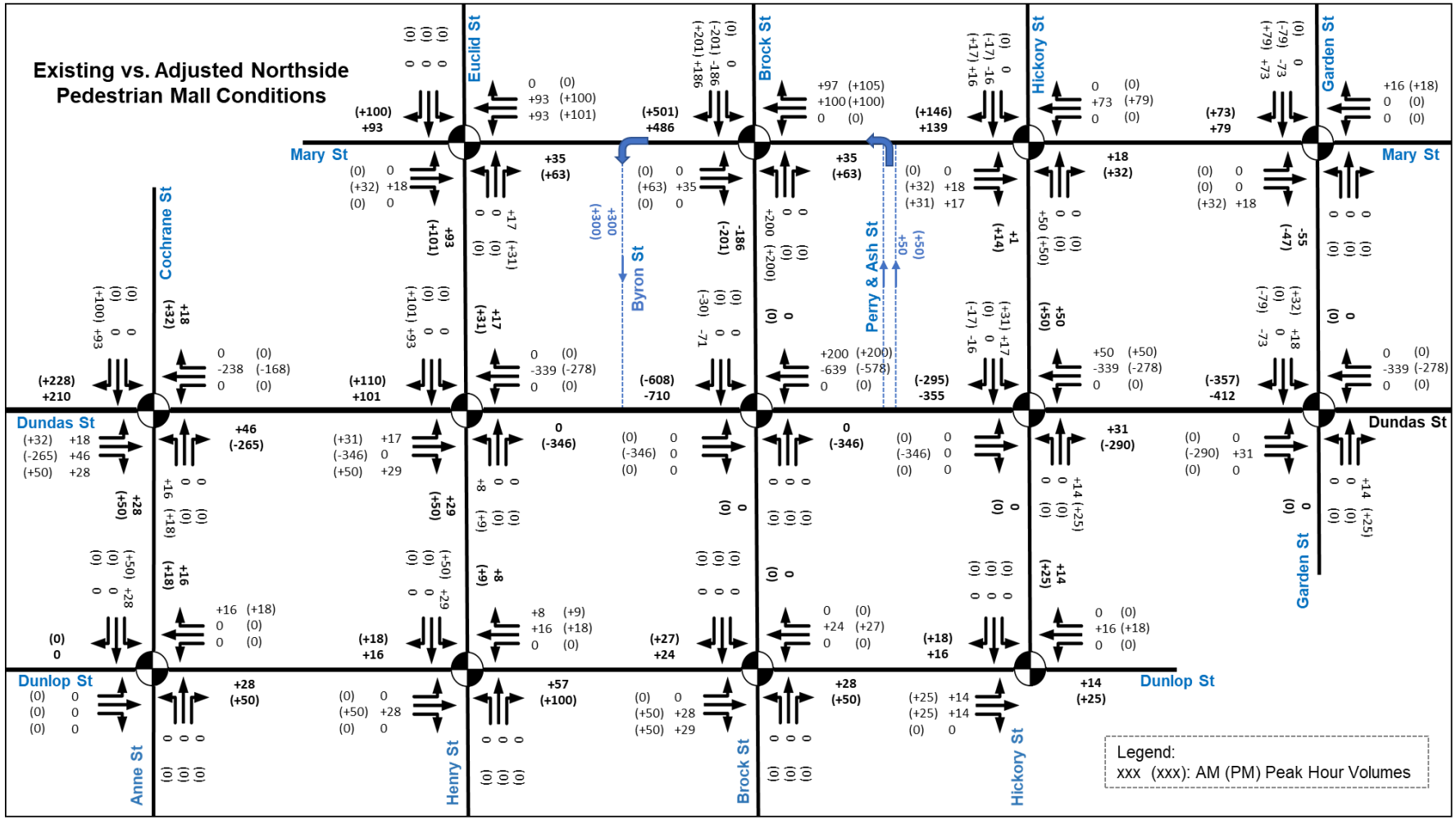


FIGURE 28 – TOWN CENTER EXISTING CONDITIONS VS. NORTHSIDE PEDESTRIAN MALL CONDITIONS

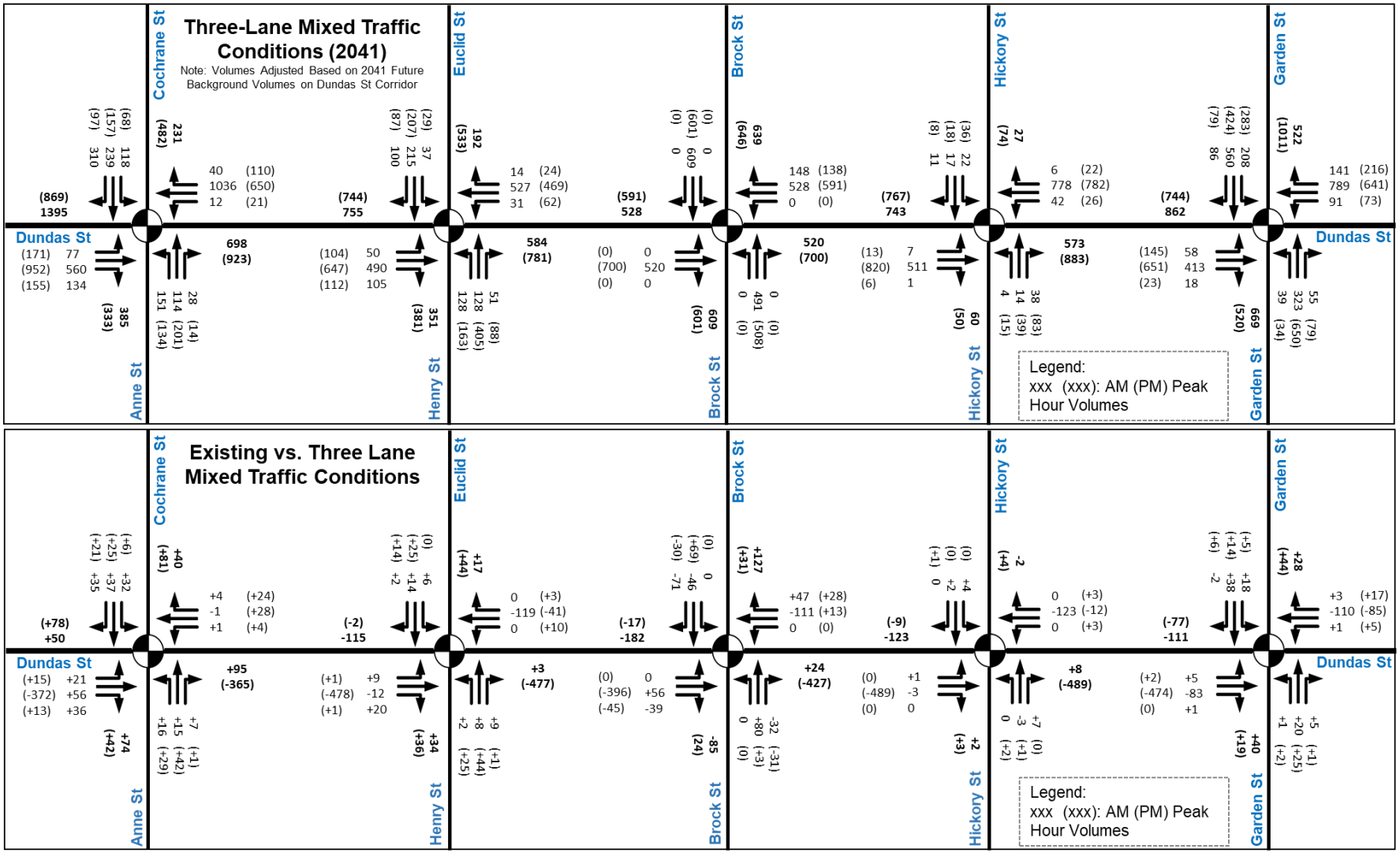


FIGURE 29 – TOWN CENTER EXISTING CONDITIONS VS. THREE-LANE MIXED TRAFFIC WESTBOUND CONDITIONS

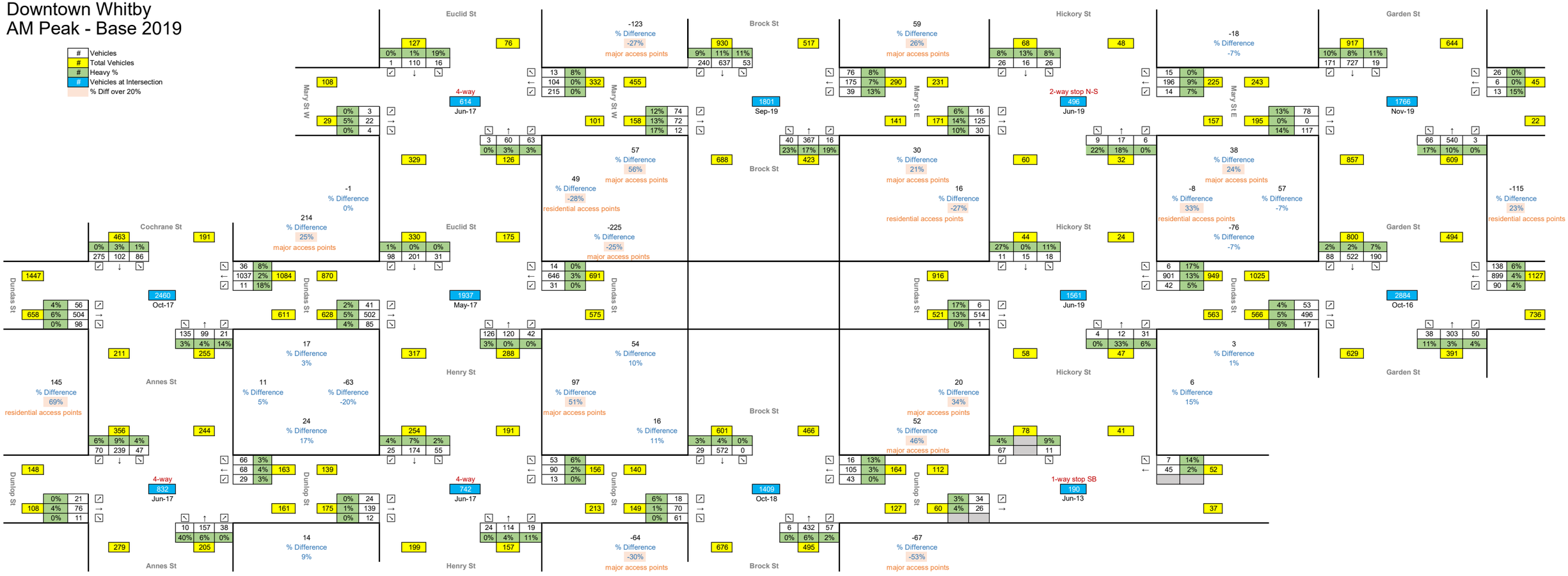
APPENDIX A – TRAFFIC VOLUME DIAGRAMS

APPENDIX B – SYNCHRO REPORTS

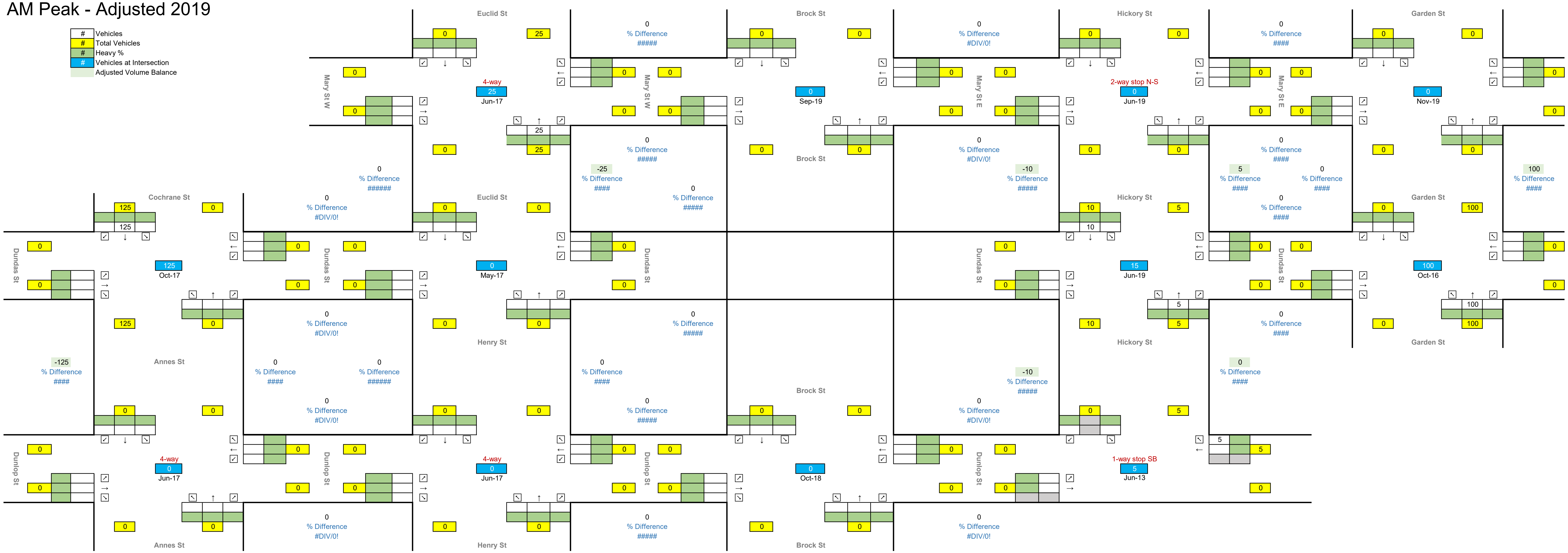
APPENDIX C – PUBLIC CONSULTATION MAPS

Downtown Whitby
AM Peak - Base 2019

#	Vehicles
#	Total Vehicles
#	Heavy %
#	Vehicles at Intersection
	% Diff over 20%

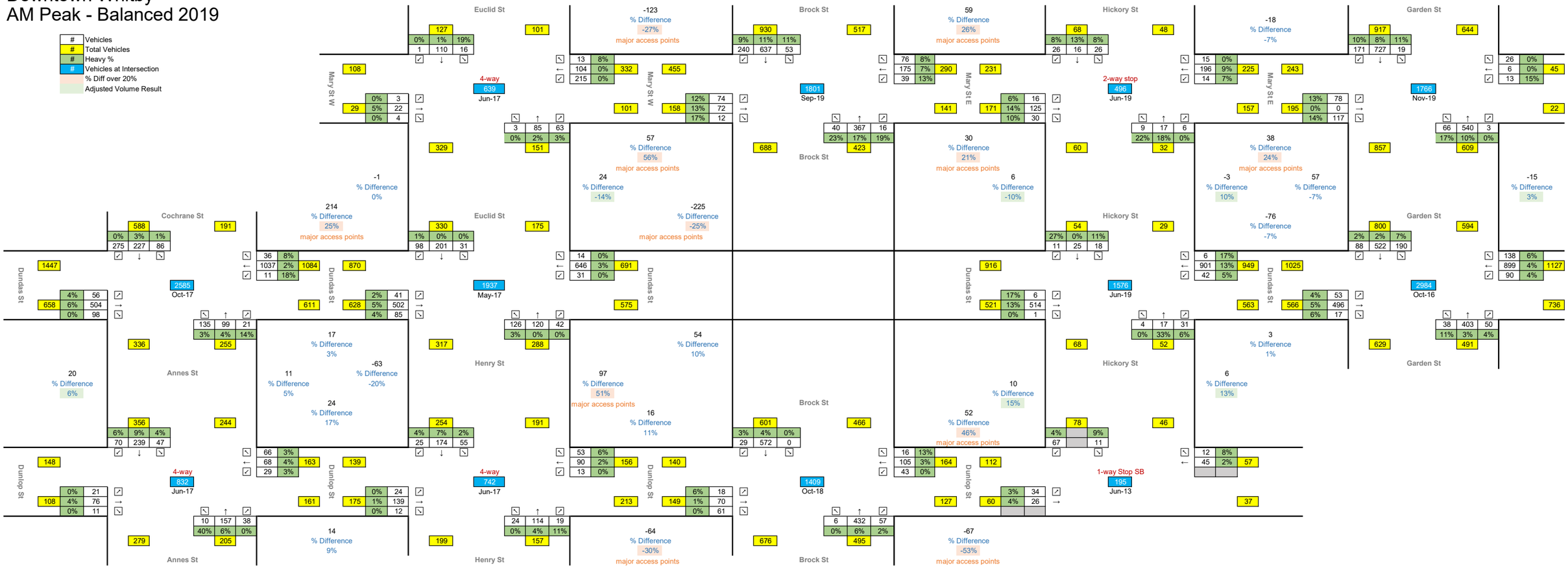


Downtown Whitby
AM Peak - Adjusted 2019



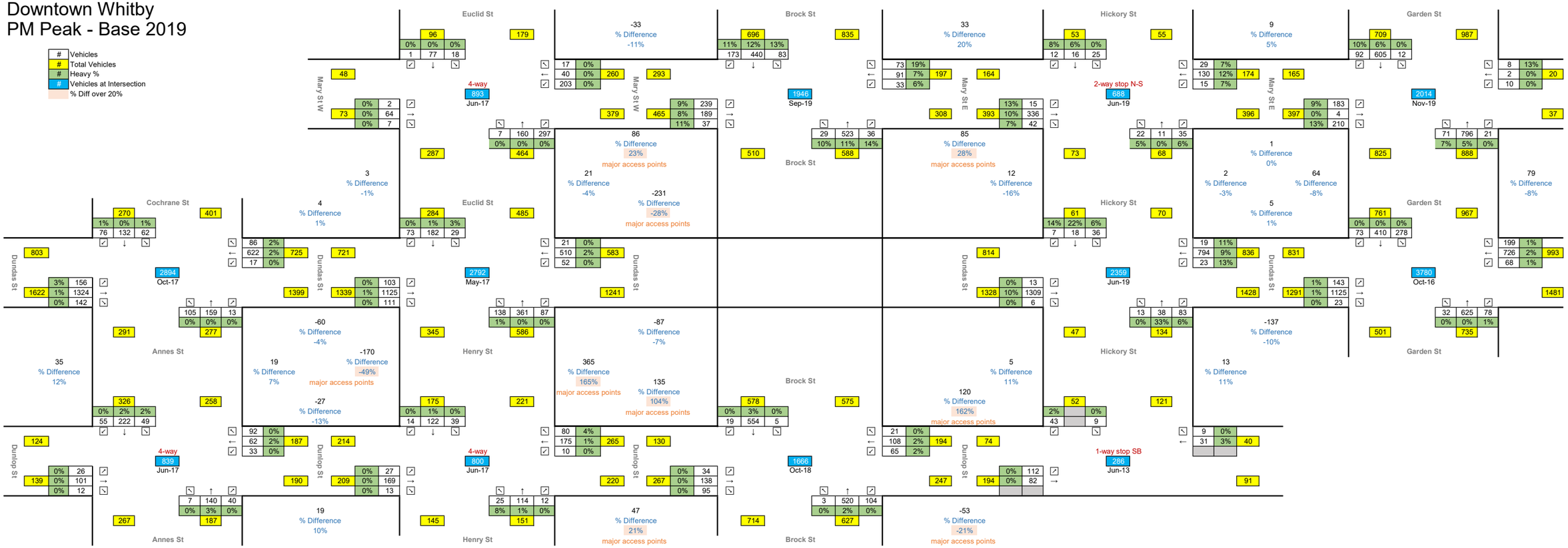
Downtown Whitby
AM Peak - Balanced 2019

#	Vehicles
#	Total Vehicles
#	Heavy %
#	Vehicles at Intersection
	% Diff over 20%
	Adjusted Volume Result

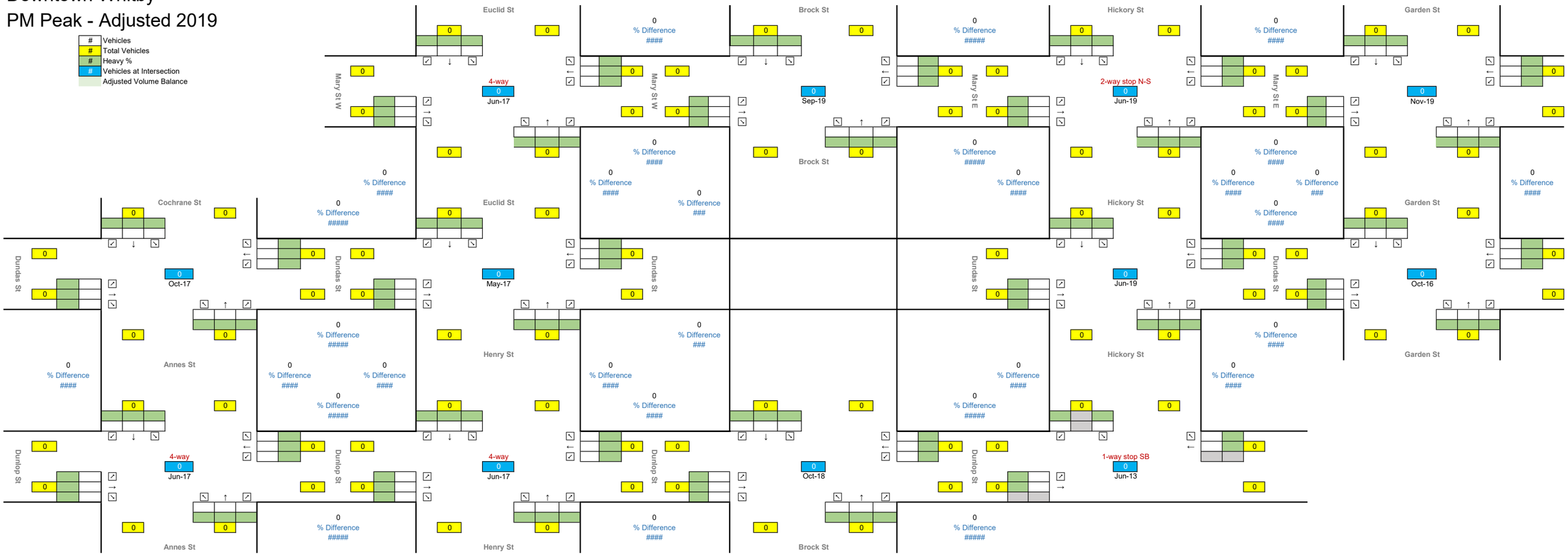


Downtown Whitby
PM Peak - Base 2019

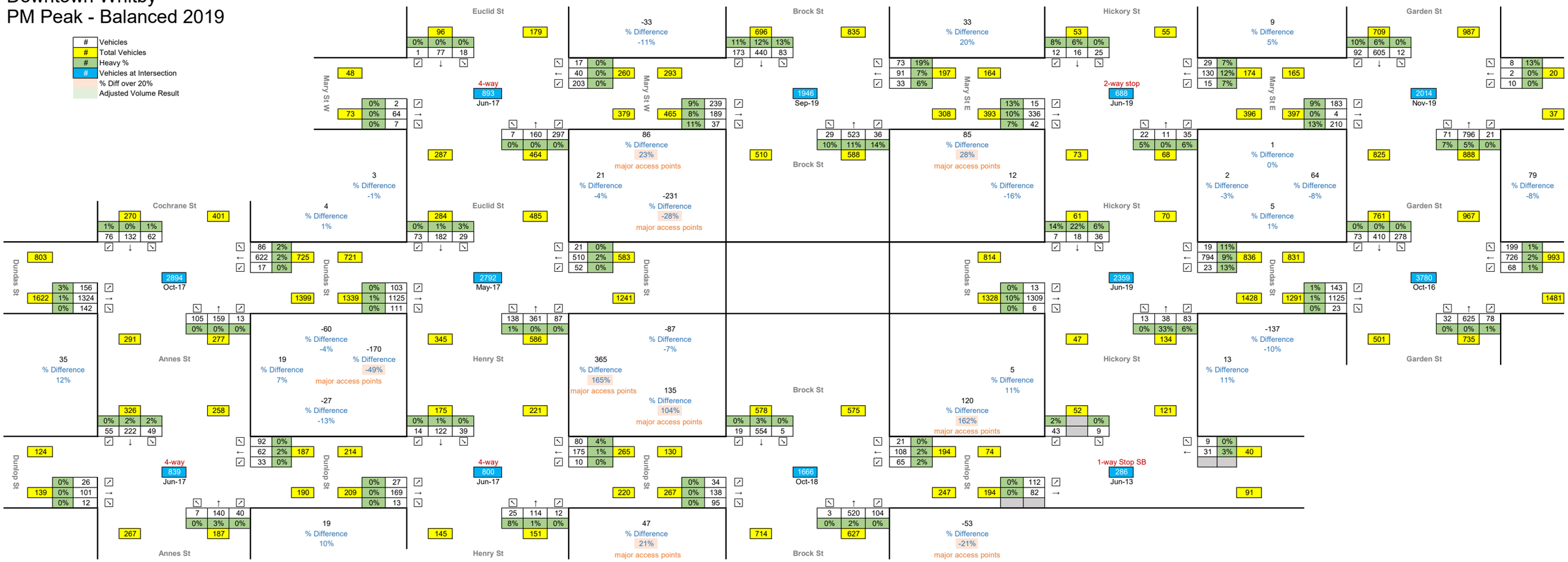
#	Vehicles
#	Total Vehicles
#	Heavy %
#	Vehicles at Intersection
	% Diff over 20%



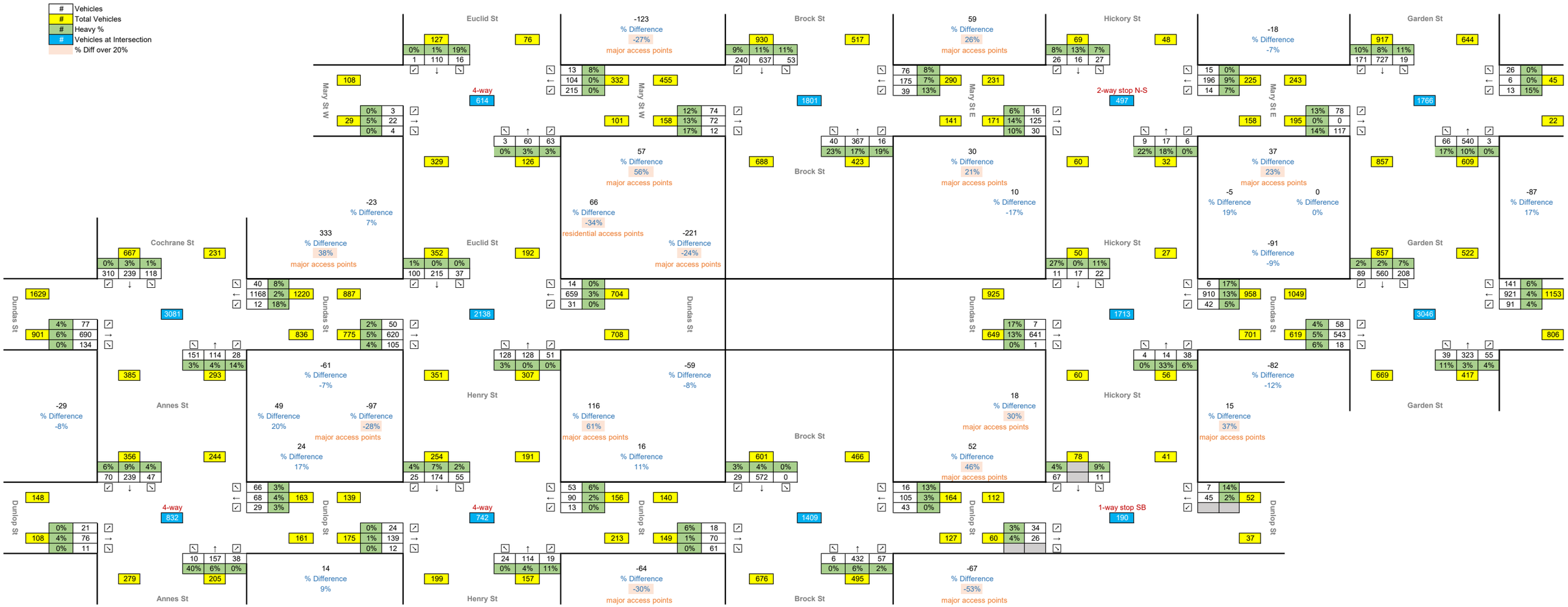
Downtown Whitby
PM Peak - Adjusted 2019



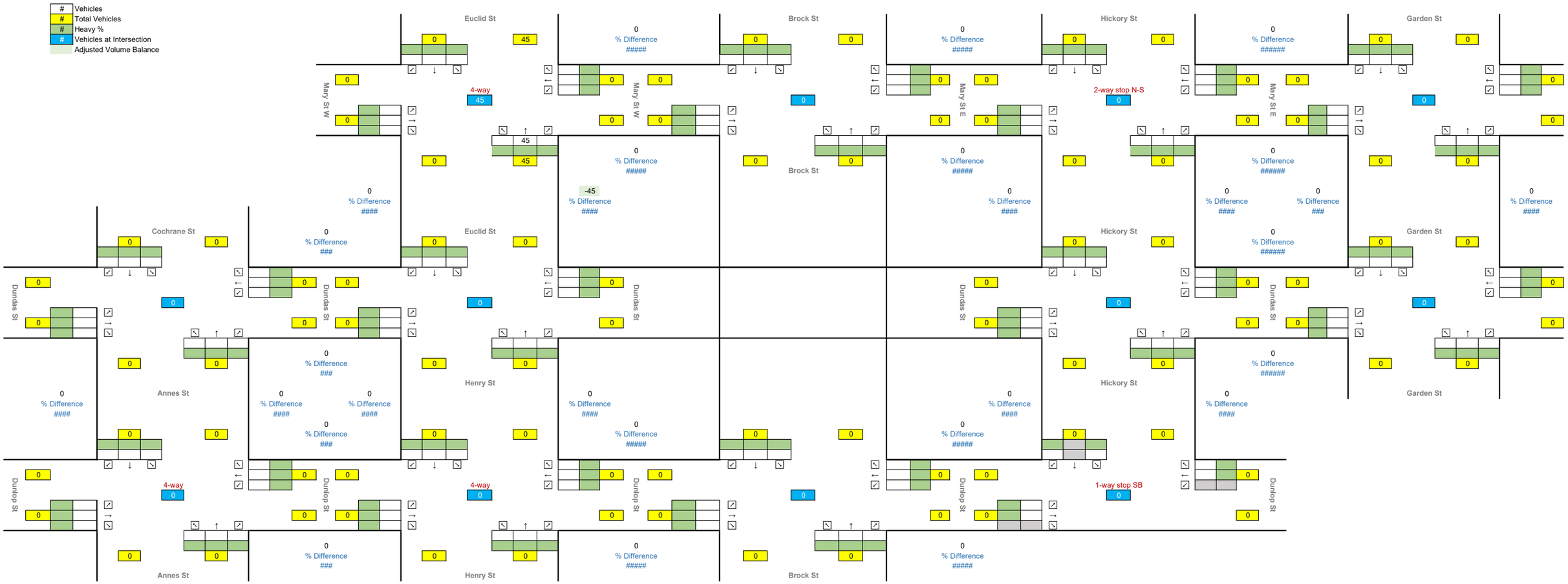
Downtown Whitby
PM Peak - Balanced 2019



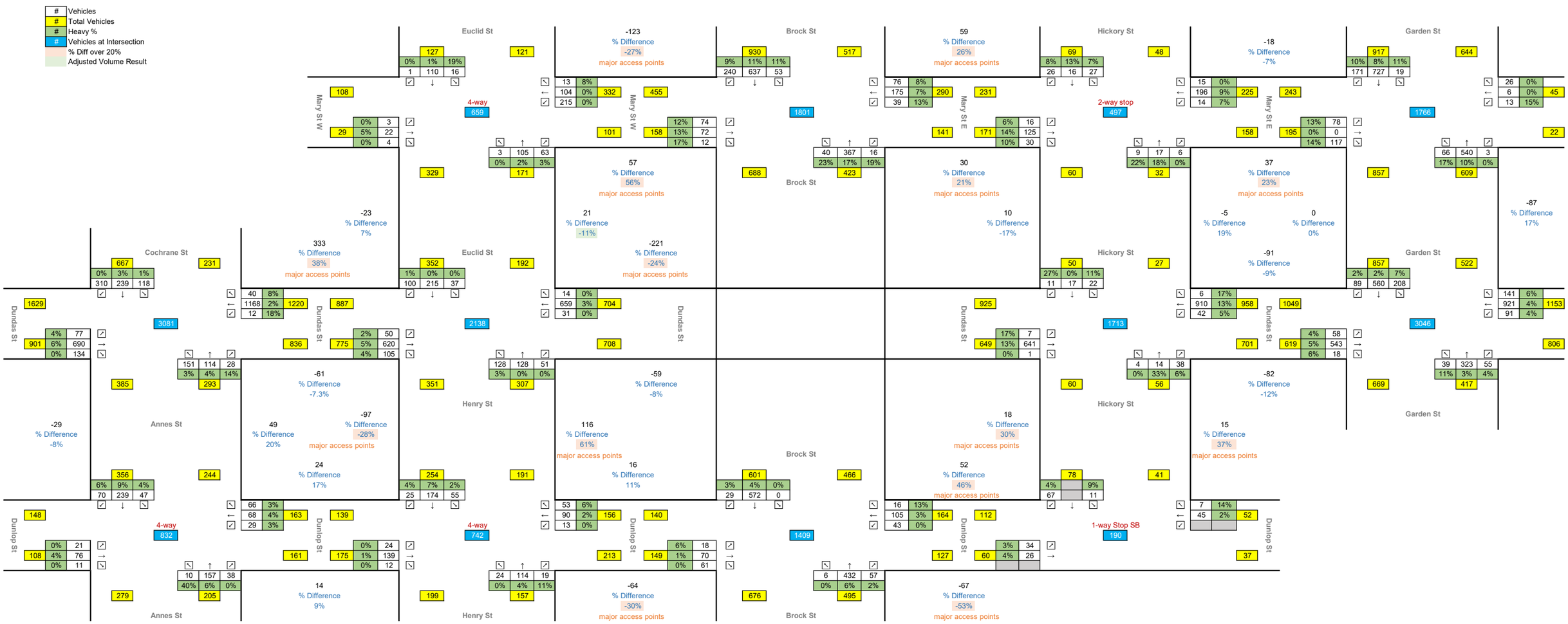
Downtown Whitby
AM Peak - Base 2041 Background



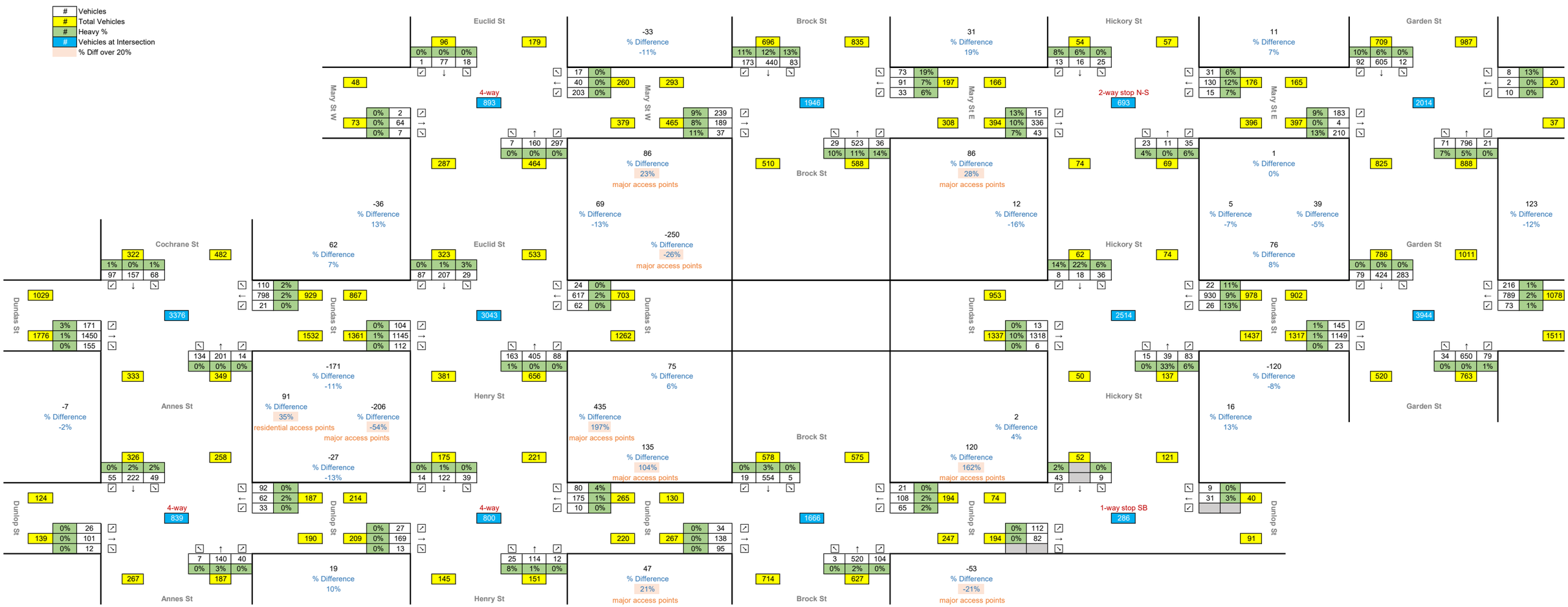
Downtown Whitby
AM Peak - Adjusted 2041 Background



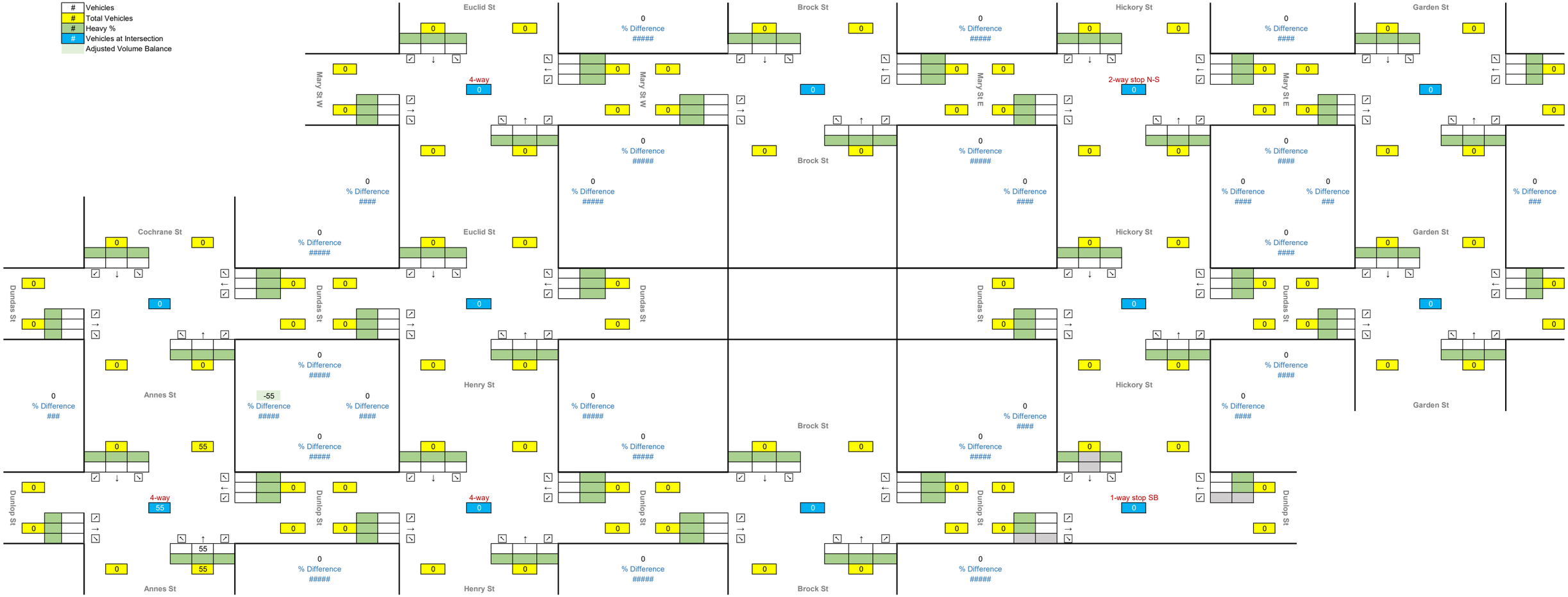
Downtown Whitby
AM Peak - Balanced 2041 Background



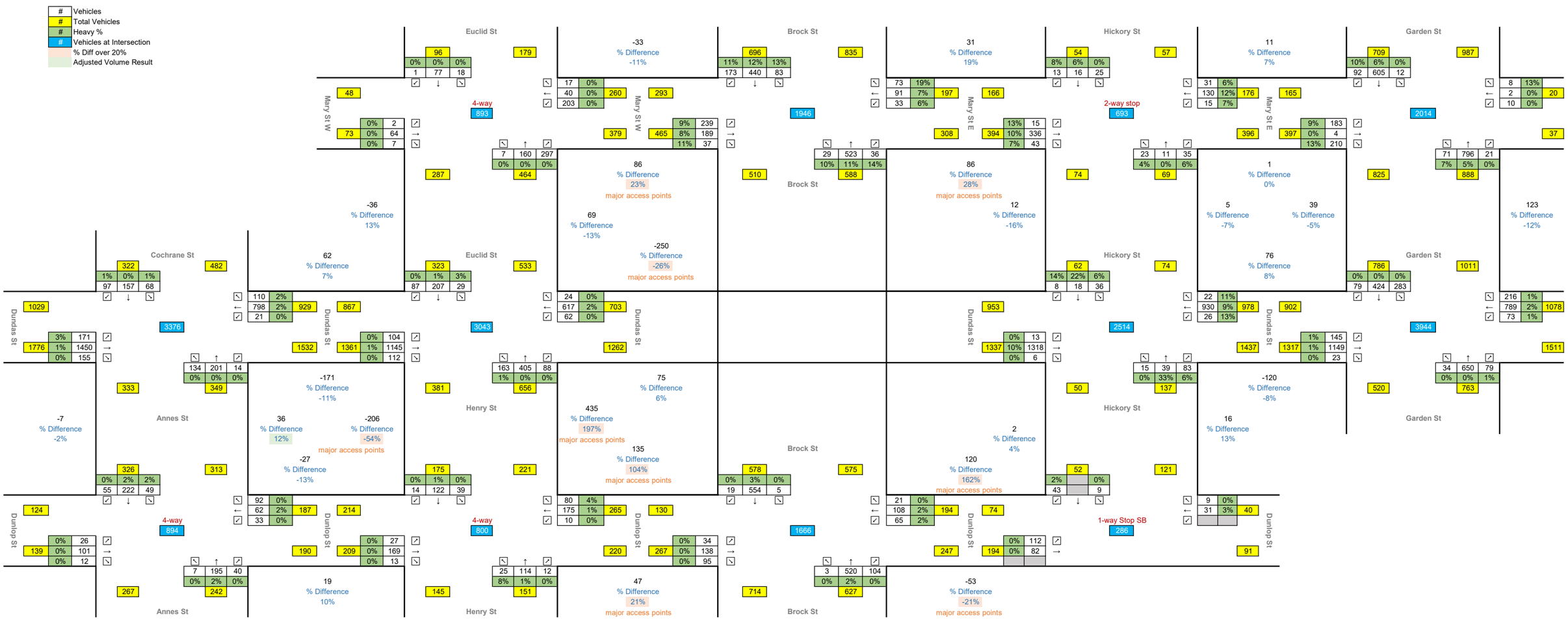
Downtown Whitby
PM Peak - Base 2041 Background



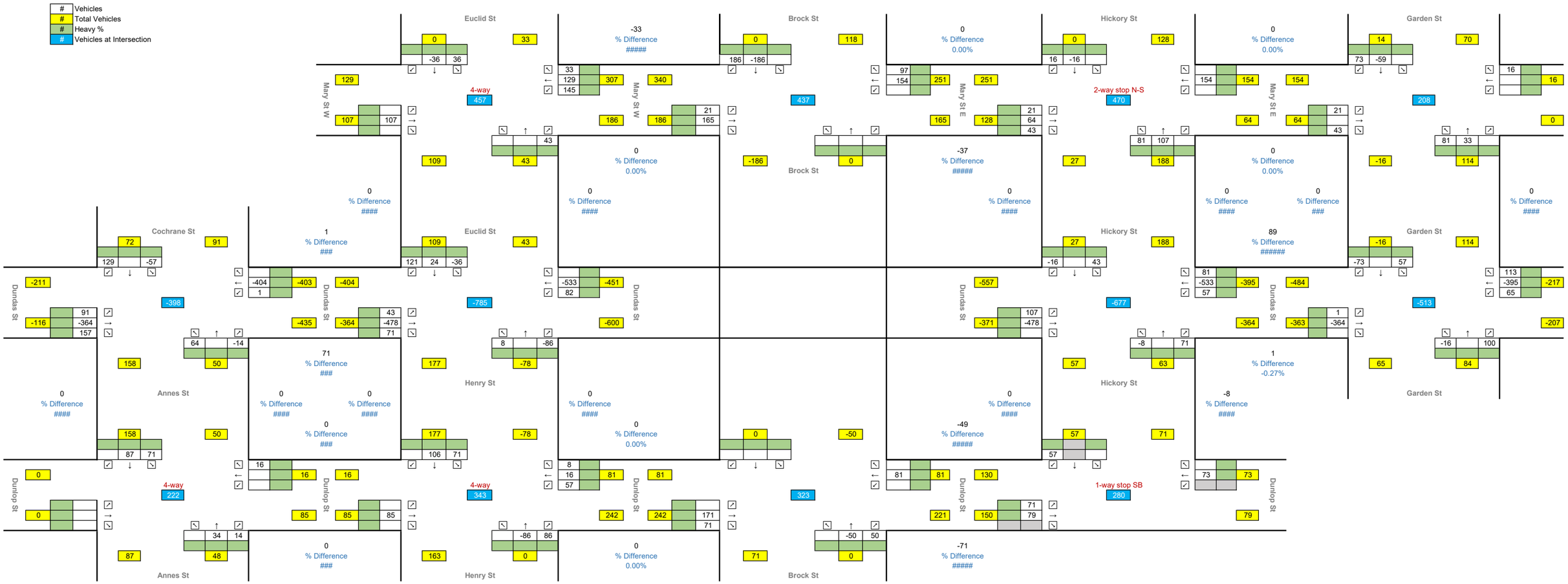
Downtown Whitby
PM Peak - Adjusted 2041 Background



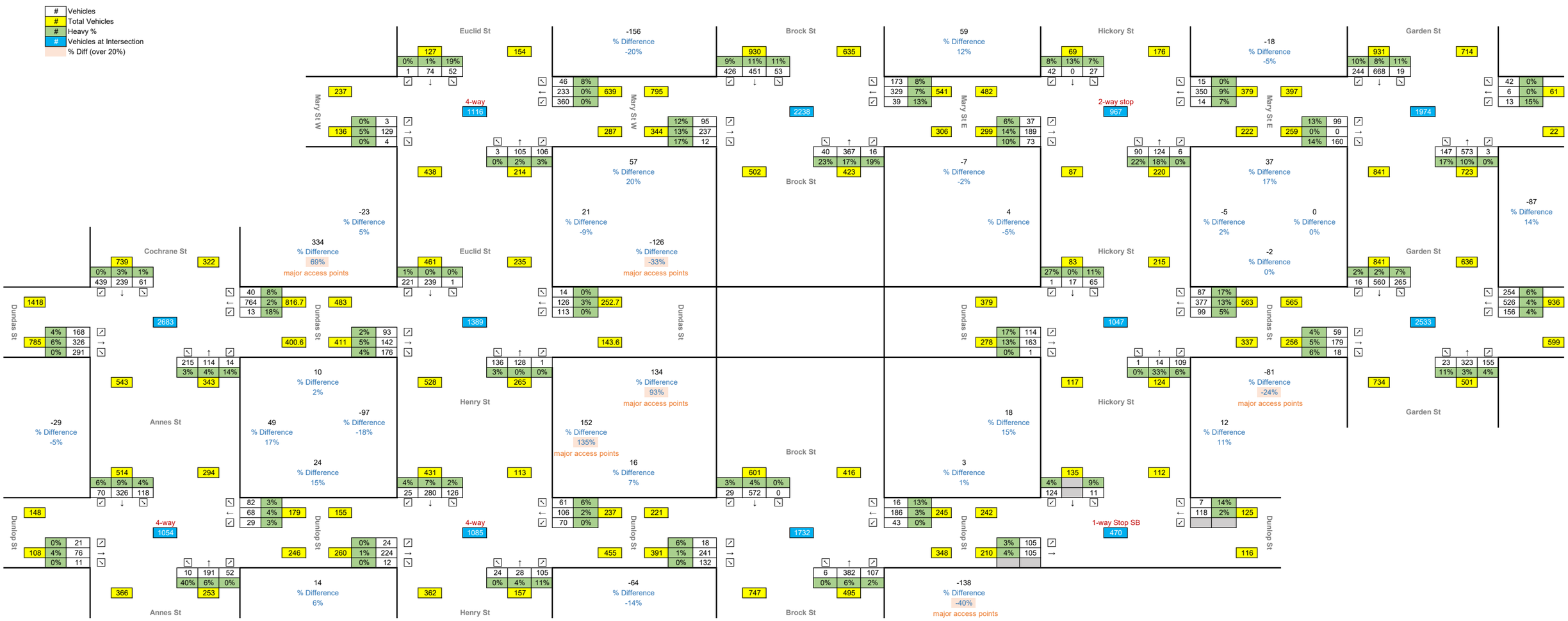
Downtown Whitby
PM Peak - Balanced 2041 Background



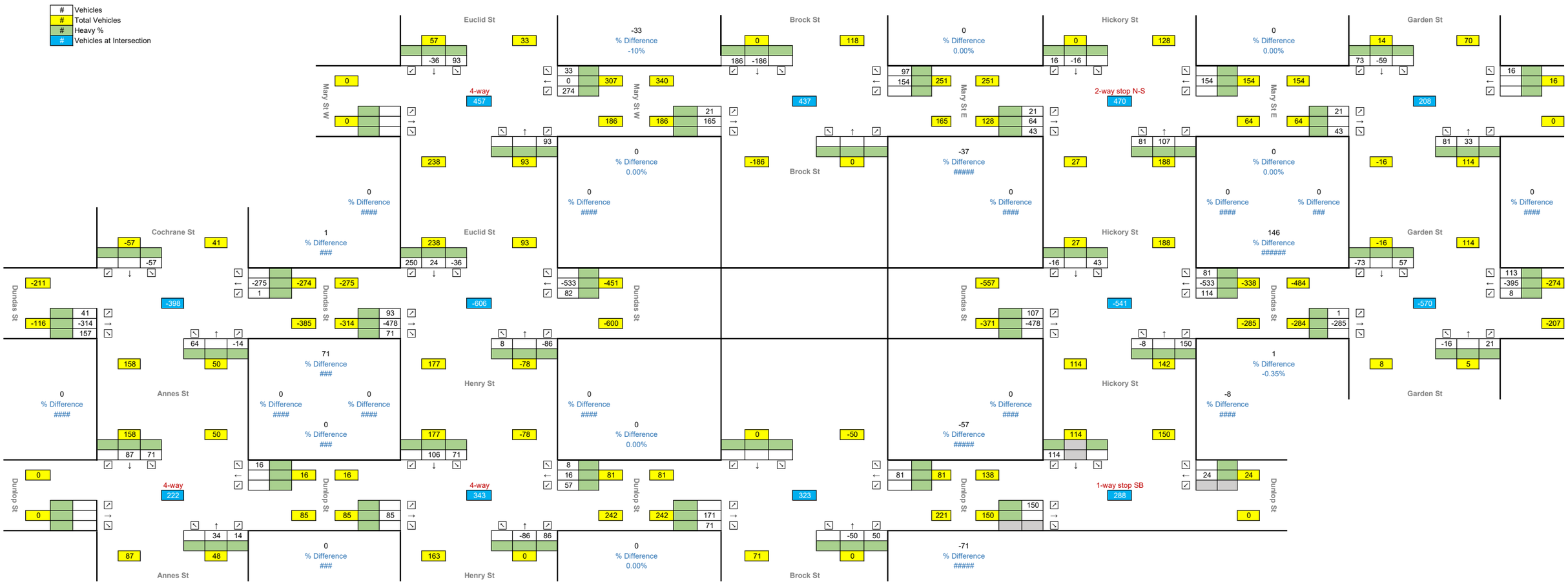
Downtown Whitby
AM Peak - Adjusted 2041 Transit Mall Scenario 1 - with Mary and Dunlop Extension



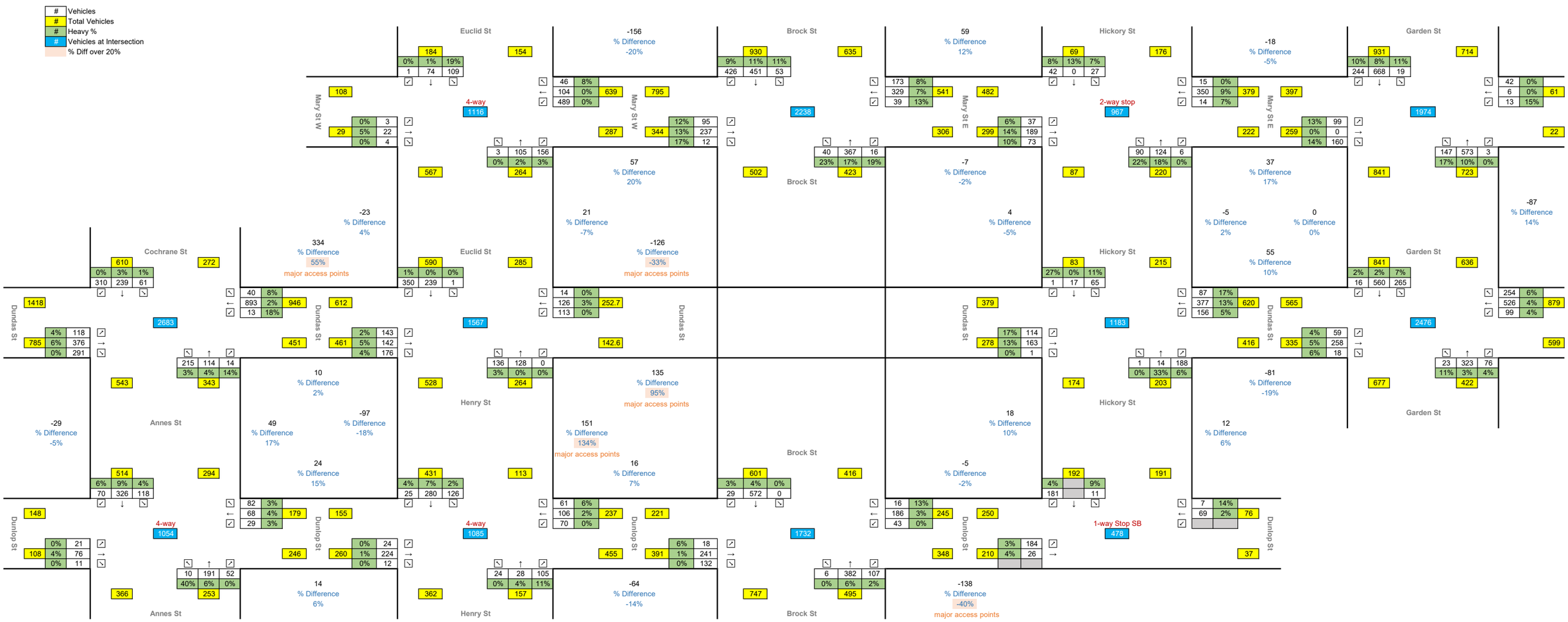
Downtown Whitby
AM Peak - Balanced 2041 Transit Mall Scenario 1 - with Mary and Dunlop Extension



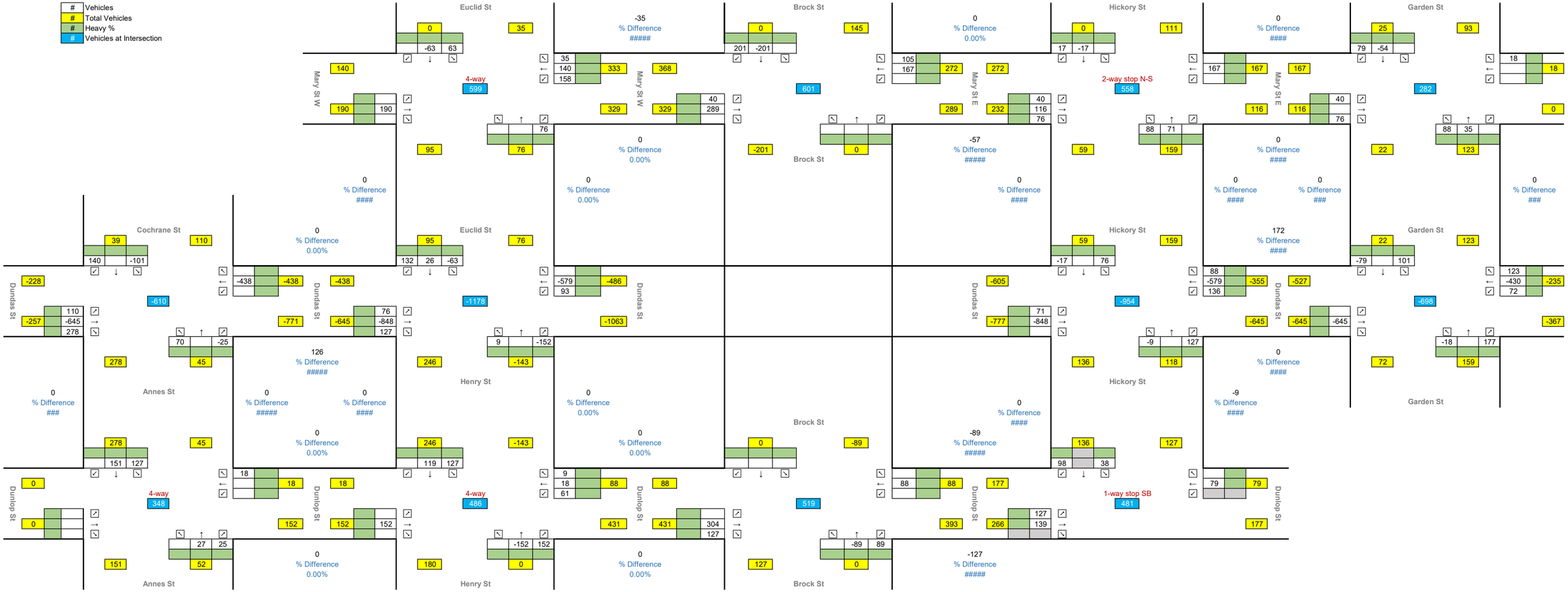
Downtown Whitby
AM Peak - Adjusted 2041 Transit Mall Scenario 2 - without Mary and Dunlop Extension



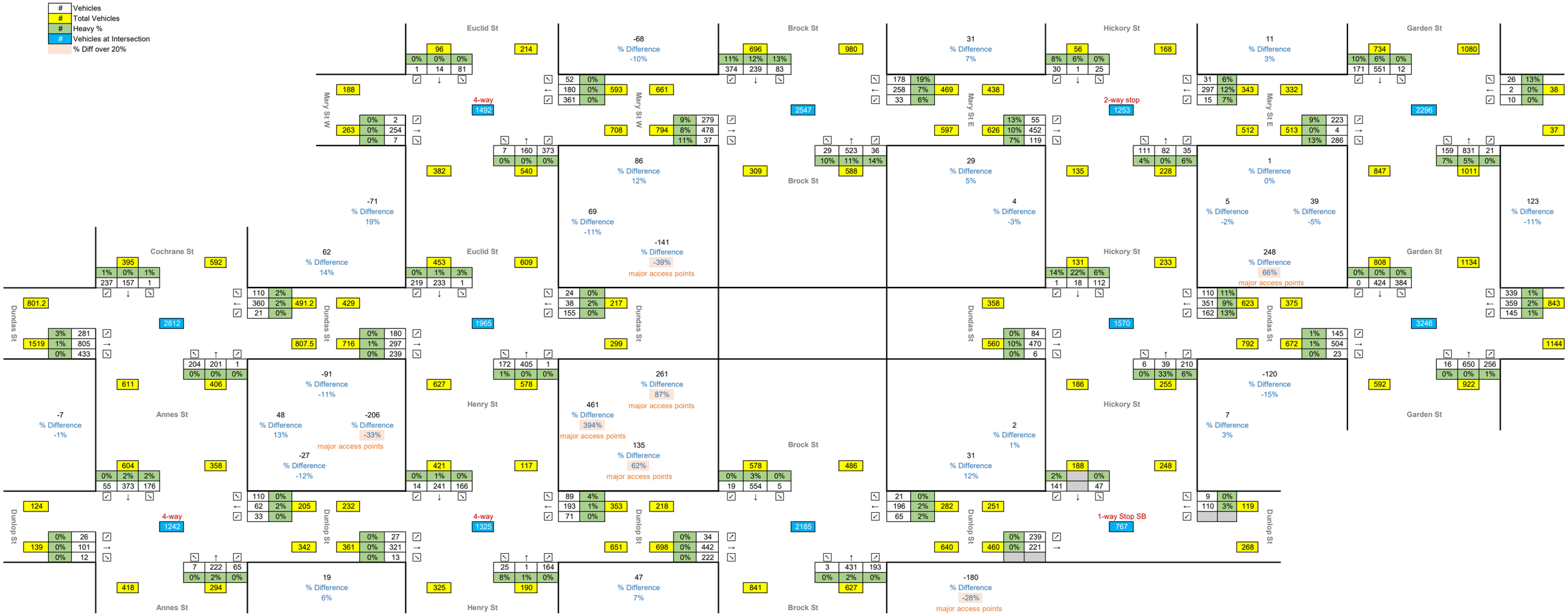
Downtown Whitby
AM Peak - Balanced 2041 Transit Mall Scenario 2 - without Mary and Dunlop Extension



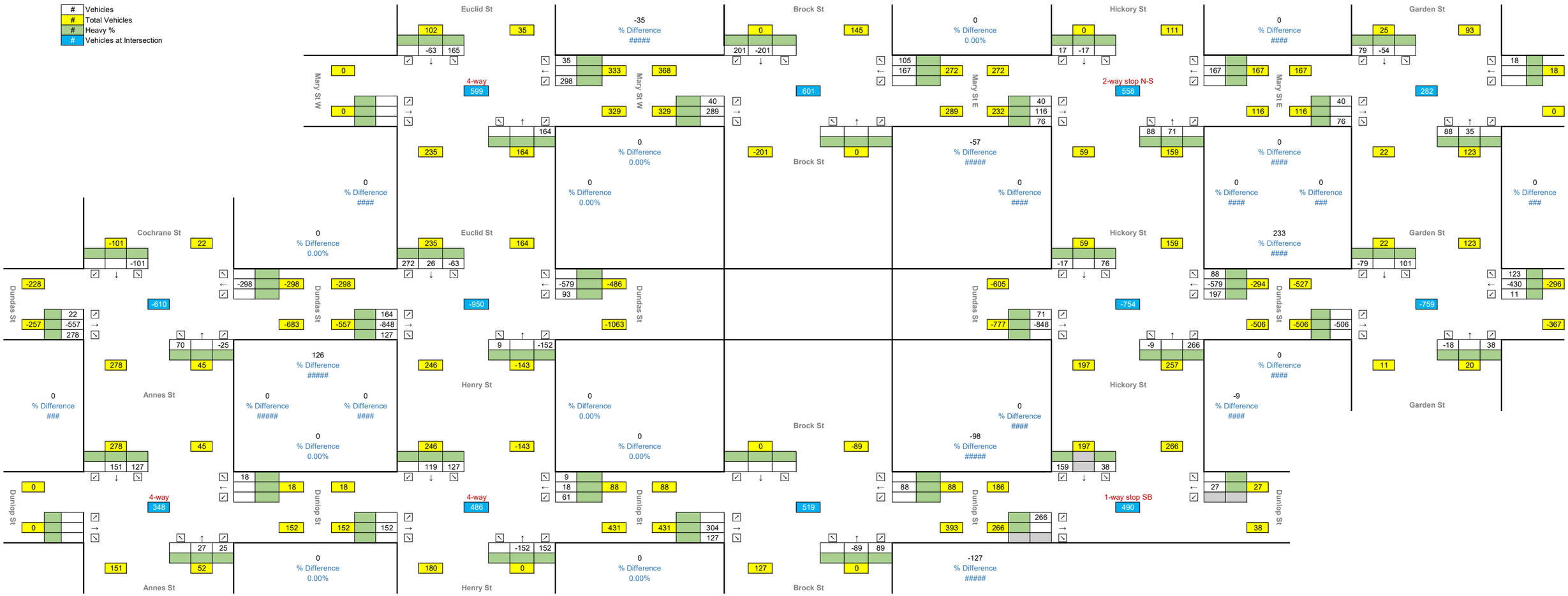
Downtown Whitby
PM Peak - Adjusted 2041 Transit Mall Scenario 1 - with Mary and Dunlop Extension



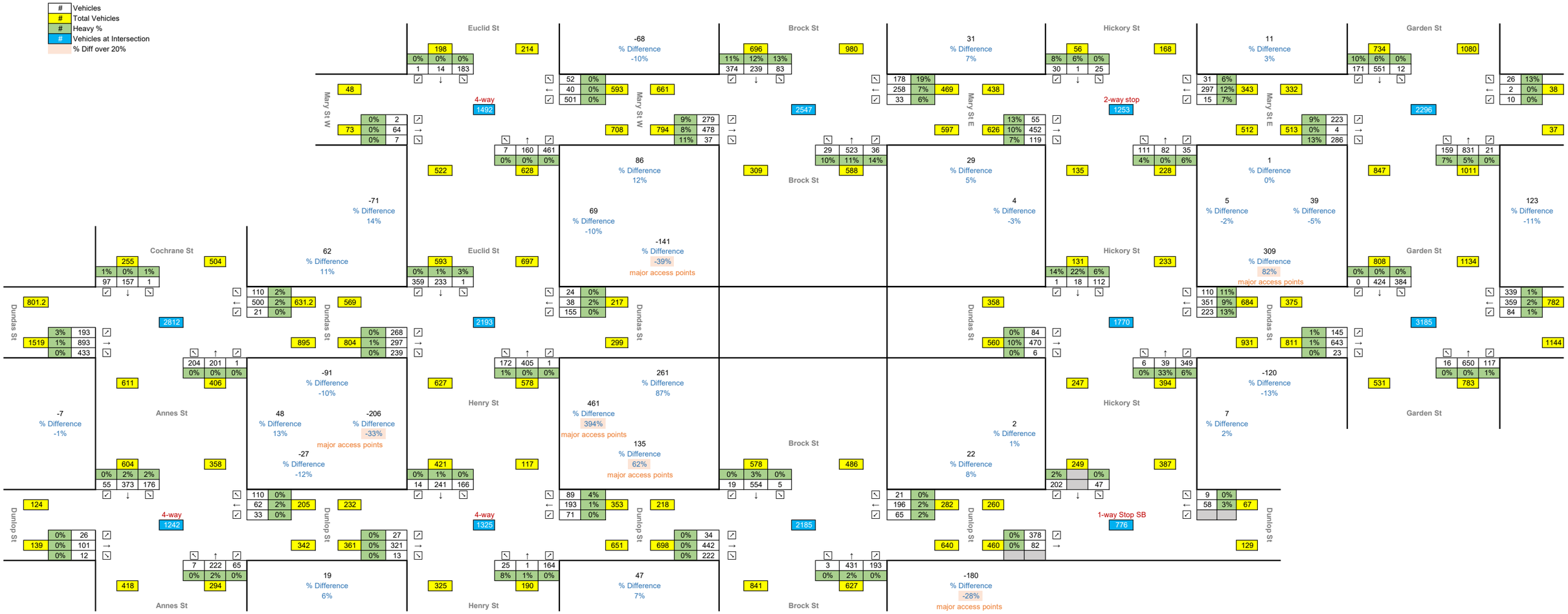
Downtown Whitby
PM Peak - Balanced 2041 Transit Mall Scenario 1 - with Mary and Dunlop Extension



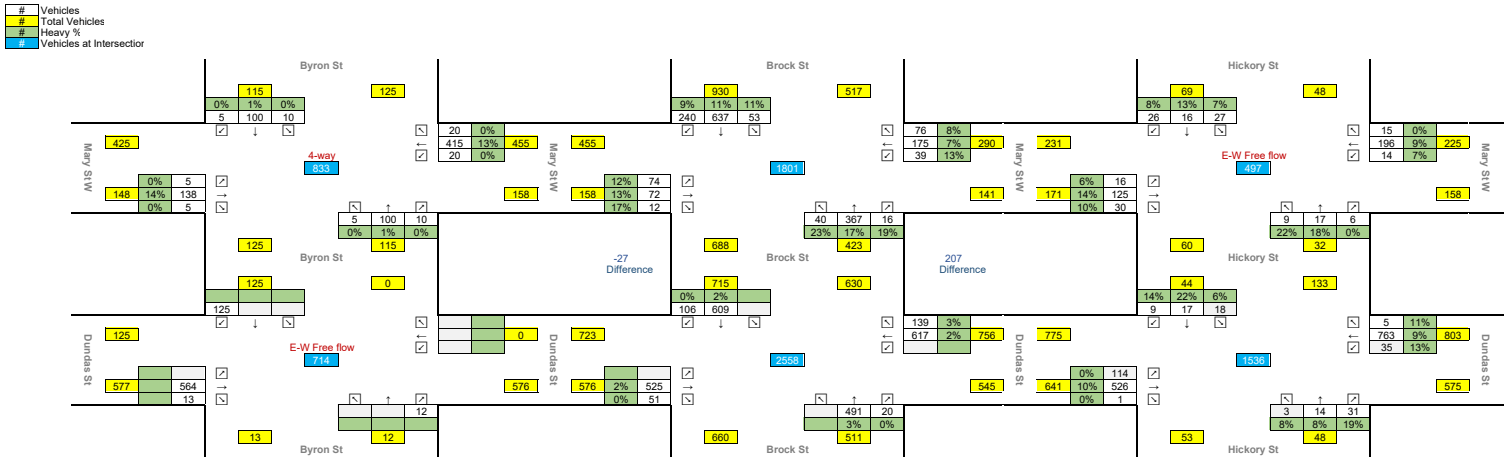
Downtown Whitby
PM Peak - Adjusted 2041 Transit Mall Scenario 2 - without Mary and Dunlop Extension



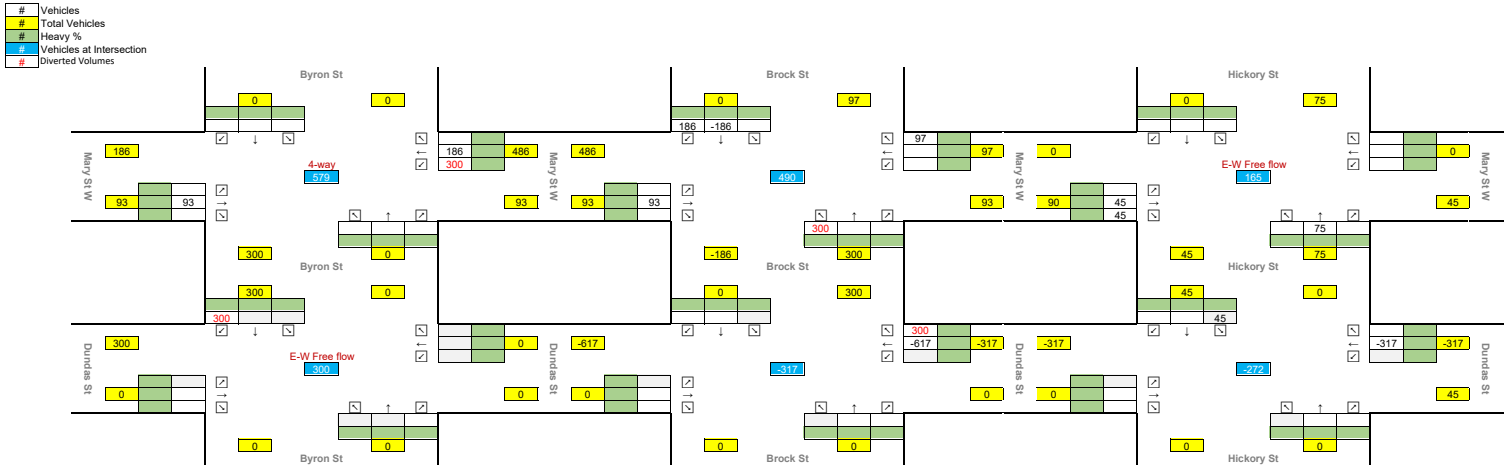
Downtown Whitby
PM Peak - Balanced 2041 Transit Mall Scenario 2 - without Mary and Dunlop Extension



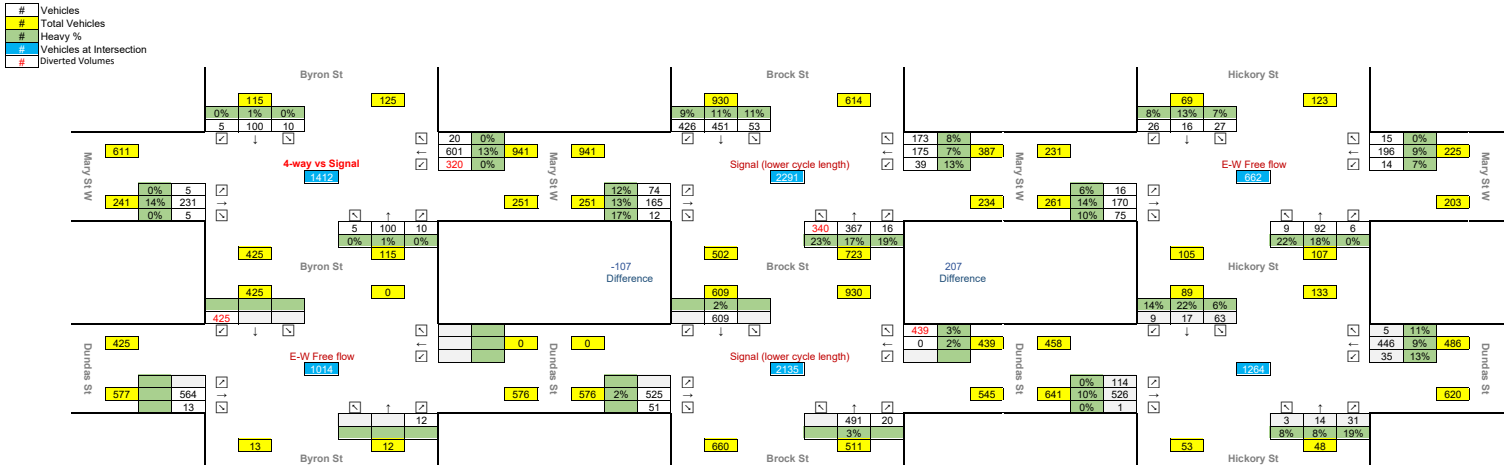
Downtown Whitby
AM Peak - Base 2041 North Pedestrian Mall - 300 Diversion



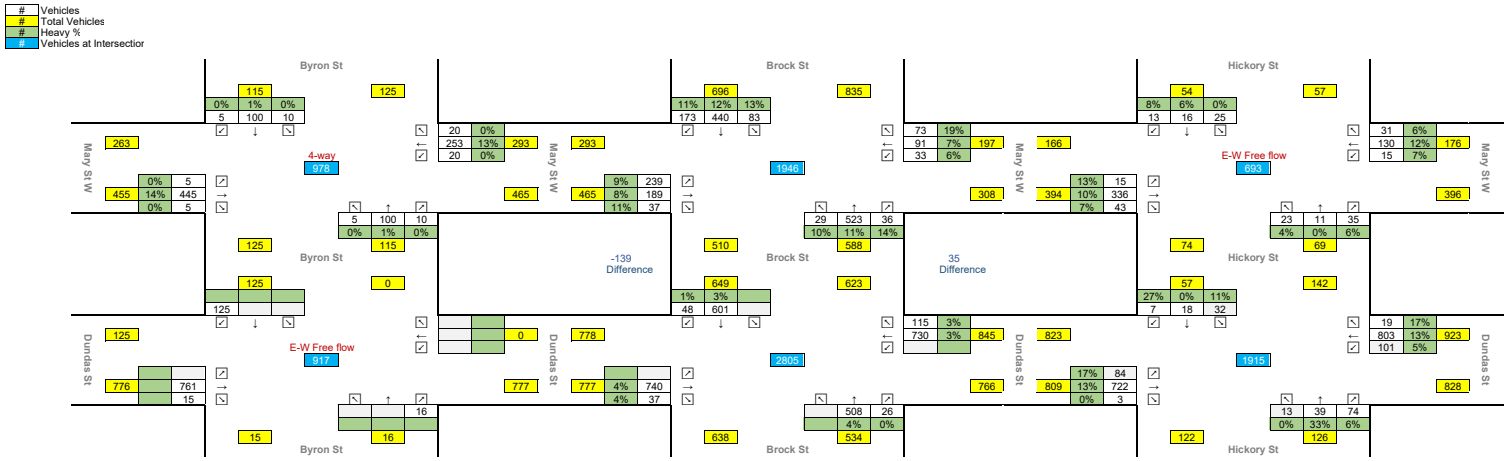
Downtown Whitby
AM Peak - Adjusted 2041 North Pedestrian Mall - 300 Diversion



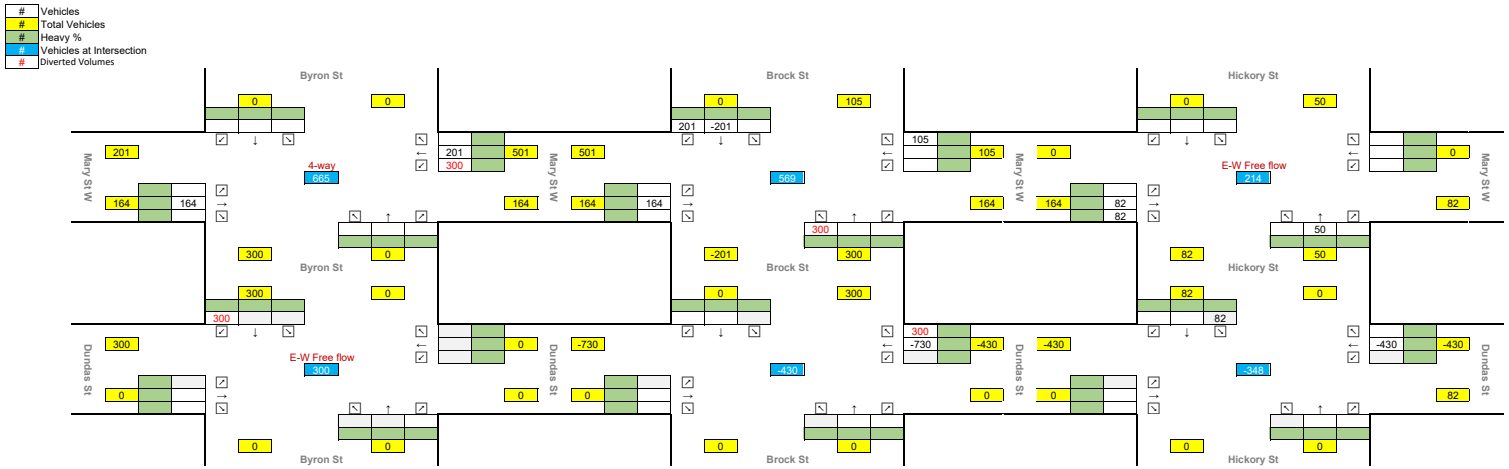
Downtown Whitby
AM Peak - Balanced 2041 North Pedestrian Mall - 300 Diversion



Downtown Whitby
PM Peak - Base 2041 North Pedestrian Mall - 300 Diversion

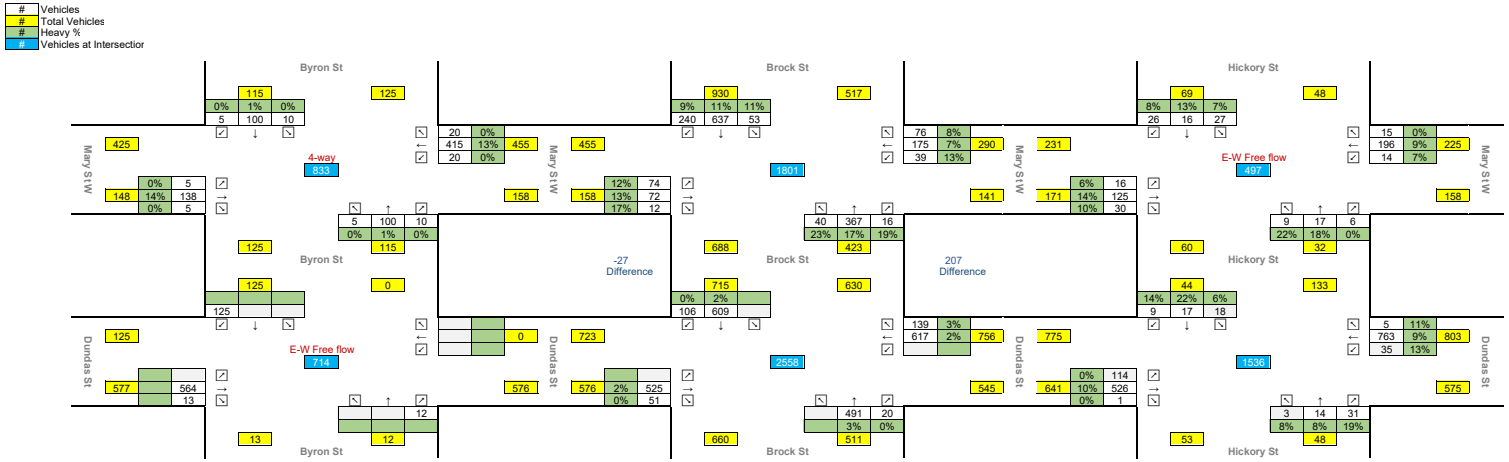


Downtown Whitby
PM Peak - Adjusted 2041 North Pedestrian Mall - 300 Diversion

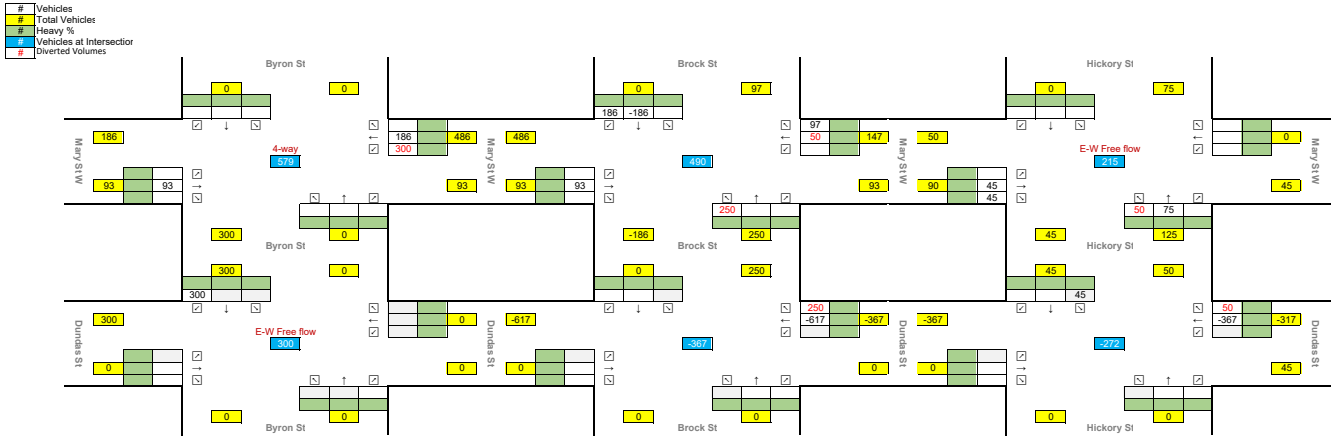


Downtown Whitby
PM Peak - Balanced 2041 North Pedestrian Mall - 300 Diversion

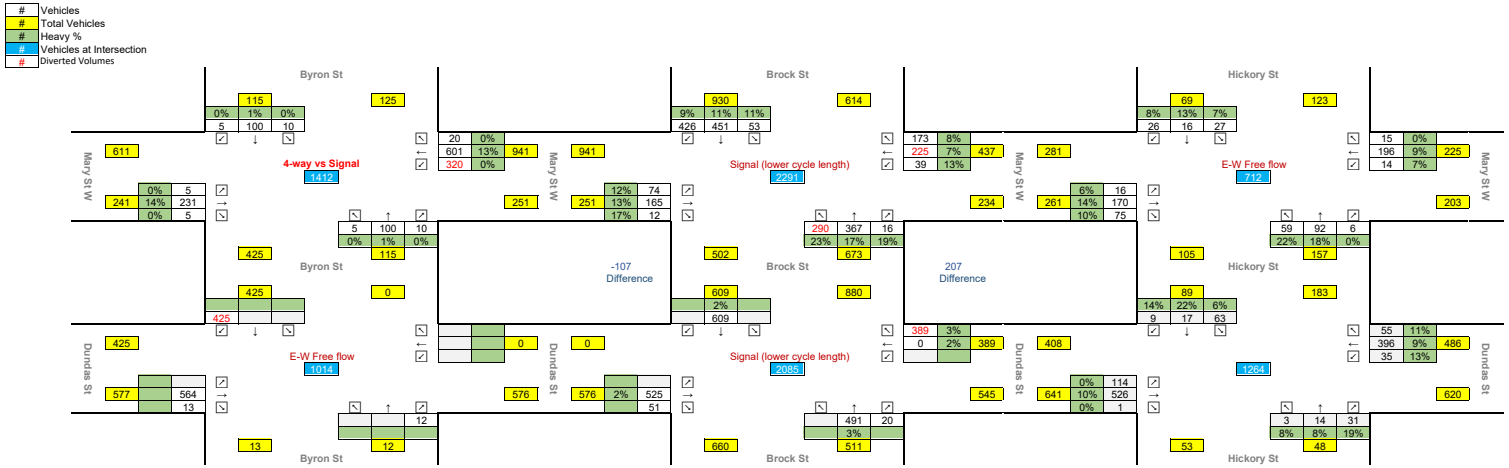
Downtown Whitby
AM Peak - Base 2041 North Pedestrian Mall - 250 Diversion



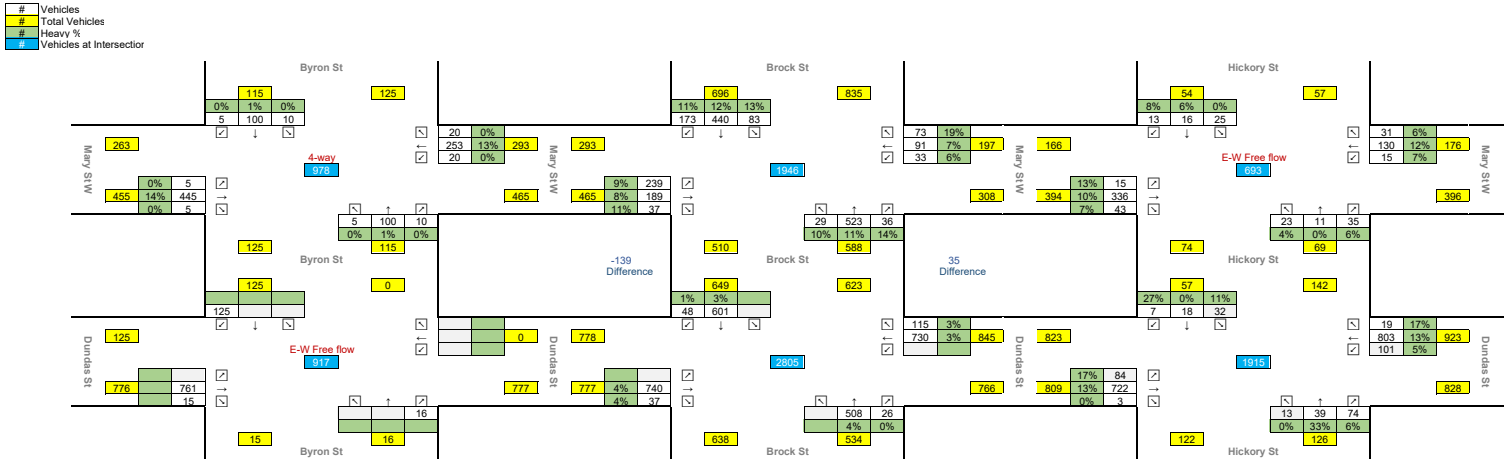
Downtown Whitby
AM Peak - Adjusted 2041 North Pedestrian Mall - 250 Diversion



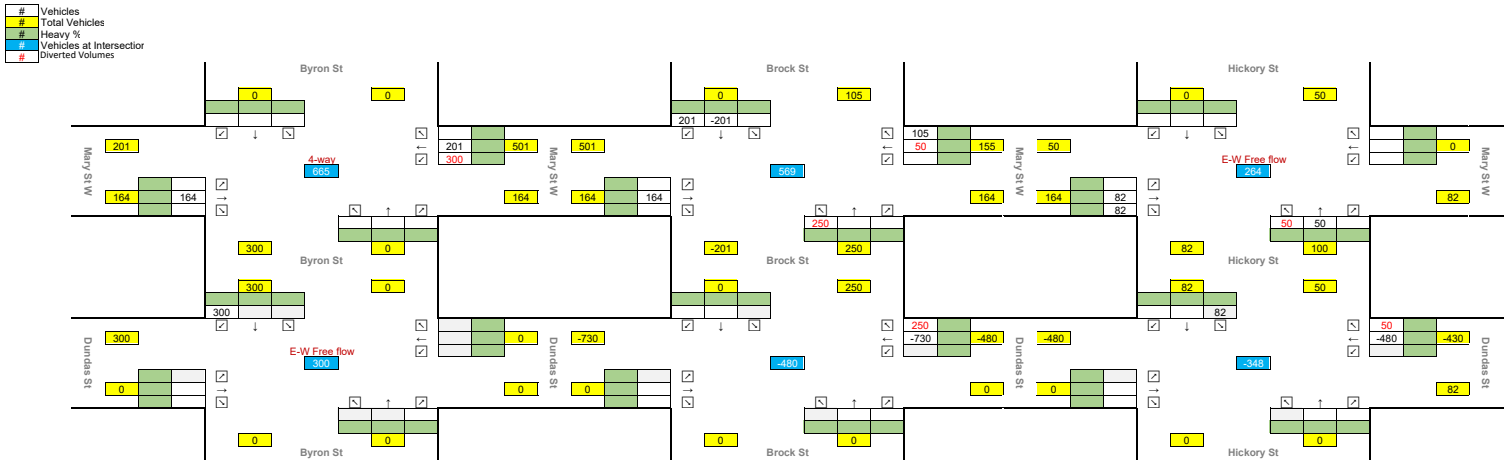
Downtown Whitby
AM Peak - Balanced 2041 North Pedestrian Mall - 250 Diversion



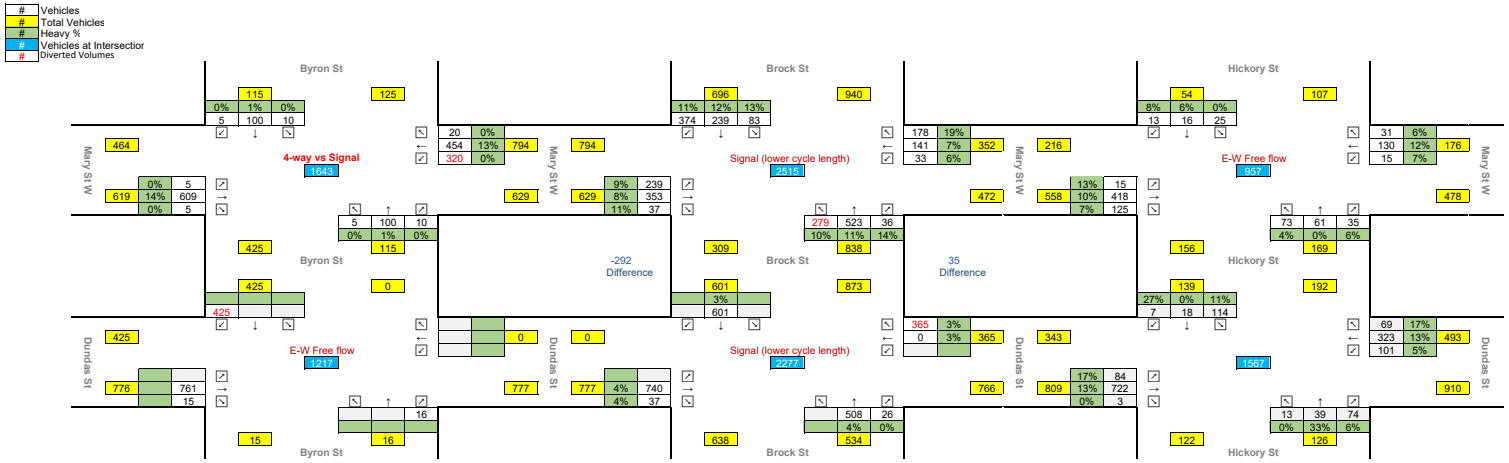
Downtown Whitby
PM Peak - Base 2041 North Pedestrian Mall - 250 Diversion



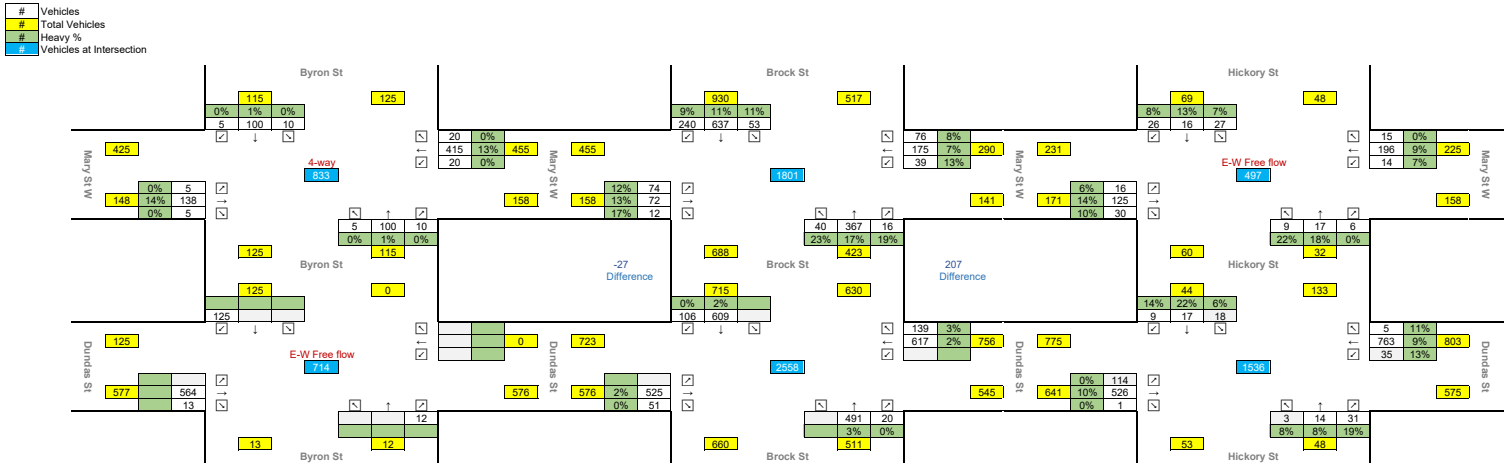
Downtown Whitby
PM Peak - Adjusted 2041 North Pedestrian Mall - 250 Diversion



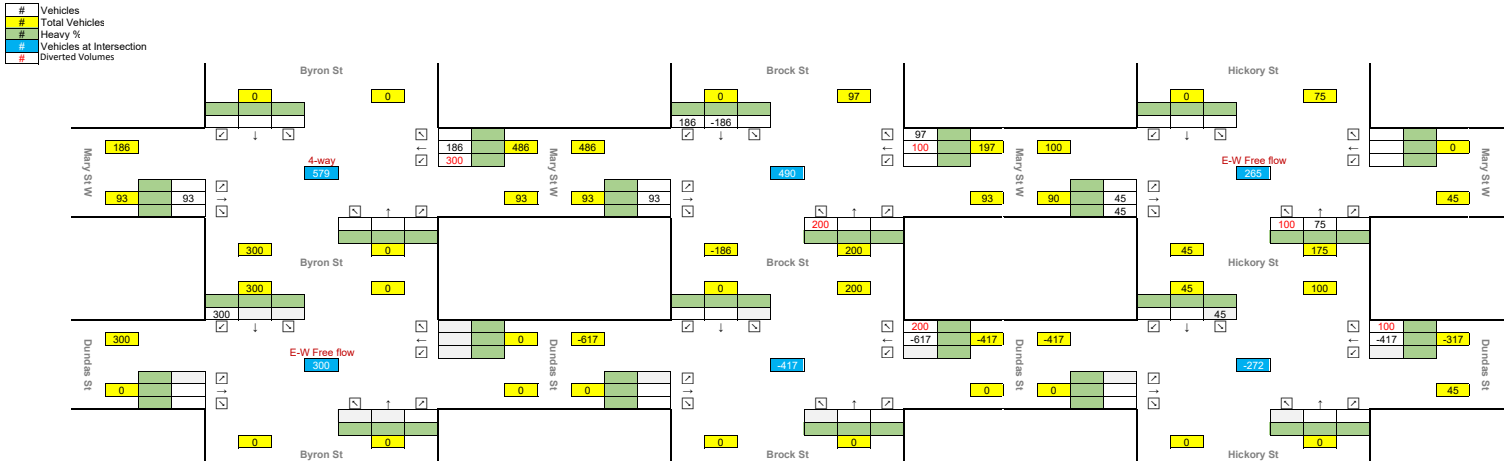
Downtown Whitby
PM Peak - Balanced 2041 North Pedestrian Mall - 250 Diversion



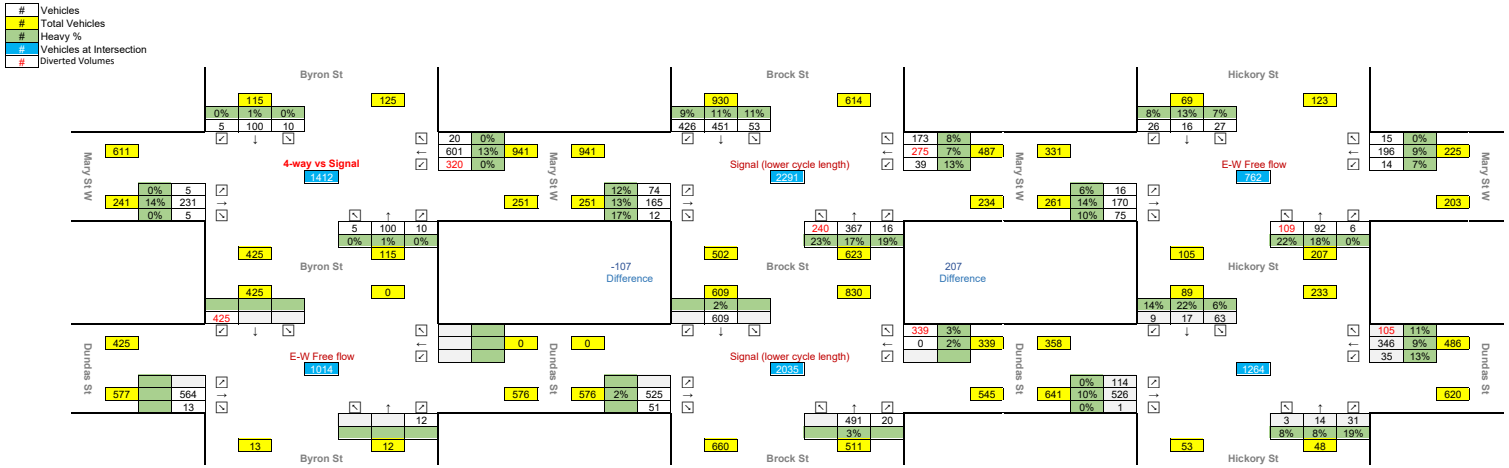
Downtown Whitby
AM Peak - Base 2041 North Pedestrian Mall - 200 Diversion



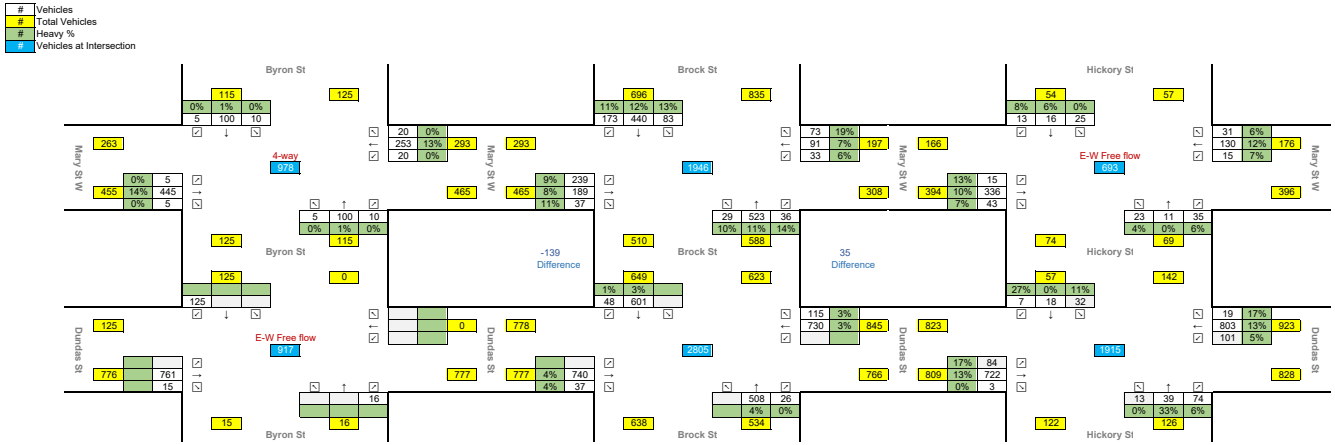
Downtown Whitby
AM Peak - Adjusted 2041 North Pedestrian Mall - 200 Diversion



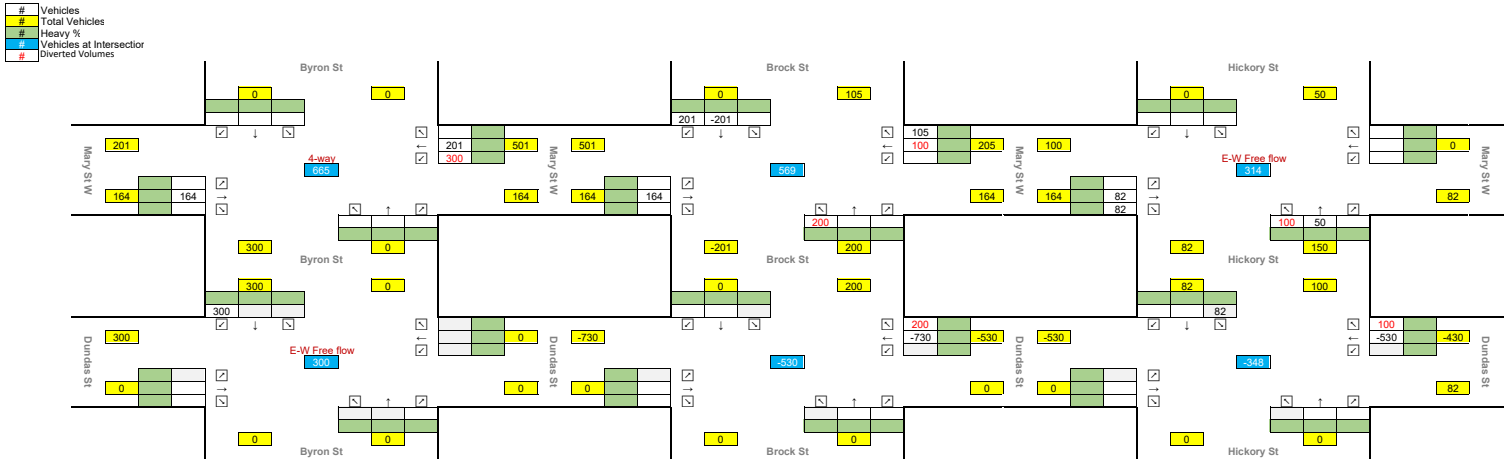
Downtown Whitby
AM Peak - Balanced 2041 North Pedestrian Mall - 200 Diversion



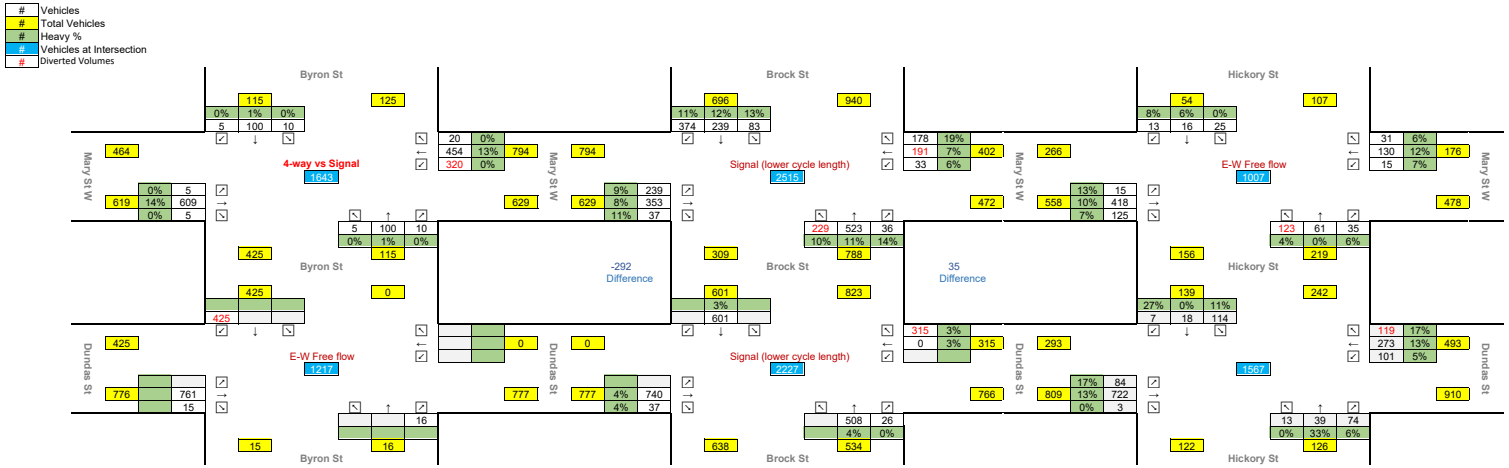
Downtown Whitby
PM Peak - Base 2041 North Pedestrian Mall - 200 Diversion



Downtown Whitby
PM Peak - Adjusted 2041 North Pedestrian Mall - 200 Diversion

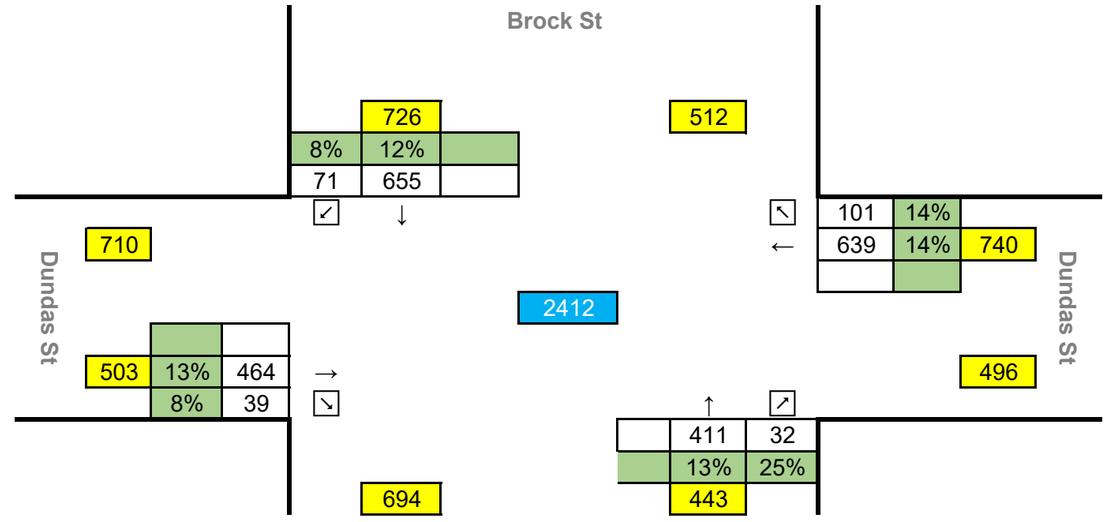


Downtown Whitby
PM Peak - Balanced 2041 North Pedestrian Mall - 200 Diversion



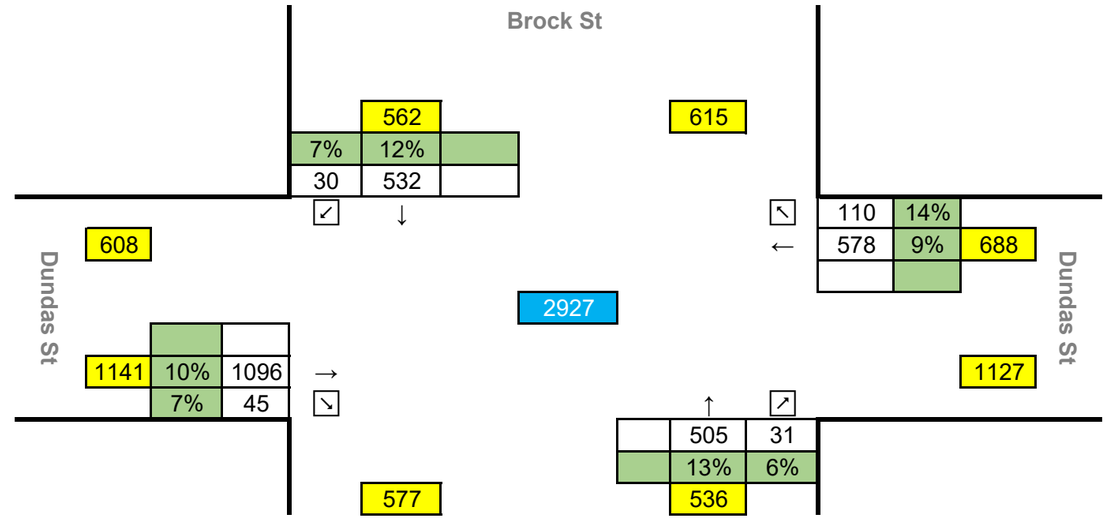
Downtown Whitby
AM Peak - Existing 2019

#	Vehicles
#	Total Vehicles
#	Heavy %
#	Vehicles at Intersection



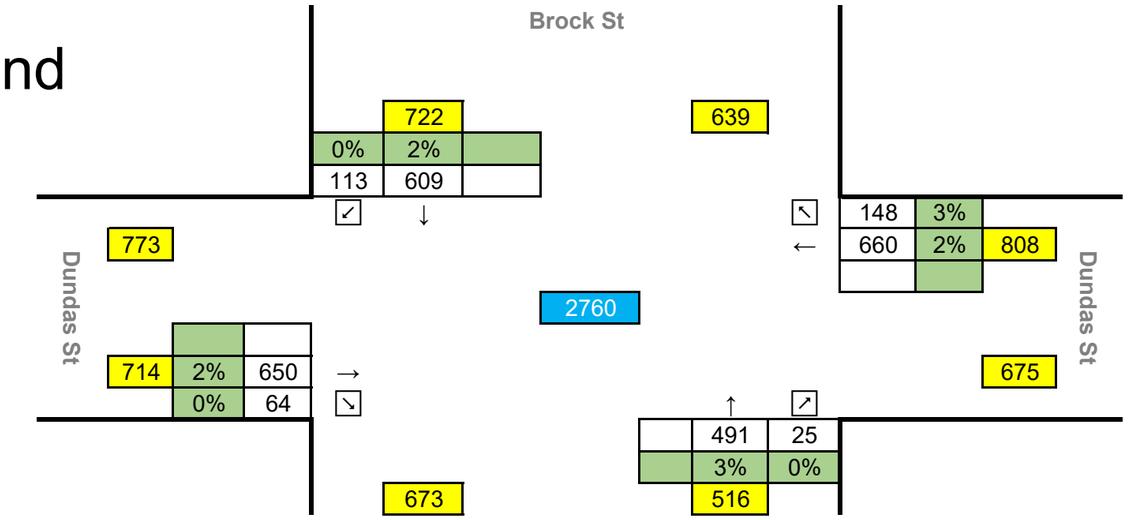
Downtown Whitby
PM Peak - Existing 2019

#	Vehicles
#	Total Vehicles
#	Heavy %
#	Vehicles at Intersection



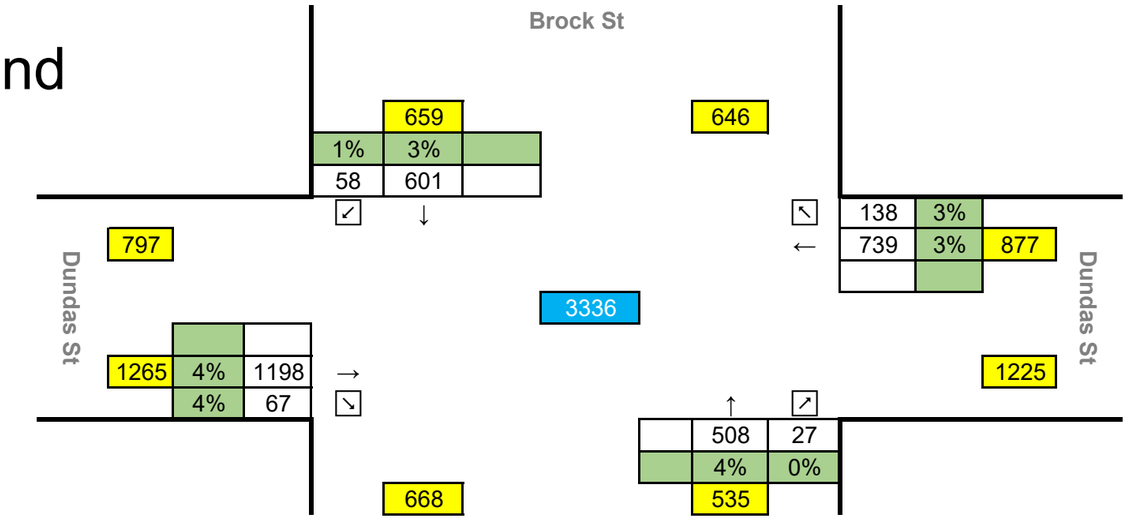
Downtown Whitby
AM Peak - 2041 Future Background

#	Vehicles
#	Total Vehicles
#	Heavy %
#	Vehicles at Intersection



Downtown Whitby
PM Peak - 2041 Future Background

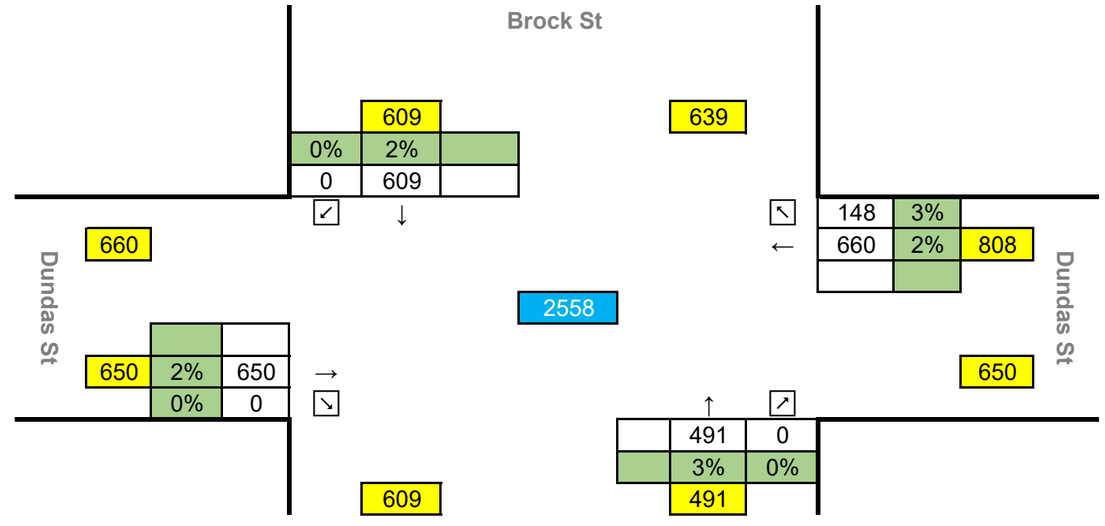
#	Vehicles
#	Total Vehicles
#	Heavy %
#	Vehicles at Intersection



Downtown Whitby
AM Peak - 2041 Future Design

#	Vehicles
#	Total Vehicles
#	Heavy %
#	Vehicles at Intersection

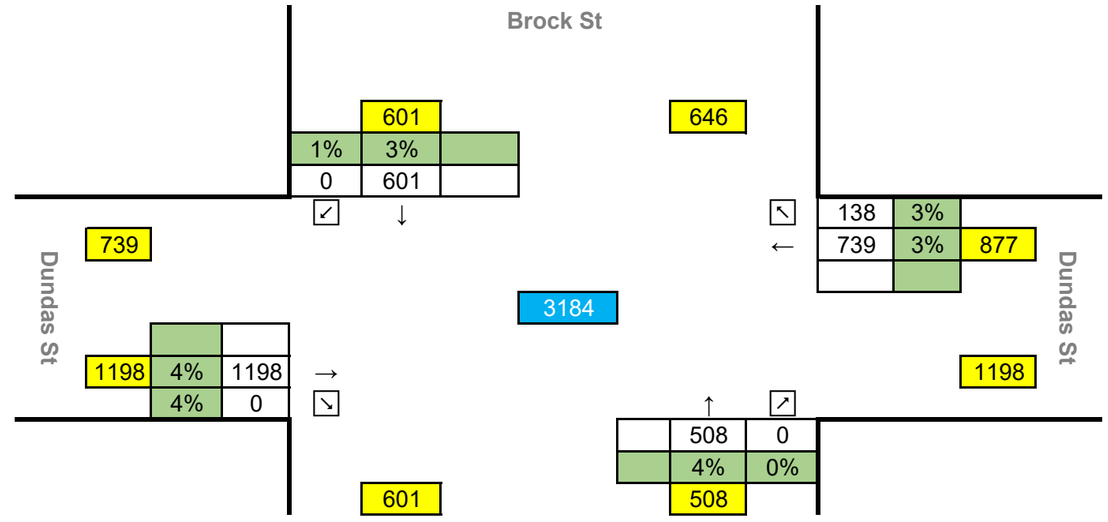
(Restrict right turns only)



Downtown Whitby
PM Peak - 2041 Future Design

#	Vehicles
#	Total Vehicles
#	Heavy %
#	Vehicles at Intersection

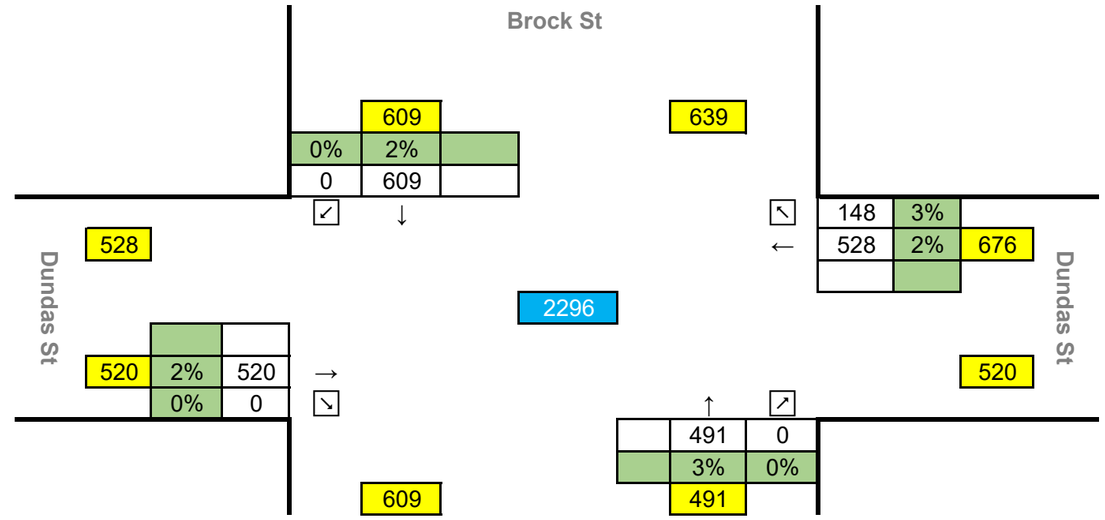
(Restrict right turns only)



Downtown Whitby
AM Peak - 2041 Future Design

#	Vehicles
#	Total Vehicles
#	Heavy %
#	Vehicles at Intersection

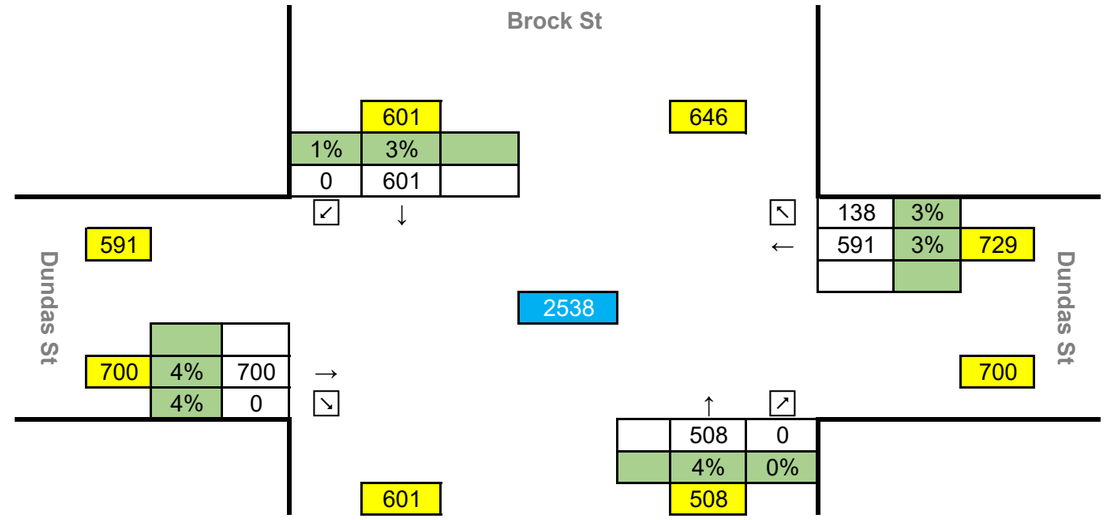
(WB & EB Thru Diversion; 20% for both WB & EB)



Downtown Whitby
PM Peak - 2041 Future Design

#	Vehicles
#	Total Vehicles
#	Heavy %
#	Vehicles at Intersection

(WB & EB Thru Diversion; 20% WB and 42% EB)



Lanes, Volumes, Timings
90: BROCK ST N & MARY ST W

11/09/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	72	12	39	175	76	40	367	16	53	637	240
Future Volume (vph)	74	72	12	39	175	76	40	367	16	53	637	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	22.3		0.0	18.9		0.0	16.3		0.0	25.4		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	23.1			28.7			29.3			34.6		
Satd. Flow (prot)	1434	1426	0	1422	1484	0	1306	1428	0	1447	1523	1319
Flt Permitted	0.308			0.677			0.280			0.432		
Satd. Flow (perm)	462	1426	0	1008	1484	0	384	1428	0	653	1523	1278
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			29			7				282
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		411.8			360.2			133.8			82.0	
Travel Time (s)		29.6			25.9			9.6			5.9	
Confl. Peds. (#/hr)	7		3	3		7	6		10	10		6
Confl. Bikes (#/hr)												
Peak Hour Factor	0.84	0.75	0.43	0.81	0.71	0.66	0.71	0.83	0.57	0.74	0.92	0.85
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	12%	13%	17%	13%	7%	8%	23%	17%	19%	11%	11%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	88	124	0	48	361	0	56	470	0	72	692	282
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2			6		
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	26.0	26.0		26.0	26.0		28.0	28.0		28.0	28.0	28.0
Total Split (s)	28.0	28.0		28.0	28.0		52.0	52.0		52.0	52.0	52.0
Total Split (%)	35.0%	35.0%		35.0%	35.0%		65.0%	65.0%		65.0%	65.0%	65.0%
Yellow Time (s)	4.0	4.0		4.0	4.0		3.7	3.7		3.7	3.7	3.7
All-Red Time (s)	1.8	1.8		1.8	1.8		1.6	1.6		1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8		5.8	5.8		5.3	5.3		5.3	5.3	5.3
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	20.8	20.8		20.8	20.8		48.1	48.1		48.1	48.1	48.1
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.60	0.60		0.60	0.60	0.60
v/c Ratio	0.74	0.32		0.18	0.89		0.24	0.55		0.18	0.76	0.32
Control Delay	63.4	22.3		24.3	51.5		15.2	15.5		4.4	14.1	1.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	63.4	22.3		24.3	51.5		15.2	15.5		4.4	14.1	1.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	C		C	D		B	B		A	B	A
Approach Delay		39.4			48.3			15.4			9.9	
Approach LOS		D			D			B			A	
Queue Length 50th (m)	11.0	11.6		5.1	43.7		4.1	35.1		1.9	71.4	0.9
Queue Length 95th (m)	#28.7	19.1		11.2	51.7		m7.7	57.6		2.3	115.8	0.0
Internal Link Dist (m)		387.8			336.2			109.8			58.0	
Turn Bay Length (m)	22.3			18.9			16.3			25.4		
Base Capacity (vph)	128	408		279	432		231	862		393	916	881
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.69	0.30		0.17	0.84		0.24	0.55		0.18	0.76	0.32

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 23.2 (29%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 21.3 Intersection LOS: C
Intersection Capacity Utilization 85.3% ICU Level of Service E
Analysis Period (min) 15
Description: TMC Sep 26/19
Updated Sept 17/20

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

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

Splits and Phases: 90: BROCK ST N & MARY ST W

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	70	61	43	105	16	6	432	57	0	572	29
Future Volume (vph)	18	70	61	43	105	16	6	432	57	0	572	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	35.0		0.0	35.1		0.0	16.0		0.0	16.1		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	25.0			21.2			15.0			30.0		
Satd. Flow (prot)	1516	1536	0	1606	1541	0	1606	1595	1409	1691	1600	0
Flt Permitted	0.639			0.572			0.317					
Satd. Flow (perm)	979	1536	0	937	1541	0	528	1595	1281	1691	1600	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		46			15				76		8	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		405.1			378.1			117.4			239.3	
Travel Time (s)		29.2			27.2			8.5			17.2	
Confl. Peds. (#/hr)	22		31	31		22	31		29	29		31
Confl. Bikes (#/hr)												
Peak Hour Factor	0.64	0.67	0.76	0.72	0.82	0.50	0.50	0.78	0.75	0.25	0.86	0.60
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	1%	0%	0%	3%	13%	0%	6%	2%	0%	4%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	184	0	60	160	0	12	554	76	0	713	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2					
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		20.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		26.0	26.0	26.0	26.0	26.0	
Total Split (s)	26.4	26.4		26.4	26.4		53.6	53.6	53.6	53.6	53.6	
Total Split (%)	33.0%	33.0%		33.0%	33.0%		67.0%	67.0%	67.0%	67.0%	67.0%	
Yellow Time (s)	4.2	4.2		4.2	4.2		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2		6.2	6.2		5.7	5.7	5.7	5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Act Effct Green (s)	13.1	13.1		13.1	13.1		55.0	55.0	55.0		55.0	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.69	0.69	0.69		0.69	
v/c Ratio	0.18	0.64		0.39	0.61		0.03	0.51	0.08		0.65	
Control Delay	29.3	32.7		36.1	37.2		5.0	7.3	1.2		2.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.1	0.0		0.0	
Total Delay	29.3	32.7		36.1	37.2		5.0	7.4	1.2		2.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C	C		D	D		A	A	A		A	
Approach Delay		32.3			36.9			6.6			2.4	
Approach LOS		C			D			A			A	
Queue Length 50th (m)	3.4	18.0		7.6	19.0		0.4	23.5	0.0		6.2	
Queue Length 95th (m)	6.3	21.8		12.6	29.4		1.0	32.0	1.2		m6.1	
Internal Link Dist (m)		381.1			354.1			93.4			215.3	
Turn Bay Length (m)	35.0			35.1			16.0					
Base Capacity (vph)	247	422		236	400		363	1097	905		1103	
Starvation Cap Reductn	0	0		0	0		0	71	0		0	
Spillback Cap Reductn	0	0		0	0		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.11	0.44		0.25	0.40		0.03	0.54	0.08		0.65	

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 49.6 (62%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.65
Intersection Signal Delay: 11.7 Intersection LOS: B
Intersection Capacity Utilization 70.3% ICU Level of Service C
Analysis Period (min) 15
Description: TMC Oct 4/18
Updated Sept 17/20

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

Splits and Phases: 91: BROCK ST S & DUNLOP ST

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	504	98	11	1037	36	135	99	21	86	227	275
Future Volume (vph)	56	504	98	11	1037	36	135	99	21	86	227	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	2000	1900	1900	1900	2000	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	44.5		0.0	49.7		157.1	23.4		14.6	35.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	31.3			29.4			40.9			25.0		
Satd. Flow (prot)	1545	2967	0	1361	3150	1331	1642	1626	1261	1591	1604	0
Flt Permitted	0.148			0.350			0.126			0.682		
Satd. Flow (perm)	240	2967	0	500	3150	1291	218	1626	1238	1135	1604	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		43				48			48		40	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		281.1			304.8			225.4			497.0	
Travel Time (s)		20.2			21.9			16.2			35.8	
Confl. Peds. (#/hr)	5		4	4		5	1		6	6		1
Confl. Bikes (#/hr)												
Peak Hour Factor	0.82	0.89	0.82	0.69	0.89	0.75	0.66	0.85	0.58	0.74	0.75	0.80
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	6%	0%	18%	2%	8%	3%	4%	14%	1%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	68	686	0	16	1165	48	205	116	36	116	647	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		
Detector Phase												
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0	20.0	8.0	8.0	8.0	8.0	8.0	
Minimum Split (s)	28.0	28.0		28.0	28.0	28.0	30.0	30.0	30.0	30.0	30.0	
Total Split (s)	44.8	44.8		44.8	44.8	44.8	35.2	35.2	35.2	35.2	35.2	
Total Split (%)	56.0%	56.0%		56.0%	56.0%	56.0%	44.0%	44.0%	44.0%	44.0%	44.0%	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.8	2.8		2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.5	6.5		6.5	6.5	6.5	3.5	6.5	6.5	6.5	6.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max	Max	Max	Max	Max	Max	Max	
Act Effct Green (s)	38.3	38.3		38.3	38.3	38.3	31.7	28.7	28.7	28.7	28.7	
Actuated g/C Ratio	0.48	0.48		0.48	0.48	0.48	0.40	0.36	0.36	0.36	0.36	
v/c Ratio	0.60	0.48		0.07	0.77	0.07	2.38	0.20	0.08	0.29	1.08	
Control Delay	41.8	14.5		10.5	16.6	2.8	675.7	18.9	4.5	20.8	85.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	41.8	14.5		10.5	16.6	2.8	675.7	18.9	4.5	20.8	85.2	

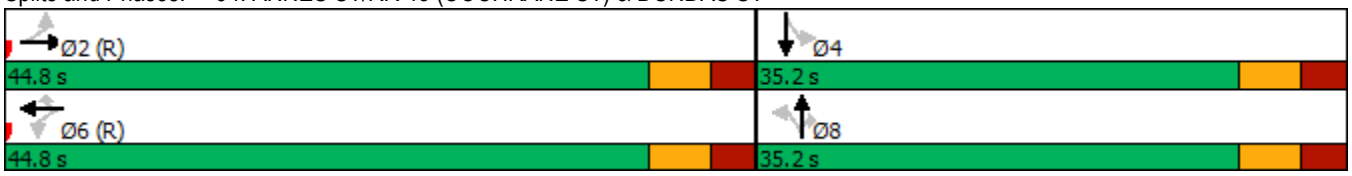
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	B		B	B	A	F	B	A	C	F	
Approach Delay		16.9			16.0			394.6			75.4	
Approach LOS		B			B			F			E	
Queue Length 50th (m)	6.6	30.2		1.0	47.5	0.1	~47.9	11.0	0.0	11.4	~98.8	
Queue Length 95th (m)	#21.5	42.2		m2.0	57.3	m1.4	#47.6	20.1	1.0	18.1	#113.7	
Internal Link Dist (m)		257.1			280.8			201.4			473.0	
Turn Bay Length (m)	44.5			49.7		157.1	23.4		14.6	35.0		
Base Capacity (vph)	114	1442		239	1508	643	86	583	474	407	601	
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	0.60	0.48		0.07	0.77	0.07	2.38	0.20	0.08	0.29	1.08	

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 46.4 (58%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 80
Control Type: Pretimed
Maximum v/c Ratio: 2.38
Intersection Signal Delay: 74.4 Intersection LOS: E
Intersection Capacity Utilization 104.2% ICU Level of Service G
Analysis Period (min) 15
Description: TMC Oct 24/17
Updated Sept 23/20

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 94: ANNES ST/RR 43 (COCHRANE ST) & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	502	85	31	646	14	126	120	42	31	201	98
Future Volume (vph)	41	502	85	31	646	14	126	120	42	31	201	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	24.7		0.0	30.2		16.0	7.6		11.0	13.8		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	32.9			38.5			41.4			24.7		
Satd. Flow (prot)	1575	2968	0	1606	3106	0	1560	1691	1437	1606	1591	0
Flt Permitted	0.329			0.331			0.342			0.653		
Satd. Flow (perm)	542	2968	0	557	3106	0	555	1691	1404	1094	1591	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		47			5				52		29	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		118.8			293.5			229.1			224.1	
Travel Time (s)		8.6			21.1			16.5			16.1	
Confl. Peds. (#/hr)	10		7	7		10	22		11	11		22
Confl. Bikes (#/hr)												
Peak Hour Factor	0.73	0.81	0.66	0.78	0.88	0.70	0.93	0.73	0.81	0.70	0.75	0.82
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	5%	4%	0%	3%	0%	3%	0%	0%	0%	0%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	56	749	0	40	754	0	135	164	52	44	388	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		8	4		
Detector Phase												
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	
Minimum Split (s)	29.0	29.0		29.0	29.0		31.0	31.0	31.0	31.0	31.0	
Total Split (s)	48.8	48.8		48.8	48.8		31.2	31.2	31.2	31.2	31.2	
Total Split (%)	61.0%	61.0%		61.0%	61.0%		39.0%	39.0%	39.0%	39.0%	39.0%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.6	2.6		2.6	2.6		2.4	2.4	2.4	2.4	2.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		6.1	6.1	6.1	6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		Max	Max	Max	Max	Max	
Act Effct Green (s)	42.5	42.5		42.5	42.5		25.1	25.1	25.1	25.1	25.1	
Actuated g/C Ratio	0.53	0.53		0.53	0.53		0.31	0.31	0.31	0.31	0.31	
v/c Ratio	0.20	0.47		0.14	0.46		0.78	0.31	0.11	0.13	0.75	
Control Delay	14.8	16.0		2.1	2.0		56.9	22.9	6.8	21.0	33.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	14.8	16.0		2.1	2.0		56.9	22.9	6.8	21.0	33.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B	B		A	A		E	C	A	C	C	
Approach Delay		15.9			2.0			33.6			32.1	
Approach LOS		B			A			C			C	
Queue Length 50th (m)	5.6	43.2		0.5	5.2		17.0	17.3	0.0	4.4	44.7	
Queue Length 95th (m)	11.0	50.7		m0.5	m4.7		#44.3	24.4	5.5	8.4	56.1	
Internal Link Dist (m)		94.8			269.5			205.1			200.1	
Turn Bay Length (m)	24.7			30.2			7.6		11.0	13.8		
Base Capacity (vph)	287	1598		295	1652		174	530	476	343	519	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.20	0.47		0.14	0.46		0.78	0.31	0.11	0.13	0.75	

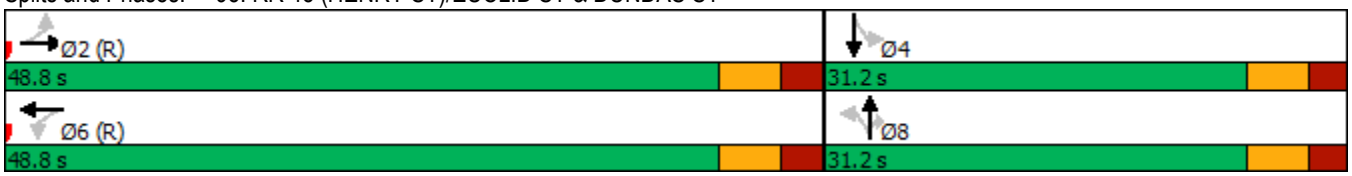
Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 20.8 (26%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 60
Control Type: Pretimed
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 16.8 Intersection LOS: B
Intersection Capacity Utilization 74.6% ICU Level of Service D
Analysis Period (min) 15
Description: TMC May 30 2017
Updated Sept 23/20

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

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

Splits and Phases: 95: RR 45 (HENRY ST)/EUCLID ST & DUNDAS ST



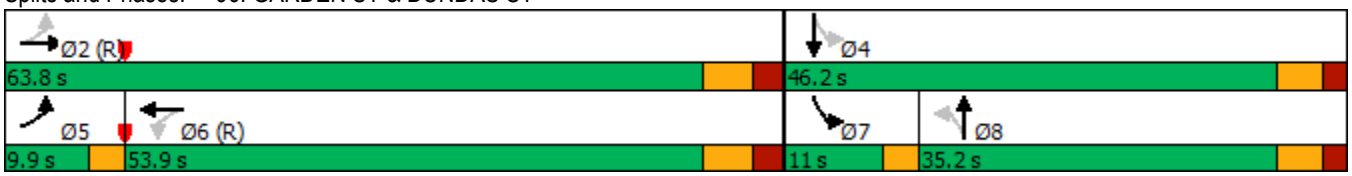
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	496	17	90	899	138	38	403	50	190	522	88
Future Volume (vph)	53	496	17	90	899	138	38	403	50	190	522	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	17.1		0.0	98.4		0.0	23.5		0.0	102.4		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	37.0			12.6			27.3			30.0		
Satd. Flow (prot)	1545	3028	0	1545	3013	0	1447	3060	0	1501	3067	0
Flt Permitted	0.094			0.421			0.361			0.275		
Satd. Flow (perm)	153	3028	0	677	3013	0	545	3060	0	431	3067	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			18			11			19	
Link Speed (k/h)		50			50			50			40	
Link Distance (m)		457.3			160.3			1037.5			218.0	
Travel Time (s)		32.9			11.5			74.7			19.6	
Confl. Peds. (#/hr)	13		26	26		13	23		17	17		23
Confl. Bikes (#/hr)												
Peak Hour Factor	0.74	0.86	0.53	0.73	0.84	0.88	0.63	0.82	0.89	0.83	0.85	0.88
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	5%	6%	4%	4%	6%	11%	3%	4%	7%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	72	609	0	123	1227	0	60	547	0	229	714	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5			6			8			7		
Switch Phase												
Minimum Initial (s)	5.0	20.0		20.0	20.0		8.0	8.0		5.0	8.0	
Minimum Split (s)	9.0	40.0		40.0	40.0		35.0	35.0		9.0	35.0	
Total Split (s)	9.9	63.8		53.9	53.9		35.2	35.2		11.0	46.2	
Total Split (%)	9.0%	58.0%		49.0%	49.0%		32.0%	32.0%		10.0%	42.0%	
Yellow Time (s)	3.0	4.1		4.1	4.1		3.7	3.7		3.0	3.7	
All-Red Time (s)	0.0	2.5		2.5	2.5		2.2	2.2		0.0	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.6		6.6	6.6		5.9	5.9		3.0	5.9	
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes									Yes		
Recall Mode	None	C-Max		C-Max	C-Max		Max	Max		None	Max	
Act Effct Green (s)	60.8	57.2		49.5	49.5		29.3	29.3		43.2	40.3	
Actuated g/C Ratio	0.55	0.52		0.45	0.45		0.27	0.27		0.39	0.37	
v/c Ratio	0.44	0.39		0.40	0.90		0.41	0.66		0.93	0.63	
Control Delay	20.1	16.5		23.4	34.8		49.4	43.9		63.4	26.9	
Queue Delay	0.0	0.0		0.0	1.8		0.0	0.0		0.0	0.0	
Total Delay	20.1	16.5		23.4	36.6		49.4	43.9		63.4	26.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C	B		C	D		D	D		E	C	
Approach Delay		16.9			35.4			44.5			35.8	
Approach LOS		B			D			D			D	
Queue Length 50th (m)	6.4	36.0		13.8	120.2		10.3	50.8		28.9	49.1	
Queue Length 95th (m)	10.1	44.8		18.8	#146.0		15.8	66.5		#54.9	62.2	
Internal Link Dist (m)		433.3			136.3			1013.5			194.0	
Turn Bay Length (m)	17.1			98.4			23.5			102.4		
Base Capacity (vph)	171	1578		304	1365		145	823		247	1135	
Starvation Cap Reductn	0	0		0	53		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.42	0.39		0.40	0.94		0.41	0.66		0.93	0.63	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 92.4 (84%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 33.5 Intersection LOS: C
Intersection Capacity Utilization 97.6% ICU Level of Service F
Analysis Period (min) 15
Description: TMC Oct 19/16
Updated Sept 23/20
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 96: GARDEN ST & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	78	0	117	13	6	26	66	540	3	19	727	171
Future Volume (vph)	78	0	117	13	6	26	66	540	3	19	727	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	34.4		0.0	33.8		0.0	51.6		0.0	79.3		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.4			18.0			30.4			24.0		
Satd. Flow (prot)	1422	1243	0	1397	1458	0	1373	2918	0	1447	2835	0
Flt Permitted	0.726			0.673			0.248			0.435		
Satd. Flow (perm)	1081	1243	0	988	1458	0	356	2918	0	661	2835	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		58			40			3			76	
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		468.1			161.7			218.0			150.1	
Travel Time (s)		42.1			14.6			19.6			13.5	
Confl. Peds. (#/hr)	7		3	3		7	21		5	5		21
Confl. Bikes (#/hr)												
Peak Hour Factor	0.65	0.25	0.89	0.65	0.75	0.65	0.75	0.95	0.38	0.59	0.91	0.76
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	13%	0%	14%	15%	0%	0%	17%	10%	0%	11%	8%	10%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	120	131	0	20	48	0	88	576	0	32	1024	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)	8.0	8.0		8.0	8.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	28.0	28.0		28.0	28.0		27.0	27.0		27.0	27.0	
Total Split (s)	28.0	28.0		28.0	28.0		27.0	27.0		27.0	27.0	
Total Split (%)	50.9%	50.9%		50.9%	50.9%		49.1%	49.1%		49.1%	49.1%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.7	3.7		3.7	3.7	
All-Red Time (s)	3.3	3.3		3.3	3.3		2.2	2.2		2.2	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		5.9	5.9		5.9	5.9	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	11.9	11.9		11.9	11.9		35.0	35.0		35.0	35.0	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.64	0.64		0.64	0.64	
v/c Ratio	0.52	0.42		0.09	0.14		0.39	0.31		0.08	0.56	
Control Delay	26.1	14.6		16.2	7.8		25.9	13.5		7.8	9.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	26.1	14.6		16.2	7.8		25.9	13.5		7.8	9.4	

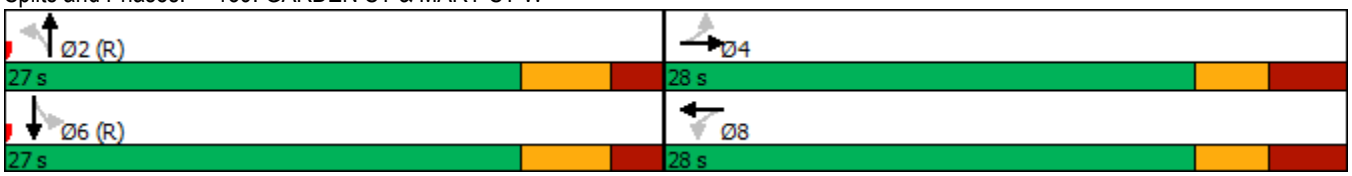
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C	B		B	A		C	B		A	A	
Approach Delay		20.1			10.2			15.2			9.3	
Approach LOS		C			B			B			A	
Queue Length 50th (m)	9.9	5.7		1.5	0.6		12.7	43.6		1.2	26.1	
Queue Length 95th (m)	12.8	0.8		3.4	4.2		m20.0	m57.2		3.2	53.4	
Internal Link Dist (m)		444.1			137.7			194.0			126.1	
Turn Bay Length (m)	34.4			33.8			51.6			79.3		
Base Capacity (vph)	426	525		389	599		226	1857		420	1830	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.28	0.25		0.05	0.08		0.39	0.31		0.08	0.56	

Intersection Summary

Area Type: CBD
Cycle Length: 55
Actuated Cycle Length: 55
Offset: 42.9 (78%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.56
Intersection Signal Delay: 12.6 Intersection LOS: B
Intersection Capacity Utilization 72.5% ICU Level of Service C
Analysis Period (min) 15
Description: TMC Nov 27/19
Updated Sept 17/20

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

Splits and Phases: 139: GARDEN ST & MARY ST W



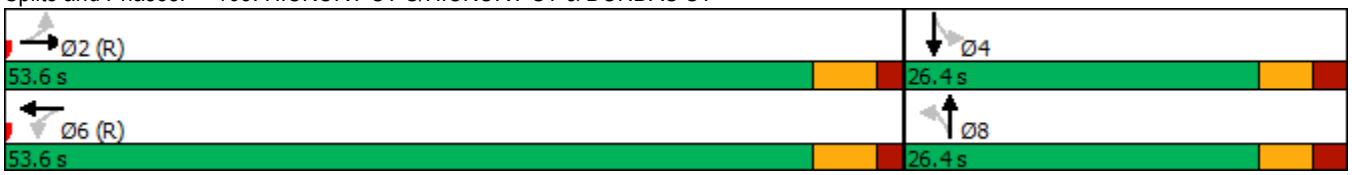
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	514	1	42	901	6	4	22	31	18	25	11
Future Volume (vph)	6	514	1	42	901	6	4	22	31	18	25	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	0.0			0.0			0.0			0.0		
Satd. Flow (prot)	0	2837	0	0	2839	0	0	1337	0	0	1432	0
Flt Permitted		0.931			0.857			0.968			0.780	
Satd. Flow (perm)	0	2644	0	0	2441	0	0	1300	0	0	1139	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			3			58			20	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		375.6			457.3			238.2			167.6	
Travel Time (s)		27.0			32.9			17.2			12.1	
Confl. Peds. (#/hr)	5		8	8		5	10		3	3		10
Confl. Bikes (#/hr)												
Peak Hour Factor	0.50	0.90	0.25	0.55	0.94	0.50	0.33	0.43	0.52	0.45	0.75	0.46
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	17%	13%	0%	5%	13%	17%	0%	33%	6%	11%	0%	27%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	587	0	0	1047	0	0	123	0	0	97	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		25.4	25.4		25.4	25.4	
Total Split (s)	53.6	53.6		53.6	53.6		26.4	26.4		26.4	26.4	
Total Split (%)	67.0%	67.0%		67.0%	67.0%		33.0%	33.0%		33.0%	33.0%	
Yellow Time (s)	3.8	3.8		3.8	3.8		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.7	1.7		1.7	1.7		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.5			5.5			5.4			5.4	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)		61.9			61.9			11.0			11.0	
Actuated g/C Ratio		0.77			0.77			0.14			0.14	
v/c Ratio		0.29			0.55			0.54			0.56	
Control Delay		1.5			6.7			25.4			38.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		1.5			6.7			25.4			38.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		A			A			C			D	
Approach Delay		1.5			6.7			25.4			38.6	
Approach LOS		A			A			C			D	
Queue Length 50th (m)		1.8			28.6			9.1			10.8	
Queue Length 95th (m)		3.4			55.4			6.1			17.8	
Internal Link Dist (m)		351.6			433.3			214.2			143.6	
Turn Bay Length (m)												
Base Capacity (vph)		2046			1889			384			313	
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		0.29			0.55			0.32			0.31	

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 34.4 (43%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.56
Intersection Signal Delay: 8.0 Intersection LOS: A
Intersection Capacity Utilization 71.1% ICU Level of Service C
Analysis Period (min) 15
Description: TMC Jun 26/19
Updated Sept 28/20

Splits and Phases: 163: HICKORY ST S/HICKORY ST & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	125	30	14	196	15	9	17	6	27	16	26
Future Volume (vph)	16	125	30	14	196	15	9	17	6	27	16	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1624	0	0	1715	0	0	1565	0	0	1607	0
Flt Permitted		0.991			0.997			0.988			0.982	
Satd. Flow (perm)	0	1624	0	0	1715	0	0	1565	0	0	1607	0
Link Speed (k/h)		40			50			48			48	
Link Distance (m)		360.2			468.1			49.2			183.4	
Travel Time (s)		32.4			33.7			3.7			13.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.36	0.84	0.68	0.70	0.80	0.75	0.56	0.47	0.50	0.54	0.50	0.50
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	14%	10%	7%	9%	0%	22%	18%	0%	7%	13%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	237	0	0	285	0	0	64	0	0	134	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 27.1%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	34	26	45	12	11	67
Future Volume (vph)	34	26	45	12	11	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%	0%		0%	
Storage Length (m)	0.0			0.0	0.0	0.0
Storage Lanes	0			0	1	0
Taper Length (m)	25.0				25.0	
Satd. Flow (prot)	0	1766	1769	0	1575	0
Flt Permitted		0.972			0.993	
Satd. Flow (perm)	0	1766	1769	0	1575	0
Link Speed (k/h)		50	48		50	
Link Distance (m)		378.1	171.0		238.2	
Travel Time (s)		27.2	12.8		17.2	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	4%	2%	8%	9%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	65	62	0	85	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 21.3%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	139	12	13	90	53	24	114	19	25	174	55
Future Volume (vph)	24	139	12	13	90	53	24	114	19	25	174	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1828	0	0	1723	0	0	1754	0	0	1711	0
Flt Permitted		0.993			0.994			0.989			0.994	
Satd. Flow (perm)	0	1828	0	0	1723	0	0	1754	0	0	1711	0
Link Speed (k/h)		48			50			50			50	
Link Distance (m)		418.6			405.1			724.8			229.1	
Travel Time (s)		31.4			29.2			52.2			16.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.75	0.85	0.60	0.54	0.90	0.78	0.50	0.84	0.68	0.65	0.91	0.78
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	1%	0%	0%	2%	6%	0%	4%	11%	2%	7%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	216	0	0	192	0	0	212	0	0	300	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 37.8%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	22	4	215	104	13	3	85	63	16	110	1
Future Volume (vph)	3	22	4	215	104	13	3	85	63	16	110	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1764	0	0	1807	0	0	1736	0	0	1796	0
Flt Permitted		0.992			0.971			0.998			0.993	
Satd. Flow (perm)	0	1764	0	0	1807	0	0	1736	0	0	1796	0
Link Speed (k/h)		48			50			50			48	
Link Distance (m)		195.3			411.8			224.1			201.6	
Travel Time (s)		14.6			29.6			16.1			15.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.38	0.61	0.50	0.96	0.74	0.81	0.38	0.79	0.83	0.67	0.79	0.25
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	5%	0%	0%	0%	8%	0%	2%	3%	19%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	52	0	0	381	0	0	192	0	0	167	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 46.2%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	76	11	66	68	29	10	157	38	70	239	47
Future Volume (vph)	21	76	11	66	68	29	10	157	38	70	239	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1782	0	0	1738	0	0	1714	0	0	1697	0
Flt Permitted		0.991			0.979			0.997			0.990	
Satd. Flow (perm)	0	1782	0	0	1738	0	0	1714	0	0	1697	0
Link Speed (k/h)		48			48			48			50	
Link Distance (m)		180.4			418.6			228.3			225.4	
Travel Time (s)		13.5			31.4			17.1			16.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.88	0.79	0.69	0.66	0.71	0.72	0.63	0.69	0.86	0.73	0.80	0.73
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	4%	0%	3%	4%	3%	40%	6%	0%	4%	9%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	136	0	0	236	0	0	288	0	0	459	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	56.1%
ICU Level of Service	B
Analysis Period (min)	15

Lanes, Volumes, Timings
90: BROCK ST & MARY ST

12/17/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	239	189	37	33	91	73	29	523	36	83	440	173
Future Volume (vph)	239	189	37	33	91	73	29	523	36	83	440	173
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	22.3		0.0	18.9		0.0	16.3		0.0	25.4		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	23.1			28.7			29.3			34.6		
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	0.98	0.99		0.99	0.98		0.99	0.99		0.97		0.94
Frt		0.964			0.931			0.985				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1474	1484	0	1516	1371	0	1460	1479	0	1422	1510	1295
Flt Permitted	0.585			0.466			0.306			0.266		
Satd. Flow (perm)	893	1484	0	734	1371	0	464	1479	0	387	1510	1213
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			57			11				219
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		412.1			360.6			134.9			82.0	
Travel Time (s)		29.7			26.0			9.7			5.9	
Confl. Peds. (#/hr)	11		11	11		11	23		51	51		23
Peak Hour Factor	0.85	0.83	0.51	0.75	0.78	0.73	0.73	0.83	0.50	0.74	0.89	0.79
Heavy Vehicles (%)	9%	8%	11%	6%	7%	19%	10%	11%	14%	13%	12%	11%
Adj. Flow (vph)	281	228	73	44	117	100	40	630	72	112	494	219
Shared Lane Traffic (%)												
Lane Group Flow (vph)	281	301	0	44	217	0	40	702	0	112	494	219
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5			6		
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		5.0	20.0		20.0	20.0	20.0
Minimum Split (s)	26.0	26.0		26.0	26.0		9.0	28.0		28.0	28.0	28.0
Total Split (s)	32.0	32.0		32.0	32.0		9.6	48.0		38.4	38.4	38.4
Total Split (%)	40.0%	40.0%		40.0%	40.0%		12.0%	60.0%		48.0%	48.0%	48.0%
Maximum Green (s)	26.2	26.2		26.2	26.2		6.6	42.7		33.1	33.1	33.1
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	3.7		3.7	3.7	3.7
All-Red Time (s)	1.8	1.8		1.8	1.8		0.0	1.6		1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8		5.8	5.8		3.0	5.3		5.3	5.3	5.3
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0		7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0		12.0	12.0			14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0			0		0	0	0
Act Effct Green (s)	26.2	26.2		26.2	26.2		45.0	42.7		37.3	37.3	37.3
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.56	0.53		0.47	0.47	0.47
v/c Ratio	0.96	0.60		0.18	0.45		0.12	0.88		0.62	0.70	0.32

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	73.9	26.9		21.8	18.8		1.7	17.7		30.7	19.0	1.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	73.9	26.9		21.8	18.8		1.7	17.7		30.7	19.0	1.5
LOS	E	C		C	B		A	B		C	B	A
Approach Delay		49.6			19.3			16.9			15.9	
Approach LOS		D			B			B			B	
90th %ile Green (s)	26.2	26.2		26.2	26.2		6.6	42.7		33.1	33.1	33.1
90th %ile Term Code	Max	Max		Hold	Hold		Max	Coord		Coord	Coord	Coord
70th %ile Green (s)	26.2	26.2		26.2	26.2		5.9	42.7		33.8	33.8	33.8
70th %ile Term Code	Max	Max		Hold	Hold		Gap	Coord		Coord	Coord	Coord
50th %ile Green (s)	26.2	26.2		26.2	26.2		5.3	42.7		34.4	34.4	34.4
50th %ile Term Code	Max	Max		Hold	Hold		Gap	Coord		Coord	Coord	Coord
30th %ile Green (s)	26.2	26.2		26.2	26.2		0.0	42.7		42.7	42.7	42.7
30th %ile Term Code	Max	Max		Hold	Hold		Skip	Coord		Coord	Coord	Coord
10th %ile Green (s)	26.2	26.2		26.2	26.2		0.0	42.7		42.7	42.7	42.7
10th %ile Term Code	Max	Max		Hold	Hold		Skip	Coord		Coord	Coord	Coord
Queue Length 50th (m)	38.2	32.4		4.4	16.9		0.2	92.9		5.1	57.9	0.0
Queue Length 95th (m)	#73.9	49.3		9.3	27.5		m0.2	m91.9		#26.5	#103.2	1.3
Internal Link Dist (m)		388.1			336.6			110.9			58.0	
Turn Bay Length (m)	22.3			18.9			16.3			25.4		
Base Capacity (vph)	292	500		240	487		343	794		180	704	682
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.96	0.60		0.18	0.45		0.12	0.88		0.62	0.70	0.32

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 76 (95%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 24.7 Intersection LOS: C
Intersection Capacity Utilization 95.5% ICU Level of Service F
Analysis Period (min) 15
Description: TMC Sep 26/19
Updated Sept 17/20
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

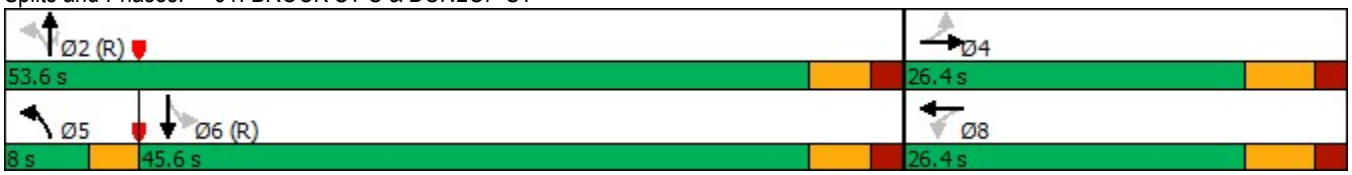
Splits and Phases: 90: BROCK ST & MARY ST

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	138	95	65	108	21	3	520	104	5	554	19
Future Volume (vph)	34	138	95	65	108	21	3	520	104	5	554	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	35.1		0.0	16.0		0.0	16.1		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	25.0			21.2			15.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.95	0.98		0.97	0.99				0.86	0.94	0.99	
Frt		0.933			0.974				0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1606	1539	0	1575	1597	0	1606	1658	1437	1606	1624	0
Flt Permitted	0.654			0.410			0.315			0.439		
Satd. Flow (perm)	1051	1539	0	662	1597	0	533	1658	1236	700	1624	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		49			13				141		4	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		409.6			376.2			117.4			239.3	
Travel Time (s)		29.5			27.1			8.5			17.2	
Confl. Peds. (#/hr)	28		33	33		28	52		49	49		52
Peak Hour Factor	0.85	0.93	0.79	0.65	0.82	0.75	0.38	0.96	0.74	0.42	0.94	0.79
Heavy Vehicles (%)	0%	0%	0%	2%	2%	0%	0%	2%	0%	0%	3%	0%
Adj. Flow (vph)	40	148	120	100	132	28	8	542	141	12	589	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	268	0	100	160	0	8	542	141	12	613	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		5					
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		5.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		8.0	26.0	26.0	26.0	26.0	
Total Split (s)	26.4	26.4		26.4	26.4		8.0	53.6	53.6	45.6	45.6	
Total Split (%)	33.0%	33.0%		33.0%	33.0%		10.0%	67.0%	67.0%	57.0%	57.0%	
Maximum Green (s)	20.2	20.2		20.2	20.2		5.0	47.9	47.9	39.9	39.9	
Yellow Time (s)	4.2	4.2		4.2	4.2		3.0	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2		6.2	6.2		3.0	5.7	5.7	5.7	5.7	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			9.0	9.0	9.0	9.0	
Pedestrian Calls (#/hr)	0	0		0	0			0	0	0	0	
Act Effct Green (s)	16.1	16.1		16.1	16.1		54.7	52.0	52.0	50.4	50.4	
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.68	0.65	0.65	0.63	0.63	
v/c Ratio	0.19	0.77		0.76	0.48		0.02	0.50	0.17	0.03	0.60	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	26.9	39.2		63.0	30.0		4.0	5.7	1.0	11.8	13.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.2	0.0	0.0	0.0	
Total Delay	26.9	39.2		63.0	30.0		4.0	5.9	1.0	11.8	13.7	
LOS	C	D		E	C		A	A	A	B	B	
Approach Delay		37.6			42.7			4.9			13.6	
Approach LOS		D			D			A			B	
90th %ile Green (s)	20.2	20.2		20.2	20.2		5.0	47.9	47.9	39.9	39.9	
90th %ile Term Code	Max	Max		Max	Max		Max	Coord	Coord	Coord	Coord	
70th %ile Green (s)	19.8	19.8		19.8	19.8		0.0	48.3	48.3	48.3	48.3	
70th %ile Term Code	Gap	Gap		Hold	Hold		Skip	Coord	Coord	Coord	Coord	
50th %ile Green (s)	16.9	16.9		16.9	16.9		0.0	51.2	51.2	51.2	51.2	
50th %ile Term Code	Gap	Gap		Hold	Hold		Skip	Coord	Coord	Coord	Coord	
30th %ile Green (s)	13.9	13.9		13.9	13.9		0.0	54.2	54.2	54.2	54.2	
30th %ile Term Code	Gap	Gap		Hold	Hold		Skip	Coord	Coord	Coord	Coord	
10th %ile Green (s)	9.5	9.5		9.5	9.5		0.0	58.6	58.6	58.6	58.6	
10th %ile Term Code	Gap	Gap		Hold	Hold		Skip	Coord	Coord	Coord	Coord	
Queue Length 50th (m)	4.6	28.8		13.1	18.0		0.3	17.5	0.0	0.7	40.2	
Queue Length 95th (m)	10.8	49.6		18.1	28.7		0.4	27.1	0.6	m0.7	m40.3	
Internal Link Dist (m)		385.6			352.2			93.4			215.3	
Turn Bay Length (m)	35.0			35.1			16.0			16.1		
Base Capacity (vph)	265	425		167	412		431	1078	853	441	1025	
Starvation Cap Reductn	0	0		0	0		0	104	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.15	0.63		0.60	0.39		0.02	0.56	0.17	0.03	0.60	

Intersection Summary	
Area Type: CBD	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 40 (50%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 18.4	Intersection LOS: B
Intersection Capacity Utilization 71.3%	ICU Level of Service C
Analysis Period (min) 15	
Description: TMC Oct 4/18	
Updated Sept 17/20	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 91: BROCK ST S & DUNLOP ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	1324	142	17	622	86	105	159	13	62	132	76
Future Volume (vph)	156	1324	142	17	622	86	105	159	13	62	132	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	44.5		0.0	49.7		157.1	23.4		14.6	35.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	31.3			29.4			40.9			25.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99				0.97	1.00		0.98	1.00	0.99	
Frt		0.983				0.850			0.850		0.942	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1560	3111	0	1606	3150	1409	1606	1691	1437	1591	1576	0
Flt Permitted	0.375			0.093			0.493			0.571		
Satd. Flow (perm)	612	3111	0	157	3150	1361	831	1691	1414	953	1576	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26				100			48		41	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		281.1			304.8			238.3			235.0	
Travel Time (s)		20.2			21.9			17.2			16.9	
Confl. Peds. (#/hr)	7		17	17		7	5		4	4		5
Peak Hour Factor	0.80	0.98	0.85	0.85	0.93	0.86	0.85	0.69	0.54	0.78	0.77	0.70
Heavy Vehicles (%)	3%	1%	0%	0%	2%	2%	0%	0%	0%	1%	0%	1%
Adj. Flow (vph)	195	1351	167	20	669	100	124	230	24	79	171	109
Shared Lane Traffic (%)												
Lane Group Flow (vph)	195	1518	0	20	669	100	124	230	24	79	280	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		
Minimum Split (s)	28.0	28.0		28.0	28.0	28.0	30.0	30.0	30.0	30.0	30.0	
Total Split (s)	49.6	49.6		49.6	49.6	49.6	30.4	30.4	30.4	30.4	30.4	
Total Split (%)	62.0%	62.0%		62.0%	62.0%	62.0%	38.0%	38.0%	38.0%	38.0%	38.0%	
Maximum Green (s)	43.1	43.1		43.1	43.1	43.1	23.9	23.9	23.9	23.9	23.9	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.8	2.8		2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.5	6.5		6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	14.0	14.0		14.0	14.0	14.0	17.0	17.0	17.0	17.0	17.0	
Flash Dont Walk (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0	0	0	
Act Effct Green (s)	43.1	43.1		43.1	43.1	43.1	23.9	23.9	23.9	23.9	23.9	
Actuated g/C Ratio	0.54	0.54		0.54	0.54	0.54	0.30	0.30	0.30	0.30	0.30	
v/c Ratio	0.59	0.90		0.24	0.39	0.13	0.50	0.46	0.05	0.28	0.56	
Control Delay	21.8	25.3		23.2	16.0	6.9	31.5	26.3	2.8	24.8	25.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	21.8	25.3		23.2	16.0	6.9	31.5	26.3	2.8	24.8	25.1	
LOS	C	C		C	B	A	C	C	A	C	C	
Approach Delay		24.9			15.0			26.5			25.1	

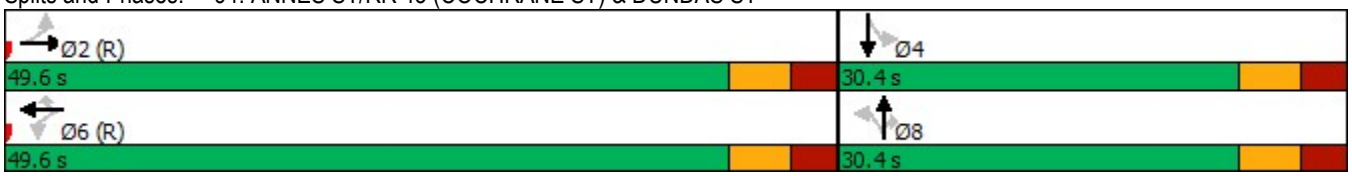
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B			C			C	
Queue Length 50th (m)	17.2	91.8		2.2	38.8	5.2	14.2	26.0	0.0	8.4	27.7	
Queue Length 95th (m)	30.9	#140.7		m5.7	55.0	m13.2	27.4	31.9	0.0	15.7	39.4	
Internal Link Dist (m)		257.1			280.8			214.3			211.0	
Turn Bay Length (m)	44.5			49.7		157.1	23.4		14.6	35.0		
Base Capacity (vph)	329	1688		84	1697	779	248	505	456	284	499	
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	0.59	0.90		0.24	0.39	0.13	0.50	0.46	0.05	0.28	0.56	

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 28 (35%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 75
Control Type: Pretimed
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 22.7 Intersection LOS: C
Intersection Capacity Utilization 109.2% ICU Level of Service H
Analysis Period (min) 15
Description: TMC Oct 24/17
Updated Sept 23/20

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 94: ANNES ST/RR 43 (COCHRANE ST) & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	103	1125	111	52	510	21	138	361	87	29	182	73
Future Volume (vph)	103	1125	111	52	510	21	138	361	87	29	182	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	24.7		0.0	30.2		16.0	7.6		11.0	13.8		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	32.9			38.5			41.4			24.7		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		1.00	1.00		0.99		0.95	0.98	0.99	
Frt		0.984			0.992				0.850		0.951	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1606	3115	0	1606	3123	0	1591	1691	1437	1560	1586	0
Flt Permitted	0.419			0.107			0.469			0.321		
Satd. Flow (perm)	706	3115	0	180	3123	0	780	1691	1363	518	1586	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			11				45		33	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		118.8			293.5			235.2			224.2	
Travel Time (s)		8.6			21.1			16.9			16.1	
Confl. Peds. (#/hr)	5		19	19		5	10		39	39		10
Peak Hour Factor	0.83	0.93	0.79	0.65	0.94	0.66	0.78	0.86	0.81	0.66	0.88	0.73
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	1%	0%	0%	3%	1%	0%
Adj. Flow (vph)	124	1210	141	80	543	32	177	420	107	44	207	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	124	1351	0	80	575	0	177	420	107	44	307	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		8	4		
Minimum Split (s)	29.0	29.0		29.0	29.0		31.0	31.0	31.0	31.0	31.0	
Total Split (s)	47.2	47.2		47.2	47.2		32.8	32.8	32.8	32.8	32.8	
Total Split (%)	59.0%	59.0%		59.0%	59.0%		41.0%	41.0%	41.0%	41.0%	41.0%	
Maximum Green (s)	40.9	40.9		40.9	40.9		26.7	26.7	26.7	26.7	26.7	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.6	2.6		2.6	2.6		2.4	2.4	2.4	2.4	2.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		6.1	6.1	6.1	6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		16.0	16.0	16.0	16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	40.9	40.9		40.9	40.9		26.7	26.7	26.7	26.7	26.7	
Actuated g/C Ratio	0.51	0.51		0.51	0.51		0.33	0.33	0.33	0.33	0.33	
v/c Ratio	0.34	0.84		0.87	0.36		0.68	0.74	0.22	0.26	0.56	
Control Delay	5.1	7.9		71.5	17.7		38.8	33.4	13.3	24.3	24.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	5.1	7.9		71.5	17.7		38.8	33.4	13.3	24.3	24.0	
LOS	A	A		E	B		D	C	B	C	C	
Approach Delay		7.6			24.2			31.7			24.0	

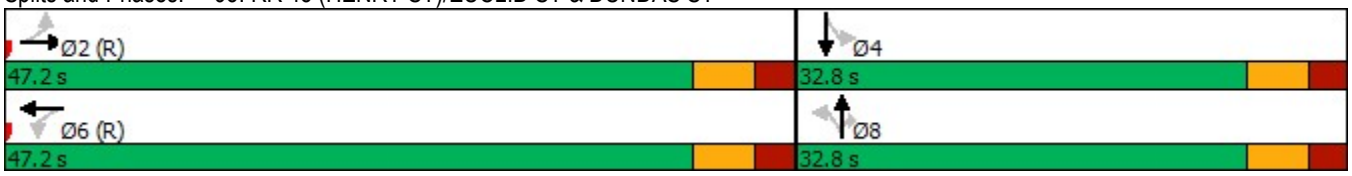
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			C			C			C	
Queue Length 50th (m)	2.1	11.2		12.4	45.2		21.1	51.4	6.0	4.4	30.8	
Queue Length 95th (m)	m3.1	m16.5		m13.8	m48.1		34.5	76.3	13.7	8.3	51.3	
Internal Link Dist (m)		94.8			269.5			211.2			200.2	
Turn Bay Length (m)	24.7			30.2			7.6		11.0	13.8		
Base Capacity (vph)	360	1603		92	1602		260	564	484	172	551	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.34	0.84		0.87	0.36		0.68	0.74	0.22	0.26	0.56	

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 57.6 (72%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 80
Control Type: Pretimed
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 18.2 Intersection LOS: B
Intersection Capacity Utilization 93.8% ICU Level of Service F
Analysis Period (min) 15
Description: TMC May 30 2017
Updated Sept 23/20

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

Splits and Phases: 95: RR 45 (HENRY ST)/EUCLID ST & DUNDAS ST



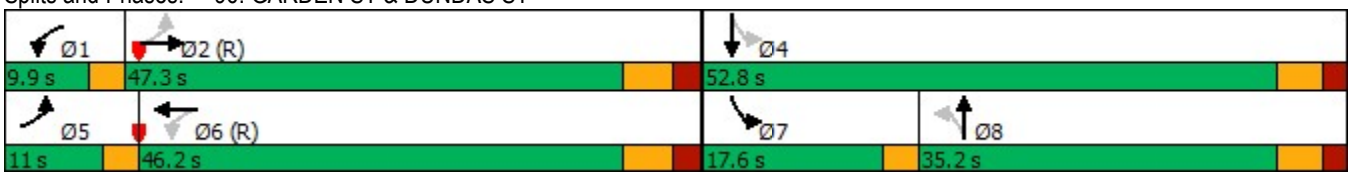
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	143	1125	23	68	726	199	32	625	78	278	410	73
Future Volume (vph)	143	1125	23	68	726	199	32	625	78	278	410	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	17.1		0.0	98.4		0.0	23.5		0.0	102.4		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	37.0			12.6			27.3			30.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.995			0.963			0.983			0.976	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1591	3164	0	1591	3027	0	1606	3142	0	1606	3128	0
Flt Permitted	0.112			0.101			0.449			0.124		
Satd. Flow (perm)	187	3164	0	169	3027	0	758	3142	0	209	3128	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			44			13			25	
Link Speed (k/h)		50			50			50			40	
Link Distance (m)		457.3			160.3			1037.5			218.0	
Travel Time (s)		32.9			11.5			74.7			19.6	
Confl. Peds. (#/hr)	6		5	5		6	3		19	19		3
Peak Hour Factor	0.85	0.90	0.52	0.77	0.94	0.80	0.73	0.82	0.78	0.93	0.90	0.83
Heavy Vehicles (%)	1%	1%	0%	1%	2%	1%	0%	0%	1%	0%	0%	0%
Adj. Flow (vph)	168	1250	44	88	772	249	44	762	100	299	456	88
Shared Lane Traffic (%)												
Lane Group Flow (vph)	168	1294	0	88	1021	0	44	862	0	299	544	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2			6			8			4		
Minimum Split (s)	9.0	40.0		9.0	40.0		35.0	35.0		9.0	35.0	
Total Split (s)	11.0	47.3		9.9	46.2		35.2	35.2		17.6	52.8	
Total Split (%)	10.0%	43.0%		9.0%	42.0%		32.0%	32.0%		16.0%	48.0%	
Maximum Green (s)	8.0	40.7		6.9	39.6		29.3	29.3		14.6	46.9	
Yellow Time (s)	3.0	4.1		3.0	4.1		3.7	3.7		3.0	3.7	
All-Red Time (s)	0.0	2.5		0.0	2.5		2.2	2.2		0.0	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		-3.0	0.0	
Total Lost Time (s)	3.0	6.6		3.0	6.6		5.9	5.9		0.0	5.9	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes						Yes		
Walk Time (s)		7.0			7.0		7.0	7.0			7.0	
Flash Dont Walk (s)		25.0			25.0		21.0	21.0			21.0	
Pedestrian Calls (#/hr)		0			0		0	0			0	
Act Effct Green (s)	52.3	40.7		50.1	39.6		29.3	29.3		52.8	46.9	
Actuated g/C Ratio	0.48	0.37		0.46	0.36		0.27	0.27		0.48	0.43	
v/c Ratio	0.88	1.10		0.53	0.91		0.22	1.02		0.93	0.40	
Control Delay	61.3	92.9		33.9	28.7		41.1	80.2		60.8	15.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	61.3	92.9		33.9	28.7		41.1	80.2		60.8	15.6	
LOS	E	F		C	C		D	F		E	B	
Approach Delay		89.3			29.1			78.3			31.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			C			E			C	
Queue Length 50th (m)	18.2	~153.7		4.6	76.1		7.7	~97.2		28.4	20.2	
Queue Length 95th (m)	#46.8	#192.6		13.8	#129.9		14.5	#113.4		#87.5	27.4	
Internal Link Dist (m)		433.3			136.3			1013.5			194.0	
Turn Bay Length (m)	17.1			98.4			23.5			102.4		
Base Capacity (vph)	191	1173		166	1117		201	846		323	1348	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.88	1.10		0.53	0.91		0.22	1.02		0.93	0.40	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 115
Control Type: Pretimed
Maximum v/c Ratio: 1.10
Intersection Signal Delay: 60.3 Intersection LOS: E
Intersection Capacity Utilization 97.1% ICU Level of Service F
Analysis Period (min) 15
Description: TMC Oct 19/16
Updated Sept 23/20
Phase 1 minimum timing error due to 2 second COMM delay
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 96: GARDEN ST & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	183	4	210	10	2	8	71	796	21	12	605	92
Future Volume (vph)	183	4	210	10	2	8	71	796	21	12	605	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	34.4		0.0	33.8		0.0	51.6		0.0	79.3		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.4			18.0			30.4			24.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Frt		0.855			0.880			0.994			0.976	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1474	1265	0	1606	1331	0	1501	3044	0	1606	2928	0
Flt Permitted	0.744			0.449			0.274			0.292		
Satd. Flow (perm)	1151	1265	0	758	1331	0	432	3044	0	493	2928	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		171			16			5			31	
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		467.7			161.7			218.0			150.1	
Travel Time (s)		42.1			14.6			19.6			13.5	
Confl. Peds. (#/hr)	2		2	2		2	3		2	2		3
Peak Hour Factor	0.76	0.50	0.85	0.50	0.50	0.50	0.74	0.96	0.66	0.60	0.79	0.64
Heavy Vehicles (%)	9%	0%	13%	0%	0%	13%	7%	5%	0%	0%	6%	10%
Adj. Flow (vph)	241	8	247	20	4	16	96	829	32	20	766	144
Shared Lane Traffic (%)												
Lane Group Flow (vph)	241	255	0	20	20	0	96	861	0	20	910	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					
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	28.0	28.0		28.0	28.0		27.0	27.0		27.0	27.0	
Total Split (s)	44.0	44.0		44.0	44.0		66.0	66.0		66.0	66.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		60.0%	60.0%		60.0%	60.0%	
Maximum Green (s)	37.7	37.7		37.7	37.7		60.1	60.1		60.1	60.1	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.7	3.7		3.7	3.7	
All-Red Time (s)	3.3	3.3		3.3	3.3		2.2	2.2		2.2	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		5.9	5.9		5.9	5.9	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	28.3	28.3		28.3	28.3		69.5	69.5		69.5	69.5	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.63	0.63		0.63	0.63	
v/c Ratio	0.81	0.56		0.10	0.06		0.35	0.45		0.06	0.49	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	58.7	15.9		28.7	13.4		21.5	18.9		11.1	12.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	58.7	15.9		28.7	13.4		21.5	18.9		11.1	12.6	
LOS	E	B		C	B		C	B		B	B	
Approach Delay		36.7			21.1			19.1			12.6	
Approach LOS		D			C			B			B	
90th %ile Green (s)	37.7	37.7		37.7	37.7		60.1	60.1		60.1	60.1	
90th %ile Term Code	Max	Max		Hold	Hold		Coord	Coord		Coord	Coord	
70th %ile Green (s)	33.5	33.5		33.5	33.5		64.3	64.3		64.3	64.3	
70th %ile Term Code	Gap	Gap		Hold	Hold		Coord	Coord		Coord	Coord	
50th %ile Green (s)	28.5	28.5		28.5	28.5		69.3	69.3		69.3	69.3	
50th %ile Term Code	Gap	Gap		Hold	Hold		Coord	Coord		Coord	Coord	
30th %ile Green (s)	24.1	24.1		24.1	24.1		73.7	73.7		73.7	73.7	
30th %ile Term Code	Gap	Gap		Hold	Hold		Coord	Coord		Coord	Coord	
10th %ile Green (s)	17.6	17.6		17.6	17.6		80.2	80.2		80.2	80.2	
10th %ile Term Code	Gap	Gap		Hold	Hold		Coord	Coord		Coord	Coord	
Queue Length 50th (m)	44.7	13.2		3.0	0.6		11.3	56.6		1.4	45.0	
Queue Length 95th (m)	51.0	4.2		4.2	2.0		m13.2	m64.8		3.4	60.2	
Internal Link Dist (m)		443.7			137.7			194.0			126.1	
Turn Bay Length (m)	34.4			33.8			51.6			79.3		
Base Capacity (vph)	394	545		259	466		273	1925		311	1861	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.61	0.47		0.08	0.04		0.35	0.45		0.06	0.49	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 36.3 (33%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 20.3 Intersection LOS: C
Intersection Capacity Utilization 74.9% ICU Level of Service D
Analysis Period (min) 15
Description: TMC Nov 27/19
Updated Sept 17/20
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 139: GARDEN ST & MARY ST

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	1309	6	23	794	19	13	38	83	36	18	7
Future Volume (vph)	13	1309	6	23	794	19	13	38	83	36	18	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			1.00			0.98			0.99	
Frt		0.998			0.994			0.915			0.984	
Flt Protected		0.999			0.998			0.995			0.973	
Satd. Flow (prot)	0	2918	0	0	2913	0	0	1387	0	0	1440	0
Flt Permitted		0.921			0.858			0.959			0.602	
Satd. Flow (perm)	0	2690	0	0	2505	0	0	1335	0	0	887	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			9			38			8	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		375.6			457.3			240.1			181.4	
Travel Time (s)		27.0			32.9			17.3			13.1	
Confl. Peds. (#/hr)	10		19	19		10	13		11	11		13
Peak Hour Factor	0.46	0.91	0.38	0.72	0.87	0.48	0.54	0.63	0.58	0.64	0.56	0.58
Heavy Vehicles (%)	0%	10%	0%	13%	9%	11%	8%	8%	10%	6%	22%	14%
Adj. Flow (vph)	28	1438	16	32	913	40	24	60	143	56	32	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1482	0	0	985	0	0	227	0	0	100	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase							8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		27.0	27.0		27.0	27.0	
Total Split (s)	52.8	52.8		52.8	52.8		27.2	27.2		27.2	27.2	
Total Split (%)	66.0%	66.0%		66.0%	66.0%		34.0%	34.0%		34.0%	34.0%	
Maximum Green (s)	47.3	47.3		47.3	47.3		21.8	21.8		21.8	21.8	
Yellow Time (s)	3.8	3.8		3.8	3.8		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.7	1.7		1.7	1.7		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.5			5.5			5.4			5.4	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		52.9			52.9			16.2			16.2	
Actuated g/C Ratio		0.66			0.66			0.20			0.20	
v/c Ratio		0.83			0.59			0.76			0.54	
Control Delay		8.1			10.3			40.1			35.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.1			10.3			40.1			35.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		A			B			D			D	
Approach Delay		8.1			10.3			40.1			35.4	
Approach LOS		A			B			D			D	
90th %ile Green (s)	47.3	47.3		47.3	47.3		21.8	21.8		21.8	21.8	
90th %ile Term Code	Coord	Coord		Coord	Coord		Max	Max		Hold	Hold	
70th %ile Green (s)	49.2	49.2		49.2	49.2		19.9	19.9		19.9	19.9	
70th %ile Term Code	Coord	Coord		Coord	Coord		Gap	Gap		Hold	Hold	
50th %ile Green (s)	52.3	52.3		52.3	52.3		16.8	16.8		16.8	16.8	
50th %ile Term Code	Coord	Coord		Coord	Coord		Gap	Gap		Hold	Hold	
30th %ile Green (s)	55.5	55.5		55.5	55.5		13.6	13.6		13.6	13.6	
30th %ile Term Code	Coord	Coord		Coord	Coord		Gap	Gap		Hold	Hold	
10th %ile Green (s)	60.1	60.1		60.1	60.1		9.0	9.0		9.0	9.0	
10th %ile Term Code	Coord	Coord		Coord	Coord		Gap	Gap		Hold	Hold	
Queue Length 50th (m)		10.1			35.6			25.8			11.0	
Queue Length 95th (m)		m#135.1			58.3			26.9			m12.1	
Internal Link Dist (m)		351.6			433.3			216.1			157.4	
Turn Bay Length (m)												
Base Capacity (vph)		1778			1658			391			247	
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		0.83			0.59			0.58			0.40	

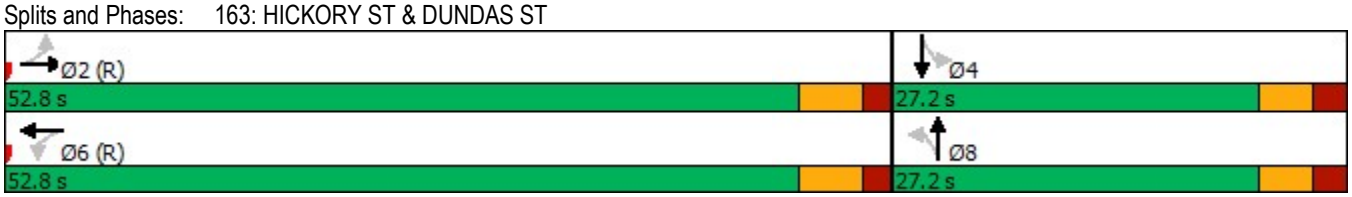
Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 20 (25%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 12.4 Intersection LOS: B
Intersection Capacity Utilization 74.9% ICU Level of Service D
Analysis Period (min) 15
Description: TMC June 26/19
Updated Sept 28/20

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

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

Splits and Phases: 163: HICKORY ST & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	336	42	15	130	29	23	11	35	25	16	12
Future Volume (vph)	15	336	42	15	130	29	23	11	35	25	16	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.985			0.976			0.927			0.968	
Flt Protected		0.998			0.996			0.984			0.982	
Satd. Flow (prot)	0	1682	0	0	1650	0	0	1639	0	0	1712	0
Flt Permitted		0.998			0.996			0.984			0.982	
Satd. Flow (perm)	0	1682	0	0	1650	0	0	1639	0	0	1712	0
Link Speed (k/h)		40			50			48			48	
Link Distance (m)		360.6			467.7			35.4			173.4	
Travel Time (s)		32.5			33.7			2.7			13.0	
Peak Hour Factor	0.63	0.81	0.75	0.94	0.96	0.91	0.79	0.92	0.73	0.69	0.40	0.50
Heavy Vehicles (%)	13%	10%	7%	7%	12%	7%	4%	0%	6%	0%	6%	8%
Adj. Flow (vph)	24	415	56	16	135	32	29	12	48	36	40	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	495	0	0	183	0	0	89	0	0	100	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 35.0%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	169	13	10	175	80	25	114	12	39	122	14
Future Volume (vph)	27	169	13	10	175	80	25	114	12	39	122	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992			0.957			0.988			0.990	
Flt Protected		0.994			0.998			0.989			0.987	
Satd. Flow (prot)	0	1853	0	0	1761	0	0	1792	0	0	1824	0
Flt Permitted		0.994			0.998			0.989			0.987	
Satd. Flow (perm)	0	1853	0	0	1761	0	0	1792	0	0	1824	0
Link Speed (k/h)		48			50			50			50	
Link Distance (m)		409.8			409.6			717.2			235.2	
Travel Time (s)		30.7			29.5			51.6			16.9	
Peak Hour Factor	0.75	0.75	0.81	0.63	0.84	0.77	0.63	0.89	0.75	0.70	0.87	0.88
Heavy Vehicles (%)	0%	0%	0%	0%	1%	4%	8%	1%	0%	0%	1%	0%
Adj. Flow (vph)	36	225	16	16	208	104	40	128	16	56	140	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	277	0	0	328	0	0	184	0	0	212	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 41.9%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	101	12	33	62	92	7	140	40	49	222	55
Future Volume (vph)	26	101	12	33	62	92	7	140	40	49	222	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.987			0.930			0.970			0.973	
Flt Protected		0.990			0.991			0.997			0.992	
Satd. Flow (prot)	0	1836	0	0	1721	0	0	1779	0	0	1785	0
Flt Permitted		0.990			0.991			0.997			0.992	
Satd. Flow (perm)	0	1836	0	0	1721	0	0	1779	0	0	1785	0
Link Speed (k/h)		48			48			48			50	
Link Distance (m)		124.1			409.8			229.8			238.3	
Travel Time (s)		9.3			30.7			17.2			17.2	
Peak Hour Factor	0.81	0.87	0.75	0.75	0.86	0.74	0.58	0.90	0.83	0.77	0.88	0.69
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	3%	0%	2%	2%	0%
Adj. Flow (vph)	32	116	16	44	72	124	12	156	48	64	252	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	164	0	0	240	0	0	216	0	0	396	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 52.0%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	64	7	203	40	17	7	160	297	18	77	1
Future Volume (vph)	2	64	7	203	40	17	7	160	297	18	77	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.985			0.988			0.918			0.995	
Flt Protected		0.996			0.963			0.999			0.992	
Satd. Flow (prot)	0	1843	0	0	1788	0	0	1723	0	0	1855	0
Flt Permitted		0.996			0.963			0.999			0.992	
Satd. Flow (perm)	0	1843	0	0	1788	0	0	1723	0	0	1855	0
Link Speed (k/h)		48			50			50			48	
Link Distance (m)		142.5			412.1			224.2			221.1	
Travel Time (s)		10.7			29.7			16.1			16.6	
Peak Hour Factor	0.25	0.73	0.58	0.75	0.83	0.53	0.88	0.83	0.95	0.90	0.80	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	8	88	12	271	48	32	8	193	313	20	96	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	108	0	0	351	0	0	514	0	0	120	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 55.3%	ICU Level of Service B
Analysis Period (min) 15	

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	112	82	31	9	9	43
Future Volume (vph)	112	82	31	9	9	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.969		0.889	
Flt Protected		0.972			0.991	
Satd. Flow (prot)	0	1826	1779	0	1628	0
Flt Permitted		0.972			0.991	
Satd. Flow (perm)	0	1826	1779	0	1628	0
Link Speed (k/h)		50	48		50	
Link Distance (m)		376.2	165.2		240.1	
Travel Time (s)		27.1	12.4		17.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	3%	0%	0%	2%
Adj. Flow (vph)	122	89	34	10	10	47
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	211	44	0	57	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 27.2%	ICU Level of Service A
Analysis Period (min) 15	

Lanes, Volumes, Timings
90: BROCK ST N & MARY ST W/MARY ST E

11/09/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	72	12	39	175	76	40	367	16	53	637	240
Future Volume (vph)	74	72	12	39	175	76	40	367	16	53	637	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	22.3		0.0	18.9		0.0	16.3		0.0	25.4		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	23.1			28.7			29.3			34.6		
Satd. Flow (prot)	1434	1452	0	1422	1488	0	1306	1433	0	1447	1523	1319
Flt Permitted	0.418			0.698			0.300			0.484		
Satd. Flow (perm)	625	1452	0	1039	1488	0	411	1433	0	730	1523	1278
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			28			4				261
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		414.4			360.2			133.8			82.0	
Travel Time (s)		29.8			25.9			9.6			5.9	
Confl. Peds. (#/hr)	7		3	3		7	6		10	10		6
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	12%	13%	17%	13%	7%	8%	23%	17%	19%	11%	11%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	80	91	0	42	273	0	43	416	0	58	692	261
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	26.0	26.0		26.0	26.0		28.0	28.0		28.0	28.0	28.0
Total Split (s)	29.0	29.0		29.0	29.0		51.0	51.0		51.0	51.0	51.0
Total Split (%)	36.3%	36.3%		36.3%	36.3%		63.8%	63.8%		63.8%	63.8%	63.8%
Yellow Time (s)	4.0	4.0		4.0	4.0		3.7	3.7		3.7	3.7	3.7
All-Red Time (s)	1.8	1.8		1.8	1.8		1.6	1.6		1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8		5.8	5.8		5.3	5.3		5.3	5.3	5.3
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	18.0	18.0		18.0	18.0		50.9	50.9		50.9	50.9	50.9
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.64	0.64		0.64	0.64	0.64
v/c Ratio	0.57	0.27		0.18	0.77		0.16	0.46		0.12	0.71	0.29
Control Delay	42.7	23.0		24.9	40.0		13.7	13.7		3.6	11.7	0.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	42.7	23.0		24.9	40.0		13.7	13.7		3.6	11.7	0.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	C		C	D		B	B		A	B	A
Approach Delay		32.2			38.0			13.7			8.4	
Approach LOS		C			D			B			A	
Queue Length 50th (m)	9.9	9.1		4.7	31.9		2.7	26.2		1.1	63.2	0.0
Queue Length 95th (m)	21.5	18.4		11.3	51.7		m6.1	m48.2		m2.3	#124.0	0.0
Internal Link Dist (m)		390.4			336.2			109.8			58.0	
Turn Bay Length (m)	22.3			18.9			16.3			25.4		
Base Capacity (vph)	181	428		301	451		261	913		464	969	908
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.44	0.21		0.14	0.61		0.16	0.46		0.13	0.71	0.29

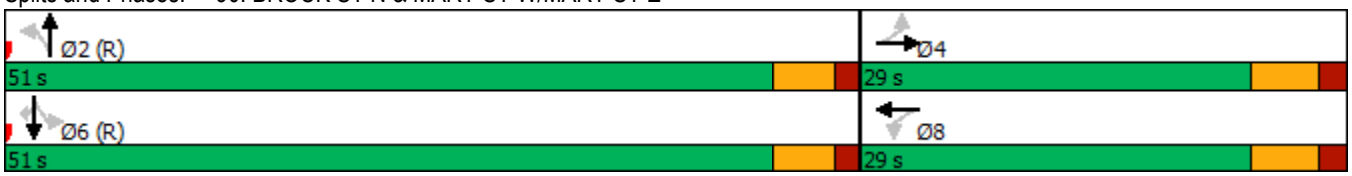
Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 23.2 (29%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 16.5 Intersection LOS: B
Intersection Capacity Utilization 85.3% ICU Level of Service E
Analysis Period (min) 15
Description: TMC Sep 26/19
Updated Sept 17/20

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

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

Splits and Phases: 90: BROCK ST N & MARY ST W/MARY ST E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	70	61	43	105	16	6	432	57	0	572	29
Future Volume (vph)	18	70	61	43	105	16	6	432	57	0	572	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	35.0		0.0	35.1		0.0	16.0		0.0	16.1		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	25.0			21.2			15.0			30.0		
Satd. Flow (prot)	1516	1526	0	1606	1576	0	1606	1595	1409	1691	1608	0
Flt Permitted	0.673			0.666			0.358					
Satd. Flow (perm)	1030	1526	0	1088	1576	0	593	1595	1281	1691	1608	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		51			9				62		6	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		405.1			375.4			117.4			239.3	
Travel Time (s)		29.2			27.0			8.5			17.2	
Confl. Peds. (#/hr)	22		31	31		22	31		29	29		31
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	1%	0%	0%	3%	13%	0%	6%	2%	0%	4%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	142	0	47	131	0	7	470	62	0	654	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		20.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		26.0	26.0	26.0	26.0	26.0	
Total Split (s)	25.0	25.0		25.0	25.0		55.0	55.0	55.0	55.0	55.0	
Total Split (%)	31.3%	31.3%		31.3%	31.3%		68.8%	68.8%	68.8%	68.8%	68.8%	
Yellow Time (s)	4.2	4.2		4.2	4.2		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2		6.2	6.2		5.7	5.7	5.7	5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Act Effct Green (s)	11.8	11.8		11.8	11.8		56.3	56.3	56.3		56.3	
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.70	0.70	0.70		0.70	
v/c Ratio	0.13	0.53		0.30	0.55		0.02	0.42	0.07		0.58	
Control Delay	29.9	27.2		34.0	37.5		4.2	5.7	1.1		1.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.1	0.0		0.0	
Total Delay	29.9	27.2		34.0	37.5		4.2	5.8	1.1		1.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C	C		C	D		A	A	A		A	
Approach Delay		27.5			36.6			5.2			1.4	
Approach LOS		C			D			A			A	
Queue Length 50th (m)	2.5	11.8		6.0	16.1		0.2	17.8	0.0		0.0	
Queue Length 95th (m)	7.4	25.4		13.9	29.1		m1.0	28.4	1.6		m0.0	
Internal Link Dist (m)		381.1			351.4			93.4			215.3	
Turn Bay Length (m)	35.0			35.1			16.0					
Base Capacity (vph)	242	397		255	377		417	1123	920		1134	
Starvation Cap Reductn	0	0		0	0		0	104	0		0	
Spillback Cap Reductn	0	0		0	0		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.08	0.36		0.18	0.35		0.02	0.46	0.07		0.58	

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 49.6 (62%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.58
Intersection Signal Delay: 9.6 Intersection LOS: A
Intersection Capacity Utilization 70.3% ICU Level of Service C
Analysis Period (min) 15
Description: TMC Oct 4/18
Updated Sept 17/20

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

Splits and Phases: 91: BROCK ST S & DUNLOP ST

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	560	134	12	1036	40	151	114	28	118	239	310
Future Volume (vph)	77	560	134	12	1036	40	151	114	28	118	239	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	44.5		40.0	0.0		157.1	23.4		14.6	35.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	31.3			29.4			40.9			25.0		
Satd. Flow (prot)	1545	3031	1437	1361	3150	1331	1560	1626	1261	1591	1516	0
Flt Permitted	0.950			0.950			0.142			0.677		
Satd. Flow (perm)	1541	3031	1397	1356	3150	1291	233	1626	1238	1127	1516	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			166			166			116		84	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		281.1			304.8			225.7			1140.1	
Travel Time (s)		20.2			21.9			16.3			82.1	
Confl. Peds. (#/hr)	5		4	4		5	1		6	6		1
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	6%	0%	18%	2%	8%	3%	4%	14%	1%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	609	146	13	1126	43	164	124	30	128	597	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases			2			6	8		8	4		
Detector Phase	5	2	2	1	6	6	3	8	8	4	4	
Switch Phase												
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0	20.0	1.3	8.0	8.0	8.0	8.0	
Minimum Split (s)	10.0	29.0	29.0	10.0	29.0	29.0	5.0	30.0	30.0	30.0	30.0	
Total Split (s)	10.0	34.0	34.0	10.0	34.0	34.0	5.0	36.0	36.0	31.0	31.0	
Total Split (%)	12.5%	42.5%	42.5%	12.5%	42.5%	42.5%	6.3%	45.0%	45.0%	38.8%	38.8%	
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.8	2.8	2.0	2.8	2.8	0.0	2.8	2.8	2.8	2.8	
Lost Time Adjust (s)	-3.0	0.0	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	2.0	6.5	6.5	5.0	6.5	6.5	0.7	6.5	6.5	6.5	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes			Yes					
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	
Act Effct Green (s)	8.0	27.5	27.5	5.0	27.5	27.5	35.3	29.5	29.5	24.5	24.5	
Actuated g/C Ratio	0.10	0.34	0.34	0.06	0.34	0.34	0.44	0.37	0.37	0.31	0.31	
v/c Ratio	0.55	0.59	0.25	0.15	1.04	0.08	0.94	0.21	0.06	0.37	1.14	
Control Delay	48.7	24.3	3.7	39.9	75.5	1.0	77.0	18.5	0.2	25.6	110.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	48.7	24.3	3.7	39.9	75.5	1.0	77.0	18.5	0.2	25.6	110.8	

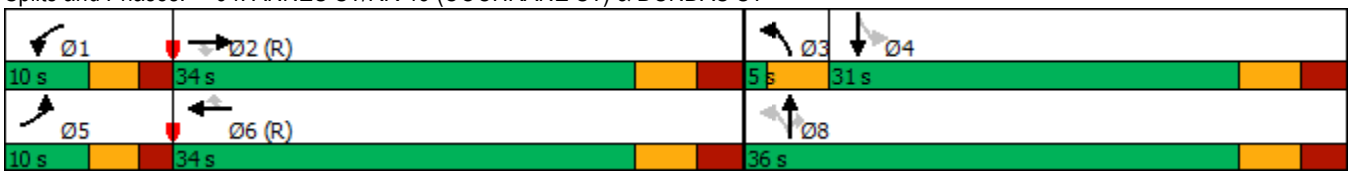
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	C	A	D	E	A	E	B	A	C	F	
Approach Delay		23.2			72.4			46.9			95.8	
Approach LOS		C			E			D			F	
Queue Length 50th (m)	11.4	36.3	0.0	1.8	~94.5	0.0	13.8	11.6	0.0	13.9	~90.8	
Queue Length 95th (m)	#26.6	51.1	8.2	m4.5	#130.1	m0.7	#41.7	22.3	0.0	27.5	#146.3	
Internal Link Dist (m)		257.1			280.8			201.7			1116.1	
Turn Bay Length (m)	44.5		40.0			157.1	23.4		14.6	35.0		
Base Capacity (vph)	154	1041	589	85	1082	552	174	599	529	345	522	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.55	0.59	0.25	0.15	1.04	0.08	0.94	0.21	0.06	0.37	1.14	

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 100
Control Type: Pretimed
Maximum v/c Ratio: 1.14
Intersection Signal Delay: 61.8 Intersection LOS: E
Intersection Capacity Utilization 98.5% ICU Level of Service F
Analysis Period (min) 15
Description: TMC Oct 24/17
Updated Sept 23/20

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 94: ANNES ST/RR 43 (COCHRANE ST) & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	413	18	91	789	141	39	323	55	208	560	89
Future Volume (vph)	58	413	18	91	789	141	39	323	55	208	560	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	17.1		0.0	98.4		0.0	23.5		0.0	102.4		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	37.0			12.6			27.3			30.0		
Satd. Flow (prot)	1545	3036	0	1545	1626	1356	1447	3034	0	1501	3060	0
Flt Permitted	0.950			0.950			0.378			0.466		
Satd. Flow (perm)	1539	3036	0	1527	1626	1325	568	3034	0	730	3060	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				137		22			23	
Link Speed (k/h)		50			50			50			40	
Link Distance (m)		457.3			160.3			1037.5			218.0	
Travel Time (s)		32.9			11.5			74.7			19.6	
Confl. Peds. (#/hr)	13		26	26		13	23		17	17		23
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	5%	6%	4%	4%	6%	11%	3%	4%	7%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	63	469	0	99	858	153	42	411	0	226	706	0
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases						6	8			4		
Detector Phase	5	2		1	6	6	8	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	20.0		5.0	20.0	20.0	8.0	8.0		5.0	8.0	
Minimum Split (s)	10.5	38.6		10.5	38.6	38.6	33.9	33.9		8.0	33.9	
Total Split (s)	10.5	38.6		10.5	38.6	38.6	33.9	33.9		8.0	41.9	
Total Split (%)	11.5%	42.4%		11.5%	42.4%	42.4%	37.3%	37.3%		8.8%	46.0%	
Yellow Time (s)	3.0	4.1		3.0	4.1	4.1	3.7	3.7		3.0	3.7	
All-Red Time (s)	2.5	2.5		2.5	2.5	2.5	2.2	2.2		0.0	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		-3.0	0.0	
Total Lost Time (s)	5.5	6.6		5.5	6.6	6.6	5.9	5.9		0.0	5.9	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes				Yes		
Recall Mode	Max	Max		Max	Max	Max	Max	Max		Max	Max	
Act Effct Green (s)	5.0	32.0		5.0	32.0	32.0	28.0	28.0		41.9	36.0	
Actuated g/C Ratio	0.05	0.35		0.05	0.35	0.35	0.31	0.31		0.46	0.40	
v/c Ratio	0.75	0.44		1.18	1.50	0.28	0.24	0.43		0.56	0.58	
Control Delay	91.0	23.9		195.0	261.7	6.3	28.1	25.5		22.2	23.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	91.0	23.9		195.0	261.7	6.3	28.1	25.5		22.2	23.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	F	C		F	F	A	C	C		C	C	
Approach Delay		31.9			220.5			25.7			22.9	
Approach LOS		C			F			C			C	
Queue Length 50th (m)	10.2	29.7		~19.2	~193.7	1.7	5.0	26.1		22.3	44.3	
Queue Length 95th (m)	#30.0	42.2		#47.2	#257.0	13.1	13.1	38.2		37.4	60.4	
Internal Link Dist (m)		433.3			136.3			1013.5			194.0	
Turn Bay Length (m)	17.1			98.4			23.5			102.4		
Base Capacity (vph)	84	1070		84	571	554	174	948		403	1224	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.75	0.44		1.18	1.50	0.28	0.24	0.43		0.56	0.58	

Intersection Summary

Area Type: CBD
Cycle Length: 91
Actuated Cycle Length: 91
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 125
Control Type: Pretimed
Maximum v/c Ratio: 1.50
Intersection Signal Delay: 97.4 Intersection LOS: F
Intersection Capacity Utilization 104.8% ICU Level of Service G
Analysis Period (min) 15
Description: TMC Oct 19/16
Updated Sept 23/20

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 96: GARDEN ST & DUNDAS ST

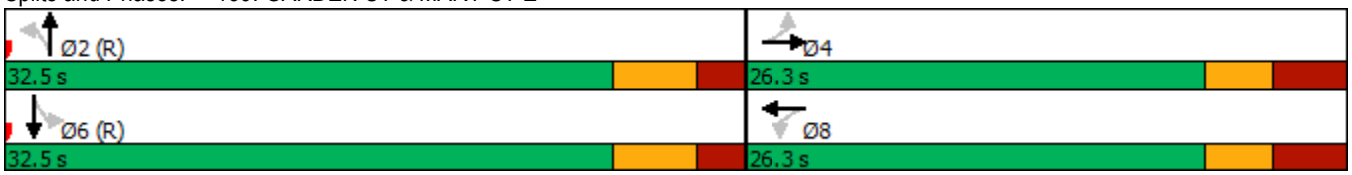
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	78	0	117	13	6	26	66	540	3	19	727	171
Future Volume (vph)	78	0	117	13	6	26	66	540	3	19	727	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	34.4		0.0	33.8		0.0	51.6		0.0	79.3		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.4			18.0			30.4			24.0		
Satd. Flow (prot)	1422	1242	0	1397	1467	0	1373	2919	0	1447	2851	0
Flt Permitted	0.734			0.676			0.274			0.429		
Satd. Flow (perm)	1092	1242	0	992	1467	0	393	2919	0	651	2851	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		95			28			1			63	
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		468.1			161.7			218.0			150.1	
Travel Time (s)		42.1			14.6			19.6			13.5	
Confl. Peds. (#/hr)	7		3	3		7	21		5	5		21
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	13%	0%	14%	15%	0%	0%	17%	10%	0%	11%	8%	10%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	85	127	0	14	35	0	72	590	0	21	976	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)	8.0	8.0		8.0	8.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	26.3	26.3		26.3	26.3		27.0	27.0		27.0	27.0	
Total Split (s)	26.3	26.3		26.3	26.3		32.5	32.5		32.5	32.5	
Total Split (%)	44.7%	44.7%		44.7%	44.7%		55.3%	55.3%		55.3%	55.3%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.7	3.7		3.7	3.7	
All-Red Time (s)	3.3	3.3		3.3	3.3		2.2	2.2		2.2	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		5.9	5.9		5.9	5.9	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	10.5	10.5		10.5	10.5		40.1	40.1		40.1	40.1	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.68	0.68		0.68	0.68	
v/c Ratio	0.44	0.42		0.08	0.12		0.27	0.30		0.05	0.50	
Control Delay	27.9	12.2		19.4	10.3		10.1	6.0		6.1	7.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	27.9	12.2		19.4	10.3		10.1	6.0		6.1	7.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C	B		B	B		B	A		A	A	
Approach Delay		18.5			12.9			6.5			7.2	
Approach LOS		B			B			A			A	
Queue Length 50th (m)	7.7	2.7		1.2	0.6		2.8	12.1		0.7	22.3	
Queue Length 95th (m)	16.4	12.7		4.4	5.6		11.3	24.0		3.3	43.8	
Internal Link Dist (m)		444.1			137.7			194.0			126.1	
Turn Bay Length (m)	34.4			33.8			51.6			79.3		
Base Capacity (vph)	371	485		337	517		268	1993		444	1966	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.23	0.26		0.04	0.07		0.27	0.30		0.05	0.50	

Intersection Summary

Area Type: CBD
Cycle Length: 58.8
Actuated Cycle Length: 58.8
Offset: 42.9 (73%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.50
Intersection Signal Delay: 8.4 Intersection LOS: A
Intersection Capacity Utilization 72.5% ICU Level of Service C
Analysis Period (min) 15
Description: TMC Nov 27/19
Updated Sept 17/20

Splits and Phases: 139: GARDEN ST & MARY ST E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	511	1	42	778	6	4	14	38	22	17	11
Future Volume (vph)	7	511	1	42	778	6	4	14	38	22	17	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	80.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	0.0			0.0			0.0			0.0		
Satd. Flow (prot)	1373	1497	0	1530	1494	0	0	1348	0	0	1439	0
Flt Permitted	0.950			0.950				0.970			0.865	
Satd. Flow (perm)	1368	1497	0	1517	1494	0	0	1311	0	0	1271	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					1			41			12	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		375.6			457.3			233.0			181.4	
Travel Time (s)		27.0			32.9			16.8			13.1	
Confl. Peds. (#/hr)	5		8	8		5	10		3	3		10
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	17%	13%	0%	5%	13%	17%	0%	33%	6%	11%	0%	27%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	8	556	0	46	853	0	0	60	0	0	54	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	20.0		5.0	20.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	10.0	28.0		10.0	28.0		26.0	26.0		26.0	26.0	
Total Split (s)	10.0	44.0		10.0	44.0		26.0	26.0		26.0	26.0	
Total Split (%)	12.5%	55.0%		12.5%	55.0%		32.5%	32.5%		32.5%	32.5%	
Yellow Time (s)	3.0	3.8		3.0	3.8		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	1.7		2.0	1.7		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.0	5.5		5.0	5.5			5.4			5.4	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes			Yes								
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Act Effct Green (s)	5.3	59.7		7.0	65.3			9.1			9.1	
Actuated g/C Ratio	0.07	0.75		0.09	0.82			0.11			0.11	
v/c Ratio	0.09	0.50		0.34	0.70			0.32			0.35	
Control Delay	17.9	18.6		40.7	12.8			22.8			30.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	17.9	18.6		40.7	12.8			22.8			30.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B	B		D	B			C			C	
Approach Delay		18.6			14.3			22.8			30.1	
Approach LOS		B			B			C			C	
Queue Length 50th (m)	1.0	56.9		6.2	50.0			2.3			4.6	
Queue Length 95th (m)	m1.1	m58.4		14.7	#187.0			10.8			m12.7	
Internal Link Dist (m)		351.6			433.3			209.0			157.4	
Turn Bay Length (m)	30.0			80.0								
Base Capacity (vph)	91	1117		134	1220			368			336	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.09	0.50		0.34	0.70			0.16			0.16	

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 16.7 Intersection LOS: B
Intersection Capacity Utilization 66.9% ICU Level of Service C
Analysis Period (min) 15
Description: TMC Jun 26/19
Updated Sept 28/20

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 163: HICKORY ST & DUNDAS ST

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	125	30	14	196	15	9	17	6	27	16	26
Future Volume (vph)	16	125	30	14	196	15	9	17	6	27	16	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1621	0	0	1714	0	0	1560	0	0	1608	0
Flt Permitted		0.995			0.997			0.986			0.981	
Satd. Flow (perm)	0	1621	0	0	1714	0	0	1560	0	0	1608	0
Link Speed (k/h)		40			50			48			48	
Link Distance (m)		360.2			468.1			35.4			183.4	
Travel Time (s)		32.4			33.7			2.7			13.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	14%	10%	7%	9%	0%	22%	18%	0%	7%	13%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	186	0	0	244	0	0	35	0	0	74	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	27.1%
ICU Level of Service	A
Analysis Period (min)	15

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	34	26	45	7	11	67
Future Volume (vph)	34	26	45	7	11	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%	0%		0%	
Storage Length (m)	0.0			0.0	0.0	0.0
Storage Lanes	0			0	1	0
Taper Length (m)	25.0				25.0	
Satd. Flow (prot)	0	1766	1702	0	1575	0
Flt Permitted		0.972			0.993	
Satd. Flow (perm)	0	1766	1702	0	1575	0
Link Speed (k/h)		50	48		50	
Link Distance (m)		375.4	228.6		233.0	
Travel Time (s)		27.0	17.1		16.8	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	4%	9%	4%	9%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	65	57	0	85	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 21.3%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	22	4	215	104	13	3	105	63	16	110	1
Future Volume (vph)	3	22	4	215	104	13	3	105	63	16	110	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1769	0	0	1806	0	0	1742	0	0	1808	0
Flt Permitted		0.995			0.969			0.999			0.994	
Satd. Flow (perm)	0	1769	0	0	1806	0	0	1742	0	0	1808	0
Link Speed (k/h)		48			50			50			48	
Link Distance (m)		204.5			414.4			228.8			243.5	
Travel Time (s)		15.3			29.8			16.5			18.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	5%	0%	0%	0%	8%	0%	2%	3%	19%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	31	0	0	361	0	0	185	0	0	138	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	46.6%
ICU Level of Service	A
Analysis Period (min)	15

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	139	12	13	90	53	24	114	19	55	174	25
Future Volume (vph)	24	139	12	13	90	53	24	114	19	55	174	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1834	0	0	1730	0	0	1757	0	0	1736	0
Flt Permitted		0.993			0.996			0.992			0.989	
Satd. Flow (perm)	0	1834	0	0	1730	0	0	1757	0	0	1736	0
Link Speed (k/h)		48			50			50			50	
Link Distance (m)		420.8			405.1			724.5			229.4	
Travel Time (s)		31.6			29.2			52.2			16.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	1%	0%	0%	2%	6%	0%	4%	11%	2%	7%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	190	0	0	170	0	0	171	0	0	276	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 42.0%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	76	11	29	68	66	10	157	38	47	239	70
Future Volume (vph)	21	76	11	29	68	66	10	157	38	47	239	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1784	0	0	1701	0	0	1715	0	0	1685	0
Flt Permitted		0.990			0.991			0.998			0.993	
Satd. Flow (perm)	0	1784	0	0	1701	0	0	1715	0	0	1685	0
Link Speed (k/h)		48			48			48			50	
Link Distance (m)		217.5			420.8			175.4			225.7	
Travel Time (s)		16.3			31.6			13.2			16.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	4%	0%	3%	4%	3%	40%	6%	0%	4%	9%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	118	0	0	178	0	0	223	0	0	387	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 52.6%	ICU Level of Service A
Analysis Period (min) 15	

Lanes, Volumes, Timings
90: BROCK ST & MARY ST W/MARY ST E

11/09/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	239	189	37	33	91	73	29	523	36	83	440	173
Future Volume (vph)	239	189	37	33	91	73	29	523	36	83	440	173
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	22.3		0.0	18.9		0.0	16.3		0.0	25.4		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	23.1			28.7			29.3			34.6		
Satd. Flow (prot)	1474	1511	0	1516	1378	0	1460	1494	0	1422	1510	1295
Flt Permitted	0.636			0.532			0.347			0.354		
Satd. Flow (perm)	969	1511	0	836	1378	0	526	1494	0	510	1510	1213
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			54			6				188
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		409.8			360.6			134.9			82.0	
Travel Time (s)		29.5			26.0			9.7			5.9	
Confl. Peds. (#/hr)	11		11	11		11	23		51	51		23
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	9%	8%	11%	6%	7%	19%	10%	11%	14%	13%	12%	11%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	260	245	0	36	178	0	32	607	0	90	478	188
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		5.0	20.0		20.0	20.0	20.0
Minimum Split (s)	26.0	26.0		26.0	26.0		9.0	28.0		28.0	28.0	28.0
Total Split (s)	33.0	33.0		33.0	33.0		9.0	47.0		38.0	38.0	38.0
Total Split (%)	41.3%	41.3%		41.3%	41.3%		11.3%	58.8%		47.5%	47.5%	47.5%
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	3.7		3.7	3.7	3.7
All-Red Time (s)	1.8	1.8		1.8	1.8		0.0	1.6		1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8		5.8	5.8		3.0	5.3		5.3	5.3	5.3
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	24.2	24.2		24.2	24.2		47.0	44.7		41.1	41.1	41.1
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.59	0.56		0.51	0.51	0.51
v/c Ratio	0.89	0.53		0.14	0.39		0.09	0.73		0.34	0.62	0.26
Control Delay	58.1	25.5		20.3	16.9		2.9	11.5		13.6	15.2	1.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	58.1	25.5		20.3	16.9		2.9	11.5		13.6	15.2	1.3

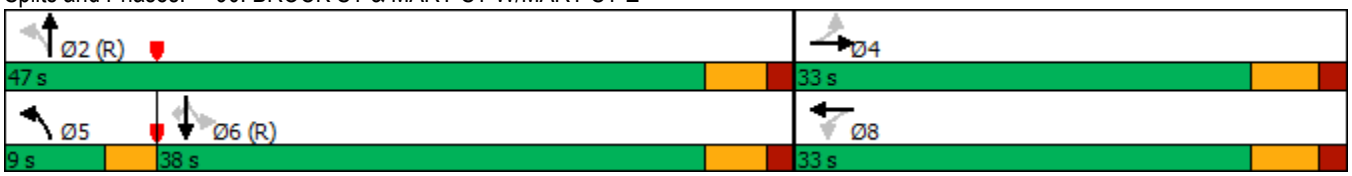
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	C		C	B		A	B		B	B	A
Approach Delay		42.3			17.4			11.1			11.5	
Approach LOS		D			B			B			B	
Queue Length 50th (m)	32.3	25.0		3.4	12.4		0.8	88.2		3.5	18.7	0.0
Queue Length 95th (m)	#67.8	43.8		9.4	26.8		m0.6	m59.4		17.3	#100.4	2.1
Internal Link Dist (m)		385.8			336.6			110.9			58.0	
Turn Bay Length (m)	22.3			18.9			16.3			25.4		
Base Capacity (vph)	329	522		284	504		378	836		262	776	715
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.79	0.47		0.13	0.35		0.08	0.73		0.34	0.62	0.26

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 76 (95%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 19.3 Intersection LOS: B
Intersection Capacity Utilization 95.5% ICU Level of Service F
Analysis Period (min) 15
Description: TMC Sep 26/19
Updated Sept 17/20

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 90: BROCK ST & MARY ST W/MARY ST E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	138	95	65	108	21	3	520	104	5	554	19
Future Volume (vph)	34	138	95	65	108	21	3	520	104	5	554	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	35.0		0.0	35.1		0.0	16.0		0.0	16.1		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	25.0			21.2			15.0			30.0		
Satd. Flow (prot)	1606	1552	0	1575	1600	0	1606	1658	1437	1606	1627	0
Flt Permitted	0.668			0.435			0.312			0.425		
Satd. Flow (perm)	1072	1552	0	701	1600	0	528	1658	1236	680	1627	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		41			12				113		3	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		407.9			373.1			117.4			239.3	
Travel Time (s)		29.4			26.9			8.5			17.2	
Confl. Peds. (#/hr)	28		33	33		28	52		49	49		52
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	0%	0%	2%	2%	0%	0%	2%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	253	0	71	140	0	3	565	113	5	623	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		5	2	2	6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		5.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		8.0	26.0	26.0	26.0	26.0	
Total Split (s)	26.0	26.0		26.0	26.0		8.0	54.0	54.0	46.0	46.0	
Total Split (%)	32.5%	32.5%		32.5%	32.5%		10.0%	67.5%	67.5%	57.5%	57.5%	
Yellow Time (s)	4.2	4.2		4.2	4.2		3.0	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2		6.2	6.2		3.0	5.7	5.7	5.7	5.7	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	C-Max	C-Max	C-Max	C-Max	
Act Effct Green (s)	15.6	15.6		15.6	15.6		55.2	52.5	52.5	50.9	50.9	
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.69	0.66	0.66	0.64	0.64	
v/c Ratio	0.18	0.76		0.52	0.43		0.01	0.52	0.13	0.01	0.60	
Control Delay	27.0	39.3		41.6	29.0		4.0	5.9	1.0	11.0	13.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.2	0.0	0.0	0.0	
Total Delay	27.0	39.3		41.6	29.0		4.0	6.0	1.0	11.0	13.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C	D		D	C		A	A	A	B	B	
Approach Delay		37.8			33.3			5.2			13.2	
Approach LOS		D			C			A			B	
Queue Length 50th (m)	4.3	27.8		8.8	15.6		0.1	18.2	0.0	0.3	37.2	
Queue Length 95th (m)	10.9	47.8		19.8	28.7		m0.2	28.0	0.8	m0.2	m33.3	
Internal Link Dist (m)		383.9			349.1			93.4			215.3	
Turn Bay Length (m)	35.0			35.1			16.0			16.1		
Base Capacity (vph)	265	414		173	405		431	1087	849	432	1035	
Starvation Cap Reductn	0	0		0	0		0	98	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.14	0.61		0.41	0.35		0.01	0.57	0.13	0.01	0.60	

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 40 (50%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 16.4 Intersection LOS: B
Intersection Capacity Utilization 71.3% ICU Level of Service C
Analysis Period (min) 15
Description: TMC Oct 4/18
Updated Sept 17/20

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

Splits and Phases: 91: BROCK ST S & DUNLOP ST

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	171	1450	155	21	798	110	134	201	14	68	157	97
Future Volume (vph)	171	1450	155	21	798	110	134	201	14	68	157	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	44.5		0.0	49.7		157.1	23.4		14.6	35.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	31.3			29.4			40.9			25.0		
Satd. Flow (prot)	1560	3123	0	1606	3150	1409	1606	1691	1437	1591	1578	0
Flt Permitted	0.283			0.092			0.507			0.588		
Satd. Flow (perm)	463	3123	0	156	3150	1361	854	1691	1414	981	1578	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22				120			48		39	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		281.1			304.8			219.5			1140.1	
Travel Time (s)		20.2			21.9			15.8			82.1	
Confl. Peds. (#/hr)	7		17	17		7	5		4	4		5
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	1%	0%	0%	2%	2%	0%	0%	0%	1%	0%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	186	1744	0	23	867	120	146	218	15	74	276	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		
Detector Phase	2	2		6	6	6	8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0	20.0	8.0	8.0	8.0	8.0	8.0	
Minimum Split (s)	29.0	29.0		29.0	29.0	29.0	30.0	30.0	30.0	30.0	30.0	
Total Split (s)	50.0	50.0		50.0	50.0	50.0	30.0	30.0	30.0	30.0	30.0	
Total Split (%)	62.5%	62.5%		62.5%	62.5%	62.5%	37.5%	37.5%	37.5%	37.5%	37.5%	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.8	2.8		2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.5	6.5		6.5	6.5	6.5	3.5	6.5	6.5	6.5	6.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max	Max	Max	Max	Max	Max	Max	
Act Effct Green (s)	43.5	43.5		43.5	43.5	43.5	26.5	23.5	23.5	23.5	23.5	
Actuated g/C Ratio	0.54	0.54		0.54	0.54	0.54	0.33	0.29	0.29	0.29	0.29	
v/c Ratio	0.74	1.02		0.27	0.51	0.15	0.52	0.44	0.03	0.26	0.56	
Control Delay	35.6	47.0		24.3	17.5	6.0	29.5	26.3	0.1	24.6	25.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	35.6	47.0		24.3	17.5	6.0	29.5	26.3	0.1	24.6	25.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	D		C	B	A	C	C	A	C	C	
Approach Delay		45.9			16.3			26.5			25.4	
Approach LOS		D			B			C			C	
Queue Length 50th (m)	18.5	~128.2		2.7	53.4	6.8	16.3	24.6	0.0	7.9	27.6	
Queue Length 95th (m)	#52.1	#176.3		m6.2	71.1	m13.0	32.8	42.3	0.4	17.7	49.2	
Internal Link Dist (m)		257.1			280.8			195.5			1116.1	
Turn Bay Length (m)	44.5			49.7		157.1	23.4		14.6	35.0		
Base Capacity (vph)	251	1708		84	1712	794	282	496	449	288	491	
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	0.74	1.02		0.27	0.51	0.15	0.52	0.44	0.03	0.26	0.56	

Intersection Summary

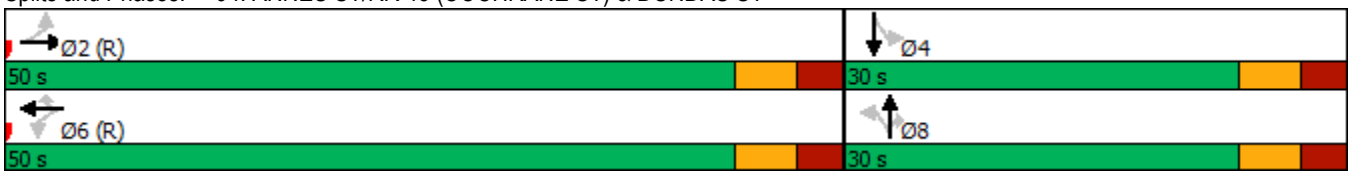
Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 28 (35%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90
Control Type: Pretimed
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 33.8 Intersection LOS: C
Intersection Capacity Utilization 113.5% ICU Level of Service H
Analysis Period (min) 15
Description: TMC Oct 24/17
Updated Sept 23/20

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

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

Splits and Phases: 94: ANNES ST/RR 43 (COCHRANE ST) & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	104	1145	112	62	617	24	163	405	88	29	207	87
Future Volume (vph)	104	1145	112	62	617	24	163	405	88	29	207	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	24.7		0.0	30.2		16.0	7.6		11.0	13.8		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	32.9			38.5			41.4			24.7		
Satd. Flow (prot)	1606	3127	0	1606	3130	0	1591	1691	1437	1560	1593	0
Flt Permitted	0.357			0.109			0.445			0.280		
Satd. Flow (perm)	602	3127	0	184	3130	0	741	1691	1363	452	1593	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			7				48		28	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		118.8			293.5			227.2			234.4	
Travel Time (s)		8.6			21.1			16.4			16.9	
Confl. Peds. (#/hr)	5		19	19		5	10		39	39		10
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	1%	0%	0%	3%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	113	1367	0	67	697	0	177	440	96	32	320	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		8	4		
Detector Phase	2	2		6	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	
Minimum Split (s)	28.0	28.0		28.0	28.0		29.5	29.5	29.5	29.5	29.5	
Total Split (s)	48.4	48.4		48.4	48.4		31.6	31.6	31.6	31.6	31.6	
Total Split (%)	60.5%	60.5%		60.5%	60.5%		39.5%	39.5%	39.5%	39.5%	39.5%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.8	2.8		2.8	2.8		2.8	2.8	2.8	2.8	2.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.5	6.5		6.5	6.5		6.5	6.5	6.5	6.5	6.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		Max	Max	Max	Max	Max	
Act Effct Green (s)	41.9	41.9		41.9	41.9		25.1	25.1	25.1	25.1	25.1	
Actuated g/C Ratio	0.52	0.52		0.52	0.52		0.31	0.31	0.31	0.31	0.31	
v/c Ratio	0.36	0.83		0.70	0.42		0.76	0.83	0.21	0.23	0.62	
Control Delay	4.0	5.1		34.0	17.9		48.7	41.1	12.7	25.4	27.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	4.0	5.1		34.0	17.9		48.7	41.1	12.7	25.4	27.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	A	A		C	B		D	D	B	C	C	
Approach Delay		5.1			19.3			39.2			27.1	
Approach LOS		A			B			D			C	
Queue Length 50th (m)	1.9	11.3		10.3	54.1		22.1	56.6	4.7	3.3	34.3	
Queue Length 95th (m)	m1.9	m11.1		m9.5	m43.7		#52.0	#100.2	14.4	10.0	58.3	
Internal Link Dist (m)		94.8			269.5			203.2			210.4	
Turn Bay Length (m)	24.7			30.2			7.6		11.0	13.8		
Base Capacity (vph)	315	1646		96	1642		232	530	460	141	519	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.36	0.83		0.70	0.42		0.76	0.83	0.21	0.23	0.62	

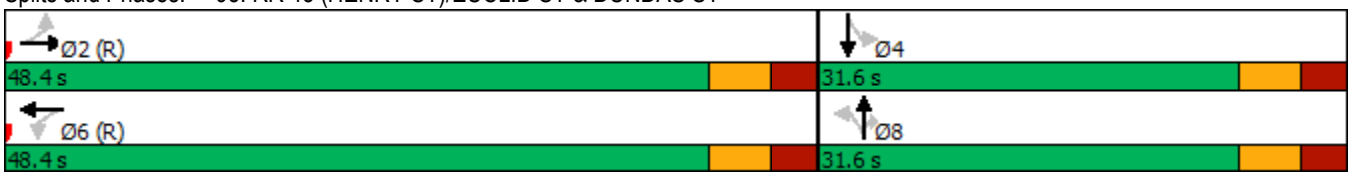
Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 57.6 (72%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 65
Control Type: Pretimed
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 18.1 Intersection LOS: B
Intersection Capacity Utilization 98.0% ICU Level of Service F
Analysis Period (min) 15
Description: TMC May 30 2017
Updated Sept 23/20

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

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

Splits and Phases: 95: RR 45 (HENRY ST)/EUCLID ST & DUNDAS ST



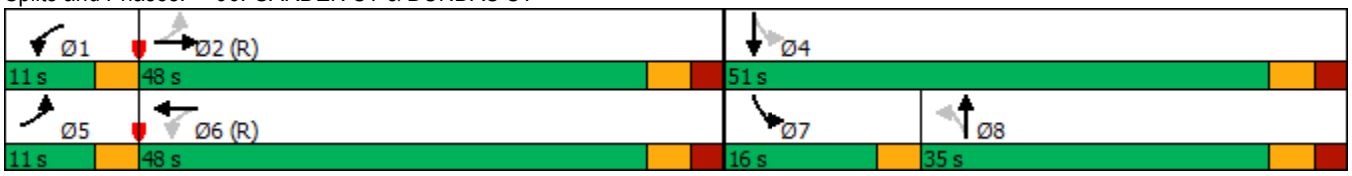
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	1149	23	73	789	216	34	650	79	283	424	79
Future Volume (vph)	145	1149	23	73	789	216	34	650	79	283	424	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	17.1		0.0	98.4		0.0	23.5		0.0	102.4		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	37.0			12.6			27.3			30.0		
Satd. Flow (prot)	1591	3171	0	1591	3044	0	1606	3146	0	1606	3128	0
Flt Permitted	0.111			0.096			0.448			0.146		
Satd. Flow (perm)	186	3171	0	161	3044	0	756	3146	0	246	3128	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			36			11			23	
Link Speed (k/h)		50			50			50			40	
Link Distance (m)		457.3			160.3			1037.5			218.0	
Travel Time (s)		32.9			11.5			74.7			19.6	
Confl. Peds. (#/hr)	6		5	5		6	3		19	19		3
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	1%	1%	0%	1%	2%	1%	0%	0%	1%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	158	1274	0	79	1093	0	37	793	0	308	547	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	20.0		5.0	20.0		8.0	8.0		5.0	8.0	
Minimum Split (s)	10.5	41.0		10.5	41.0		35.0	35.0		11.5	35.0	
Total Split (s)	11.0	48.0		11.0	48.0		35.0	35.0		16.0	51.0	
Total Split (%)	10.0%	43.6%		10.0%	43.6%		31.8%	31.8%		14.5%	46.4%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7		3.7	3.7	
All-Red Time (s)	0.0	2.8		0.0	2.8		2.8	2.8		0.0	2.8	
Lost Time Adjust (s)	-3.0	0.0		0.0	0.0		0.0	0.0		-3.0	0.0	
Total Lost Time (s)	0.7	6.5		3.7	6.5		6.5	6.5		0.7	6.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes						Yes		
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Act Effct Green (s)	57.6	41.5		51.6	41.5		28.5	28.5		50.3	44.5	
Actuated g/C Ratio	0.52	0.38		0.47	0.38		0.26	0.26		0.46	0.40	
v/c Ratio	0.69	1.06		0.46	0.93		0.19	0.96		1.02	0.43	
Control Delay	33.7	78.8		29.3	31.8		40.9	68.8		81.2	17.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	33.7	78.8		29.3	31.8		40.9	68.8		81.2	17.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C	E		C	C		D	E		F	B	
Approach Delay		73.8			31.7			67.5			40.7	
Approach LOS		E			C			E			D	
Queue Length 50th (m)	15.6	~146.7		4.1	100.1		6.3	87.4		~48.6	39.4	
Queue Length 95th (m)	#38.1	#185.4		16.8	#144.6		16.9	#120.3		#93.5	26.6	
Internal Link Dist (m)		433.3			136.3			1013.5			194.0	
Turn Bay Length (m)	17.1			98.4			23.5			102.4		
Base Capacity (vph)	228	1197		170	1170		195	823		301	1279	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.69	1.06		0.46	0.93		0.19	0.96		1.02	0.43	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 120
Control Type: Pretimed
Maximum v/c Ratio: 1.06
Intersection Signal Delay: 54.5 Intersection LOS: D
Intersection Capacity Utilization 99.2% ICU Level of Service F
Analysis Period (min) 15
Description: TMC Oct 19/16
Updated Sept 23/20
Phase 1 minimum timing error due to 2 second COMM delay
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 96: GARDEN ST & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	183	4	210	10	2	8	71	796	21	12	605	92
Future Volume (vph)	183	4	210	10	2	8	71	796	21	12	605	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	34.4		0.0	33.8		0.0	51.6		0.0	79.3		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.4			18.0			30.4			24.0		
Satd. Flow (prot)	1474	1260	0	1606	1324	0	1501	3049	0	1606	2945	0
Flt Permitted	0.750			0.455			0.342			0.290		
Satd. Flow (perm)	1160	1260	0	768	1324	0	539	3049	0	490	2945	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		217			9			4			24	
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		467.7			161.7			218.0			150.1	
Travel Time (s)		42.1			14.6			19.6			13.5	
Confl. Peds. (#/hr)	2		2	2		2	3		2	2		3
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	9%	0%	13%	0%	0%	13%	7%	5%	0%	0%	6%	10%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	199	232	0	11	11	0	77	888	0	13	758	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)	8.0	8.0		8.0	8.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	28.0	28.0		28.0	28.0		27.0	27.0		27.0	27.0	
Total Split (s)	45.0	45.0		45.0	45.0		65.0	65.0		65.0	65.0	
Total Split (%)	40.9%	40.9%		40.9%	40.9%		59.1%	59.1%		59.1%	59.1%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.7	3.7		3.7	3.7	
All-Red Time (s)	3.3	3.3		3.3	3.3		2.2	2.2		2.2	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		5.9	5.9		5.9	5.9	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	24.5	24.5		24.5	24.5		73.3	73.3		73.3	73.3	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.67	0.67		0.67	0.67	
v/c Ratio	0.77	0.52		0.06	0.04		0.21	0.44		0.04	0.38	
Control Delay	58.8	9.6		30.3	16.7		17.2	17.0		9.2	9.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	58.8	9.6		30.3	16.7		17.2	17.0		9.2	9.6	

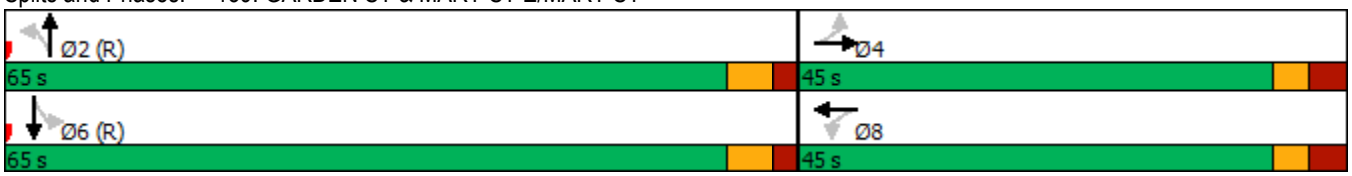
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	A		C	B		B	B		A	A	
Approach Delay		32.3			23.5			17.0			9.6	
Approach LOS		C			C			B			A	
Queue Length 50th (m)	37.2	2.4		1.7	0.3		7.9	54.1		0.8	30.8	
Queue Length 95th (m)	54.3	18.8		5.4	4.0		m10.5	m68.7		3.6	53.7	
Internal Link Dist (m)		443.7			137.7			194.0			126.1	
Turn Bay Length (m)	34.4			33.8			51.6			79.3		
Base Capacity (vph)	408	583		270	471		359	2033		326	1970	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.49	0.40		0.04	0.02		0.21	0.44		0.04	0.38	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 36.3 (33%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 17.5 Intersection LOS: B
Intersection Capacity Utilization 74.9% ICU Level of Service D
Analysis Period (min) 15
Description: TMC Nov 27/19
Updated Sept 17/20

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

Splits and Phases: 139: GARDEN ST & MARY ST E/MARY ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	1318	6	26	930	22	15	39	83	36	18	8
Future Volume (vph)	13	1318	6	26	930	22	15	39	83	36	18	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	0.0			0.0			0.0			0.0		
Satd. Flow (prot)	0	2921	0	0	2929	0	0	1346	0	0	1439	0
Flt Permitted		0.940			0.876			0.957			0.728	
Satd. Flow (perm)	0	2746	0	0	2568	0	0	1293	0	0	1072	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			5			37			9	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		375.6			457.3			241.7			181.4	
Travel Time (s)		27.0			32.9			17.4			13.1	
Confl. Peds. (#/hr)	10		19	19		10	13		11	11		13
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	10%	0%	13%	9%	11%	0%	33%	6%	6%	22%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1454	0	0	1063	0	0	148	0	0	68	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	28.0	28.0		28.0	28.0		26.5	26.5		26.5	26.5	
Total Split (s)	53.5	53.5		53.5	53.5		26.5	26.5		26.5	26.5	
Total Split (%)	66.9%	66.9%		66.9%	66.9%		33.1%	33.1%		33.1%	33.1%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7		3.7	3.7	
All-Red Time (s)	2.8	2.8		2.8	2.8		2.8	2.8		2.8	2.8	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.5			6.5			6.5			6.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)		54.3			54.3			12.7			12.7	
Actuated g/C Ratio		0.68			0.68			0.16			0.16	
v/c Ratio		0.78			0.61			0.63			0.38	
Control Delay		16.4			9.7			25.7			33.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		16.4			9.7			25.7			33.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B			A			C			C	
Approach Delay		16.4			9.7			25.7			33.3	
Approach LOS		B			A			C			C	
Queue Length 50th (m)		60.1			35.6			8.1			7.8	
Queue Length 95th (m)		m62.4			66.7			m19.4			m16.3	
Internal Link Dist (m)		351.6			433.3			217.7			157.4	
Turn Bay Length (m)												
Base Capacity (vph)		1864			1745			351			274	
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		0.78			0.61			0.42			0.25	

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 14.7 Intersection LOS: B
Intersection Capacity Utilization 76.3% ICU Level of Service D
Analysis Period (min) 15
Description: TMC June 26/19
Updated Sept 28/20

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

Splits and Phases: 163: HICKORY ST & DUNDAS ST

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	336	43	15	130	31	23	11	35	25	16	13
Future Volume (vph)	15	336	43	15	130	31	23	11	35	25	16	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1682	0	0	1653	0	0	1651	0	0	1712	0
Flt Permitted		0.998			0.996			0.984			0.977	
Satd. Flow (perm)	0	1682	0	0	1653	0	0	1651	0	0	1712	0
Link Speed (k/h)		40			50			48			48	
Link Distance (m)		360.6			467.7			35.4			173.4	
Travel Time (s)		32.5			33.7			2.7			13.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	13%	10%	7%	7%	12%	6%	4%	0%	6%	0%	6%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	428	0	0	191	0	0	75	0	0	58	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 35.1%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	169	13	10	175	80	25	114	12	39	122	14
Future Volume (vph)	27	169	13	10	175	80	25	114	12	39	122	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1853	0	0	1765	0	0	1806	0	0	1825	0
Flt Permitted		0.994			0.998			0.992			0.989	
Satd. Flow (perm)	0	1853	0	0	1765	0	0	1806	0	0	1825	0
Link Speed (k/h)		48			50			50			50	
Link Distance (m)		418.0			407.9			725.2			227.2	
Travel Time (s)		31.4			29.4			52.2			16.4	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	0%	0%	0%	1%	4%	8%	1%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	227	0	0	288	0	0	164	0	0	190	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	41.9%
ICU Level of Service	A
Analysis Period (min)	15

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	101	12	33	62	92	7	195	40	49	222	55
Future Volume (vph)	26	101	12	33	62	92	7	195	40	49	222	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1840	0	0	1726	0	0	1805	0	0	1793	0
Flt Permitted		0.991			0.991			0.998			0.993	
Satd. Flow (perm)	0	1840	0	0	1726	0	0	1805	0	0	1793	0
Link Speed (k/h)		48			48			48			50	
Link Distance (m)		208.7			418.0			214.5			219.5	
Travel Time (s)		15.7			31.4			16.1			15.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	2%	0%	2%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	151	0	0	203	0	0	263	0	0	354	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 54.9%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	64	7	203	40	17	7	160	297	18	77	1
Future Volume (vph)	2	64	7	203	40	17	7	160	297	18	77	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1851	0	0	1791	0	0	1716	0	0	1860	0
Flt Permitted		0.999			0.962			0.999			0.991	
Satd. Flow (perm)	0	1851	0	0	1791	0	0	1716	0	0	1860	0
Link Speed (k/h)		48			50			50			48	
Link Distance (m)		208.2			409.8			234.4			259.5	
Travel Time (s)		15.6			29.5			16.9			19.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	80	0	0	282	0	0	505	0	0	105	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	55.3%
ICU Level of Service	B
Analysis Period (min)	15

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	112	82	31	9	9	43
Future Volume (vph)	112	82	31	9	9	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%	0%		0%	
Storage Length (m)	0.0			0.0	0.0	0.0
Storage Lanes	0			0	1	0
Taper Length (m)	25.0				25.0	
Satd. Flow (prot)	0	1826	1779	0	1628	0
Flt Permitted		0.972			0.991	
Satd. Flow (perm)	0	1826	1779	0	1628	0
Link Speed (k/h)		50	48		50	
Link Distance (m)		373.1	229.4		241.7	
Travel Time (s)		26.9	17.2		17.4	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	0%	3%	0%	0%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	211	44	0	57	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 27.2%	ICU Level of Service A
Analysis Period (min) 15	

Lanes, Volumes, Timings
90: BROCK ST N & MARY ST W/MARY ST E

12/17/2020

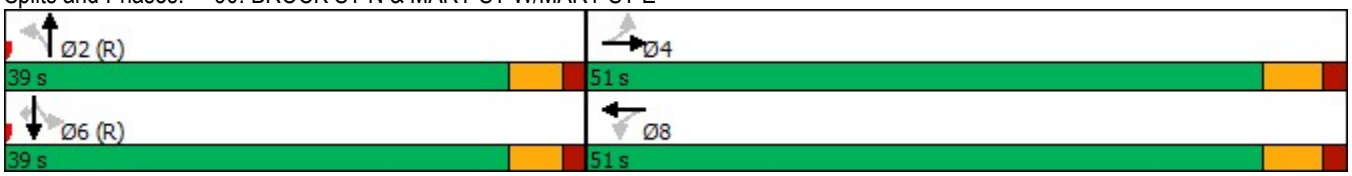
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	237	12	39	329	173	40	367	16	53	451	426
Future Volume (vph)	95	237	12	39	329	173	40	367	16	53	451	426
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	22.3		0.0	18.9		0.0	16.3		0.0	25.4		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	23.1			28.7			29.3			34.6		
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		1.00	0.99		1.00	1.00		0.99		0.97
Frt		0.988			0.946			0.991				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1434	1471	0	1422	1470	0	1306	1427	0	1447	1523	1319
Flt Permitted	0.171			0.492			0.267			0.289		
Satd. Flow (perm)	258	1471	0	733	1470	0	366	1427	0	437	1523	1276
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			45			4				318
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		414.4			360.2			133.8			82.0	
Travel Time (s)		29.8			25.9			9.6			5.9	
Confl. Peds. (#/hr)	7		3	3		7	6		10	10		6
Peak Hour Factor	0.84	0.75	0.43	0.81	0.71	0.66	0.71	0.83	0.57	0.74	0.92	0.85
Heavy Vehicles (%)	12%	13%	17%	13%	7%	8%	23%	17%	19%	11%	11%	9%
Adj. Flow (vph)	113	316	28	48	463	262	56	442	28	72	490	501
Shared Lane Traffic (%)												
Lane Group Flow (vph)	113	344	0	48	725	0	56	470	0	72	490	501
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	26.0	26.0		26.0	26.0		28.0	28.0		28.0	28.0	28.0
Total Split (s)	51.0	51.0		51.0	51.0		39.0	39.0		39.0	39.0	39.0
Total Split (%)	56.7%	56.7%		56.7%	56.7%		43.3%	43.3%		43.3%	43.3%	43.3%
Maximum Green (s)	45.2	45.2		45.2	45.2		33.7	33.7		33.7	33.7	33.7
Yellow Time (s)	4.0	4.0		4.0	4.0		3.7	3.7		3.7	3.7	3.7
All-Red Time (s)	1.8	1.8		1.8	1.8		1.6	1.6		1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8		5.8	5.8		5.3	5.3		5.3	5.3	5.3
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	44.4	44.4		44.4	44.4		34.5	34.5		34.5	34.5	34.5
Actuated g/C Ratio	0.49	0.49		0.49	0.49		0.38	0.38		0.38	0.38	0.38
v/c Ratio	0.89	0.47		0.13	0.97		0.40	0.86		0.43	0.84	0.73

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	81.3	17.1		12.2	43.9		31.5	43.0		31.2	40.7	15.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	81.3	17.1		12.2	43.9		31.5	43.0		31.2	40.7	15.9
LOS	F	B		B	D		C	D		C	D	B
Approach Delay		33.0			41.9			41.8			28.4	
Approach LOS		C			D			D			C	
90th %ile Green (s)	45.2	45.2		45.2	45.2		33.7	33.7		33.7	33.7	33.7
90th %ile Term Code	Max	Max		Max	Max		Coord	Coord		Coord	Coord	Coord
70th %ile Green (s)	45.2	45.2		45.2	45.2		33.7	33.7		33.7	33.7	33.7
70th %ile Term Code	Max	Max		Max	Max		Coord	Coord		Coord	Coord	Coord
50th %ile Green (s)	45.2	45.2		45.2	45.2		33.7	33.7		33.7	33.7	33.7
50th %ile Term Code	Max	Max		Max	Max		Coord	Coord		Coord	Coord	Coord
30th %ile Green (s)	45.2	45.2		45.2	45.2		33.7	33.7		33.7	33.7	33.7
30th %ile Term Code	Hold	Hold		Max	Max		Coord	Coord		Coord	Coord	Coord
10th %ile Green (s)	41.2	41.2		41.2	41.2		37.7	37.7		37.7	37.7	37.7
10th %ile Term Code	Hold	Hold		Gap	Gap		Coord	Coord		Coord	Coord	Coord
Queue Length 50th (m)	15.2	33.1		2.9	79.5		6.5	68.0		8.4	70.8	23.4
Queue Length 95th (m)	#41.2	41.1		m5.2	73.5		12.6	#103.5		15.8	#121.4	51.4
Internal Link Dist (m)		390.4			336.2			109.8			58.0	
Turn Bay Length (m)	22.3			18.9			16.3			25.4		
Base Capacity (vph)	129	742		368	760		140	549		167	583	685
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.88	0.46		0.13	0.95		0.40	0.86		0.43	0.84	0.73

Intersection Summary

Area Type: CBD
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 35.3 Intersection LOS: D
Intersection Capacity Utilization 99.4% ICU Level of Service F
Analysis Period (min) 15
Description: TMC Sep 26/19
Updated Sept 17/20
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 90: BROCK ST N & MARY ST W/MARY ST E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	241	132	43	186	16	6	382	107	0	572	29
Future Volume (vph)	18	241	132	43	186	16	6	382	107	0	572	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	35.1		0.0	16.0		0.0	16.1		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	25.0			21.2			15.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.96	0.98			0.99				0.90		0.99	
Frt		0.951			0.983				0.850		0.990	
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1516	1567	0	1606	1584	0	1606	1595	1409	1691	1599	0
Flt Permitted	0.537			0.185			0.206					
Satd. Flow (perm)	826	1567	0	313	1584	0	348	1595	1268	1691	1599	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			8				143		6	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		405.1			375.4			117.4			239.3	
Travel Time (s)		29.2			27.0			8.5			17.2	
Confl. Peds. (#/hr)	22		31	31		22	31		29	29		31
Peak Hour Factor	0.64	0.67	0.76	0.71	0.83	0.57	0.50	0.78	0.75	0.25	0.86	0.60
Heavy Vehicles (%)	6%	1%	0%	0%	3%	13%	0%	6%	2%	0%	4%	3%
Adj. Flow (vph)	28	360	174	61	224	28	12	490	143	0	665	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	534	0	61	252	0	12	490	143	0	713	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		20.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		26.0	26.0	26.0	26.0	26.0	
Total Split (s)	38.0	38.0		38.0	38.0		52.0	52.0	52.0	52.0	52.0	
Total Split (%)	42.2%	42.2%		42.2%	42.2%		57.8%	57.8%	57.8%	57.8%	57.8%	
Maximum Green (s)	31.8	31.8		31.8	31.8		46.3	46.3	46.3	46.3	46.3	
Yellow Time (s)	4.2	4.2		4.2	4.2		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2		6.2	6.2		5.7	5.7	5.7	5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		9.0	9.0	9.0	9.0	9.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	31.0	31.0		31.0	31.0		47.1	47.1	47.1		47.1	
Actuated g/C Ratio	0.34	0.34		0.34	0.34		0.52	0.52	0.52		0.52	
v/c Ratio	0.10	0.95		0.57	0.46		0.07	0.59	0.20		0.85	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	20.8	56.8		47.5	25.1		12.3	18.7	2.8		30.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	1.9	0.0		0.0	
Total Delay	20.8	56.8		47.5	25.1		12.3	20.5	2.8		30.6	
LOS	C	E		D	C		B	C	A		C	
Approach Delay		55.0			29.5			16.4			30.6	
Approach LOS		D			C			B			C	
90th %ile Green (s)	31.8	31.8		31.8	31.8		46.3	46.3	46.3	46.3	46.3	
90th %ile Term Code	Max	Max		Max	Max		Coord	Coord	Coord	Coord	Coord	
70th %ile Green (s)	31.8	31.8		31.8	31.8		46.3	46.3	46.3	46.3	46.3	
70th %ile Term Code	Max	Max		Hold	Hold		Coord	Coord	Coord	Coord	Coord	
50th %ile Green (s)	31.8	31.8		31.8	31.8		46.3	46.3	46.3	46.3	46.3	
50th %ile Term Code	Max	Max		Hold	Hold		Coord	Coord	Coord	Coord	Coord	
30th %ile Green (s)	31.8	31.8		31.8	31.8		46.3	46.3	46.3	46.3	46.3	
30th %ile Term Code	Max	Max		Hold	Hold		Coord	Coord	Coord	Coord	Coord	
10th %ile Green (s)	28.0	28.0		28.0	28.0		50.1	50.1	50.1	50.1	50.1	
10th %ile Term Code	Gap	Gap		Hold	Hold		Coord	Coord	Coord	Coord	Coord	
Queue Length 50th (m)	2.9	77.0		7.7	29.4		0.9	51.9	0.0		93.6	
Queue Length 95th (m)	5.8	73.8		15.2	43.8		1.9	63.7	4.4		#146.7	
Internal Link Dist (m)		381.1			351.4			93.4			215.3	
Turn Bay Length (m)	35.0			35.1			16.0					
Base Capacity (vph)	291	573		110	564		182	833	731		838	
Starvation Cap Reductn	0	0		0	0		0	197	0		0	
Spillback Cap Reductn	0	0		0	0		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.10	0.93		0.55	0.45		0.07	0.77	0.20		0.85	

Intersection Summary

Area Type: CBD
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 32.5 Intersection LOS: C
Intersection Capacity Utilization 81.3% ICU Level of Service D
Analysis Period (min) 15
Description: TMC Oct 4/18
Updated Sept 17/20
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 91: BROCK ST S & DUNLOP ST

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	326	291	13	764	40	215	114	14	61	239	439
Future Volume (vph)	168	326	291	13	764	40	215	114	14	61	239	439
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	44.5		40.0	0.0		157.1	23.4		14.6	35.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	31.3			29.4			40.9			25.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.97	0.99		0.96			0.98	0.99	0.99	
Frt			0.850			0.850			0.850		0.905	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1545	3031	1437	1361	3150	1331	1560	1626	1261	1591	1501	0
Flt Permitted	0.950			0.950			0.072			0.671		
Satd. Flow (perm)	1537	3031	1390	1351	3150	1283	118	1626	1233	1114	1501	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			355			115			83		84	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		281.1			304.8			225.7			1140.1	
Travel Time (s)		20.2			21.9			16.3			82.1	
Confl. Peds. (#/hr)	5		4	4		5	1		6	6		1
Peak Hour Factor	0.82	0.89	0.82	0.69	0.89	0.75	0.66	0.85	0.58	0.74	0.75	0.80
Heavy Vehicles (%)	4%	6%	0%	18%	2%	8%	3%	4%	14%	1%	3%	0%
Adj. Flow (vph)	205	366	355	19	858	53	326	134	24	82	319	549
Shared Lane Traffic (%)												
Lane Group Flow (vph)	205	366	355	19	858	53	326	134	24	82	868	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases			2			6	8		8	4		
Minimum Split (s)	7.3	29.0	29.0	10.0	29.0	29.0	5.0	30.0	30.0	30.0	30.0	
Total Split (s)	14.0	38.0	38.0	14.0	38.0	38.0	15.0	73.0	73.0	58.0	58.0	
Total Split (%)	11.2%	30.4%	30.4%	11.2%	30.4%	30.4%	12.0%	58.4%	58.4%	46.4%	46.4%	
Maximum Green (s)	8.0	31.5	31.5	8.0	31.5	31.5	11.3	66.5	66.5	51.5	51.5	
Yellow Time (s)	4.0	3.7	3.7	4.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.8	2.8	2.0	2.8	2.8	0.0	2.8	2.8	2.8	2.8	
Lost Time Adjust (s)	-3.0	0.0	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	6.5	6.5	6.0	6.5	6.5	0.7	6.5	6.5	6.5	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes			Yes					
Walk Time (s)		14.0	14.0		14.0	14.0		17.0	17.0	17.0	17.0	
Flash Dont Walk (s)		5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0	0	0	
Act Effct Green (s)	11.0	31.5	31.5	8.0	31.5	31.5	72.3	66.5	66.5	51.5	51.5	
Actuated g/C Ratio	0.09	0.25	0.25	0.06	0.25	0.25	0.58	0.53	0.53	0.41	0.41	
v/c Ratio	1.52	0.48	0.58	0.22	1.08	0.13	1.40	0.15	0.03	0.18	1.30	
Control Delay	305.6	42.3	7.9	55.5	106.0	1.5	233.3	15.5	0.1	24.7	176.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	305.6	42.3	7.9	55.5	106.0	1.5	233.3	15.5	0.1	24.7	176.0	
LOS	F	D	A	E	F	A	F	B	A	C	F	
Approach Delay		87.4			99.0			161.5			163.0	

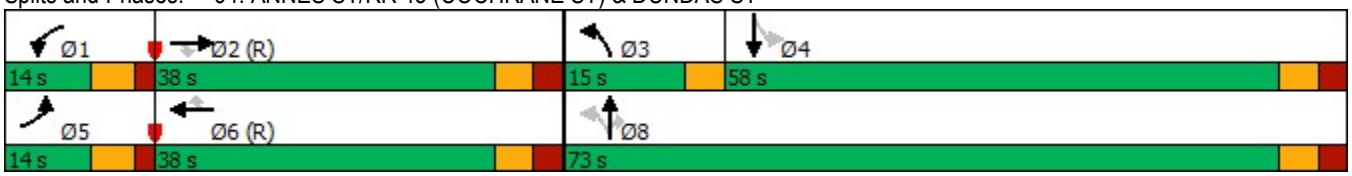
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			F			F	
Queue Length 50th (m)	~64.5	37.2	0.0	4.1	~115.1	0.0	~86.0	14.9	0.0	11.6	~241.0	
Queue Length 95th (m)	#95.6	50.5	12.9	m7.1	m#149.7	m0.2	#83.1	23.4	0.0	17.7	#230.4	
Internal Link Dist (m)		257.1			280.8			201.7			1116.1	
Turn Bay Length (m)	44.5		40.0			157.1	23.4		14.6	35.0		
Base Capacity (vph)	135	763	615	87	793	409	233	865	694	458	667	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	1.52	0.48	0.58	0.22	1.08	0.13	1.40	0.15	0.03	0.18	1.30	

Intersection Summary

Area Type: CBD
Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 120
Control Type: Pretimed
Maximum v/c Ratio: 1.52
Intersection Signal Delay: 123.4 Intersection LOS: F
Intersection Capacity Utilization 108.5% ICU Level of Service G
Analysis Period (min) 15
Description: TMC Oct 24/17
Updated Sept 23/20

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 94: ANNES ST/RR 43 (COCHRANE ST) & DUNDAS ST



Lanes, Volumes, Timings
95: RR 45 (HENRY ST)/EUCLID ST & DUNDAS ST

12/17/2020

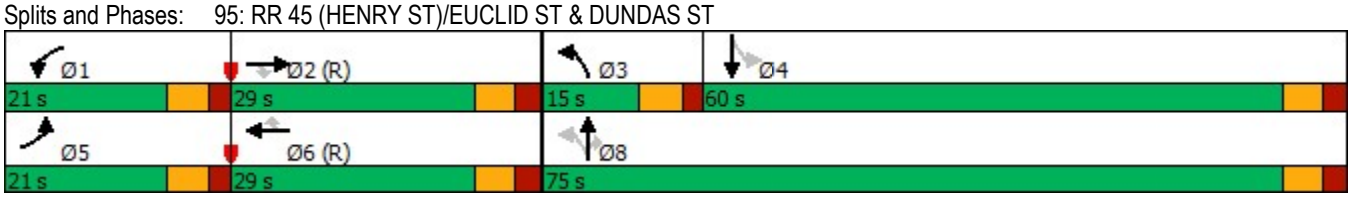
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	142	176	113	126	14	136	128	1	1	239	221
Future Volume (vph)	93	142	176	113	126	14	136	128	1	1	239	221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	24.7		0.0	30.2		16.0	7.6		11.0	13.8		0.0
Storage Lanes	1		1	0		1	1		1	1		0
Taper Length (m)	32.9			38.5			41.4			24.7		
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	0.98		0.96	0.98		0.95			0.95	0.98	0.96	
Frt			0.850			0.850			0.850		0.931	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1575	1610	1382	1606	1642	1437	1560	1691	1437	1606	1511	0
Flt Permitted	0.950			0.950			0.188			0.647		
Satd. Flow (perm)	1537	1610	1326	1580	1642	1367	309	1691	1366	1068	1511	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			267			132			81		43	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		118.8			293.5			229.4			228.8	
Travel Time (s)		8.6			21.1			16.5			16.5	
Confl. Peds. (#/hr)	10		7	7		10	22		11	11		22
Peak Hour Factor	0.73	0.81	0.66	0.78	0.88	0.70	0.93	0.73	0.81	0.70	0.75	0.82
Heavy Vehicles (%)	2%	5%	4%	0%	3%	0%	3%	0%	0%	0%	0%	1%
Adj. Flow (vph)	127	175	267	145	143	20	146	175	1	1	319	270
Shared Lane Traffic (%)												
Lane Group Flow (vph)	127	175	267	145	143	20	146	175	1	1	589	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases			2			6	8		8	4		
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	10.0	29.1	29.1	29.1	29.1	
Total Split (s)	21.0	29.0	29.0	21.0	29.0	29.0	15.0	75.0	75.0	60.0	60.0	
Total Split (%)	16.8%	23.2%	23.2%	16.8%	23.2%	23.2%	12.0%	60.0%	60.0%	48.0%	48.0%	
Maximum Green (s)	15.0	22.7	22.7	15.0	22.7	22.7	9.0	68.9	68.9	53.9	53.9	
Yellow Time (s)	4.0	3.7	3.7	4.0	3.7	3.7	4.0	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.6	2.6	2.0	2.6	2.6	2.0	2.4	2.4	2.4	2.4	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.3	6.3	6.0	6.3	6.3	6.0	6.1	6.1	6.1	6.1	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes			Yes					
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		14.0	14.0		14.0	14.0		16.0	16.0	16.0	16.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0	0	0	
Act Effct Green (s)	15.0	22.7	22.7	15.0	22.7	22.7	69.0	68.9	68.9	53.9	53.9	
Actuated g/C Ratio	0.12	0.18	0.18	0.12	0.18	0.18	0.55	0.55	0.55	0.43	0.43	
v/c Ratio	0.67	0.60	0.58	0.76	0.48	0.06	0.56	0.19	0.00	0.00	0.87	
Control Delay	77.6	83.7	38.2	77.7	52.0	0.3	22.6	14.7	0.0	20.0	45.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	77.6	83.7	38.2	77.7	52.0	0.3	22.6	14.7	0.0	20.0	45.3	
LOS	E	F	D	E	D	A	C	B	A	B	D	
Approach Delay		60.9			60.7			18.2			45.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			E			B			D	
Queue Length 50th (m)	29.9	41.3	33.4	32.3	29.3	0.0	15.7	19.0	0.0	0.1	112.5	
Queue Length 95th (m)	39.2	56.3	33.4	#46.9	47.3	0.0	26.0	23.8	0.0	0.9	116.9	
Internal Link Dist (m)		94.8			269.5			205.4			204.8	
Turn Bay Length (m)	24.7			30.2		16.0	7.6		11.0	13.8		
Base Capacity (vph)	189	292	459	192	298	356	260	932	789	460	676	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.67	0.60	0.58	0.76	0.48	0.06	0.56	0.19	0.00	0.00	0.87	

Intersection Summary

Area Type: CBD
Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Pretimed
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 48.0 Intersection LOS: D
Intersection Capacity Utilization 83.2% ICU Level of Service E
Analysis Period (min) 15
Description: TMC May 30 2017
Updated Sept 23/20
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 95: RR 45 (HENRY ST)/EUCLID ST & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	179	18	156	526	254	23	323	155	265	560	16
Future Volume (vph)	59	179	18	156	526	254	23	323	155	265	560	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	17.1		0.0	98.4		0.0	23.5		0.0	102.4		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	37.0			12.6			27.3			30.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	0.99	0.99		0.98		0.97	0.98	0.99		0.99	1.00	
Frt		0.979				0.850		0.954			0.996	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1545	2974	0	1545	1626	1356	1447	2936	0	1501	3131	0
Flt Permitted	0.950			0.950			0.409			0.258		
Satd. Flow (perm)	1535	2974	0	1511	1626	1319	610	2936	0	405	3131	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17				230		52			2	
Link Speed (k/h)		50			50			50			40	
Link Distance (m)		457.3			160.3			1037.5			218.0	
Travel Time (s)		32.9			11.5			74.7			19.6	
Confl. Peds. (#/hr)	13		26	26		13	23		17	17		23
Peak Hour Factor	0.74	0.86	0.53	0.73	0.84	0.88	0.63	0.82	0.89	0.93	0.90	0.88
Heavy Vehicles (%)	4%	5%	6%	4%	4%	6%	11%	3%	4%	7%	2%	2%
Adj. Flow (vph)	80	208	34	214	626	289	37	394	174	285	622	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	80	242	0	214	626	289	37	568	0	285	640	0
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases						6	8			4		
Minimum Split (s)	10.0	41.0		10.0	41.0	41.0	35.0	35.0		9.0	35.0	
Total Split (s)	24.0	52.0		24.0	52.0	52.0	35.0	35.0		14.0	49.0	
Total Split (%)	19.2%	41.6%		19.2%	41.6%	41.6%	28.0%	28.0%		11.2%	39.2%	
Maximum Green (s)	19.0	45.4		19.0	45.4	45.4	29.1	29.1		11.0	43.1	
Yellow Time (s)	3.0	4.1		3.0	4.1	4.1	3.7	3.7		3.0	3.7	
All-Red Time (s)	2.0	2.5		2.0	2.5	2.5	2.2	2.2		0.0	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		-3.0	0.0	
Total Lost Time (s)	5.0	6.6		5.0	6.6	6.6	5.9	5.9		0.0	5.9	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes				Yes		
Walk Time (s)		7.0			7.0	7.0	7.0	7.0			7.0	
Flash Dont Walk (s)		25.0			25.0	25.0	21.0	21.0			21.0	
Pedestrian Calls (#/hr)		0			0	0	0	0			0	
Act Effct Green (s)	19.0	45.4		19.0	45.4	45.4	29.1	29.1		49.0	43.1	
Actuated g/C Ratio	0.15	0.36		0.15	0.36	0.36	0.23	0.23		0.39	0.34	
v/c Ratio	0.34	0.22		0.91	1.06	0.46	0.26	0.79		1.01	0.59	
Control Delay	43.1	24.4		92.8	93.1	9.5	45.0	49.6		89.9	36.4	
Queue Delay	0.0	0.0		0.0	15.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	43.1	24.4		92.8	108.1	9.5	45.0	49.6		89.9	36.4	
LOS	D	C		F	F	A	D	D		F	D	
Approach Delay		29.0			80.0			49.3			52.8	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			E			D			D	
Queue Length 50th (m)	15.7	17.6		48.3	~155.7	8.8	6.9	58.4		~48.9	62.3	
Queue Length 95th (m)	m21.8	m26.6		#62.4	#195.7	27.8	11.0	68.5		#90.0	80.1	
Internal Link Dist (m)		433.3			136.3			1013.5			194.0	
Turn Bay Length (m)	17.1			98.4			23.5			102.4		
Base Capacity (vph)	234	1090		234	590	625	142	723		281	1080	
Starvation Cap Reductn	0	0		0	24	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.34	0.22		0.91	1.11	0.46	0.26	0.79		1.01	0.59	

Intersection Summary

Area Type: CBD
Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 95
Control Type: Pretimed
Maximum v/c Ratio: 1.06
Intersection Signal Delay: 59.8 Intersection LOS: E
Intersection Capacity Utilization 93.8% ICU Level of Service F
Analysis Period (min) 15
Description: TMC Oct 19/16
Updated Sept 23/20

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

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

Splits and Phases: 96: GARDEN ST & DUNDAS ST

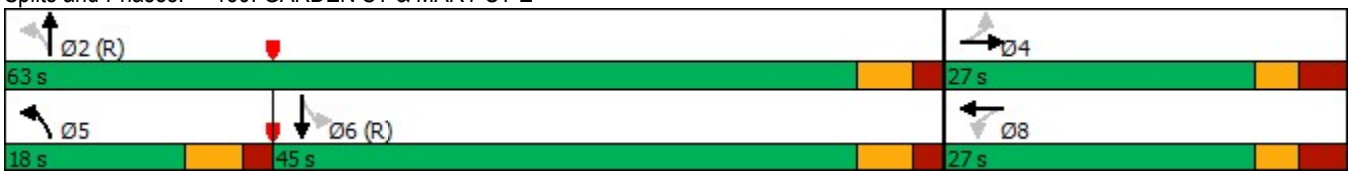
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	0	160	13	6	42	147	573	3	19	668	244
Future Volume (vph)	99	0	160	13	6	42	147	573	3	19	668	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	34.4		0.0	33.8		0.0	51.6		0.0	79.3		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.4			18.0			30.4			24.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	0.99	0.98		1.00	0.98			1.00		1.00	0.98	
Frt		0.850			0.866			0.998			0.954	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1422	1241	0	1397	1437	0	1373	2917	0	1447	2765	0
Flt Permitted	0.709			0.574			0.165			0.421		
Satd. Flow (perm)	1052	1241	0	841	1437	0	238	2917	0	638	2765	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		334			65			3			97	
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		468.1			161.7			218.0			150.1	
Travel Time (s)		42.1			14.6			19.6			13.5	
Confl. Peds. (#/hr)	7		3	3		7	21		5	5		21
Peak Hour Factor	0.65	0.25	0.89	0.65	0.75	0.65	0.75	0.95	0.38	0.59	0.91	0.76
Heavy Vehicles (%)	13%	0%	14%	15%	0%	0%	17%	10%	0%	11%	8%	10%
Adj. Flow (vph)	152	0	180	20	8	65	196	603	8	32	734	321
Shared Lane Traffic (%)												
Lane Group Flow (vph)	152	180	0	20	73	0	196	611	0	32	1055	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		4.0	20.0		20.0	20.0	
Minimum Split (s)	26.3	26.3		26.3	26.3		10.0	27.0		27.0	27.0	
Total Split (s)	27.0	27.0		27.0	27.0		18.0	63.0		45.0	45.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		20.0%	70.0%		50.0%	50.0%	
Maximum Green (s)	20.7	20.7		20.7	20.7		12.0	57.1		39.1	39.1	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	3.7		3.7	3.7	
All-Red Time (s)	3.3	3.3		3.3	3.3		2.0	2.2		2.2	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		6.0	5.9		5.9	5.9	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes					
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	C-Max		C-Max	C-Max	
Walk Time (s)	15.0	15.0		15.0	15.0			15.0		15.0	15.0	
Flash Dont Walk (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Pedestrian Calls (#/hr)	0	0		0	0			0		0	0	
Act Effct Green (s)	16.9	16.9		16.9	16.9		60.8	60.9		45.3	45.3	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.68	0.68		0.50	0.50	
v/c Ratio	0.77	0.36		0.13	0.23		0.70	0.31		0.10	0.73	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	54.6	3.3		30.2	10.9		22.5	7.0		13.4	16.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	54.6	3.3		30.2	10.9		22.5	7.0		13.4	16.0	
LOS	D	A		C	B		C	A		B	B	
Approach Delay		26.8			15.1			10.7			15.9	
Approach LOS		C			B			B			B	
90th %ile Green (s)	20.7	20.7		20.7	20.7		12.0	57.1		39.1	39.1	
90th %ile Term Code	Max	Max		Hold	Hold		Max	Coord		Coord	Coord	
70th %ile Green (s)	20.7	20.7		20.7	20.7		12.0	57.1		39.1	39.1	
70th %ile Term Code	Max	Max		Hold	Hold		Max	Coord		Coord	Coord	
50th %ile Green (s)	18.3	18.3		18.3	18.3		9.9	59.5		43.6	43.6	
50th %ile Term Code	Gap	Gap		Hold	Hold		Gap	Coord		Coord	Coord	
30th %ile Green (s)	14.9	14.9		14.9	14.9		8.0	62.9		48.9	48.9	
30th %ile Term Code	Gap	Gap		Hold	Hold		Gap	Coord		Coord	Coord	
10th %ile Green (s)	10.0	10.0		10.0	10.0		6.1	67.8		55.7	55.7	
10th %ile Term Code	Gap	Gap		Hold	Hold		Gap	Coord		Coord	Coord	
Queue Length 50th (m)	23.6	2.0		2.6	1.0		10.9	19.2		1.5	31.8	
Queue Length 95th (m)	m28.1	0.0		5.7	7.3		18.6	29.2		4.5	53.7	
Internal Link Dist (m)		444.1			137.7			194.0			126.1	
Turn Bay Length (m)	34.4			33.8			51.6			79.3		
Base Capacity (vph)	241	542		193	380		312	1974		321	1439	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.63	0.33		0.10	0.19		0.63	0.31		0.10	0.73	

Intersection Summary

Area Type: CBD
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 15.7 Intersection LOS: B
Intersection Capacity Utilization 67.1% ICU Level of Service C
Analysis Period (min) 15
Description: TMC Nov 27/19
Updated Sept 17/20
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 139: GARDEN ST & MARY ST E

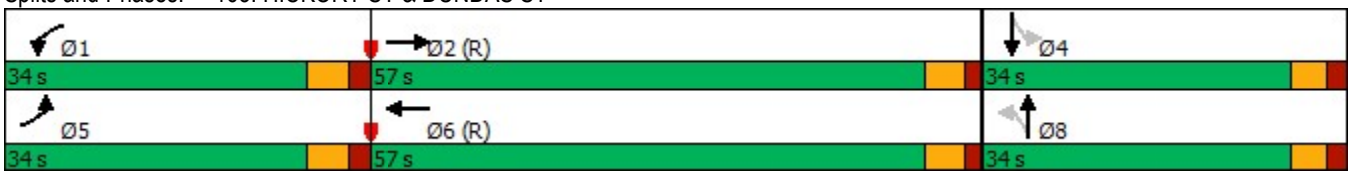


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	163	1	99	377	87	1	14	109	65	17	1
Future Volume (vph)	114	163	1	99	377	87	1	14	109	65	17	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	80.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	0.0			0.0			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.98	0.99			0.98			1.00	
Frt		0.997			0.955			0.885			0.998	
Flt Protected	0.950			0.950				0.999			0.963	
Satd. Flow (prot)	1373	1494	0	1530	1398	0	0	1344	0	0	1493	0
Flt Permitted	0.950			0.950				0.997			0.400	
Satd. Flow (perm)	1362	1494	0	1497	1398	0	0	1341	0	0	619	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			21			210			1	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		375.6			457.3			233.0			181.4	
Travel Time (s)		27.0			32.9			16.8			13.1	
Confl. Peds. (#/hr)	5		8	8		5	10		3	3		10
Peak Hour Factor	0.50	0.90	0.25	0.55	0.94	0.50	0.33	0.43	0.52	0.64	0.56	0.58
Heavy Vehicles (%)	17%	13%	0%	5%	13%	17%	0%	33%	6%	11%	0%	27%
Adj. Flow (vph)	228	181	4	180	401	174	3	33	210	102	30	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	228	185	0	180	575	0	0	246	0	0	134	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	4.0	20.0		4.0	20.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	10.0	28.0		10.0	28.0		26.0	26.0		26.0	26.0	
Total Split (s)	34.0	57.0		34.0	57.0		34.0	34.0		34.0	34.0	
Total Split (%)	27.2%	45.6%		27.2%	45.6%		27.2%	27.2%		27.2%	27.2%	
Maximum Green (s)	28.0	51.5		28.0	51.5		28.6	28.6		28.6	28.6	
Yellow Time (s)	4.0	3.8		4.0	3.8		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	1.7		2.0	1.7		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	5.5		6.0	5.5			5.4			5.4	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes			Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		11.0			11.0		13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effct Green (s)	24.4	60.7		19.9	56.2			27.4			27.4	
Actuated g/C Ratio	0.20	0.49		0.16	0.45			0.22			0.22	
v/c Ratio	0.85	0.25		0.74	0.90			0.54			0.99	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	75.7	21.7		50.2	48.1			13.2			121.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	75.7	21.7		50.2	48.1			13.2			121.5	
LOS	E	C		D	D			B			F	
Approach Delay		51.5			48.6			13.2			121.5	
Approach LOS		D			D			B			F	
90th %ile Green (s)	28.0	52.3		27.2	51.5		28.6	28.6		28.6	28.6	
90th %ile Term Code	Max	Coord		Gap	Coord		Hold	Hold		Max	Max	
70th %ile Green (s)	28.0	56.5		23.0	51.5		28.6	28.6		28.6	28.6	
70th %ile Term Code	Max	Coord		Gap	Coord		Hold	Hold		Max	Max	
50th %ile Green (s)	26.4	59.5		20.0	53.1		28.6	28.6		28.6	28.6	
50th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold		Max	Max	
30th %ile Green (s)	22.6	62.6		16.9	56.9		28.6	28.6		28.6	28.6	
30th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold		Max	Max	
10th %ile Green (s)	17.1	72.8		12.5	68.2		22.8	22.8		22.8	22.8	
10th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold		Gap	Gap	
Queue Length 50th (m)	49.2	24.3		41.2	86.5			6.5			29.8	
Queue Length 95th (m)	36.9	43.6		36.9	m86.0			0.0			29.3	
Internal Link Dist (m)		351.6			433.3			209.0			157.4	
Turn Bay Length (m)	30.0			80.0								
Base Capacity (vph)	307	726		342	640			468			142	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.74	0.25		0.53	0.90			0.53			0.94	

Intersection Summary	
Area Type: CBD	
Cycle Length: 125	
Actuated Cycle Length: 125	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 50.0	Intersection LOS: D
Intersection Capacity Utilization 72.5%	ICU Level of Service C
Analysis Period (min) 15	
Description: TMC Jun 26/19	
Updated Sept 28/20	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 163: HICKORY ST & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	189	73	14	350	15	90	124	6	27	0	42
Future Volume (vph)	37	189	73	14	350	15	90	124	6	27	0	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.961			0.995			0.995			0.917	
Flt Protected		0.995			0.998			0.975			0.981	
Satd. Flow (prot)	0	1610	0	0	1717	0	0	1622	0	0	1657	0
Flt Permitted		0.995			0.998			0.975			0.981	
Satd. Flow (perm)	0	1610	0	0	1717	0	0	1622	0	0	1657	0
Link Speed (k/h)		40			50			48			48	
Link Distance (m)		360.2			468.1			35.4			114.4	
Travel Time (s)		32.4			33.7			2.7			8.6	
Peak Hour Factor	0.92	0.84	0.68	0.70	0.80	0.92	0.56	0.92	0.50	0.92	0.92	0.92
Heavy Vehicles (%)	2%	14%	10%	7%	9%	2%	22%	2%	0%	2%	2%	2%
Adj. Flow (vph)	40	225	107	20	438	16	161	135	12	29	0	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	372	0	0	474	0	0	308	0	0	75	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 52.9%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	105	105	118	7	11	124
Future Volume (vph)	105	105	118	7	11	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.992		0.876	
Flt Protected		0.976			0.996	
Satd. Flow (prot)	0	1772	1715	0	1570	0
Flt Permitted		0.976			0.996	
Satd. Flow (perm)	0	1772	1715	0	1570	0
Link Speed (k/h)		50	48		50	
Link Distance (m)		375.4	228.6		233.0	
Travel Time (s)		27.0	17.1		16.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	4%	9%	4%	9%	4%
Adj. Flow (vph)	114	114	128	8	12	135
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	228	136	0	147	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 36.2%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	129	4	360	233	46	3	105	106	52	74	1
Future Volume (vph)	3	129	4	360	233	46	3	105	106	52	74	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.990			0.936			0.997	
Flt Protected		0.998			0.976			0.999			0.978	
Satd. Flow (prot)	0	1783	0	0	1804	0	0	1715	0	0	1681	0
Flt Permitted		0.998			0.976			0.999			0.978	
Satd. Flow (perm)	0	1783	0	0	1804	0	0	1715	0	0	1681	0
Link Speed (k/h)		48			50			50			48	
Link Distance (m)		204.5			414.4			228.8			243.5	
Travel Time (s)		15.3			29.8			16.5			18.3	
Peak Hour Factor	0.38	0.61	0.50	0.96	0.74	0.81	0.38	0.79	0.83	0.67	0.79	0.25
Heavy Vehicles (%)	0%	5%	0%	0%	0%	8%	0%	2%	3%	19%	1%	0%
Adj. Flow (vph)	8	211	8	375	315	57	8	133	128	78	94	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	227	0	0	747	0	0	269	0	0	176	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 74.5%	ICU Level of Service D
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	224	12	70	106	61	24	28	105	126	280	25
Future Volume (vph)	24	224	12	70	106	61	24	28	105	126	280	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.968			0.912			0.992	
Flt Protected		0.995			0.980			0.990			0.982	
Satd. Flow (prot)	0	1837	0	0	1745	0	0	1574	0	0	1743	0
Flt Permitted		0.995			0.980			0.990			0.982	
Satd. Flow (perm)	0	1837	0	0	1745	0	0	1574	0	0	1743	0
Link Speed (k/h)		48			50			50			50	
Link Distance (m)		420.8			405.1			724.5			229.4	
Travel Time (s)		31.6			29.2			52.2			16.5	
Peak Hour Factor	0.75	0.85	0.60	0.54	0.90	0.78	0.50	0.84	0.68	0.65	0.91	0.78
Heavy Vehicles (%)	0%	1%	0%	0%	2%	6%	0%	4%	11%	2%	7%	4%
Adj. Flow (vph)	32	264	20	130	118	78	48	33	154	194	308	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	316	0	0	326	0	0	235	0	0	534	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 72.1%	ICU Level of Service C
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	76	11	29	68	82	10	191	52	118	326	70
Future Volume (vph)	21	76	11	29	68	82	10	191	52	118	326	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.984			0.939			0.977			0.981	
Flt Protected		0.991			0.991			0.998			0.988	
Satd. Flow (prot)	0	1782	0	0	1691	0	0	1720	0	0	1696	0
Flt Permitted		0.991			0.991			0.998			0.988	
Satd. Flow (perm)	0	1782	0	0	1691	0	0	1720	0	0	1696	0
Link Speed (k/h)		48			48			48			50	
Link Distance (m)		217.5			420.8			175.4			225.7	
Travel Time (s)		16.3			31.6			13.2			16.3	
Peak Hour Factor	0.88	0.79	0.69	0.66	0.71	0.72	0.63	0.69	0.86	0.73	0.80	0.73
Heavy Vehicles (%)	0%	4%	0%	3%	4%	3%	40%	6%	0%	4%	9%	6%
Adj. Flow (vph)	24	96	16	44	96	114	16	277	60	162	408	96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	136	0	0	254	0	0	353	0	0	666	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 64.7%	ICU Level of Service C
Analysis Period (min) 15	

Lanes, Volumes, Timings
90: BROCK ST & MARY ST W/MARY ST E

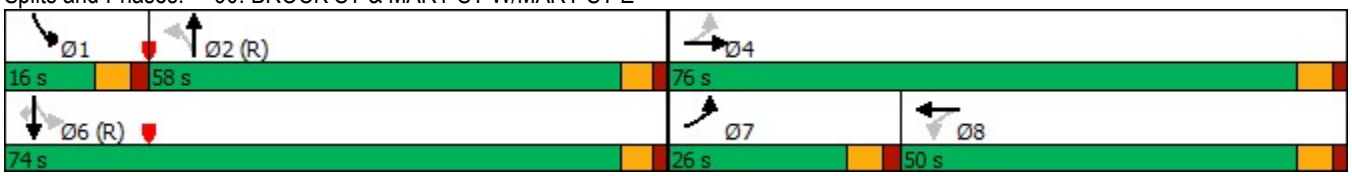
12/17/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	279	478	37	33	258	178	29	523	36	83	239	374
Future Volume (vph)	279	478	37	33	258	178	29	523	36	83	239	374
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	22.3		0.0	18.9		0.0	16.3		0.0	25.4		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	23.1			28.7			29.3			34.6		
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		0.99	0.97		0.94	0.98				0.90
Frt		0.983			0.936			0.985				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1474	1524	0	1516	1375	0	1460	1466	0	1422	1510	1295
Flt Permitted	0.080			0.293			0.594			0.068		
Satd. Flow (perm)	124	1524	0	462	1375	0	862	1466	0	102	1510	1165
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			25			4				473
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		409.8			360.6			134.9			82.0	
Travel Time (s)		29.5			26.0			9.7			5.9	
Confl. Peds. (#/hr)	11		11	11		11	23		51	51		23
Peak Hour Factor	0.85	0.83	0.51	0.75	0.78	0.73	0.73	0.83	0.50	0.74	0.89	0.79
Heavy Vehicles (%)	9%	8%	11%	6%	7%	19%	10%	11%	14%	13%	12%	11%
Adj. Flow (vph)	328	576	73	44	331	244	40	630	72	112	269	473
Shared Lane Traffic (%)												
Lane Group Flow (vph)	328	649	0	44	575	0	40	702	0	112	269	473
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		8	8		2	2		1	6	6
Switch Phase												
Minimum Initial (s)	4.0	8.0		8.0	8.0		20.0	20.0		4.0	20.0	20.0
Minimum Split (s)	10.0	26.0		26.0	26.0		28.0	28.0		10.0	28.0	28.0
Total Split (s)	26.0	76.0		50.0	50.0		58.0	58.0		16.0	74.0	74.0
Total Split (%)	17.3%	50.7%		33.3%	33.3%		38.7%	38.7%		10.7%	49.3%	49.3%
Maximum Green (s)	20.0	70.2		44.2	44.2		52.7	52.7		10.0	68.7	68.7
Yellow Time (s)	4.0	4.0		4.0	4.0		3.7	3.7		4.0	3.7	3.7
All-Red Time (s)	2.0	1.8		1.8	1.8		1.6	1.6		2.0	1.6	1.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	5.8		5.8	5.8		5.3	5.3		6.0	5.3	5.3
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes									Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		None	C-Max	C-Max
Walk Time (s)		7.0		7.0	7.0		7.0	7.0			7.0	7.0
Flash Dont Walk (s)		12.0		12.0	12.0		14.0	14.0			14.0	14.0
Pedestrian Calls (#/hr)		0		0	0		0	0			0	0
Act Effct Green (s)	70.0	70.2		44.2	44.2		52.9	52.9		68.0	68.7	68.7
Actuated g/C Ratio	0.47	0.47		0.29	0.29		0.35	0.35		0.45	0.46	0.46
v/c Ratio	1.38	0.91		0.32	1.36		0.13	1.35		0.85	0.39	0.60

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	232.1	54.4		48.0	217.0		52.4	217.2		79.3	28.9	5.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	232.1	54.4		48.0	217.0		52.4	217.2		79.3	28.9	5.5
LOS	F	D		D	F		D	F		E	C	A
Approach Delay		114.1			205.0			208.3			22.6	
Approach LOS		F			F			F			C	
90th %ile Green (s)	20.0	70.2		44.2	44.2		52.7	52.7		10.0	68.7	68.7
90th %ile Term Code	Max	Max		Max	Max		Coord	Coord		Max	Coord	Coord
70th %ile Green (s)	20.0	70.2		44.2	44.2		52.7	52.7		10.0	68.7	68.7
70th %ile Term Code	Max	Max		Max	Max		Coord	Coord		Max	Coord	Coord
50th %ile Green (s)	20.0	70.2		44.2	44.2		52.7	52.7		10.0	68.7	68.7
50th %ile Term Code	Max	Max		Max	Max		Coord	Coord		Max	Coord	Coord
30th %ile Green (s)	20.0	70.2		44.2	44.2		52.7	52.7		10.0	68.7	68.7
30th %ile Term Code	Max	Hold		Max	Max		Coord	Coord		Max	Coord	Coord
10th %ile Green (s)	20.0	70.2		44.2	44.2		53.8	53.8		8.9	68.7	68.7
10th %ile Term Code	Max	Hold		Max	Max		Coord	Coord		Gap	Coord	Coord
Stops (vph)	174	445		30	327		23	390		50	155	27
Fuel Used(l)	65	52		3	95		2	114		11	22	22
CO Emissions (g/hr)	1202	960		56	1768		43	2117		198	402	413
NOx Emissions (g/hr)	232	185		11	341		8	409		38	78	80
VOC Emissions (g/hr)	277	221		13	408		10	488		46	93	95
Dilemma Vehicles (#)	0	0		0	0		0	0		0	0	0

Intersection Summary	
Area Type: CBD	
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.38	
Intersection Signal Delay: 129.1	Intersection LOS: F
Intersection Capacity Utilization 102.4%	ICU Level of Service G
Analysis Period (min) 15	
Description: TMC Sep 26/19	
Updated Sept 17/20	

Splits and Phases: 90: BROCK ST & MARY ST W/MARY ST E

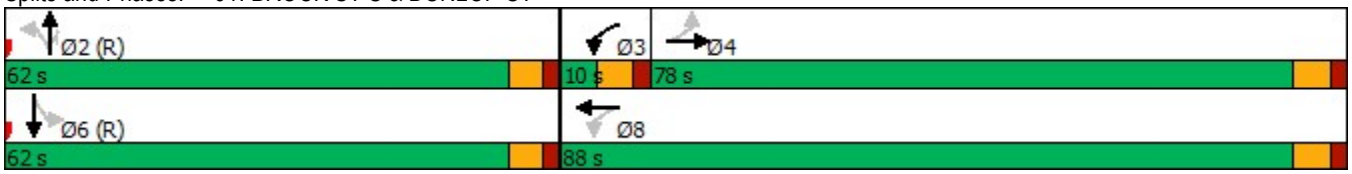


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	442	222	65	196	21	3	431	193	5	554	19
Future Volume (vph)	34	442	222	65	196	21	3	431	193	5	554	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	35.1		0.0	16.0		0.0	16.1		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	25.0			21.2			15.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.92	0.97			0.99				0.75		0.99	
Frt		0.944			0.984				0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1606	1541	0	1575	1612	0	1606	1658	1437	1606	1617	0
Flt Permitted	0.595			0.104			0.105			0.276		
Satd. Flow (perm)	925	1541	0	172	1612	0	178	1658	1085	467	1617	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			6				246		2	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		407.9			373.1			117.4			239.3	
Travel Time (s)		29.4			26.9			8.5			17.2	
Confl. Peds. (#/hr)	28		33	33		28	52		49	49		52
Peak Hour Factor	0.85	0.93	0.79	0.65	0.82	0.75	0.38	0.96	0.74	0.42	0.94	0.79
Heavy Vehicles (%)	0%	0%	0%	2%	2%	0%	0%	2%	0%	0%	3%	0%
Adj. Flow (vph)	40	475	281	100	239	28	8	449	261	12	589	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	756	0	100	267	0	8	449	261	12	613	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		3	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		4.0	8.0		20.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	25.0	25.0		10.0	25.0		26.0	26.0	26.0	26.0	26.0	
Total Split (s)	78.0	78.0		10.0	88.0		62.0	62.0	62.0	62.0	62.0	
Total Split (%)	52.0%	52.0%		6.7%	58.7%		41.3%	41.3%	41.3%	41.3%	41.3%	
Maximum Green (s)	71.8	71.8		4.0	81.8		56.3	56.3	56.3	56.3	56.3	
Yellow Time (s)	4.2	4.2		4.0	4.2		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2		6.0	6.2		5.7	5.7	5.7	5.7	5.7	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?				Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0			11.0		9.0	9.0	9.0	9.0	9.0	
Pedestrian Calls (#/hr)	0	0			0		0	0	0	0	0	
Act Effct Green (s)	71.8	71.8		82.0	81.8		56.3	56.3	56.3	56.3	56.3	
Actuated g/C Ratio	0.48	0.48		0.55	0.55		0.38	0.38	0.38	0.38	0.38	
v/c Ratio	0.09	1.01		0.76	0.30		0.12	0.72	0.47	0.07	1.01	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	22.2	71.8		55.7	19.3		36.7	48.1	7.5	47.8	93.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	54.4	0.4	0.0	0.0	
Total Delay	22.2	71.8		55.7	19.3		36.7	102.5	7.9	47.8	93.3	
LOS	C	E		E	B		D	F	A	D	F	
Approach Delay		69.3			29.2			67.4			92.4	
Approach LOS		E			C			E			F	
90th %ile Green (s)	71.8	71.8		4.0	81.8		56.3	56.3	56.3	56.3	56.3	
90th %ile Term Code	Max	Max		Max	Hold		Coord	Coord	Coord	Coord	Coord	
70th %ile Green (s)	71.8	71.8		4.0	81.8		56.3	56.3	56.3	56.3	56.3	
70th %ile Term Code	Max	Max		Max	Hold		Coord	Coord	Coord	Coord	Coord	
50th %ile Green (s)	71.8	71.8		4.0	81.8		56.3	56.3	56.3	56.3	56.3	
50th %ile Term Code	Max	Max		Max	Hold		Coord	Coord	Coord	Coord	Coord	
30th %ile Green (s)	71.8	71.8		4.0	81.8		56.3	56.3	56.3	56.3	56.3	
30th %ile Term Code	Max	Max		Max	Hold		Coord	Coord	Coord	Coord	Coord	
10th %ile Green (s)	71.8	71.8		4.0	81.8		56.3	56.3	56.3	56.3	56.3	
10th %ile Term Code	Max	Max		Max	Hold		Coord	Coord	Coord	Coord	Coord	
Stops (vph)	18	565		29	112		3	367	22	5	484	
Fuel Used(l)	2	75		6	13		0	29	4	0	65	
CO Emissions (g/hr)	43	1396		107	250		3	539	70	8	1209	
NOx Emissions (g/hr)	8	270		21	48		1	104	13	1	233	
VOC Emissions (g/hr)	10	322		25	58		1	124	16	2	279	
Dilemma Vehicles (#)	0	0		0	0		0	0	0	0	0	

Intersection Summary	
Area Type: CBD	
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 140	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 68.6	Intersection LOS: E
Intersection Capacity Utilization 94.6%	ICU Level of Service F
Analysis Period (min) 15	
Description: TMC Oct 4/18	
Updated Sept 17/20	

Splits and Phases: 91: BROCK ST S & DUNLOP ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	281	805	433	21	360	110	204	201	1	1	157	237
Future Volume (vph)	281	805	433	21	360	110	204	201	1	1	157	237
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	44.5		40.0	0.0		157.1	23.4		14.6	35.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	31.3			29.4			40.9			25.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98		0.91	0.98		0.95			0.98	0.99	0.99	
Frt			0.850			0.850			0.850		0.906	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1560	3181	1437	1606	3150	1409	1606	1691	1437	1591	1502	0
Flt Permitted	0.950			0.950			0.086			0.582		
Satd. Flow (perm)	1534	3181	1314	1572	3150	1343	145	1691	1409	969	1502	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			255			128			69		55	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		281.1			304.8			219.5			1140.1	
Travel Time (s)		20.2			21.9			15.8			82.1	
Confl. Peds. (#/hr)	7		17	17		7	5		4	4		5
Peak Hour Factor	0.80	0.98	0.85	0.85	0.93	0.86	0.85	0.69	0.54	0.78	0.77	0.70
Heavy Vehicles (%)	3%	1%	0%	0%	2%	2%	0%	0%	0%	1%	0%	1%
Adj. Flow (vph)	351	821	509	25	387	128	240	291	2	1	204	339
Shared Lane Traffic (%)												
Lane Group Flow (vph)	351	821	509	25	387	128	240	291	2	1	543	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases			2			6	8		8	4		
Minimum Split (s)	10.0	29.0	29.0	10.0	29.0	29.0	10.0	30.0	30.0	30.0	30.0	
Total Split (s)	40.0	45.0	45.0	40.0	45.0	45.0	18.0	65.0	65.0	47.0	47.0	
Total Split (%)	26.7%	30.0%	30.0%	26.7%	30.0%	30.0%	12.0%	43.3%	43.3%	31.3%	31.3%	
Maximum Green (s)	34.0	38.5	38.5	34.0	38.5	38.5	12.0	58.5	58.5	40.5	40.5	
Yellow Time (s)	4.0	3.7	3.7	4.0	3.7	3.7	4.0	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.8	2.8	2.0	2.8	2.8	2.0	2.8	2.8	2.8	2.8	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.5	6.5	6.0	6.5	6.5	3.0	6.5	6.5	6.5	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes			Yes					
Walk Time (s)		14.0	14.0		14.0	14.0		17.0	17.0	17.0	17.0	
Flash Dont Walk (s)		5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0	0	0	
Act Effct Green (s)	34.0	38.5	38.5	34.0	38.5	38.5	62.0	58.5	58.5	40.5	40.5	
Actuated g/C Ratio	0.23	0.26	0.26	0.23	0.26	0.26	0.41	0.39	0.39	0.27	0.27	
v/c Ratio	0.99	1.01	0.97	0.07	0.48	0.29	1.17	0.44	0.00	0.00	1.22	
Control Delay	103.5	87.8	59.2	41.0	30.2	11.0	151.5	36.4	0.0	40.0	158.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	103.5	87.8	59.2	41.0	30.2	11.0	151.5	36.4	0.0	40.0	158.8	
LOS	F	F	E	D	C	B	F	D	A	D	F	
Approach Delay		82.4			26.1			88.1			158.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			C			F			F	
Stops (vph)	247	728	216	13	328	65	127	145	0	2	291	
Fuel Used(l)	35	92	36	2	30	7	31	13	0	0	97	
CO Emissions (g/hr)	659	1715	672	33	562	127	574	243	0	3	1811	
NOx Emissions (g/hr)	127	331	130	6	108	24	111	47	0	1	350	
VOC Emissions (g/hr)	152	396	155	8	130	29	132	56	0	1	418	
Dilemma Vehicles (#)	0	0	0	0	0	0	0	0	0	0	0	

Intersection Summary	
Area Type: CBD	
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 112 (75%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 120	
Control Type: Pretimed	
Maximum v/c Ratio: 1.22	
Intersection Signal Delay: 86.7	Intersection LOS: F
Intersection Capacity Utilization 91.3%	ICU Level of Service F
Analysis Period (min) 15	
Description: TMC Oct 24/17	
Updated Sept 23/20	

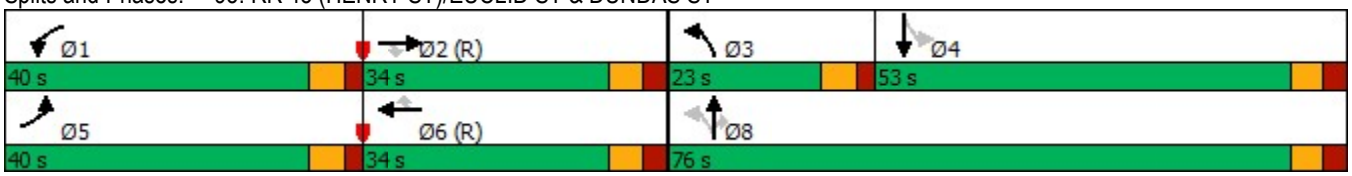
Splits and Phases: 94: ANNES ST/RR 43 (COCHRANE ST) & DUNDAS ST

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	297	239	155	38	24	172	405	1	1	233	219
Future Volume (vph)	180	297	239	155	38	24	172	405	1	1	233	219
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	24.7		0.0	0.0		16.0	7.6		11.0	13.8		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	32.9			38.5			41.4			24.7		
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	0.98		0.91	0.96		0.96			0.86	0.93	0.97	
Frt			0.850			0.850			0.850		0.920	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1606	1674	1437	1606	1658	1437	1591	1691	1437	1560	1506	0
Flt Permitted	0.950			0.950			0.076			0.493		
Satd. Flow (perm)	1579	1674	1313	1536	1658	1383	127	1691	1229	756	1506	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			303			113			69		39	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		118.8			293.5			227.2			234.4	
Travel Time (s)		8.6			21.1			16.4			16.9	
Confl. Peds. (#/hr)	5		19	19		5	10		39	39		10
Peak Hour Factor	0.83	0.93	0.79	0.65	0.94	0.66	0.78	0.86	0.81	0.66	0.88	0.73
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	1%	0%	0%	3%	1%	0%
Adj. Flow (vph)	217	319	303	238	40	36	221	471	1	2	265	300
Shared Lane Traffic (%)												
Lane Group Flow (vph)	217	319	303	238	40	36	221	471	1	2	565	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases			2			6	8		8	4		
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	10.0	29.5	29.5	29.5	29.5	
Total Split (s)	40.0	34.0	34.0	40.0	34.0	34.0	23.0	76.0	76.0	53.0	53.0	
Total Split (%)	26.7%	22.7%	22.7%	26.7%	22.7%	22.7%	15.3%	50.7%	50.7%	35.3%	35.3%	
Maximum Green (s)	34.0	27.5	27.5	34.0	27.5	27.5	17.0	69.5	69.5	46.5	46.5	
Yellow Time (s)	4.0	3.7	3.7	4.0	3.7	3.7	4.0	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.8	2.8	2.0	2.8	2.8	2.0	2.8	2.8	2.8	2.8	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.5	6.5	6.0	6.5	6.5	6.0	6.5	6.5	6.5	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes			Yes					
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		14.0	14.0		14.0	14.0		16.0	16.0	16.0	16.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0	0	0	
Act Effct Green (s)	34.0	27.5	27.5	34.0	27.5	27.5	70.0	69.5	69.5	46.5	46.5	
Actuated g/C Ratio	0.23	0.18	0.18	0.23	0.18	0.18	0.47	0.46	0.46	0.31	0.31	
v/c Ratio	0.60	1.04	0.62	0.65	0.13	0.10	0.98	0.60	0.00	0.01	1.15	
Control Delay	105.3	55.9	10.9	62.2	55.4	0.8	97.4	34.0	0.0	36.0	130.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	105.3	55.9	10.9	62.2	55.4	0.8	97.4	34.0	0.0	36.0	130.0	
LOS	F	E	B	E	E	A	F	C	A	D	F	
Approach Delay		52.4			54.3			54.1			129.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			D			F	
Stops (vph)	173	177	166	140	32	0	115	297	0	1	357	
Fuel Used(l)	26	29	15	16	4	1	19	26	0	0	63	
CO Emissions (g/hr)	478	534	285	305	70	17	357	483	0	1	1177	
NOx Emissions (g/hr)	92	103	55	59	14	3	69	93	0	0	227	
VOC Emissions (g/hr)	110	123	66	70	16	4	82	111	0	0	271	
Dilemma Vehicles (#)	0	0	0	0	0	0	0	0	0	0	0	

Intersection Summary	
Area Type: CBD	
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 130	
Control Type: Pretimed	
Maximum v/c Ratio: 1.15	
Intersection Signal Delay: 71.3	Intersection LOS: E
Intersection Capacity Utilization 89.0%	ICU Level of Service E
Analysis Period (min) 15	
Description: TMC May 30 2017	
Updated Sept 23/20	

Splits and Phases: 95: RR 45 (HENRY ST)/EUCLID ST & DUNDAS ST

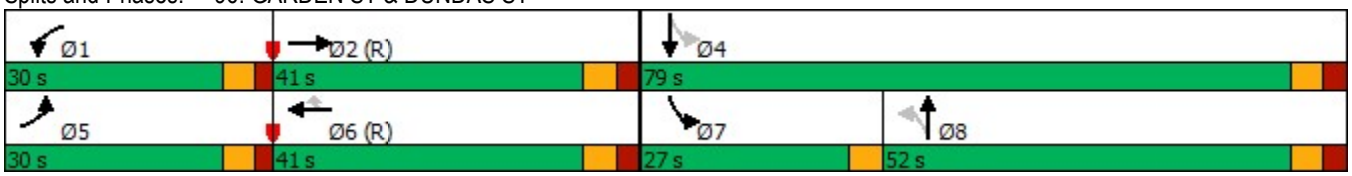


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	504	23	145	359	339	16	650	256	384	424	0
Future Volume (vph)	145	504	23	145	359	339	16	650	256	384	424	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	17.1		0.0	98.4		0.0	23.5		0.0	102.4		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	37.0			12.6			27.3			30.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00		0.98	1.00	0.99				
Frt		0.989				0.850		0.956				
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1591	3144	0	1591	1658	1423	1606	3025	0	1606	3213	0
Flt Permitted	0.950			0.950			0.482			0.081		
Satd. Flow (perm)	1583	3144	0	1586	1658	1394	812	3025	0	137	3213	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				370		43				
Link Speed (k/h)		50			50			50			40	
Link Distance (m)		457.3			160.3			1037.5			218.0	
Travel Time (s)		32.9			11.5			74.7			19.6	
Confl. Peds. (#/hr)	6		5	5		6	3		19	19		3
Peak Hour Factor	0.85	0.90	0.52	0.77	0.94	0.80	0.73	0.82	0.78	0.93	0.90	0.83
Heavy Vehicles (%)	1%	1%	0%	1%	2%	1%	0%	0%	1%	0%	0%	0%
Adj. Flow (vph)	171	560	44	188	382	424	22	793	328	413	471	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	171	604	0	188	382	424	22	1121	0	413	471	0
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases						6	8			4		
Minimum Split (s)	10.5	41.0		10.5	41.0	41.0	35.0	35.0		11.5	35.0	
Total Split (s)	30.0	41.0		30.0	41.0	41.0	52.0	52.0		27.0	79.0	
Total Split (%)	20.0%	27.3%		20.0%	27.3%	27.3%	34.7%	34.7%		18.0%	52.7%	
Maximum Green (s)	24.3	34.5		24.3	34.5	34.5	45.5	45.5		23.3	72.5	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7		3.7	3.7	
All-Red Time (s)	2.0	2.8		2.0	2.8	2.8	2.8	2.8		0.0	2.8	
Lost Time Adjust (s)	-3.0	0.0		0.0	0.0	0.0	0.0	0.0		-3.0	0.0	
Total Lost Time (s)	2.7	6.5		5.7	6.5	6.5	6.5	6.5		0.7	6.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes						Yes		
Walk Time (s)		7.0			7.0	7.0	7.0	7.0			7.0	
Flash Dont Walk (s)		25.0			25.0	25.0	21.0	21.0			21.0	
Pedestrian Calls (#/hr)		0			0	0	0	0			0	
Act Effct Green (s)	27.3	34.5		24.3	34.5	34.5	45.5	45.5		78.3	72.5	
Actuated g/C Ratio	0.18	0.23		0.16	0.23	0.23	0.30	0.30		0.52	0.48	
v/c Ratio	0.59	0.83		0.73	1.00	0.70	0.09	1.18		1.26	0.30	
Control Delay	55.9	76.8		77.1	103.5	15.0	38.9	136.9		163.0	23.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	55.9	76.8		77.1	103.5	15.0	38.9	136.9		163.0	23.5	
LOS	E	E		E	F	B	D	F		F	C	
Approach Delay		72.2			60.8			135.0			88.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			E			F			F	
Stops (vph)	142	475		134	315	61	12	736		295	329	
Fuel Used(l)	16	65		14	41	10	2	201		61	22	
CO Emissions (g/hr)	292	1203		257	765	194	43	3743		1140	413	
NOx Emissions (g/hr)	56	232		50	148	38	8	722		220	80	
VOC Emissions (g/hr)	67	277		59	176	45	10	863		263	95	
Dilemma Vehicles (#)	0	0		0	0	0	0	0		0	0	

Intersection Summary	
Area Type: CBD	
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 150	
Control Type: Pretimed	
Maximum v/c Ratio: 1.26	
Intersection Signal Delay: 91.9	Intersection LOS: F
Intersection Capacity Utilization 107.7%	ICU Level of Service G
Analysis Period (min) 15	
Description: TMC Oct 19/16	
Updated Sept 23/20	
Phase 1 minimum timing error due to 2 second COMM delay	

Splits and Phases: 96: GARDEN ST & DUNDAS ST

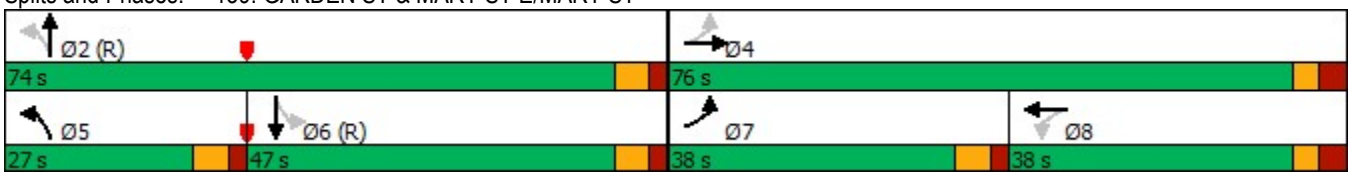


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	4	286	10	2	26	159	831	21	12	551	171
Future Volume (vph)	223	4	286	10	2	26	159	831	21	12	551	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	34.4		0.0	33.8		0.0	51.6		0.0	79.3		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.4			18.0			30.4			24.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	0.98		1.00	0.98			1.00		1.00	0.99	
Frt		0.853			0.861			0.995			0.958	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1474	1259	0	1606	1279	0	1501	3047	0	1606	2849	0
Flt Permitted	0.412			0.554			0.164			0.317		
Satd. Flow (perm)	637	1259	0	934	1279	0	259	3047	0	535	2849	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		336			52			3			37	
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		467.7			161.7			218.0			150.1	
Travel Time (s)		42.1			14.6			19.6			13.5	
Confl. Peds. (#/hr)	2		2	2		2	3		2	2		3
Peak Hour Factor	0.76	0.50	0.85	0.50	0.50	0.50	0.74	0.96	0.66	0.60	0.79	0.64
Heavy Vehicles (%)	9%	0%	13%	0%	0%	13%	7%	5%	0%	0%	6%	10%
Adj. Flow (vph)	293	8	336	20	4	52	215	866	32	20	697	267
Shared Lane Traffic (%)												
Lane Group Flow (vph)	293	344	0	20	56	0	215	898	0	20	964	0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	8.0		8.0	8.0		4.0	20.0		20.0	20.0	
Minimum Split (s)	10.0	28.0		28.0	28.0		10.0	27.0		27.0	27.0	
Total Split (s)	38.0	76.0		38.0	38.0		27.0	74.0		47.0	47.0	
Total Split (%)	25.3%	50.7%		25.3%	25.3%		18.0%	49.3%		31.3%	31.3%	
Maximum Green (s)	32.0	69.7		31.7	31.7		21.0	68.1		41.1	41.1	
Yellow Time (s)	4.0	3.0		3.0	3.0		4.0	3.7		3.7	3.7	
All-Red Time (s)	2.0	3.3		3.3	3.3		2.0	2.2		2.2	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.3		6.3	6.3		6.0	5.9		5.9	5.9	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes						Yes					
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	C-Max		C-Max	C-Max	
Walk Time (s)		15.0		15.0	15.0			15.0		15.0	15.0	
Flash Dont Walk (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Pedestrian Calls (#/hr)		0		0	0			0		0	0	
Act Effct Green (s)	43.7	43.4		9.6	9.6		94.3	94.4		68.4	68.4	
Actuated g/C Ratio	0.29	0.29		0.06	0.06		0.63	0.63		0.46	0.46	
v/c Ratio	0.83	0.57		0.34	0.43		0.66	0.47		0.08	0.73	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	58.0	13.8		81.4	28.2		10.3	9.2		31.4	38.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	58.0	13.8		81.4	28.2		10.3	9.2		31.4	38.7	
LOS	E	B		F	C		B	A		C	D	
Approach Delay		34.1			42.2			9.4			38.6	
Approach LOS		C			D			A			D	
90th %ile Green (s)	32.0	51.1		13.1	13.1		29.0	86.7		51.7	51.7	
90th %ile Term Code	Max	Hold		Gap	Gap		Gap	Coord		Coord	Coord	
70th %ile Green (s)	32.0	48.5		10.5	10.5		24.5	89.3		58.8	58.8	
70th %ile Term Code	Max	Hold		Gap	Gap		Gap	Coord		Coord	Coord	
50th %ile Green (s)	32.0	46.6		8.6	8.6		20.7	91.2		64.5	64.5	
50th %ile Term Code	Max	Hold		Gap	Gap		Gap	Coord		Coord	Coord	
30th %ile Green (s)	32.0	46.0		8.0	8.0		16.6	91.8		69.2	69.2	
30th %ile Term Code	Max	Hold		Min	Min		Gap	Coord		Coord	Coord	
10th %ile Green (s)	24.9	24.6		0.0	0.0		9.5	113.2		97.7	97.7	
10th %ile Term Code	Gap	Hold		Skip	Skip		Gap	Coord		Coord	Coord	
Stops (vph)	209	101		10	8		67	467		8	543	
Fuel Used(l)	24	19		1	1		6	32		1	73	
CO Emissions (g/hr)	446	351		18	22		110	602		21	1349	
NOx Emissions (g/hr)	86	68		3	4		21	116		4	260	
VOC Emissions (g/hr)	103	81		4	5		25	139		5	311	
Dilemma Vehicles (#)	0	0		0	0		0	0		0	0	

Intersection Summary	
Area Type: CBD	
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 26.1	Intersection LOS: C
Intersection Capacity Utilization 78.4%	ICU Level of Service D
Analysis Period (min) 15	
Description: TMC Nov 27/19	
Updated Sept 17/20	

Splits and Phases: 139: GARDEN ST & MARY ST E/MARY ST

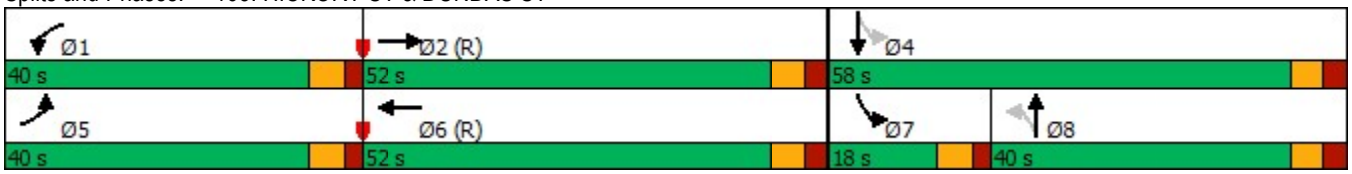


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	470	6	162	351	110	6	39	210	112	18	1
Future Volume (vph)	84	470	6	162	351	110	6	39	210	112	18	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	80.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	0.0			0.0			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98	1.00		0.96	0.98			0.97			1.00	
Frt		0.995			0.946			0.888			0.999	
Flt Protected	0.950			0.950				0.999			0.960	
Satd. Flow (prot)	1606	1529	0	1422	1426	0	0	1326	0	0	1493	0
Flt Permitted	0.950			0.950				0.991			0.340	
Satd. Flow (perm)	1579	1529	0	1368	1426	0	0	1314	0	0	529	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			20			153				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		375.6			457.3			241.7			181.4	
Travel Time (s)		27.0			32.9			17.4			13.1	
Confl. Peds. (#/hr)	10		19	19		10	13		11	11		13
Peak Hour Factor	0.46	0.91	0.38	0.72	0.87	0.48	0.54	0.63	0.58	0.64	0.56	0.58
Heavy Vehicles (%)	0%	10%	0%	13%	9%	11%	0%	33%	6%	6%	22%	14%
Adj. Flow (vph)	183	516	16	225	403	229	11	62	362	175	32	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	183	532	0	225	632	0	0	435	0	0	209	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases							8			4		
Detector Phase	5	2		1	6		8	8		7	4	
Switch Phase												
Minimum Initial (s)	4.0	20.0		4.0	20.0		8.0	8.0		4.0	8.0	
Minimum Split (s)	10.0	28.0		10.0	28.0		26.5	26.5		10.0	26.5	
Total Split (s)	40.0	52.0		40.0	52.0		40.0	40.0		18.0	58.0	
Total Split (%)	26.7%	34.7%		26.7%	34.7%		26.7%	26.7%		12.0%	38.7%	
Maximum Green (s)	34.0	45.5		34.0	45.5		33.5	33.5		12.0	51.5	
Yellow Time (s)	4.0	3.7		4.0	3.7		3.7	3.7		4.0	3.7	
All-Red Time (s)	2.0	2.8		2.0	2.8		2.8	2.8		2.0	2.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	6.5		6.0	6.5			6.5			6.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes						Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		7.0			7.0		7.0	7.0			7.0	
Flash Dont Walk (s)		11.0			11.0		13.0	13.0			13.0	
Pedestrian Calls (#/hr)		0			0		0	0			0	
Act Effct Green (s)	22.4	51.6		27.9	57.1			51.5			51.5	
Actuated g/C Ratio	0.15	0.34		0.19	0.38			0.34			0.34	
v/c Ratio	0.77	1.01		0.85	1.14			0.79			1.15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	80.1	92.0		90.0	126.6			47.5			157.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	80.1	92.0		90.0	126.6			47.5			157.6	
LOS	F	F		F	F			D			F	
Approach Delay		89.0			117.0			47.5			157.6	
Approach LOS		F			F			D			F	
90th %ile Green (s)	30.1	45.5		34.0	49.4		51.5	51.5		0.0	51.5	
90th %ile Term Code	Gap	Coord		Max	Coord		Max	Max		Skip	Max	
70th %ile Green (s)	25.6	46.7		32.8	53.9		51.5	51.5		0.0	51.5	
70th %ile Term Code	Gap	Coord		Gap	Coord		Max	Max		Skip	Max	
50th %ile Green (s)	22.4	50.6		28.9	57.1		51.5	51.5		0.0	51.5	
50th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold		Skip	Max	
30th %ile Green (s)	19.2	54.6		24.9	60.3		51.5	51.5		0.0	51.5	
30th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold		Skip	Max	
10th %ile Green (s)	14.5	60.4		19.1	65.0		51.5	51.5		0.0	51.5	
10th %ile Term Code	Gap	Coord		Gap	Coord		Max	Max		Skip	Max	
Stops (vph)	79	391		159	296			175			107	
Fuel Used(l)	10	59		22	72			19			21	
CO Emissions (g/hr)	185	1106		406	1331			355			390	
NOx Emissions (g/hr)	36	213		78	257			69			75	
VOC Emissions (g/hr)	43	255		94	307			82			90	
Dilemma Vehicles (#)	0	0		0	0			0			0	

Intersection Summary	
Area Type: CBD	
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.15	
Intersection Signal Delay: 98.1	Intersection LOS: F
Intersection Capacity Utilization 88.2%	ICU Level of Service E
Analysis Period (min) 15	
Description: TMC June 26/19	
Updated Sept 28/20	

Splits and Phases: 163: HICKORY ST & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	452	119	15	297	31	111	82	35	25	1	30
Future Volume (vph)	55	452	119	15	297	31	111	82	35	25	1	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.973			0.987			0.977			0.918	
Flt Protected		0.995			0.998			0.975			0.982	
Satd. Flow (prot)	0	1658	0	0	1664	0	0	1737	0	0	1613	0
Flt Permitted		0.995			0.998			0.975			0.982	
Satd. Flow (perm)	0	1658	0	0	1664	0	0	1737	0	0	1613	0
Link Speed (k/h)		40			50			48			48	
Link Distance (m)		360.6			467.7			35.4			173.4	
Travel Time (s)		32.5			33.7			2.7			13.0	
Peak Hour Factor	0.63	0.81	0.75	0.94	0.96	0.91	0.79	0.92	0.73	0.69	0.40	0.50
Heavy Vehicles (%)	13%	10%	7%	7%	12%	6%	4%	0%	6%	0%	6%	8%
Adj. Flow (vph)	87	558	159	16	309	34	141	89	48	36	3	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	804	0	0	359	0	0	278	0	0	99	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 75.6%	ICU Level of Service D
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	321	13	71	193	89	25	1	164	166	241	14
Future Volume (vph)	27	321	13	71	193	89	25	1	164	166	241	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.966			0.886			0.996	
Flt Protected		0.996			0.988			0.992			0.978	
Satd. Flow (prot)	0	1862	0	0	1767	0	0	1631	0	0	1821	0
Flt Permitted		0.996			0.988			0.992			0.978	
Satd. Flow (perm)	0	1862	0	0	1767	0	0	1631	0	0	1821	0
Link Speed (k/h)		48			50			50			50	
Link Distance (m)		418.0			407.9			725.2			227.2	
Travel Time (s)		31.4			29.4			52.2			16.4	
Peak Hour Factor	0.75	0.75	0.81	0.63	0.84	0.77	0.63	0.89	0.75	0.70	0.87	0.88
Heavy Vehicles (%)	0%	0%	0%	0%	1%	4%	8%	1%	0%	0%	1%	0%
Adj. Flow (vph)	36	428	16	113	230	116	40	1	219	237	277	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	480	0	0	459	0	0	260	0	0	530	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 82.0%	ICU Level of Service E
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	101	12	33	62	110	7	222	65	176	373	55
Future Volume (vph)	26	101	12	33	62	110	7	222	65	176	373	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.987			0.924			0.969			0.985	
Flt Protected		0.990			0.992			0.998			0.985	
Satd. Flow (prot)	0	1836	0	0	1713	0	0	1791	0	0	1791	0
Flt Permitted		0.990			0.992			0.998			0.985	
Satd. Flow (perm)	0	1836	0	0	1713	0	0	1791	0	0	1791	0
Link Speed (k/h)		48			48			48			50	
Link Distance (m)		208.7			418.0			214.5			219.5	
Travel Time (s)		15.7			31.4			16.1			15.8	
Peak Hour Factor	0.81	0.87	0.75	0.75	0.86	0.74	0.58	0.90	0.83	0.77	0.88	0.69
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	2%	0%	2%	2%	0%
Adj. Flow (vph)	32	116	16	44	72	149	12	247	78	229	424	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	164	0	0	265	0	0	337	0	0	733	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 73.9%	ICU Level of Service D
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	254	7	361	180	52	7	160	373	81	14	1
Future Volume (vph)	2	254	7	361	180	52	7	160	373	81	14	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.983			0.911			0.995	
Flt Protected		0.999			0.971			0.999			0.961	
Satd. Flow (prot)	0	1870	0	0	1793	0	0	1710	0	0	1797	0
Flt Permitted		0.999			0.971			0.999			0.961	
Satd. Flow (perm)	0	1870	0	0	1793	0	0	1710	0	0	1797	0
Link Speed (k/h)		48			50			50			48	
Link Distance (m)		208.2			409.8			234.4			259.5	
Travel Time (s)		15.6			29.5			16.9			19.5	
Peak Hour Factor	0.25	0.73	0.58	0.75	0.83	0.53	0.88	0.83	0.95	0.90	0.80	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	8	348	12	481	217	98	8	193	393	90	18	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	368	0	0	796	0	0	594	0	0	112	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 96.9%	ICU Level of Service F
Analysis Period (min) 15	

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	239	221	110	9	47	141
Future Volume (vph)	239	221	110	9	47	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.990		0.899	
Flt Protected		0.975			0.988	
Satd. Flow (prot)	0	1832	1810	0	1644	0
Flt Permitted		0.975			0.988	
Satd. Flow (perm)	0	1832	1810	0	1644	0
Link Speed (k/h)		50	48		50	
Link Distance (m)		373.1	229.4		241.7	
Travel Time (s)		26.9	17.2		17.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	3%	0%	0%	2%
Adj. Flow (vph)	260	240	120	10	51	153
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	500	130	0	204	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 49.5%		ICU Level of Service A	
Analysis Period (min) 15			

Lanes, Volumes, Timings
90: BROCK ST N & MARY ST W/MARY ST E

12/17/2020

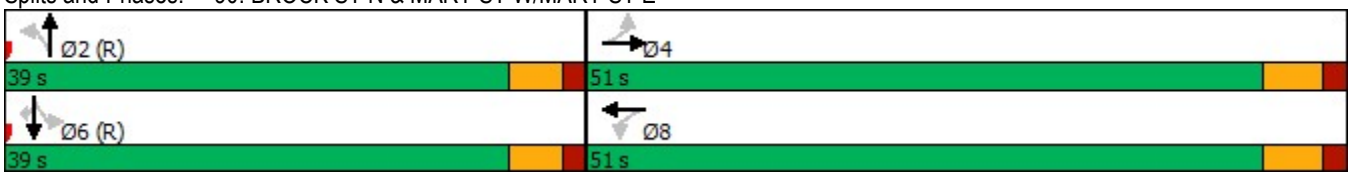
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	237	12	39	329	173	40	367	16	53	451	426
Future Volume (vph)	95	237	12	39	329	173	40	367	16	53	451	426
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	22.3		0.0	18.9		0.0	16.3		0.0	25.4		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	23.1			28.7			29.3			34.6		
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		1.00	0.99		1.00	1.00		0.99		0.97
Frt		0.988			0.946			0.991				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1434	1471	0	1422	1470	0	1306	1427	0	1447	1523	1319
Flt Permitted	0.171			0.492			0.267			0.289		
Satd. Flow (perm)	258	1471	0	733	1470	0	366	1427	0	437	1523	1276
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			45			4				318
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		414.4			360.2			133.8			82.0	
Travel Time (s)		29.8			25.9			9.6			5.9	
Confl. Peds. (#/hr)	7		3	3		7	6		10	10		6
Peak Hour Factor	0.84	0.75	0.43	0.81	0.71	0.66	0.71	0.83	0.57	0.74	0.92	0.85
Heavy Vehicles (%)	12%	13%	17%	13%	7%	8%	23%	17%	19%	11%	11%	9%
Adj. Flow (vph)	113	316	28	48	463	262	56	442	28	72	490	501
Shared Lane Traffic (%)												
Lane Group Flow (vph)	113	344	0	48	725	0	56	470	0	72	490	501
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	26.0	26.0		26.0	26.0		28.0	28.0		28.0	28.0	28.0
Total Split (s)	51.0	51.0		51.0	51.0		39.0	39.0		39.0	39.0	39.0
Total Split (%)	56.7%	56.7%		56.7%	56.7%		43.3%	43.3%		43.3%	43.3%	43.3%
Maximum Green (s)	45.2	45.2		45.2	45.2		33.7	33.7		33.7	33.7	33.7
Yellow Time (s)	4.0	4.0		4.0	4.0		3.7	3.7		3.7	3.7	3.7
All-Red Time (s)	1.8	1.8		1.8	1.8		1.6	1.6		1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8		5.8	5.8		5.3	5.3		5.3	5.3	5.3
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	44.4	44.4		44.4	44.4		34.5	34.5		34.5	34.5	34.5
Actuated g/C Ratio	0.49	0.49		0.49	0.49		0.38	0.38		0.38	0.38	0.38
v/c Ratio	0.89	0.47		0.13	0.97		0.40	0.86		0.43	0.84	0.73

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	81.3	17.1		12.2	43.9		31.5	43.0		31.2	40.7	15.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	81.3	17.1		12.2	43.9		31.5	43.0		31.2	40.7	15.9
LOS	F	B		B	D		C	D		C	D	B
Approach Delay		33.0			41.9			41.8			28.4	
Approach LOS		C			D			D			C	
90th %ile Green (s)	45.2	45.2		45.2	45.2		33.7	33.7		33.7	33.7	33.7
90th %ile Term Code	Max	Max		Max	Max		Coord	Coord		Coord	Coord	Coord
70th %ile Green (s)	45.2	45.2		45.2	45.2		33.7	33.7		33.7	33.7	33.7
70th %ile Term Code	Max	Max		Max	Max		Coord	Coord		Coord	Coord	Coord
50th %ile Green (s)	45.2	45.2		45.2	45.2		33.7	33.7		33.7	33.7	33.7
50th %ile Term Code	Max	Max		Max	Max		Coord	Coord		Coord	Coord	Coord
30th %ile Green (s)	45.2	45.2		45.2	45.2		33.7	33.7		33.7	33.7	33.7
30th %ile Term Code	Hold	Hold		Max	Max		Coord	Coord		Coord	Coord	Coord
10th %ile Green (s)	41.2	41.2		41.2	41.2		37.7	37.7		37.7	37.7	37.7
10th %ile Term Code	Hold	Hold		Gap	Gap		Coord	Coord		Coord	Coord	Coord
Queue Length 50th (m)	15.2	33.1		2.9	79.5		6.5	68.0		8.4	70.8	23.4
Queue Length 95th (m)	#41.2	41.1		m5.2	73.5		12.6	#103.5		15.8	#121.4	51.4
Internal Link Dist (m)		390.4			336.2			109.8			58.0	
Turn Bay Length (m)	22.3			18.9			16.3			25.4		
Base Capacity (vph)	129	742		368	760		140	549		167	583	685
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.88	0.46		0.13	0.95		0.40	0.86		0.43	0.84	0.73

Intersection Summary

Area Type: CBD
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 35.3 Intersection LOS: D
Intersection Capacity Utilization 99.4% ICU Level of Service F
Analysis Period (min) 15
Description: TMC Sep 26/19
Updated Sept 17/20
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 90: BROCK ST N & MARY ST W/MARY ST E



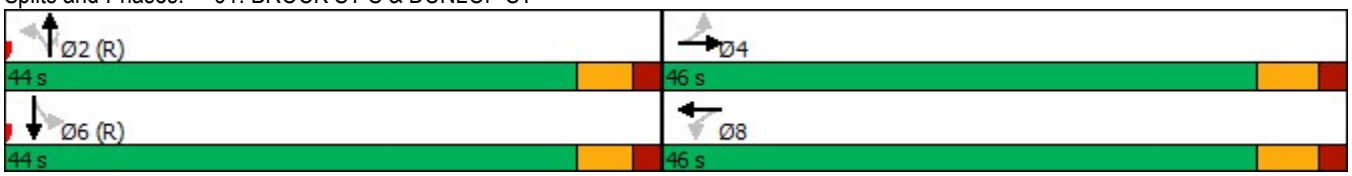
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	241	132	43	186	16	6	382	107	0	572	29
Future Volume (vph)	18	241	132	43	186	16	6	382	107	0	572	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	35.1		0.0	16.0		0.0	16.1		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	25.0			21.2			15.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.96	0.98		0.99	0.99				0.90		0.99	
Frt		0.951			0.983				0.850		0.990	
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1516	1567	0	1606	1584	0	1606	1595	1409	1691	1599	0
Flt Permitted	0.551			0.227			0.176					
Satd. Flow (perm)	847	1567	0	379	1584	0	298	1595	1268	1691	1599	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			9				143		5	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		405.1			375.4			117.4			239.3	
Travel Time (s)		29.2			27.0			8.5			17.2	
Confl. Peds. (#/hr)	22		31	31		22	31		29	29		31
Peak Hour Factor	0.64	0.67	0.76	0.71	0.83	0.57	0.50	0.78	0.75	0.25	0.86	0.60
Heavy Vehicles (%)	6%	1%	0%	0%	3%	13%	0%	6%	2%	0%	4%	3%
Adj. Flow (vph)	28	360	174	61	224	28	12	490	143	0	665	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	534	0	61	252	0	12	490	143	0	713	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		20.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		26.0	26.0	26.0	26.0	26.0	
Total Split (s)	46.0	46.0		46.0	46.0		44.0	44.0	44.0	44.0	44.0	
Total Split (%)	51.1%	51.1%		51.1%	51.1%		48.9%	48.9%	48.9%	48.9%	48.9%	
Maximum Green (s)	39.8	39.8		39.8	39.8		38.3	38.3	38.3	38.3	38.3	
Yellow Time (s)	4.2	4.2		4.2	4.2		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2		6.2	6.2		5.7	5.7	5.7	5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		9.0	9.0	9.0	9.0	9.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	34.0	34.0		34.0	34.0		44.1	44.1	44.1		44.1	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.49	0.49	0.49		0.49	
v/c Ratio	0.09	0.87		0.43	0.42		0.08	0.63	0.21		0.91	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	16.4	39.5		29.2	21.1		17.2	23.0	3.7		40.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	1.5	0.0		0.0	
Total Delay	16.4	39.5		29.2	21.1		17.2	24.5	3.7		40.7	
LOS	B	D		C	C		B	C	A		D	
Approach Delay		38.4			22.7			19.8			40.7	
Approach LOS		D			C			B			D	
90th %ile Green (s)	39.8	39.8		39.8	39.8		38.3	38.3	38.3	38.3	38.3	
90th %ile Term Code	Max	Max		Hold	Hold		Coord	Coord	Coord	Coord	Coord	
70th %ile Green (s)	39.3	39.3		39.3	39.3		38.8	38.8	38.8	38.8	38.8	
70th %ile Term Code	Gap	Gap		Hold	Hold		Coord	Coord	Coord	Coord	Coord	
50th %ile Green (s)	35.3	35.3		35.3	35.3		42.8	42.8	42.8	42.8	42.8	
50th %ile Term Code	Gap	Gap		Hold	Hold		Coord	Coord	Coord	Coord	Coord	
30th %ile Green (s)	31.0	31.0		31.0	31.0		47.1	47.1	47.1	47.1	47.1	
30th %ile Term Code	Gap	Gap		Hold	Hold		Coord	Coord	Coord	Coord	Coord	
10th %ile Green (s)	24.4	24.4		24.4	24.4		53.7	53.7	53.7	53.7	53.7	
10th %ile Term Code	Gap	Gap		Hold	Hold		Coord	Coord	Coord	Coord	Coord	
Queue Length 50th (m)	2.7	71.1		6.9	27.3		1.0	56.8	0.0		102.3	
Queue Length 95th (m)	4.9	61.6		11.8	37.0		2.3	77.2	5.3		#171.6	
Internal Link Dist (m)		381.1			351.4			93.4			215.3	
Turn Bay Length (m)	35.0			35.1			16.0					
Base Capacity (vph)	374	712		167	705		145	782	694		787	
Starvation Cap Reductn	0	0		0	0		0	141	0		0	
Spillback Cap Reductn	0	0		0	0		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.07	0.75		0.37	0.36		0.08	0.76	0.21		0.91	

Intersection Summary

Area Type: CBD
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 49.6 (55%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 31.5 Intersection LOS: C
Intersection Capacity Utilization 81.3% ICU Level of Service D
Analysis Period (min) 15
Description: TMC Oct 4/18
Updated Sept 17/20
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 91: BROCK ST S & DUNLOP ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	376	291	13	893	40	215	114	14	61	239	310
Future Volume (vph)	118	376	291	13	893	40	215	114	14	61	239	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	44.5		40.0	0.0		157.1	23.4		14.6	35.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	31.3			29.4			40.9			25.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.97	0.99		0.96			0.98	0.99	0.99	
Frt			0.850			0.850			0.850		0.918	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1545	3031	1437	1361	3150	1331	1560	1626	1261	1591	1520	0
Flt Permitted	0.950			0.950			0.083			0.671		
Satd. Flow (perm)	1538	3031	1390	1351	3150	1283	136	1626	1233	1114	1520	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			355			115			83		54	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		281.1			304.8			225.7			1140.1	
Travel Time (s)		20.2			21.9			16.3			82.1	
Confl. Peds. (#/hr)	5		4	4		5	1		6	6		1
Peak Hour Factor	0.82	0.89	0.82	0.69	0.89	0.75	0.66	0.85	0.58	0.74	0.75	0.80
Heavy Vehicles (%)	4%	6%	0%	18%	2%	8%	3%	4%	14%	1%	3%	0%
Adj. Flow (vph)	144	422	355	19	1003	53	326	134	24	82	319	388
Shared Lane Traffic (%)												
Lane Group Flow (vph)	144	422	355	19	1003	53	326	134	24	82	707	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases			2			6	8		8	4		
Minimum Split (s)	7.0	29.0	29.0	10.0	29.0	29.0	5.0	30.0	30.0	30.0	30.0	
Total Split (s)	12.0	45.0	45.0	12.0	45.0	45.0	17.0	68.0	68.0	51.0	51.0	
Total Split (%)	9.6%	36.0%	36.0%	9.6%	36.0%	36.0%	13.6%	54.4%	54.4%	40.8%	40.8%	
Maximum Green (s)	6.3	38.5	38.5	6.0	38.5	38.5	13.3	61.5	61.5	44.5	44.5	
Yellow Time (s)	3.7	3.7	3.7	4.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.8	2.8	2.0	2.8	2.8	0.0	2.8	2.8	2.8	2.8	
Lost Time Adjust (s)	-3.0	0.0	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	2.7	6.5	6.5	6.0	6.5	6.5	0.7	6.5	6.5	6.5	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes			Yes					
Walk Time (s)		14.0	14.0		14.0	14.0		17.0	17.0	17.0	17.0	
Flash Dont Walk (s)		5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0	0	0	
Act Effct Green (s)	9.3	38.5	38.5	6.0	38.5	38.5	67.3	61.5	61.5	44.5	44.5	
Actuated g/C Ratio	0.07	0.31	0.31	0.05	0.31	0.31	0.54	0.49	0.49	0.36	0.36	
v/c Ratio	1.26	0.45	0.53	0.29	1.03	0.11	1.26	0.17	0.04	0.21	1.23	
Control Delay	217.0	36.7	6.4	59.3	78.0	1.4	177.4	18.3	0.1	29.8	151.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	217.0	36.7	6.4	59.3	78.0	1.4	177.4	18.3	0.1	29.8	151.2	
LOS	F	D	A	E	E	A	F	B	A	C	F	
Approach Delay		53.2			73.9			124.6			138.6	

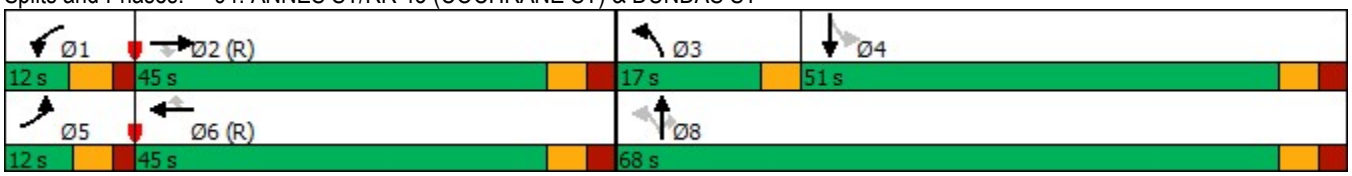
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			E			F			F	
Queue Length 50th (m)	~40.7	40.3	0.0	4.1	~125.1	0.0	~79.6	16.4	0.0	12.8	~189.8	
Queue Length 95th (m)	#69.5	53.7	11.9	m5.9	m#136.6	m0.2	#76.7	25.7	0.0	19.5	#189.8	
Internal Link Dist (m)		257.1			280.8			201.7			1116.1	
Turn Bay Length (m)	44.5		40.0			157.1	23.4		14.6	35.0		
Base Capacity (vph)	114	933	673	65	970	474	258	799	648	396	575	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	1.26	0.45	0.53	0.29	1.03	0.11	1.26	0.17	0.04	0.21	1.23	

Intersection Summary

Area Type: CBD
Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 100
Control Type: Pretimed
Maximum v/c Ratio: 1.26
Intersection Signal Delay: 91.2 Intersection LOS: F
Intersection Capacity Utilization 100.6% ICU Level of Service G
Analysis Period (min) 15
Description: TMC Oct 24/17
Updated Sept 23/20

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 94: ANNES ST/RR 43 (COCHRANE ST) & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	143	142	176	113	126	14	136	128	0	1	239	350
Future Volume (vph)	143	142	176	113	126	14	136	128	0	1	239	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	24.7		0.0	30.2		16.0	7.6		11.0	13.8		0.0
Storage Lanes	1		1	0		1	1		1	1		0
Taper Length (m)	32.9			38.5			41.4			24.7		
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	0.98		0.96	0.98		0.95				0.98	0.96	
Frt			0.850			0.850					0.914	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1575	1610	1382	1606	1642	1437	1560	1691	1691	1606	1468	0
Flt Permitted	0.950			0.950			0.090			0.647		
Satd. Flow (perm)	1537	1610	1326	1580	1642	1367	148	1691	1691	1068	1468	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			267			132					71	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		118.8			293.5			229.4			228.8	
Travel Time (s)		8.6			21.1			16.5			16.5	
Confl. Peds. (#/hr)	10		7	7		10	22		11	11		22
Peak Hour Factor	0.73	0.81	0.66	0.78	0.88	0.70	0.93	0.73	0.81	0.70	0.75	0.82
Heavy Vehicles (%)	2%	5%	4%	0%	3%	0%	3%	0%	0%	0%	0%	1%
Adj. Flow (vph)	196	175	267	145	143	20	146	175	0	1	319	427
Shared Lane Traffic (%)												
Lane Group Flow (vph)	196	175	267	145	143	20	146	175	0	1	746	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases			2			6	8		8	4		
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	10.0	29.1	29.1	29.1	29.1	
Total Split (s)	22.0	29.0	29.0	22.0	29.0	29.0	11.0	74.0	74.0	63.0	63.0	
Total Split (%)	17.6%	23.2%	23.2%	17.6%	23.2%	23.2%	8.8%	59.2%	59.2%	50.4%	50.4%	
Maximum Green (s)	16.0	22.7	22.7	16.0	22.7	22.7	5.0	67.9	67.9	56.9	56.9	
Yellow Time (s)	4.0	3.7	3.7	4.0	3.7	3.7	4.0	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.6	2.6	2.0	2.6	2.6	2.0	2.4	2.4	2.4	2.4	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.3	6.3	6.0	6.3	6.3	6.0	6.1	6.1	6.1	6.1	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes			Yes					
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		14.0	14.0		14.0	14.0		16.0	16.0	16.0	16.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0	0	0	
Act Effct Green (s)	16.0	22.7	22.7	16.0	22.7	22.7	68.0	67.9		56.9	56.9	
Actuated g/C Ratio	0.13	0.18	0.18	0.13	0.18	0.18	0.54	0.54		0.46	0.46	
v/c Ratio	0.98	0.60	0.58	0.71	0.48	0.06	1.07	0.19		0.00	1.06	
Control Delay	116.1	82.6	37.1	71.6	52.0	0.3	120.5	15.2		19.0	80.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	116.1	82.6	37.1	71.6	52.0	0.3	120.5	15.2		19.0	80.6	
LOS	F	F	D	E	D	A	F	B		B	F	
Approach Delay		73.9			57.9			63.1			80.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			E			E			F	
Queue Length 50th (m)	46.7	41.3	31.6	31.9	29.3	0.0	~18.1	19.4		0.1	~175.7	
Queue Length 95th (m)	#64.1	56.7	31.9	44.7	47.3	0.0	#49.7	24.2		0.9	#172.8	
Internal Link Dist (m)		94.8			269.5			205.4			204.8	
Turn Bay Length (m)	24.7			30.2		16.0	7.6			13.8		
Base Capacity (vph)	201	292	459	205	298	356	136	918		486	706	
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	0.98	0.60	0.58	0.71	0.48	0.06	1.07	0.19		0.00	1.06	

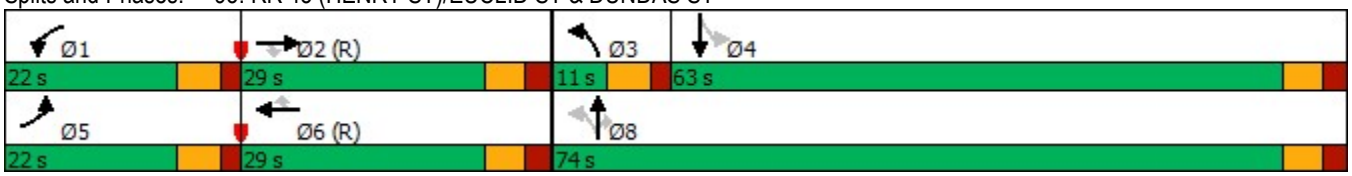
Intersection Summary

Area Type: CBD
Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 130
Control Type: Pretimed
Maximum v/c Ratio: 1.07
Intersection Signal Delay: 72.2 Intersection LOS: E
Intersection Capacity Utilization 94.1% ICU Level of Service F
Analysis Period (min) 15
Description: TMC May 30 2017
Updated Sept 23/20

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 95: RR 45 (HENRY ST)/EUCLID ST & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	258	18	99	526	254	23	323	76	265	560	16
Future Volume (vph)	58	258	18	99	526	254	23	323	76	265	560	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	17.1		0.0	98.4		0.0	23.5		0.0	102.4		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	37.0			12.6			27.3			30.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	0.99	1.00		0.98		0.97	0.98	0.99		0.99	1.00	
Frt		0.985				0.850		0.973			0.996	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1545	2998	0	1545	1626	1356	1447	3011	0	1501	3131	0
Flt Permitted	0.950			0.950			0.406			0.333		
Satd. Flow (perm)	1535	2998	0	1515	1626	1319	605	3011	0	521	3131	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12				248		19			2	
Link Speed (k/h)		50			50			50			40	
Link Distance (m)		457.3			160.3			1037.5			218.0	
Travel Time (s)		32.9			11.5			74.7			19.6	
Confl. Peds. (#/hr)	13		26	26		13	23		17	17		23
Peak Hour Factor	0.74	0.86	0.53	0.73	0.84	0.88	0.63	0.82	0.89	0.93	0.90	0.88
Heavy Vehicles (%)	4%	5%	6%	4%	4%	6%	11%	3%	4%	7%	2%	2%
Adj. Flow (vph)	78	300	34	136	626	289	37	394	85	285	622	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	334	0	136	626	289	37	479	0	285	640	0
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases						6	8			4		
Minimum Split (s)	10.0	41.0		10.0	41.0	41.0	35.0	35.0		9.0	35.0	
Total Split (s)	19.0	58.0		19.0	58.0	58.0	35.0	35.0		13.0	48.0	
Total Split (%)	15.2%	46.4%		15.2%	46.4%	46.4%	28.0%	28.0%		10.4%	38.4%	
Maximum Green (s)	14.0	51.4		14.0	51.4	51.4	29.1	29.1		10.0	42.1	
Yellow Time (s)	3.0	4.1		3.0	4.1	4.1	3.7	3.7		3.0	3.7	
All-Red Time (s)	2.0	2.5		2.0	2.5	2.5	2.2	2.2		0.0	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		-3.0	0.0	
Total Lost Time (s)	5.0	6.6		5.0	6.6	6.6	5.9	5.9		0.0	5.9	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes				Yes		
Walk Time (s)		7.0			7.0	7.0	7.0	7.0			7.0	
Flash Dont Walk (s)		25.0			25.0	25.0	21.0	21.0			21.0	
Pedestrian Calls (#/hr)		0			0	0	0	0			0	
Act Effct Green (s)	14.0	51.4		14.0	51.4	51.4	29.1	29.1		48.0	42.1	
Actuated g/C Ratio	0.11	0.41		0.11	0.41	0.41	0.23	0.23		0.38	0.34	
v/c Ratio	0.45	0.27		0.79	0.94	0.42	0.26	0.67		0.95	0.61	
Control Delay	52.2	22.6		84.0	58.4	6.8	45.3	47.1		73.3	37.4	
Queue Delay	0.0	0.0		0.0	24.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	52.2	22.6		84.0	82.4	6.8	45.3	47.1		73.3	37.4	
LOS	D	C		F	F	A	D	D		E	D	
Approach Delay		28.2			61.8			47.0			48.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			E			D			D	
Queue Length 50th (m)	16.5	24.1		30.5	133.8	5.6	6.9	50.2		48.6	63.1	
Queue Length 95th (m)	m23.5	m33.0		#40.3	#177.3	21.5	11.0	59.7		#100.0	81.1	
Internal Link Dist (m)		433.3			136.3			1013.5			194.0	
Turn Bay Length (m)	17.1			98.4			23.5			102.4		
Base Capacity (vph)	173	1239		173	668	688	140	715		301	1055	
Starvation Cap Reductn	0	0		0	69	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.45	0.27		0.79	1.05	0.42	0.26	0.67		0.95	0.61	

Intersection Summary

Area Type: CBD
Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 95
Control Type: Pretimed
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 50.1 Intersection LOS: D
Intersection Capacity Utilization 92.5% ICU Level of Service F
Analysis Period (min) 15
Description: TMC Oct 19/16
Updated Sept 23/20

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

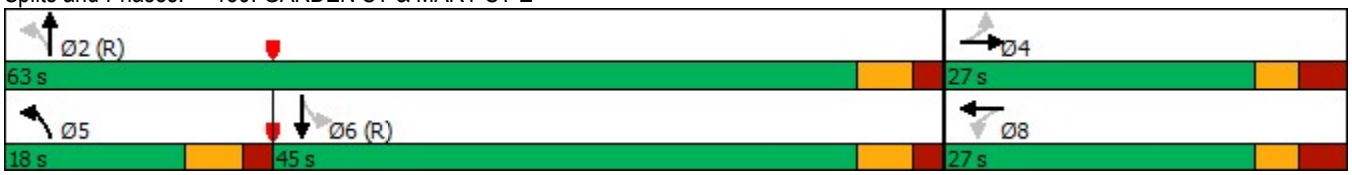
Splits and Phases: 96: GARDEN ST & DUNDAS ST

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	0	160	13	6	42	147	573	3	19	668	244
Future Volume (vph)	99	0	160	13	6	42	147	573	3	19	668	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	34.4		0.0	33.8		0.0	51.6		0.0	79.3		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.4			18.0			30.4			24.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	0.99	0.98		1.00	0.98			1.00		1.00	0.98	
Frt		0.850			0.866			0.998			0.954	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1422	1241	0	1397	1437	0	1373	2917	0	1447	2765	0
Flt Permitted	0.709			0.574			0.165			0.421		
Satd. Flow (perm)	1052	1241	0	841	1437	0	238	2917	0	638	2765	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		334			65			3			97	
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		468.1			161.7			218.0			150.1	
Travel Time (s)		42.1			14.6			19.6			13.5	
Confl. Peds. (#/hr)	7		3	3		7	21		5	5		21
Peak Hour Factor	0.65	0.25	0.89	0.65	0.75	0.65	0.75	0.95	0.38	0.59	0.91	0.76
Heavy Vehicles (%)	13%	0%	14%	15%	0%	0%	17%	10%	0%	11%	8%	10%
Adj. Flow (vph)	152	0	180	20	8	65	196	603	8	32	734	321
Shared Lane Traffic (%)												
Lane Group Flow (vph)	152	180	0	20	73	0	196	611	0	32	1055	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		4.0	20.0		20.0	20.0	
Minimum Split (s)	26.3	26.3		26.3	26.3		10.0	27.0		27.0	27.0	
Total Split (s)	27.0	27.0		27.0	27.0		18.0	63.0		45.0	45.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		20.0%	70.0%		50.0%	50.0%	
Maximum Green (s)	20.7	20.7		20.7	20.7		12.0	57.1		39.1	39.1	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	3.7		3.7	3.7	
All-Red Time (s)	3.3	3.3		3.3	3.3		2.0	2.2		2.2	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		6.0	5.9		5.9	5.9	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes					
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	C-Max		C-Max	C-Max	
Walk Time (s)	15.0	15.0		15.0	15.0			15.0		15.0	15.0	
Flash Dont Walk (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Pedestrian Calls (#/hr)	0	0		0	0			0		0	0	
Act Effct Green (s)	16.9	16.9		16.9	16.9		60.8	60.9		45.3	45.3	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.68	0.68		0.50	0.50	
v/c Ratio	0.77	0.36		0.13	0.23		0.70	0.31		0.10	0.73	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	54.6	3.3		30.2	10.9		22.5	7.0		13.4	16.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	54.6	3.3		30.2	10.9		22.5	7.0		13.4	16.0	
LOS	D	A		C	B		C	A		B	B	
Approach Delay		26.8			15.1			10.7			15.9	
Approach LOS		C			B			B			B	
90th %ile Green (s)	20.7	20.7		20.7	20.7		12.0	57.1		39.1	39.1	
90th %ile Term Code	Max	Max		Hold	Hold		Max	Coord		Coord	Coord	
70th %ile Green (s)	20.7	20.7		20.7	20.7		12.0	57.1		39.1	39.1	
70th %ile Term Code	Max	Max		Hold	Hold		Max	Coord		Coord	Coord	
50th %ile Green (s)	18.3	18.3		18.3	18.3		9.9	59.5		43.6	43.6	
50th %ile Term Code	Gap	Gap		Hold	Hold		Gap	Coord		Coord	Coord	
30th %ile Green (s)	14.9	14.9		14.9	14.9		8.0	62.9		48.9	48.9	
30th %ile Term Code	Gap	Gap		Hold	Hold		Gap	Coord		Coord	Coord	
10th %ile Green (s)	10.0	10.0		10.0	10.0		6.1	67.8		55.7	55.7	
10th %ile Term Code	Gap	Gap		Hold	Hold		Gap	Coord		Coord	Coord	
Queue Length 50th (m)	23.6	2.0		2.6	1.0		10.9	19.2		1.5	31.8	
Queue Length 95th (m)	m28.1	0.0		5.7	7.3		18.6	29.2		4.5	53.7	
Internal Link Dist (m)		444.1			137.7			194.0			126.1	
Turn Bay Length (m)	34.4			33.8			51.6			79.3		
Base Capacity (vph)	241	542		193	380		312	1974		321	1439	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.63	0.33		0.10	0.19		0.63	0.31		0.10	0.73	

Intersection Summary	
Area Type: CBD	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 15.7	Intersection LOS: B
Intersection Capacity Utilization 67.1%	ICU Level of Service C
Analysis Period (min) 15	
Description: TMC Nov 27/19	
Updated Sept 17/20	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 139: GARDEN ST & MARY ST E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	163	1	156	377	87	1	14	188	65	17	1
Future Volume (vph)	144	163	1	156	377	87	1	14	188	65	17	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	80.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	0.0			0.0			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.98	0.99			0.98			1.00	
Frt		0.997			0.955			0.877			0.998	
Flt Protected	0.950			0.950							0.963	
Satd. Flow (prot)	1373	1494	0	1530	1398	0	0	1349	0	0	1493	0
Flt Permitted	0.950			0.950				0.998			0.300	
Satd. Flow (perm)	1362	1494	0	1497	1398	0	0	1346	0	0	465	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			20			362			1	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		375.6			457.3			233.0			181.4	
Travel Time (s)		27.0			32.9			16.8			13.1	
Confl. Peds. (#/hr)	5		8	8		5	10		3	3		10
Peak Hour Factor	0.50	0.90	0.25	0.55	0.94	0.50	0.33	0.43	0.52	0.64	0.56	0.58
Heavy Vehicles (%)	17%	13%	0%	5%	13%	17%	0%	33%	6%	11%	0%	27%
Adj. Flow (vph)	288	181	4	284	401	174	3	33	362	102	30	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	288	185	0	284	575	0	0	398	0	0	134	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	4.0	20.0		4.0	20.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	10.0	28.0		10.0	28.0		26.0	26.0		26.0	26.0	
Total Split (s)	31.0	54.0		31.0	54.0		40.0	40.0		40.0	40.0	
Total Split (%)	24.8%	43.2%		24.8%	43.2%		32.0%	32.0%		32.0%	32.0%	
Maximum Green (s)	25.0	48.5		25.0	48.5		34.6	34.6		34.6	34.6	
Yellow Time (s)	4.0	3.8		4.0	3.8		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	1.7		2.0	1.7		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	5.5		6.0	5.5			5.4			5.4	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes			Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		11.0			11.0		13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effct Green (s)	25.0	48.9		24.6	48.5			34.6			34.6	
Actuated g/C Ratio	0.20	0.39		0.20	0.39			0.28			0.28	
v/c Ratio	1.05	0.32		0.94	1.04			0.63			1.04	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	116.6	28.3		78.8	86.9			10.4			134.7	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	116.6	28.3		78.8	86.9			10.4			134.7	
LOS	F	C		E	F			B			F	
Approach Delay		82.1			84.2			10.4			134.7	
Approach LOS		F			F			B			F	
90th %ile Green (s)	25.0	48.5		25.0	48.5		34.6	34.6		34.6	34.6	
90th %ile Term Code	Max	Coord		Max	Coord		Hold	Hold		Max	Max	
70th %ile Green (s)	25.0	48.5		25.0	48.5		34.6	34.6		34.6	34.6	
70th %ile Term Code	Max	Coord		Max	Coord		Hold	Hold		Max	Max	
50th %ile Green (s)	25.0	48.5		25.0	48.5		34.6	34.6		34.6	34.6	
50th %ile Term Code	Max	Coord		Max	Coord		Hold	Hold		Max	Max	
30th %ile Green (s)	25.0	48.5		25.0	48.5		34.6	34.6		34.6	34.6	
30th %ile Term Code	Max	Coord		Max	Coord		Hold	Hold		Max	Max	
10th %ile Green (s)	25.0	50.6		22.9	48.5		34.6	34.6		34.6	34.6	
10th %ile Term Code	Max	Coord		Gap	Coord		Hold	Hold		Max	Max	
Queue Length 50th (m)	~70.9	28.8		67.9	~132.7			6.1			~32.5	
Queue Length 95th (m)	47.6	46.0		54.0 m	#164.5			0.0			#31.5	
Internal Link Dist (m)		351.6			433.3			209.0			157.4	
Turn Bay Length (m)	30.0			80.0								
Base Capacity (vph)	274	585		306	554			634			129	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	1.05	0.32		0.93	1.04			0.63			1.04	

Intersection Summary

Area Type: CBD
Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.05
Intersection Signal Delay: 71.5 Intersection LOS: E
Intersection Capacity Utilization 79.3% ICU Level of Service D
Analysis Period (min) 15
Description: TMC Jun 26/19
Updated Sept 28/20

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

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

Splits and Phases: 163: HICKORY ST & DUNDAS ST

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	189	73	14	350	15	90	124	6	27	0	42
Future Volume (vph)	37	189	73	14	350	15	90	124	6	27	0	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.961			0.995			0.995			0.917	
Flt Protected		0.995			0.998			0.975			0.981	
Satd. Flow (prot)	0	1610	0	0	1717	0	0	1622	0	0	1657	0
Flt Permitted		0.995			0.998			0.975			0.981	
Satd. Flow (perm)	0	1610	0	0	1717	0	0	1622	0	0	1657	0
Link Speed (k/h)		40			50			48			48	
Link Distance (m)		360.2			468.1			35.4			149.0	
Travel Time (s)		32.4			33.7			2.7			11.2	
Peak Hour Factor	0.92	0.84	0.68	0.70	0.80	0.92	0.56	0.92	0.50	0.92	0.92	0.92
Heavy Vehicles (%)	2%	14%	10%	7%	9%	2%	22%	2%	0%	2%	2%	2%
Adj. Flow (vph)	40	225	107	20	438	16	161	135	12	29	0	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	372	0	0	474	0	0	308	0	0	75	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 52.9%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	184	26	69	7	11	181
Future Volume (vph)	184	26	69	7	11	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.987		0.873	
Flt Protected		0.958			0.997	
Satd. Flow (prot)	0	1745	1709	0	1568	0
Flt Permitted		0.958			0.997	
Satd. Flow (perm)	0	1745	1709	0	1568	0
Link Speed (k/h)		50	48		50	
Link Distance (m)		375.4	228.6		233.0	
Travel Time (s)		27.0	17.1		16.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	4%	9%	4%	9%	4%
Adj. Flow (vph)	200	28	75	8	12	197
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	228	83	0	209	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 36.7%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	22	4	489	104	46	3	105	156	109	74	1
Future Volume (vph)	3	22	4	489	104	46	3	105	156	109	74	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.979			0.989			0.923			0.998	
Flt Protected		0.992			0.965			0.999			0.970	
Satd. Flow (prot)	0	1764	0	0	1782	0	0	1690	0	0	1621	0
Flt Permitted		0.992			0.965			0.999			0.970	
Satd. Flow (perm)	0	1764	0	0	1782	0	0	1690	0	0	1621	0
Link Speed (k/h)		48			50			50			48	
Link Distance (m)		204.5			414.4			228.8			243.5	
Travel Time (s)		15.3			29.8			16.5			18.3	
Peak Hour Factor	0.38	0.61	0.50	0.96	0.74	0.81	0.38	0.79	0.83	0.67	0.79	0.25
Heavy Vehicles (%)	0%	5%	0%	0%	0%	8%	0%	2%	3%	19%	1%	0%
Adj. Flow (vph)	8	36	8	509	141	57	8	133	188	163	94	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	52	0	0	707	0	0	329	0	0	261	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 77.3%	ICU Level of Service D
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	224	12	70	106	61	24	28	105	126	280	25
Future Volume (vph)	24	224	12	70	106	61	24	28	105	126	280	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.968			0.912			0.992	
Flt Protected		0.995			0.980			0.990			0.982	
Satd. Flow (prot)	0	1837	0	0	1745	0	0	1574	0	0	1743	0
Flt Permitted		0.995			0.980			0.990			0.982	
Satd. Flow (perm)	0	1837	0	0	1745	0	0	1574	0	0	1743	0
Link Speed (k/h)		48			50			50			50	
Link Distance (m)		420.8			405.1			724.5			229.4	
Travel Time (s)		31.6			29.2			52.2			16.5	
Peak Hour Factor	0.75	0.85	0.60	0.54	0.90	0.78	0.50	0.84	0.68	0.65	0.91	0.78
Heavy Vehicles (%)	0%	1%	0%	0%	2%	6%	0%	4%	11%	2%	7%	4%
Adj. Flow (vph)	32	264	20	130	118	78	48	33	154	194	308	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	316	0	0	326	0	0	235	0	0	534	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 72.1%	ICU Level of Service C
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	76	11	29	68	82	10	191	52	118	326	70
Future Volume (vph)	21	76	11	29	68	82	10	191	52	118	326	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.984			0.939			0.977			0.981	
Flt Protected		0.991			0.991			0.998			0.988	
Satd. Flow (prot)	0	1782	0	0	1691	0	0	1720	0	0	1696	0
Flt Permitted		0.991			0.991			0.998			0.988	
Satd. Flow (perm)	0	1782	0	0	1691	0	0	1720	0	0	1696	0
Link Speed (k/h)		48			48			48			50	
Link Distance (m)		217.5			420.8			175.4			225.7	
Travel Time (s)		16.3			31.6			13.2			16.3	
Peak Hour Factor	0.88	0.79	0.69	0.66	0.71	0.72	0.63	0.69	0.86	0.73	0.80	0.73
Heavy Vehicles (%)	0%	4%	0%	3%	4%	3%	40%	6%	0%	4%	9%	6%
Adj. Flow (vph)	24	96	16	44	96	114	16	277	60	162	408	96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	136	0	0	254	0	0	353	0	0	666	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 64.7%	ICU Level of Service C
Analysis Period (min) 15	

Lanes, Volumes, Timings
90: BROCK ST & MARY ST W/MARY ST E

12/17/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	279	478	37	33	258	178	29	523	36	83	239	374
Future Volume (vph)	279	478	37	33	258	178	29	523	36	83	239	374
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	22.3		0.0	18.9		0.0	16.3		0.0	25.4		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	23.1			28.7			29.3			34.6		
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		0.99	0.97		0.94	0.98				0.90
Frt		0.983			0.936			0.985				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1474	1524	0	1516	1375	0	1460	1466	0	1422	1510	1295
Flt Permitted	0.080			0.293			0.594			0.068		
Satd. Flow (perm)	124	1524	0	462	1375	0	862	1466	0	102	1510	1165
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			25			4				473
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		409.8			360.6			134.9			82.0	
Travel Time (s)		29.5			26.0			9.7			5.9	
Confl. Peds. (#/hr)	11		11	11		11	23		51	51		23
Peak Hour Factor	0.85	0.83	0.51	0.75	0.78	0.73	0.73	0.83	0.50	0.74	0.89	0.79
Heavy Vehicles (%)	9%	8%	11%	6%	7%	19%	10%	11%	14%	13%	12%	11%
Adj. Flow (vph)	328	576	73	44	331	244	40	630	72	112	269	473
Shared Lane Traffic (%)												
Lane Group Flow (vph)	328	649	0	44	575	0	40	702	0	112	269	473
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		8	8		2	2		1	6	6
Switch Phase												
Minimum Initial (s)	4.0	8.0		8.0	8.0		20.0	20.0		4.0	20.0	20.0
Minimum Split (s)	10.0	26.0		26.0	26.0		28.0	28.0		10.0	28.0	28.0
Total Split (s)	26.0	76.0		50.0	50.0		58.0	58.0		16.0	74.0	74.0
Total Split (%)	17.3%	50.7%		33.3%	33.3%		38.7%	38.7%		10.7%	49.3%	49.3%
Maximum Green (s)	20.0	70.2		44.2	44.2		52.7	52.7		10.0	68.7	68.7
Yellow Time (s)	4.0	4.0		4.0	4.0		3.7	3.7		4.0	3.7	3.7
All-Red Time (s)	2.0	1.8		1.8	1.8		1.6	1.6		2.0	1.6	1.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	5.8		5.8	5.8		5.3	5.3		6.0	5.3	5.3
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes									Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		None	C-Max	C-Max
Walk Time (s)		7.0		7.0	7.0		7.0	7.0			7.0	7.0
Flash Dont Walk (s)		12.0		12.0	12.0		14.0	14.0			14.0	14.0
Pedestrian Calls (#/hr)		0		0	0		0	0			0	0
Act Effct Green (s)	70.0	70.2		44.2	44.2		52.9	52.9		68.0	68.7	68.7
Actuated g/C Ratio	0.47	0.47		0.29	0.29		0.35	0.35		0.45	0.46	0.46
v/c Ratio	1.38	0.91		0.32	1.36		0.13	1.35		0.85	0.39	0.60

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	232.1	54.4		45.2	215.6		34.8	208.7		79.3	28.9	5.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	232.1	54.4		45.2	215.6		34.8	208.7		79.3	28.9	5.5
LOS	F	D		D	F		C	F		E	C	A
Approach Delay		114.1			203.5			199.3			22.6	
Approach LOS		F			F			F			C	
90th %ile Green (s)	20.0	70.2		44.2	44.2		52.7	52.7		10.0	68.7	68.7
90th %ile Term Code	Max	Max		Max	Max		Coord	Coord		Max	Coord	Coord
70th %ile Green (s)	20.0	70.2		44.2	44.2		52.7	52.7		10.0	68.7	68.7
70th %ile Term Code	Max	Max		Max	Max		Coord	Coord		Max	Coord	Coord
50th %ile Green (s)	20.0	70.2		44.2	44.2		52.7	52.7		10.0	68.7	68.7
50th %ile Term Code	Max	Max		Max	Max		Coord	Coord		Max	Coord	Coord
30th %ile Green (s)	20.0	70.2		44.2	44.2		52.7	52.7		10.0	68.7	68.7
30th %ile Term Code	Max	Hold		Max	Max		Coord	Coord		Max	Coord	Coord
10th %ile Green (s)	20.0	70.2		44.2	44.2		53.8	53.8		8.9	68.7	68.7
10th %ile Term Code	Max	Hold		Max	Max		Coord	Coord		Gap	Coord	Coord
Queue Length 50th (m)	~107.4	160.7		10.6	~204.6		7.4	~252.4		19.2	47.9	0.0
Queue Length 95th (m)	#150.6	188.7		m17.1	#218.4		12.7	#285.8		#33.4	68.4	5.9
Internal Link Dist (m)		385.8			336.6			110.9			58.0	
Turn Bay Length (m)	22.3			18.9			16.3			25.4		
Base Capacity (vph)	237	716		136	422		303	519		134	691	789
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.38	0.91		0.32	1.36		0.13	1.35		0.84	0.39	0.60

Intersection Summary

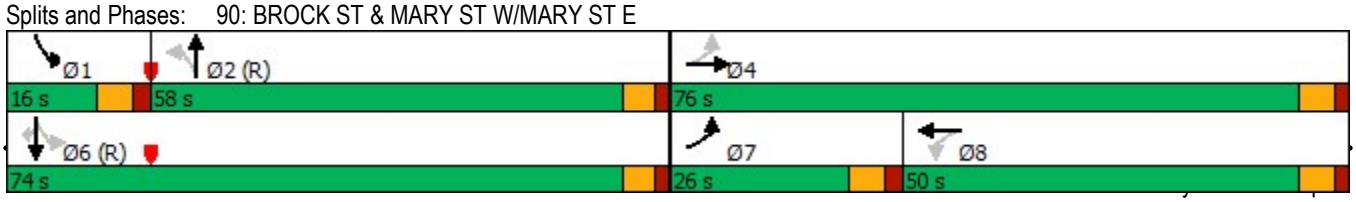
Area Type: CBD
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.38
Intersection Signal Delay: 126.7 Intersection LOS: F
Intersection Capacity Utilization 102.4% ICU Level of Service G
Analysis Period (min) 15
Description: TMC Sep 26/19
Updated Sept 17/20

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

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

Splits and Phases: 90: BROCK ST & MARY ST W/MARY ST E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	442	222	65	196	21	3	431	193	5	554	19
Future Volume (vph)	34	442	222	65	196	21	3	431	193	5	554	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	35.1		0.0	16.0		0.0	16.1		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	25.0			21.2			15.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.92	0.97			0.99				0.75		0.99	
Frt		0.944			0.984				0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1606	1541	0	1575	1612	0	1606	1658	1437	1606	1617	0
Flt Permitted	0.595			0.104			0.105			0.276		
Satd. Flow (perm)	925	1541	0	172	1612	0	178	1658	1085	467	1617	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			6				246		2	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		407.9			373.1			117.4			239.3	
Travel Time (s)		29.4			26.9			8.5			17.2	
Confl. Peds. (#/hr)	28		33	33		28	52		49	49		52
Peak Hour Factor	0.85	0.93	0.79	0.65	0.82	0.75	0.38	0.96	0.74	0.42	0.94	0.79
Heavy Vehicles (%)	0%	0%	0%	2%	2%	0%	0%	2%	0%	0%	3%	0%
Adj. Flow (vph)	40	475	281	100	239	28	8	449	261	12	589	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	756	0	100	267	0	8	449	261	12	613	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		3	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		4.0	8.0		20.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	25.0	25.0		10.0	25.0		26.0	26.0	26.0	26.0	26.0	
Total Split (s)	78.0	78.0		10.0	88.0		62.0	62.0	62.0	62.0	62.0	
Total Split (%)	52.0%	52.0%		6.7%	58.7%		41.3%	41.3%	41.3%	41.3%	41.3%	
Maximum Green (s)	71.8	71.8		4.0	81.8		56.3	56.3	56.3	56.3	56.3	
Yellow Time (s)	4.2	4.2		4.0	4.2		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2		6.0	6.2		5.7	5.7	5.7	5.7	5.7	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?				Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0			11.0		9.0	9.0	9.0	9.0	9.0	
Pedestrian Calls (#/hr)	0	0			0		0	0	0	0	0	
Act Effct Green (s)	71.8	71.8		82.0	81.8		56.3	56.3	56.3	56.3	56.3	
Actuated g/C Ratio	0.48	0.48		0.55	0.55		0.38	0.38	0.38	0.38	0.38	
v/c Ratio	0.09	1.01		0.76	0.30		0.12	0.72	0.47	0.07	1.01	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	22.2	71.8		55.7	19.3		36.7	48.1	7.5	31.6	84.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	54.4	0.4	0.0	0.0	
Total Delay	22.2	71.8		55.7	19.3		36.7	102.5	7.9	31.6	84.5	
LOS	C	E		E	B		D	F	A	C	F	
Approach Delay		69.3			29.2			67.4			83.5	
Approach LOS		E			C			E			F	
90th %ile Green (s)	71.8	71.8		4.0	81.8		56.3	56.3	56.3	56.3	56.3	
90th %ile Term Code	Max	Max		Max	Hold		Coord	Coord	Coord	Coord	Coord	
70th %ile Green (s)	71.8	71.8		4.0	81.8		56.3	56.3	56.3	56.3	56.3	
70th %ile Term Code	Max	Max		Max	Hold		Coord	Coord	Coord	Coord	Coord	
50th %ile Green (s)	71.8	71.8		4.0	81.8		56.3	56.3	56.3	56.3	56.3	
50th %ile Term Code	Max	Max		Max	Hold		Coord	Coord	Coord	Coord	Coord	
30th %ile Green (s)	71.8	71.8		4.0	81.8		56.3	56.3	56.3	56.3	56.3	
30th %ile Term Code	Max	Max		Max	Hold		Coord	Coord	Coord	Coord	Coord	
10th %ile Green (s)	71.8	71.8		4.0	81.8		56.3	56.3	56.3	56.3	56.3	
10th %ile Term Code	Max	Max		Max	Hold		Coord	Coord	Coord	Coord	Coord	
Queue Length 50th (m)	5.9	~202.9		12.9	37.8		1.4	105.0	2.6	2.1	~170.1	
Queue Length 95th (m)	11.8	#283.2		15.4	48.7		2.2	143.5	7.6	3.0	#243.6	
Internal Link Dist (m)		383.9			349.1			93.4			215.3	
Turn Bay Length (m)	35.0			35.1			16.0			16.1		
Base Capacity (vph)	442	751		131	881		66	622	560	175	608	
Starvation Cap Reductn	0	0		0	0		0	217	70	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.09	1.01		0.76	0.30		0.12	1.11	0.53	0.07	1.01	

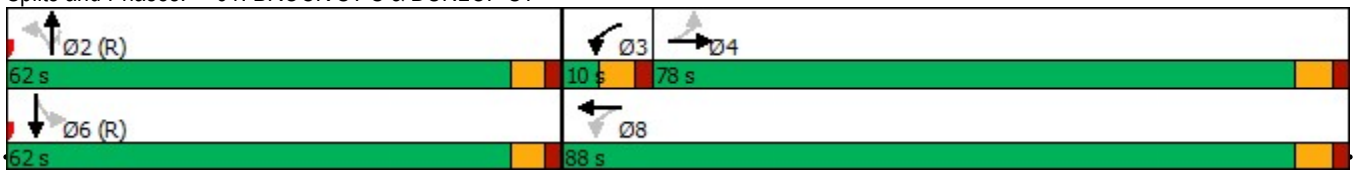
Intersection Summary

Area Type: CBD
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 66.4 Intersection LOS: E
Intersection Capacity Utilization 94.6% ICU Level of Service F
Analysis Period (min) 15
Description: TMC Oct 4/18
Updated Sept 17/20

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 91: BROCK ST S & DUNLOP ST



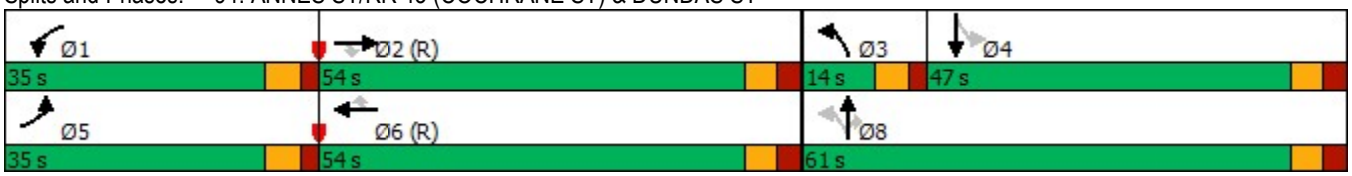
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	193	893	433	21	500	110	204	201	1	1	157	97
Future Volume (vph)	193	893	433	21	500	110	204	201	1	1	157	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	44.5		40.0	0.0		157.1	23.4		14.6	35.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	31.3			29.4			40.9			25.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99		0.91	0.98		0.95			0.98	0.99	0.99	
Frt			0.850			0.850			0.850		0.939	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1560	3181	1437	1606	3150	1409	1606	1691	1437	1591	1567	0
Flt Permitted	0.950			0.950			0.289			0.582		
Satd. Flow (perm)	1539	3181	1314	1576	3150	1343	489	1691	1409	969	1567	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			251			128			69		22	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		281.1			304.8			219.5			1140.1	
Travel Time (s)		20.2			21.9			15.8			82.1	
Confl. Peds. (#/hr)	7		17	17		7	5		4	4		5
Peak Hour Factor	0.80	0.98	0.85	0.85	0.93	0.86	0.85	0.69	0.54	0.78	0.77	0.70
Heavy Vehicles (%)	3%	1%	0%	0%	2%	2%	0%	0%	0%	1%	0%	1%
Adj. Flow (vph)	241	911	509	25	538	128	240	291	2	1	204	139
Shared Lane Traffic (%)												
Lane Group Flow (vph)	241	911	509	25	538	128	240	291	2	1	343	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases			2			6	8		8	4		
Minimum Split (s)	10.0	29.0	29.0	10.0	29.0	29.0	10.0	30.0	30.0	30.0	30.0	
Total Split (s)	35.0	54.0	54.0	35.0	54.0	54.0	14.0	61.0	61.0	47.0	47.0	
Total Split (%)	23.3%	36.0%	36.0%	23.3%	36.0%	36.0%	9.3%	40.7%	40.7%	31.3%	31.3%	
Maximum Green (s)	29.0	47.5	47.5	29.0	47.5	47.5	8.0	54.5	54.5	40.5	40.5	
Yellow Time (s)	4.0	3.7	3.7	4.0	3.7	3.7	4.0	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.8	2.8	2.0	2.8	2.8	2.0	2.8	2.8	2.8	2.8	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.5	6.5	6.0	6.5	6.5	3.0	6.5	6.5	6.5	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes			Yes					
Walk Time (s)		14.0	14.0		14.0	14.0		17.0	17.0	17.0	17.0	
Flash Dont Walk (s)		5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0	0	0	
Act Effct Green (s)	29.0	47.5	47.5	29.0	47.5	47.5	58.0	54.5	54.5	40.5	40.5	
Actuated g/C Ratio	0.19	0.32	0.32	0.19	0.32	0.32	0.39	0.36	0.36	0.27	0.27	
v/c Ratio	0.80	0.90	0.87	0.08	0.54	0.25	0.89	0.47	0.00	0.00	0.78	
Control Delay	77.8	62.3	40.1	45.0	58.5	18.3	69.9	39.9	0.0	40.0	60.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	77.8	62.3	40.1	45.0	58.5	18.3	69.9	39.9	0.0	40.0	60.9	
LOS	E	E	D	D	E	B	E	D	A	D	E	
Approach Delay		57.7			50.5			53.2			60.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			D			D			E	
Queue Length 50th (m)	63.8	126.1	74.2	6.6	68.2	9.9	47.2	61.2	0.0	0.2	82.4	
Queue Length 95th (m)	80.6	#160.0	108.7	m6.1	m58.6	m6.7	#77.5	62.2	0.0	1.4	94.5	
Internal Link Dist (m)		257.1			280.8			195.5			1116.1	
Turn Bay Length (m)	44.5		40.0			157.1	23.4		14.6	35.0		
Base Capacity (vph)	301	1007	587	310	997	512	270	614	555	261	439	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.80	0.90	0.87	0.08	0.54	0.25	0.89	0.47	0.00	0.00	0.78	

Intersection Summary

Area Type: CBD
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Pretimed
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 55.8 Intersection LOS: E
Intersection Capacity Utilization 80.8% ICU Level of Service D
Analysis Period (min) 15
Description: TMC Oct 24/17
Updated Sept 23/20
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 94: ANNES ST/RR 43 (COCHRANE ST) & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	268	297	239	155	38	24	172	405	1	1	233	359
Future Volume (vph)	268	297	239	155	38	24	172	405	1	1	233	359
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	24.7		0.0	30.2		16.0	7.6		11.0	13.8		0.0
Storage Lanes	1		1	0		1	1		1	1		0
Taper Length (m)	32.9			38.5			41.4			24.7		
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	0.98		0.91	0.96		0.96			0.86	0.93	0.98	
Frt			0.850			0.850			0.850		0.903	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1606	1674	1437	1606	1658	1437	1591	1691	1437	1560	1491	0
Flt Permitted	0.950			0.950			0.059			0.493		
Satd. Flow (perm)	1579	1674	1313	1536	1658	1383	99	1691	1229	756	1491	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			300			113			69		76	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		118.8			293.5			227.2			234.4	
Travel Time (s)		8.6			21.1			16.4			16.9	
Confl. Peds. (#/hr)	5		19	19		5	10		39	39		10
Peak Hour Factor	0.83	0.93	0.79	0.65	0.94	0.66	0.78	0.86	0.81	0.66	0.88	0.73
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	1%	0%	0%	3%	1%	0%
Adj. Flow (vph)	323	319	303	238	40	36	221	471	1	2	265	492
Shared Lane Traffic (%)												
Lane Group Flow (vph)	323	319	303	238	40	36	221	471	1	2	757	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases			2			6	8		8	4		
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	10.0	29.5	29.5	29.5	29.5	
Total Split (s)	32.0	31.0	31.0	32.0	31.0	31.0	19.0	87.0	87.0	68.0	68.0	
Total Split (%)	21.3%	20.7%	20.7%	21.3%	20.7%	20.7%	12.7%	58.0%	58.0%	45.3%	45.3%	
Maximum Green (s)	26.0	24.5	24.5	26.0	24.5	24.5	13.0	80.5	80.5	61.5	61.5	
Yellow Time (s)	4.0	3.7	3.7	4.0	3.7	3.7	4.0	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.8	2.8	2.0	2.8	2.8	2.0	2.8	2.8	2.8	2.8	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.5	6.5	6.0	6.5	6.5	6.0	6.5	6.5	6.5	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes			Yes					
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		14.0	14.0		14.0	14.0		16.0	16.0	16.0	16.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0	0	0	
Act Effct Green (s)	26.0	24.5	24.5	26.0	24.5	24.5	81.0	80.5	80.5	61.5	61.5	
Actuated g/C Ratio	0.17	0.16	0.16	0.17	0.16	0.16	0.54	0.54	0.54	0.41	0.41	
v/c Ratio	1.16	1.17	0.65	0.86	0.15	0.11	1.21	0.52	0.00	0.01	1.15	
Control Delay	138.9	162.5	48.9	87.4	55.6	0.7	172.5	24.9	0.0	26.0	122.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	138.9	162.5	48.9	87.4	55.6	0.7	172.5	24.9	0.0	26.0	122.0	
LOS	F	F	D	F	E	A	F	C	A	C	F	
Approach Delay		118.0			73.4			71.9			121.8	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			E			E			F	
Queue Length 50th (m)	~107.4	~106.1	58.9	64.1	9.5	0.0	~60.8	80.6	0.0	0.3	~231.3	
Queue Length 95th (m)	m#127.7	m#127.5	m68.4	63.2	20.1	0.0	#86.7	102.3	0.0	1.5	#291.8	
Internal Link Dist (m)		94.8			269.5			203.2			210.4	
Turn Bay Length (m)	24.7			30.2		16.0	7.6		11.0	13.8		
Base Capacity (vph)	278	273	465	278	270	320	182	907	691	309	656	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	1.16	1.17	0.65	0.86	0.15	0.11	1.21	0.52	0.00	0.01	1.15	

Intersection Summary

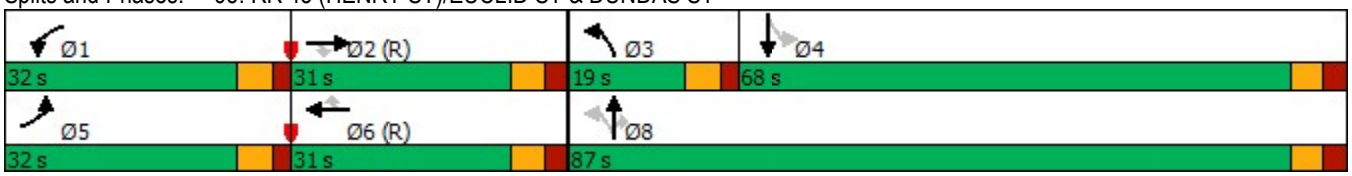
Area Type: CBD
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 127 (85%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 150
Control Type: Pretimed
Maximum v/c Ratio: 1.21
Intersection Signal Delay: 102.1 Intersection LOS: F
Intersection Capacity Utilization 104.1% ICU Level of Service G
Analysis Period (min) 15
Description: TMC May 30 2017
Updated Sept 23/20

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

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

Splits and Phases: 95: RR 45 (HENRY ST)/EUCLID ST & DUNDAS ST



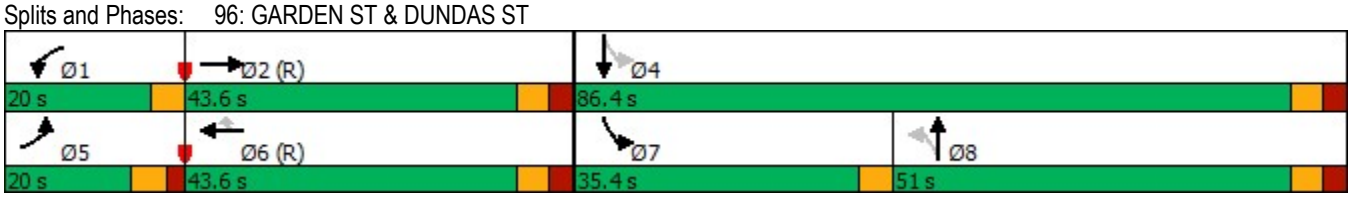
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	643	23	84	359	339	16	650	117	384	424	0
Future Volume (vph)	145	643	23	84	359	339	16	650	117	384	424	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	17.1		0.0	98.4		0.0	23.5		0.0	102.4		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	37.0			12.6			27.3			30.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00		0.98	1.00	0.99				
Frt		0.991				0.850		0.976				
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1591	3151	0	1591	1658	1423	1606	3110	0	1606	3213	0
Flt Permitted	0.950			0.950			0.482			0.087		
Satd. Flow (perm)	1583	3151	0	1587	1658	1394	812	3110	0	147	3213	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				389		15				
Link Speed (k/h)		50			50			50			40	
Link Distance (m)		457.3			160.3			1037.5			218.0	
Travel Time (s)		32.9			11.5			74.7			19.6	
Confl. Peds. (#/hr)	6		5	5		6	3		19	19		3
Peak Hour Factor	0.85	0.90	0.52	0.77	0.94	0.80	0.73	0.82	0.78	0.93	0.90	0.83
Heavy Vehicles (%)	1%	1%	0%	1%	2%	1%	0%	0%	1%	0%	0%	0%
Adj. Flow (vph)	171	714	44	109	382	424	22	793	150	413	471	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	171	758	0	109	382	424	22	943	0	413	471	0
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases						6	8			4		
Minimum Split (s)	10.0	41.0		10.5	41.0	41.0	35.0	35.0		11.5	35.0	
Total Split (s)	20.0	43.6		20.0	43.6	43.6	51.0	51.0		35.4	86.4	
Total Split (%)	13.3%	29.1%		13.3%	29.1%	29.1%	34.0%	34.0%		23.6%	57.6%	
Maximum Green (s)	14.0	37.1		16.3	37.1	37.1	44.5	44.5		31.7	79.9	
Yellow Time (s)	4.0	3.7		3.7	3.7	3.7	3.7	3.7		3.7	3.7	
All-Red Time (s)	2.0	2.8		0.0	2.8	2.8	2.8	2.8		0.0	2.8	
Lost Time Adjust (s)	-3.0	0.0		0.0	0.0	0.0	0.0	0.0		-3.0	0.0	
Total Lost Time (s)	3.0	6.5		3.7	6.5	6.5	6.5	6.5		0.7	6.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes						Yes		
Walk Time (s)		7.0			7.0	7.0	7.0	7.0			7.0	
Flash Dont Walk (s)		25.0			25.0	25.0	21.0	21.0			21.0	
Pedestrian Calls (#/hr)		0			0	0	0	0			0	
Act Effct Green (s)	17.0	37.1		16.3	37.1	37.1	44.5	44.5		85.7	79.9	
Actuated g/C Ratio	0.11	0.25		0.11	0.25	0.25	0.30	0.30		0.57	0.53	
v/c Ratio	0.95	0.97		0.63	0.93	0.67	0.09	1.01		0.98	0.28	
Control Delay	70.1	76.9		81.2	85.2	12.0	39.6	83.0		63.6	20.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	70.1	76.9		81.2	85.2	12.0	39.6	83.0		63.6	20.1	
LOS	E	E		F	F	B	D	F		E	C	
Approach Delay		75.6			50.8			82.0			40.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			D			F			D	
Queue Length 50th (m)	48.7	109.7		29.1	103.1	7.5	4.4	~137.7		101.2	55.3	
Queue Length 95th (m)	m45.4	m105.1		40.8	#159.6	19.3	9.0	#150.8		#162.5	64.6	
Internal Link Dist (m)		433.3			136.3			1013.5			194.0	
Turn Bay Length (m)	17.1			98.4			23.5			102.4		
Base Capacity (vph)	180	782		172	410	637	240	933		421	1711	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.95	0.97		0.63	0.93	0.67	0.09	1.01		0.98	0.28	

Intersection Summary

Area Type: CBD
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 130
Control Type: Pretimed
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 62.7 Intersection LOS: E
Intersection Capacity Utilization 101.1% ICU Level of Service G
Analysis Period (min) 15
Description: TMC Oct 19/16
Updated Sept 23/20
Phase 1 minimum timing error due to 2 second COMM delay
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 96: GARDEN ST & DUNDAS ST



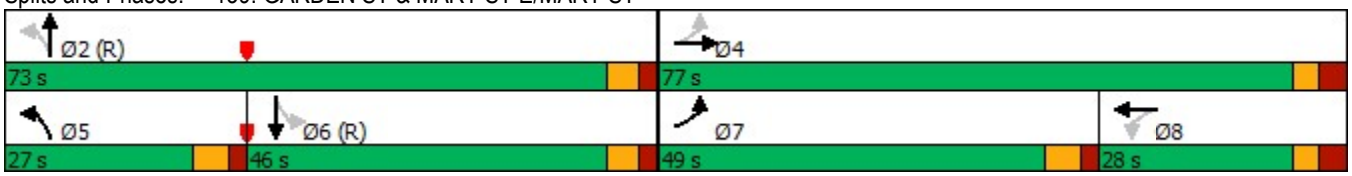
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	4	286	10	2	26	159	831	21	12	551	171
Future Volume (vph)	223	4	286	10	2	26	159	831	21	12	551	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	34.4		0.0	33.8		0.0	51.6		0.0	79.3		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.4			18.0			30.4			24.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	0.98		1.00	0.98			1.00		1.00	0.99	
Frt		0.853			0.861			0.995			0.958	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1474	1259	0	1606	1279	0	1501	3047	0	1606	2849	0
Flt Permitted	0.412			0.554			0.144			0.317		
Satd. Flow (perm)	637	1259	0	934	1279	0	228	3047	0	535	2849	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		336			52			3			36	
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		467.7			161.7			218.0			150.1	
Travel Time (s)		42.1			14.6			19.6			13.5	
Confl. Peds. (#/hr)	2		2	2		2	3		2	2		3
Peak Hour Factor	0.76	0.50	0.85	0.50	0.50	0.50	0.74	0.96	0.66	0.60	0.79	0.64
Heavy Vehicles (%)	9%	0%	13%	0%	0%	13%	7%	5%	0%	0%	6%	10%
Adj. Flow (vph)	293	8	336	20	4	52	215	866	32	20	697	267
Shared Lane Traffic (%)												
Lane Group Flow (vph)	293	344	0	20	56	0	215	898	0	20	964	0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	8.0		8.0	8.0		4.0	20.0		20.0	20.0	
Minimum Split (s)	10.0	28.0		28.0	28.0		10.0	27.0		27.0	27.0	
Total Split (s)	49.0	77.0		28.0	28.0		27.0	73.0		46.0	46.0	
Total Split (%)	32.7%	51.3%		18.7%	18.7%		18.0%	48.7%		30.7%	30.7%	
Maximum Green (s)	43.0	70.7		21.7	21.7		21.0	67.1		40.1	40.1	
Yellow Time (s)	4.0	3.0		3.0	3.0		4.0	3.7		3.7	3.7	
All-Red Time (s)	2.0	3.3		3.3	3.3		2.0	2.2		2.2	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.3		6.3	6.3		6.0	5.9		5.9	5.9	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes						Yes					
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	C-Max		C-Max	C-Max	
Walk Time (s)		15.0		15.0	15.0			15.0		15.0	15.0	
Flash Dont Walk (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Pedestrian Calls (#/hr)		0		0	0			0		0	0	
Act Effct Green (s)	48.9	48.6		9.6	9.6		89.1	89.2		62.8	62.8	
Actuated g/C Ratio	0.33	0.32		0.06	0.06		0.59	0.59		0.42	0.42	
v/c Ratio	0.72	0.54		0.34	0.43		0.70	0.50		0.09	0.79	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	48.5	13.1		81.6	28.3		18.6	8.9		38.3	44.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	48.5	13.1		81.6	28.3		18.6	8.9		38.3	44.8	
LOS	D	B		F	C		B	A		D	D	
Approach Delay		29.4			42.3			10.8			44.6	
Approach LOS		C			D			B			D	
90th %ile Green (s)	43.0	62.0		13.0	13.0		29.7	75.8		40.1	40.1	
90th %ile Term Code	Max	Hold		Gap	Gap		Max	Coord		Coord	Coord	
70th %ile Green (s)	42.1	58.6		10.5	10.5		25.4	79.2		47.8	47.8	
70th %ile Term Code	Gap	Hold		Gap	Gap		Gap	Coord		Coord	Coord	
50th %ile Green (s)	37.1	51.7		8.6	8.6		21.1	86.1		59.0	59.0	
50th %ile Term Code	Gap	Hold		Gap	Gap		Gap	Coord		Coord	Coord	
30th %ile Green (s)	32.1	46.1		8.0	8.0		16.4	91.7		69.3	69.3	
30th %ile Term Code	Gap	Hold		Min	Min		Gap	Coord		Coord	Coord	
10th %ile Green (s)	24.9	24.6		0.0	0.0		9.5	113.2		97.7	97.7	
10th %ile Term Code	Gap	Hold		Skip	Skip		Gap	Coord		Coord	Coord	
Queue Length 50th (m)	77.4	29.3		5.4	1.1		13.3	41.2		3.4	121.7	
Queue Length 95th (m)	m81.2	4.1		7.4	1.5		m23.0	m98.8		7.3	#165.5	
Internal Link Dist (m)		443.7			137.7			194.0			126.1	
Turn Bay Length (m)	34.4			33.8			51.6			79.3		
Base Capacity (vph)	462	771		135	229		336	1813		224	1213	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.63	0.45		0.15	0.24		0.64	0.50		0.09	0.79	

Intersection Summary

Area Type: CBD
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 27.7 Intersection LOS: C
Intersection Capacity Utilization 78.4% ICU Level of Service D
Analysis Period (min) 15
Description: TMC Nov 27/19
Updated Sept 17/20
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 139: GARDEN ST & MARY ST E/MARY ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	470	6	223	351	110	6	39	349	112	18	1
Future Volume (vph)	84	470	6	223	351	110	6	39	349	112	18	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	80.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	0.0			0.0			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98	1.00		0.96	0.98			0.97			1.00	
Frt		0.995			0.946			0.880			0.999	
Flt Protected	0.950			0.950				0.999			0.960	
Satd. Flow (prot)	1606	1529	0	1422	1426	0	0	1327	0	0	1493	0
Flt Permitted	0.950			0.950				0.994			0.261	
Satd. Flow (perm)	1579	1529	0	1368	1426	0	0	1320	0	0	406	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			19			339				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		375.6			457.3			241.7			115.8	
Travel Time (s)		27.0			32.9			17.4			8.3	
Confl. Peds. (#/hr)	10		19	19		10	13		11	11		13
Peak Hour Factor	0.46	0.91	0.38	0.72	0.87	0.48	0.54	0.63	0.58	0.64	0.56	0.58
Heavy Vehicles (%)	0%	10%	0%	13%	9%	11%	0%	33%	6%	6%	22%	14%
Adj. Flow (vph)	183	516	16	310	403	229	11	62	602	175	32	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	183	532	0	310	632	0	0	675	0	0	209	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	4.0	20.0		4.0	20.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	10.0	28.0		10.0	28.0		26.5	26.5		26.5	26.5	
Total Split (s)	31.0	50.0		31.0	50.0		69.0	69.0		69.0	69.0	
Total Split (%)	20.7%	33.3%		20.7%	33.3%		46.0%	46.0%		46.0%	46.0%	
Maximum Green (s)	25.0	43.5		25.0	43.5		62.5	62.5		62.5	62.5	
Yellow Time (s)	4.0	3.7		4.0	3.7		3.7	3.7		3.7	3.7	
All-Red Time (s)	2.0	2.8		2.0	2.8		2.8	2.8		2.8	2.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	6.5		6.0	6.5			6.5			6.5	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes			Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		11.0			11.0		13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effct Green (s)	21.2	43.5		25.0	47.3			62.5			62.5	
Actuated g/C Ratio	0.14	0.29		0.17	0.32			0.42			0.42	
v/c Ratio	0.81	1.20		1.31	1.37			0.90			1.24	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	88.0	154.3		215.5	219.7			47.6			182.4	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	88.0	154.3		215.5	219.7			47.6			182.4	
LOS	F	F		F	F			D			F	
Approach Delay		137.3			218.3			47.6			182.4	
Approach LOS		F			F			D			F	
90th %ile Green (s)	25.0	43.5		25.0	43.5		62.5	62.5		62.5	62.5	
90th %ile Term Code	Max	Coord		Max	Coord		Max	Max		Max	Max	
70th %ile Green (s)	25.0	43.5		25.0	43.5		62.5	62.5		62.5	62.5	
70th %ile Term Code	Max	Coord		Max	Coord		Max	Max		Max	Max	
50th %ile Green (s)	22.3	43.5		25.0	46.2		62.5	62.5		62.5	62.5	
50th %ile Term Code	Gap	Coord		Max	Coord		Hold	Hold		Max	Max	
30th %ile Green (s)	19.1	43.5		25.0	49.4		62.5	62.5		62.5	62.5	
30th %ile Term Code	Gap	Coord		Max	Coord		Hold	Hold		Max	Max	
10th %ile Green (s)	14.5	43.5		25.0	54.0		62.5	62.5		62.5	62.5	
10th %ile Term Code	Gap	Coord		Max	Coord		Hold	Hold		Max	Max	
Queue Length 50th (m)	48.9	~176.5		~110.5	~221.9			122.8			~70.3	
Queue Length 95th (m)	33.8	#242.1		#119.6	m#272.3			80.4			m#54.4	
Internal Link Dist (m)		351.6			433.3			217.7			91.8	
Turn Bay Length (m)	30.0			80.0								
Base Capacity (vph)	267	444		237	463			747			169	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.69	1.20		1.31	1.37			0.90			1.24	

Intersection Summary

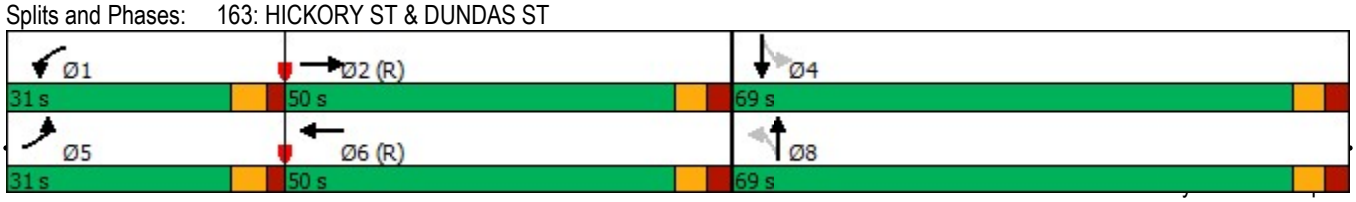
Area Type: CBD
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.37
Intersection Signal Delay: 147.2 Intersection LOS: F
Intersection Capacity Utilization 101.5% ICU Level of Service G
Analysis Period (min) 15
Description: TMC June 26/19
Updated Sept 28/20

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

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

Splits and Phases: 163: HICKORY ST & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	452	119	15	297	31	111	82	35	25	1	30
Future Volume (vph)	55	452	119	15	297	31	111	82	35	25	1	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.973			0.987			0.977			0.918	
Flt Protected		0.995			0.998			0.975			0.982	
Satd. Flow (prot)	0	1658	0	0	1664	0	0	1737	0	0	1613	0
Flt Permitted		0.995			0.998			0.975			0.982	
Satd. Flow (perm)	0	1658	0	0	1664	0	0	1737	0	0	1613	0
Link Speed (k/h)		40			50			48			48	
Link Distance (m)		360.6			467.7			101.0			173.4	
Travel Time (s)		32.5			33.7			7.6			13.0	
Peak Hour Factor	0.63	0.81	0.75	0.94	0.96	0.91	0.79	0.92	0.73	0.69	0.40	0.50
Heavy Vehicles (%)	13%	10%	7%	7%	12%	6%	4%	0%	6%	0%	6%	8%
Adj. Flow (vph)	87	558	159	16	309	34	141	89	48	36	3	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	804	0	0	359	0	0	278	0	0	99	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 75.6%	ICU Level of Service D
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	321	13	71	193	89	25	1	164	166	241	14
Future Volume (vph)	27	321	13	71	193	89	25	1	164	166	241	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.966			0.886			0.996	
Flt Protected		0.996			0.988			0.992			0.978	
Satd. Flow (prot)	0	1862	0	0	1767	0	0	1631	0	0	1821	0
Flt Permitted		0.996			0.988			0.992			0.978	
Satd. Flow (perm)	0	1862	0	0	1767	0	0	1631	0	0	1821	0
Link Speed (k/h)		48			50			50			50	
Link Distance (m)		418.0			407.9			725.2			227.2	
Travel Time (s)		31.4			29.4			52.2			16.4	
Peak Hour Factor	0.75	0.75	0.81	0.63	0.84	0.77	0.63	0.89	0.75	0.70	0.87	0.88
Heavy Vehicles (%)	0%	0%	0%	0%	1%	4%	8%	1%	0%	0%	1%	0%
Adj. Flow (vph)	36	428	16	113	230	116	40	1	219	237	277	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	480	0	0	459	0	0	260	0	0	530	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 82.0%	ICU Level of Service E
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	101	12	33	62	110	7	222	65	176	373	55
Future Volume (vph)	26	101	12	33	62	110	7	222	65	176	373	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.987			0.924			0.969			0.985	
Flt Protected		0.990			0.992			0.998			0.985	
Satd. Flow (prot)	0	1836	0	0	1713	0	0	1791	0	0	1791	0
Flt Permitted		0.990			0.992			0.998			0.985	
Satd. Flow (perm)	0	1836	0	0	1713	0	0	1791	0	0	1791	0
Link Speed (k/h)		48			48			48			50	
Link Distance (m)		208.7			418.0			214.5			219.5	
Travel Time (s)		15.7			31.4			16.1			15.8	
Peak Hour Factor	0.81	0.87	0.75	0.75	0.86	0.74	0.58	0.90	0.83	0.77	0.88	0.69
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	2%	0%	2%	2%	0%
Adj. Flow (vph)	32	116	16	44	72	149	12	247	78	229	424	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	164	0	0	265	0	0	337	0	0	733	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 73.9%	ICU Level of Service D
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	64	7	501	40	52	7	160	461	183	14	1
Future Volume (vph)	2	64	7	501	40	52	7	160	461	183	14	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.985			0.984			0.905			0.998	
Flt Protected		0.996			0.961			0.999			0.957	
Satd. Flow (prot)	0	1843	0	0	1777	0	0	1699	0	0	1795	0
Flt Permitted		0.996			0.961			0.999			0.957	
Satd. Flow (perm)	0	1843	0	0	1777	0	0	1699	0	0	1795	0
Link Speed (k/h)		48			50			50			48	
Link Distance (m)		208.2			409.8			234.4			259.5	
Travel Time (s)		15.6			29.5			16.9			19.5	
Peak Hour Factor	0.25	0.73	0.58	0.75	0.83	0.53	0.88	0.83	0.95	0.90	0.80	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	8	88	12	668	48	98	8	193	485	203	18	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	108	0	0	814	0	0	686	0	0	225	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 97.8%	ICU Level of Service F
Analysis Period (min) 15	

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	378	82	58	9	47	202
Future Volume (vph)	378	82	58	9	47	202
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.982		0.890	
Flt Protected		0.961			0.991	
Satd. Flow (prot)	0	1806	1799	0	1631	0
Flt Permitted		0.961			0.991	
Satd. Flow (perm)	0	1806	1799	0	1631	0
Link Speed (k/h)		50	48		50	
Link Distance (m)		373.1	229.4		241.7	
Travel Time (s)		26.9	17.2		17.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	3%	0%	0%	2%
Adj. Flow (vph)	411	89	63	10	51	220
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	500	73	0	271	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 53.6%	ICU Level of Service A
Analysis Period (min) 15	

Lanes, Volumes, Timings
90: BROCK ST N & MARY ST W/MARY ST E

12/17/2020

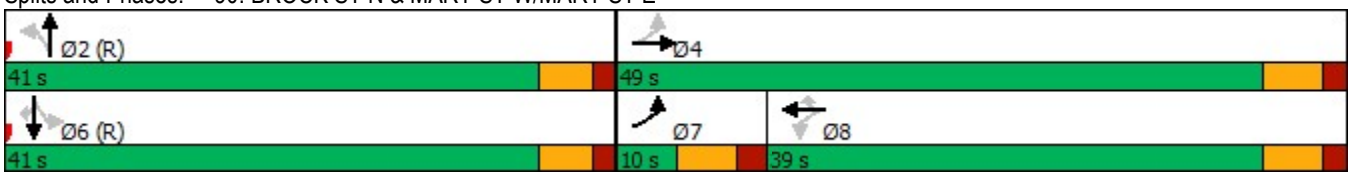
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	237	12	39	329	173	40	367	16	53	451	426
Future Volume (vph)	95	237	12	39	329	173	40	367	16	53	451	426
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	22.3		0.0	18.9		25.0	16.3		0.0	25.4		0.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	23.1			28.7			29.3			34.6		
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		1.00		0.96	1.00	1.00		0.99		0.97
Frt		0.988				0.850		0.991				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1434	1471	0	1422	1580	1331	1306	1427	0	1447	1523	1319
Flt Permitted	0.210			0.554			0.318			0.337		
Satd. Flow (perm)	317	1471	0	825	1580	1283	435	1427	0	510	1523	1276
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				164		4				296
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		414.4			360.2			133.8			82.0	
Travel Time (s)		29.8			25.9			9.6			5.9	
Confl. Peds. (#/hr)	7		3	3		7	6		10	10		6
Peak Hour Factor	0.84	0.75	0.43	0.81	0.71	0.66	0.71	0.83	0.57	0.74	0.92	0.85
Heavy Vehicles (%)	12%	13%	17%	13%	7%	8%	23%	17%	19%	11%	11%	9%
Adj. Flow (vph)	113	316	28	48	463	262	56	442	28	72	490	501
Shared Lane Traffic (%)												
Lane Group Flow (vph)	113	344	0	48	463	262	56	470	0	72	490	501
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Detector Phase	7	4		8	8	8	2	2		6	6	6
Switch Phase												
Minimum Initial (s)	4.0	8.0		8.0	8.0	8.0	20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	10.0	26.0		26.0	26.0	26.0	28.0	28.0		28.0	28.0	28.0
Total Split (s)	10.0	49.0		39.0	39.0	39.0	41.0	41.0		41.0	41.0	41.0
Total Split (%)	11.1%	54.4%		43.3%	43.3%	43.3%	45.6%	45.6%		45.6%	45.6%	45.6%
Maximum Green (s)	4.0	43.2		33.2	33.2	33.2	35.7	35.7		35.7	35.7	35.7
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.7	3.7		3.7	3.7	3.7
All-Red Time (s)	2.0	1.8		1.8	1.8	1.8	1.6	1.6		1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	5.8		5.8	5.8	5.8	5.3	5.3		5.3	5.3	5.3
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes											
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)		7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)		12.0		12.0	12.0	12.0	14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0		0	0	0
Act Effct Green (s)	38.0	38.2		30.2	30.2	30.2	40.7	40.7		40.7	40.7	40.7
Actuated g/C Ratio	0.42	0.42		0.34	0.34	0.34	0.45	0.45		0.45	0.45	0.45
v/c Ratio	0.62	0.55		0.17	0.88	0.49	0.29	0.73		0.31	0.71	0.68

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	42.5	33.0		20.7	45.8	11.5	23.8	30.4		23.7	29.4	14.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	42.5	33.0		20.7	45.8	11.5	23.8	30.4		23.7	29.4	14.2
LOS	D	C		C	D	B	C	C		C	C	B
Approach Delay		35.4			32.6			29.7			21.9	
Approach LOS		D			C			C			C	
90th %ile Green (s)	4.0	43.2		33.2	33.2	33.2	35.7	35.7		35.7	35.7	35.7
90th %ile Term Code	Max	Hold		Max	Max	Max	Coord	Coord		Coord	Coord	Coord
70th %ile Green (s)	4.0	43.2		33.2	33.2	33.2	35.7	35.7		35.7	35.7	35.7
70th %ile Term Code	Max	Hold		Max	Max	Max	Coord	Coord		Coord	Coord	Coord
50th %ile Green (s)	4.0	42.6		32.6	32.6	32.6	36.3	36.3		36.3	36.3	36.3
50th %ile Term Code	Max	Hold		Gap	Gap	Gap	Coord	Coord		Coord	Coord	Coord
30th %ile Green (s)	4.0	39.1		29.1	29.1	29.1	39.8	39.8		39.8	39.8	39.8
30th %ile Term Code	Max	Hold		Gap	Gap	Gap	Coord	Coord		Coord	Coord	Coord
10th %ile Green (s)	0.0	22.7		22.7	22.7	22.7	56.2	56.2		56.2	56.2	56.2
10th %ile Term Code	Skip	Hold		Gap	Gap	Gap	Coord	Coord		Coord	Coord	Coord
Queue Length 50th (m)	15.8	51.7		5.5	70.8	8.2	6.0	64.4		7.8	67.0	25.7
Queue Length 95th (m)	28.1	64.7		m11.7	74.8	16.3	11.4	#93.5		14.4	#115.8	53.6
Internal Link Dist (m)		390.4			336.2			109.8			58.0	
Turn Bay Length (m)	22.3			18.9		25.0	16.3			25.4		
Base Capacity (vph)	183	709		304	582	576	196	648		230	689	739
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	0.62	0.49		0.16	0.80	0.45	0.29	0.73		0.31	0.71	0.68

Intersection Summary

Area Type: CBD
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 28.5 Intersection LOS: C
Intersection Capacity Utilization 86.8% ICU Level of Service E
Analysis Period (min) 15
Description: TMC Sep 26/19
Updated Sept 17/20
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 90: BROCK ST N & MARY ST W/MARY ST E



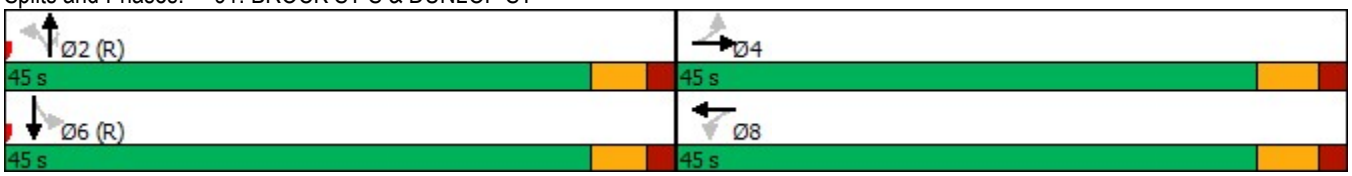
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	241	132	43	186	16	6	382	107	0	572	29
Future Volume (vph)	18	241	132	43	186	16	6	382	107	0	572	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	35.1		0.0	16.0		0.0	16.1		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	25.0			21.2			15.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.96	0.98		0.99	0.99				0.90		0.99	
Frt		0.951			0.983				0.850		0.990	
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1516	1567	0	1606	1584	0	1606	1595	1409	1691	1599	0
Flt Permitted	0.550			0.223			0.179					
Satd. Flow (perm)	845	1567	0	372	1584	0	303	1595	1268	1691	1599	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34			9				143		5	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		405.1			375.4			117.4			239.3	
Travel Time (s)		29.2			27.0			8.5			17.2	
Confl. Peds. (#/hr)	22		31	31		22	31		29	29		31
Peak Hour Factor	0.64	0.67	0.76	0.71	0.83	0.57	0.50	0.78	0.75	0.25	0.86	0.60
Heavy Vehicles (%)	6%	1%	0%	0%	3%	13%	0%	6%	2%	0%	4%	3%
Adj. Flow (vph)	28	360	174	61	224	28	12	490	143	0	665	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	534	0	61	252	0	12	490	143	0	713	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		20.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		26.0	26.0	26.0	26.0	26.0	
Total Split (s)	45.0	45.0		45.0	45.0		45.0	45.0	45.0	45.0	45.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	
Maximum Green (s)	38.8	38.8		38.8	38.8		39.3	39.3	39.3	39.3	39.3	
Yellow Time (s)	4.2	4.2		4.2	4.2		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2		6.2	6.2		5.7	5.7	5.7	5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		9.0	9.0	9.0	9.0	9.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	33.7	33.7		33.7	33.7		44.4	44.4	44.4		44.4	
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.49	0.49	0.49		0.49	
v/c Ratio	0.09	0.88		0.44	0.42		0.08	0.62	0.21		0.90	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	21.3	46.8		27.3	20.2		16.7	22.6	3.6		39.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	1.5	0.0		0.0	
Total Delay	21.3	46.8		27.3	20.2		16.7	24.1	3.6		39.7	
LOS	C	D		C	C		B	C	A		D	
Approach Delay		45.5			21.6			19.4			39.7	
Approach LOS		D			C			B			D	
90th %ile Green (s)	38.8	38.8		38.8	38.8		39.3	39.3	39.3	39.3	39.3	
90th %ile Term Code	Max	Max		Hold	Hold		Coord	Coord	Coord	Coord	Coord	
70th %ile Green (s)	38.8	38.8		38.8	38.8		39.3	39.3	39.3	39.3	39.3	
70th %ile Term Code	Max	Max		Hold	Hold		Coord	Coord	Coord	Coord	Coord	
50th %ile Green (s)	35.3	35.3		35.3	35.3		42.8	42.8	42.8	42.8	42.8	
50th %ile Term Code	Gap	Gap		Hold	Hold		Coord	Coord	Coord	Coord	Coord	
30th %ile Green (s)	31.1	31.1		31.1	31.1		47.0	47.0	47.0	47.0	47.0	
30th %ile Term Code	Gap	Gap		Hold	Hold		Coord	Coord	Coord	Coord	Coord	
10th %ile Green (s)	24.6	24.6		24.6	24.6		53.5	53.5	53.5	53.5	53.5	
10th %ile Term Code	Gap	Gap		Hold	Hold		Coord	Coord	Coord	Coord	Coord	
Queue Length 50th (m)	3.5	77.6		5.5	21.9		1.0	56.8	0.0		102.3	
Queue Length 95th (m)	6.0	69.3		9.8	31.2		2.3	75.5	5.2		#168.5	
Internal Link Dist (m)		381.1			351.4			93.4			215.3	
Turn Bay Length (m)	35.0			35.1			16.0					
Base Capacity (vph)	364	694		160	688		149	786	697		791	
Starvation Cap Reductn	0	0		0	0		0	145	0		0	
Spillback Cap Reductn	0	0		0	0		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.08	0.77		0.38	0.37		0.08	0.76	0.21		0.90	

Intersection Summary

Area Type: CBD
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 32.8 Intersection LOS: C
Intersection Capacity Utilization 81.3% ICU Level of Service D
Analysis Period (min) 15
Description: TMC Oct 4/18
Updated Sept 17/20
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 91: BROCK ST S & DUNLOP ST



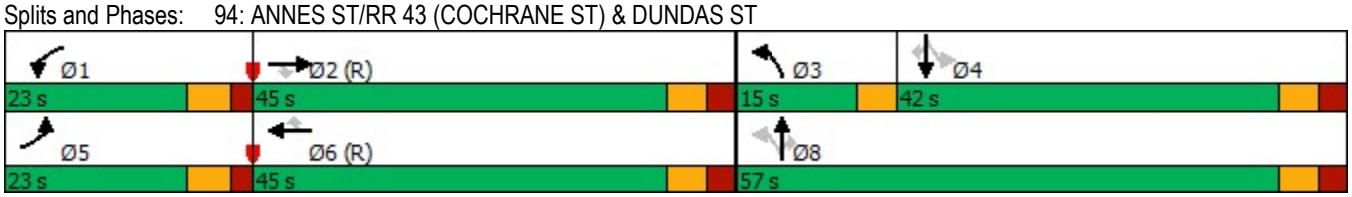
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	326	291	13	764	40	215	114	14	61	239	439
Future Volume (vph)	168	326	291	13	764	40	215	114	14	61	239	439
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	44.5		40.0	0.0		157.1	23.4		14.6	35.0		0.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	31.3			29.4			40.9			25.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.97	0.99		0.96	1.00		0.98	0.99		0.99
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1545	3031	1437	1361	3150	1331	1560	1626	1261	1591	1642	1437
Flt Permitted	0.950			0.950			0.372			0.671		
Satd. Flow (perm)	1537	3031	1390	1351	3150	1283	610	1626	1233	1114	1642	1418
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			355			115			83			324
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		281.1			304.8			225.7			1140.1	
Travel Time (s)		20.2			21.9			16.3			82.1	
Confl. Peds. (#/hr)	5		4	4		5	1		6	6		1
Peak Hour Factor	0.82	0.89	0.82	0.69	0.89	0.75	0.66	0.85	0.58	0.74	0.75	0.80
Heavy Vehicles (%)	4%	6%	0%	18%	2%	8%	3%	4%	14%	1%	3%	0%
Adj. Flow (vph)	205	366	355	19	858	53	326	134	24	82	319	549
Shared Lane Traffic (%)												
Lane Group Flow (vph)	205	366	355	19	858	53	326	134	24	82	319	549
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases			2			6	8		8	4		4
Minimum Split (s)	7.3	29.0	29.0	10.0	29.0	29.0	5.0	30.0	30.0	30.0	30.0	30.0
Total Split (s)	23.0	45.0	45.0	23.0	45.0	45.0	15.0	57.0	57.0	42.0	42.0	42.0
Total Split (%)	18.4%	36.0%	36.0%	18.4%	36.0%	36.0%	12.0%	45.6%	45.6%	33.6%	33.6%	33.6%
Maximum Green (s)	17.0	38.5	38.5	17.0	38.5	38.5	11.3	50.5	50.5	35.5	35.5	35.5
Yellow Time (s)	4.0	3.7	3.7	4.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	2.8	2.8	2.0	2.8	2.8	0.0	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	-3.0	0.0	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.5	6.5	6.0	6.5	6.5	0.7	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes			Yes					
Walk Time (s)		14.0	14.0		14.0	14.0		17.0	17.0	17.0	17.0	17.0
Flash Dont Walk (s)		5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0	0	0	0
Act Effct Green (s)	20.0	38.5	38.5	17.0	38.5	38.5	56.3	50.5	50.5	35.5	35.5	35.5
Actuated g/C Ratio	0.16	0.31	0.31	0.14	0.31	0.31	0.45	0.40	0.40	0.28	0.28	0.28
v/c Ratio	0.83	0.39	0.53	0.10	0.88	0.11	0.85	0.20	0.04	0.26	0.68	0.87
Control Delay	77.9	35.6	6.4	47.6	53.7	1.6	47.6	25.3	0.1	37.4	48.5	32.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.9	35.6	6.4	47.6	53.7	1.6	47.6	25.3	0.1	37.4	48.5	32.3
LOS	E	D	A	D	D	A	D	C	A	D	D	C
Approach Delay		33.8			50.6			39.1			38.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			D			D			D	
Queue Length 50th (m)	45.5	34.3	0.0	4.1	86.6	0.2	50.2	19.5	0.0	14.4	64.3	53.5
Queue Length 95th (m)	#69.4	46.5	11.9	8.3	#116.4	0.4	49.1	30.6	0.0	21.9	74.4	73.1
Internal Link Dist (m)		257.1			280.8			201.7			1116.1	
Turn Bay Length (m)	44.5		40.0			157.1	23.4		14.6	35.0		
Base Capacity (vph)	247	933	673	185	970	474	383	656	547	316	466	634
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.83	0.39	0.53	0.10	0.88	0.11	0.85	0.20	0.04	0.26	0.68	0.87

Intersection Summary

Area Type: CBD
Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Pretimed
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 40.6 Intersection LOS: D
Intersection Capacity Utilization 82.9% ICU Level of Service E
Analysis Period (min) 15
Description: TMC Oct 24/17
Updated Sept 23/20
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 94: ANNES ST/RR 43 (COCHRANE ST) & DUNDAS ST



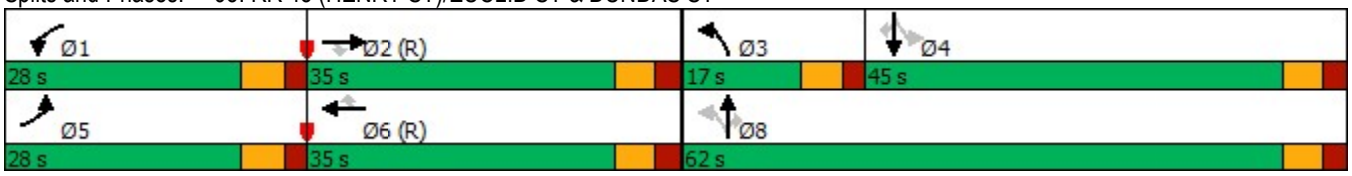
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	142	176	113	126	14	136	128	1	1	239	221
Future Volume (vph)	93	142	176	113	126	14	136	128	1	1	239	221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	24.7		0.0	30.2		16.0	7.6		11.0	13.8		0.0
Storage Lanes	1		1	0		1	1		1	1		1
Taper Length (m)	32.9			38.5			41.4			24.7		
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	0.98		0.96	0.98		0.95	0.98		0.95	0.98		0.92
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1575	1610	1382	1606	1642	1437	1560	1691	1437	1606	1691	1423
Flt Permitted	0.950			0.950			0.334			0.647		
Satd. Flow (perm)	1537	1610	1326	1580	1642	1367	536	1691	1366	1068	1691	1311
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			267			132			81			270
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		118.8			293.5			229.4			228.8	
Travel Time (s)		8.6			21.1			16.5			16.5	
Confl. Peds. (#/hr)	10		7	7		10	22		11	11		22
Peak Hour Factor	0.73	0.81	0.66	0.78	0.88	0.70	0.93	0.73	0.81	0.70	0.75	0.82
Heavy Vehicles (%)	2%	5%	4%	0%	3%	0%	3%	0%	0%	0%	0%	1%
Adj. Flow (vph)	127	175	267	145	143	20	146	175	1	1	319	270
Shared Lane Traffic (%)												
Lane Group Flow (vph)	127	175	267	145	143	20	146	175	1	1	319	270
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases			2			6	8		8	4		4
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	10.0	29.1	29.1	29.1	29.1	29.1
Total Split (s)	28.0	35.0	35.0	28.0	35.0	35.0	17.0	62.0	62.0	45.0	45.0	45.0
Total Split (%)	22.4%	28.0%	28.0%	22.4%	28.0%	28.0%	13.6%	49.6%	49.6%	36.0%	36.0%	36.0%
Maximum Green (s)	22.0	28.7	28.7	22.0	28.7	28.7	11.0	55.9	55.9	38.9	38.9	38.9
Yellow Time (s)	4.0	3.7	3.7	4.0	3.7	3.7	4.0	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	2.6	2.6	2.0	2.6	2.6	2.0	2.4	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.3	6.3	6.0	6.3	6.3	6.0	6.1	6.1	6.1	6.1	6.1
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes			Yes					
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		14.0	14.0		14.0	14.0		16.0	16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0	0	0	0
Act Effct Green (s)	22.0	28.7	28.7	22.0	28.7	28.7	56.0	55.9	55.9	38.9	38.9	38.9
Actuated g/C Ratio	0.18	0.23	0.23	0.18	0.23	0.23	0.45	0.45	0.45	0.31	0.31	0.31
v/c Ratio	0.46	0.47	0.52	0.51	0.38	0.05	0.44	0.23	0.00	0.00	0.61	0.46
Control Delay	56.8	77.2	35.7	54.0	44.2	0.2	25.6	22.4	0.0	30.0	42.4	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.8	77.2	35.7	54.0	44.2	0.2	25.6	22.4	0.0	30.0	42.4	6.3
LOS	E	E	D	D	D	A	C	C	A	C	D	A
Approach Delay		53.2			45.9			23.8			25.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			C			C	
Queue Length 50th (m)	29.3	41.0	30.7	30.1	27.5	0.0	19.8	23.9	0.0	0.2	61.3	0.0
Queue Length 95th (m)	38.3	55.8	30.7	42.1	44.4	0.0	32.7	29.9	0.0	1.1	70.8	11.5
Internal Link Dist (m)		94.8			269.5			205.4			204.8	
Turn Bay Length (m)	24.7			30.2		16.0	7.6		11.0	13.8		
Base Capacity (vph)	277	369	510	282	377	415	330	756	655	332	526	593
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.47	0.52	0.51	0.38	0.05	0.44	0.23	0.00	0.00	0.61	0.46

Intersection Summary

Area Type: CBD
Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Pretimed
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 37.6 Intersection LOS: D
Intersection Capacity Utilization 72.3% ICU Level of Service C
Analysis Period (min) 15
Description: TMC May 30 2017
Updated Sept 23/20

Splits and Phases: 95: RR 45 (HENRY ST)/EUCLID ST & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	179	18	156	526	254	23	323	155	265	560	16
Future Volume (vph)	59	179	18	156	526	254	23	323	155	265	560	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	17.1		0.0	98.4		0.0	23.5		30.0	102.4		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	37.0			12.6			27.3			30.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor	0.99	0.99		0.98		0.97	0.98		0.97	0.99	1.00	
Frt		0.979				0.850			0.850		0.996	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1545	2974	0	1545	1626	1356	1447	3119	1382	1501	3131	0
Flt Permitted	0.950			0.950			0.372			0.413		
Satd. Flow (perm)	1535	2974	0	1511	1626	1319	555	3119	1335	645	3131	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17				233			167		2	
Link Speed (k/h)		50			50			50			40	
Link Distance (m)		457.3			160.3			1037.5			218.0	
Travel Time (s)		32.9			11.5			74.7			19.6	
Confl. Peds. (#/hr)	13		26	26		13	23		17	17		23
Peak Hour Factor	0.74	0.86	0.53	0.73	0.84	0.88	0.63	0.82	0.89	0.93	0.90	0.88
Heavy Vehicles (%)	4%	5%	6%	4%	4%	6%	11%	3%	4%	7%	2%	2%
Adj. Flow (vph)	80	208	34	214	626	289	37	394	174	285	622	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	80	242	0	214	626	289	37	394	174	285	640	0
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases						6	8		8	4		
Minimum Split (s)	10.0	41.0		10.0	41.0	41.0	35.0	35.0	35.0	9.0	35.0	
Total Split (s)	26.0	53.0		26.0	53.0	53.0	35.0	35.0	35.0	11.0	46.0	
Total Split (%)	20.8%	42.4%		20.8%	42.4%	42.4%	28.0%	28.0%	28.0%	8.8%	36.8%	
Maximum Green (s)	21.0	46.4		21.0	46.4	46.4	29.1	29.1	29.1	8.0	40.1	
Yellow Time (s)	3.0	4.1		3.0	4.1	4.1	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	2.0	2.5		2.0	2.5	2.5	2.2	2.2	2.2	0.0	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	-3.0	0.0	
Total Lost Time (s)	5.0	6.6		5.0	6.6	6.6	5.9	5.9	5.9	0.0	5.9	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes				Yes		
Walk Time (s)		7.0			7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)		25.0			25.0	25.0	21.0	21.0	21.0		21.0	
Pedestrian Calls (#/hr)		0			0	0	0	0	0		0	
Act Effct Green (s)	21.0	46.4		21.0	46.4	46.4	29.1	29.1	29.1	46.0	40.1	
Actuated g/C Ratio	0.17	0.37		0.17	0.37	0.37	0.23	0.23	0.23	0.37	0.32	
v/c Ratio	0.31	0.22		0.83	1.04	0.45	0.29	0.54	0.40	0.91	0.64	
Control Delay	47.7	24.5		75.9	85.7	9.0	46.6	45.4	9.4	68.0	39.6	
Queue Delay	0.0	0.0		0.0	21.5	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	47.7	24.5		75.9	107.2	9.0	46.6	45.4	9.4	68.0	39.6	
LOS	D	C		E	F	A	D	D	A	E	D	
Approach Delay		30.2			76.1			35.1			48.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			E			D			D	
Queue Length 50th (m)	17.9	16.1		47.3	~152.6	8.3	6.9	41.5	1.2	50.0	64.7	
Queue Length 95th (m)	25.6	24.6		56.9	#192.6	26.6	11.1	50.5	17.4	#98.8	83.2	
Internal Link Dist (m)		433.3			136.3			1013.5			194.0	
Turn Bay Length (m)	17.1			98.4			23.5		30.0	102.4		
Base Capacity (vph)	259	1114		259	603	636	129	726	438	312	1005	
Starvation Cap Reductn	0	0		0	32	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	0.31	0.22		0.83	1.10	0.45	0.29	0.54	0.40	0.91	0.64	

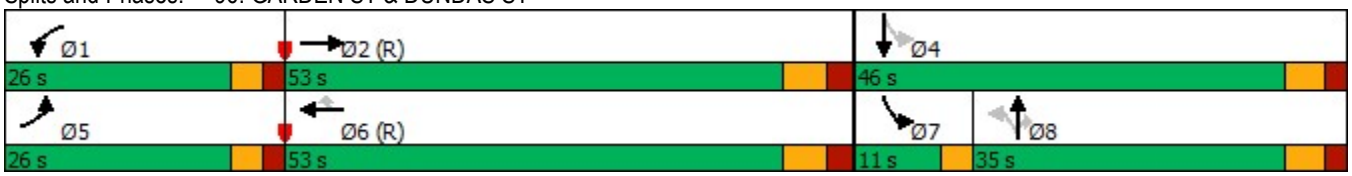
Intersection Summary

Area Type: CBD
Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 95
Control Type: Pretimed
Maximum v/c Ratio: 1.04
Intersection Signal Delay: 54.2 Intersection LOS: D
Intersection Capacity Utilization 93.8% ICU Level of Service F
Analysis Period (min) 15
Description: TMC Oct 19/16
Updated Sept 23/20

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 96: GARDEN ST & DUNDAS ST



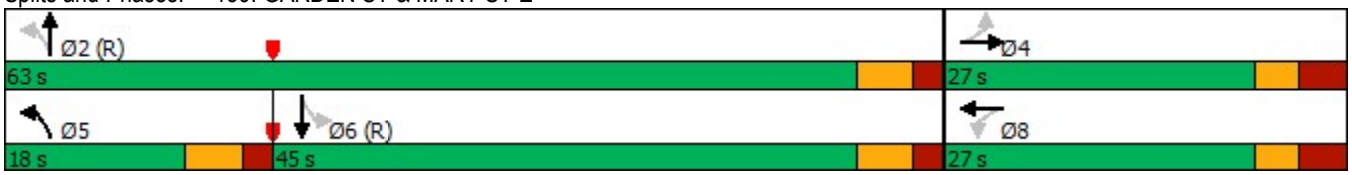
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	0	160	13	6	42	147	573	3	19	668	244
Future Volume (vph)	99	0	160	13	6	42	147	573	3	19	668	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	34.4		0.0	33.8		0.0	51.6		0.0	79.3		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.4			18.0			30.4			24.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	0.99	0.98		1.00	0.98			1.00		1.00	0.98	
Frt		0.850			0.866			0.998			0.954	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1422	1241	0	1397	1437	0	1373	2917	0	1447	2765	0
Flt Permitted	0.709			0.574			0.165			0.421		
Satd. Flow (perm)	1052	1241	0	841	1437	0	238	2917	0	638	2765	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		334			65			3			97	
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		468.1			161.7			218.0			150.1	
Travel Time (s)		42.1			14.6			19.6			13.5	
Confl. Peds. (#/hr)	7		3	3		7	21		5	5		21
Peak Hour Factor	0.65	0.25	0.89	0.65	0.75	0.65	0.75	0.95	0.38	0.59	0.91	0.76
Heavy Vehicles (%)	13%	0%	14%	15%	0%	0%	17%	10%	0%	11%	8%	10%
Adj. Flow (vph)	152	0	180	20	8	65	196	603	8	32	734	321
Shared Lane Traffic (%)												
Lane Group Flow (vph)	152	180	0	20	73	0	196	611	0	32	1055	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		4.0	20.0		20.0	20.0	
Minimum Split (s)	26.3	26.3		26.3	26.3		10.0	27.0		27.0	27.0	
Total Split (s)	27.0	27.0		27.0	27.0		18.0	63.0		45.0	45.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		20.0%	70.0%		50.0%	50.0%	
Maximum Green (s)	20.7	20.7		20.7	20.7		12.0	57.1		39.1	39.1	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	3.7		3.7	3.7	
All-Red Time (s)	3.3	3.3		3.3	3.3		2.0	2.2		2.2	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		6.0	5.9		5.9	5.9	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		C-Max	C-Max	
Walk Time (s)	15.0	15.0		15.0	15.0			15.0		15.0	15.0	
Flash Dont Walk (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Pedestrian Calls (#/hr)	0	0		0	0			0		0	0	
Act Effct Green (s)	16.9	16.9		16.9	16.9		60.8	60.9		45.3	45.3	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.68	0.68		0.50	0.50	
v/c Ratio	0.77	0.36		0.13	0.23		0.70	0.31		0.10	0.73	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	46.6	2.2		30.2	10.9		22.5	7.0		13.4	16.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	46.6	2.2		30.2	10.9		22.5	7.0		13.4	16.0	
LOS	D	A		C	B		C	A		B	B	
Approach Delay		22.5			15.1			10.7			15.9	
Approach LOS		C			B			B			B	
90th %ile Green (s)	20.7	20.7		20.7	20.7		12.0	57.1		39.1	39.1	
90th %ile Term Code	Max	Max		Hold	Hold		Max	Coord		Coord	Coord	
70th %ile Green (s)	20.7	20.7		20.7	20.7		12.0	57.1		39.1	39.1	
70th %ile Term Code	Max	Max		Hold	Hold		Max	Coord		Coord	Coord	
50th %ile Green (s)	18.3	18.3		18.3	18.3		9.9	59.5		43.6	43.6	
50th %ile Term Code	Gap	Gap		Hold	Hold		Gap	Coord		Coord	Coord	
30th %ile Green (s)	14.9	14.9		14.9	14.9		8.0	62.9		48.9	48.9	
30th %ile Term Code	Gap	Gap		Hold	Hold		Gap	Coord		Coord	Coord	
10th %ile Green (s)	10.0	10.0		10.0	10.0		6.1	67.8		55.7	55.7	
10th %ile Term Code	Gap	Gap		Hold	Hold		Gap	Coord		Coord	Coord	
Queue Length 50th (m)	18.0	0.0		2.6	1.0		10.9	19.2		1.5	31.8	
Queue Length 95th (m)	18.1	0.0		5.7	7.3		18.6	29.2		4.5	53.7	
Internal Link Dist (m)		444.1			137.7			194.0			126.1	
Turn Bay Length (m)	34.4			33.8			51.6			79.3		
Base Capacity (vph)	241	542		193	380		312	1974		321	1439	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.63	0.33		0.10	0.19		0.63	0.31		0.10	0.73	

Intersection Summary

Area Type: CBD
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 15.0 Intersection LOS: B
Intersection Capacity Utilization 67.1% ICU Level of Service C
Analysis Period (min) 15
Description: TMC Nov 27/19
Updated Sept 17/20

Splits and Phases: 139: GARDEN ST & MARY ST E



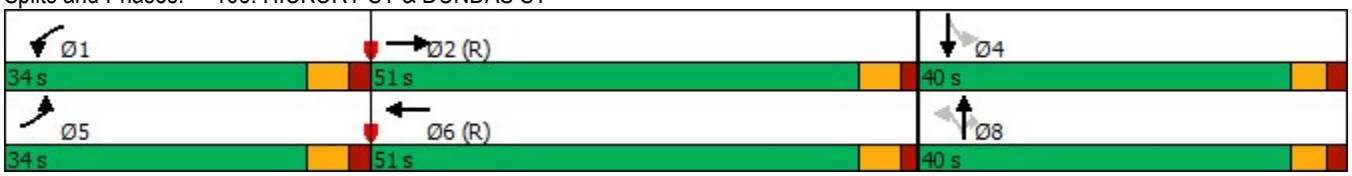
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	163	1	99	377	87	1	14	109	65	17	1
Future Volume (vph)	114	163	1	99	377	87	1	14	109	65	17	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	80.0		0.0	0.0		20.0	0.0		0.0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (m)	0.0			0.0			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	0.99			1.00	0.98		1.00	
Frt		0.997			0.955				0.850		0.998	
Flt Protected	0.950			0.950				0.996			0.963	
Satd. Flow (prot)	1373	1495	0	1530	1398	0	0	1293	1356	0	1493	0
Flt Permitted	0.950			0.950				0.978			0.754	
Satd. Flow (perm)	1362	1495	0	1510	1398	0	0	1267	1332	0	1164	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			20				210		1	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		375.6			457.3			233.0			181.4	
Travel Time (s)		27.0			32.9			16.8			13.1	
Confl. Peds. (#/hr)	5		8	8		5	10		3	3		10
Peak Hour Factor	0.50	0.90	0.25	0.55	0.94	0.50	0.33	0.43	0.52	0.64	0.56	0.58
Heavy Vehicles (%)	17%	13%	0%	5%	13%	17%	0%	33%	6%	11%	0%	27%
Adj. Flow (vph)	228	181	4	180	401	174	3	33	210	102	30	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	228	185	0	180	575	0	0	36	210	0	134	0
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		
Detector Phase	5	2		1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	4.0	20.0		4.0	20.0		8.0	8.0	8.0	8.0	8.0	
Minimum Split (s)	10.0	28.0		10.0	28.0		26.0	26.0	26.0	26.0	26.0	
Total Split (s)	34.0	51.0		34.0	51.0		40.0	40.0	40.0	40.0	40.0	
Total Split (%)	27.2%	40.8%		27.2%	40.8%		32.0%	32.0%	32.0%	32.0%	32.0%	
Maximum Green (s)	28.0	45.5		28.0	45.5		34.6	34.6	34.6	34.6	34.6	
Yellow Time (s)	4.0	3.8		4.0	3.8		3.3	3.3	3.3	3.3	3.3	
All-Red Time (s)	2.0	1.7		2.0	1.7		2.1	2.1	2.1	2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	6.0	5.5		6.0	5.5			5.4	5.4		5.4	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes			Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None	None	None	None	
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		11.0			11.0		13.0	13.0	13.0	13.0	13.0	
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	
Act Effct Green (s)	26.1	68.5		19.9	62.3			19.6	19.6		19.6	
Actuated g/C Ratio	0.21	0.55		0.16	0.50			0.16	0.16		0.16	
v/c Ratio	0.80	0.23		0.74	0.81			0.18	0.54		0.73	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	66.2	18.2		43.2	48.5			44.9	11.0		71.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	66.2	18.2		43.2	48.5			44.9	11.0		71.1	
LOS	E	B		D	D			D	B		E	
Approach Delay		44.7			47.2			16.0			71.1	
Approach LOS		D			D			B			E	
90th %ile Green (s)	34.5	52.8		27.2	45.5		28.1	28.1	28.1	28.1	28.1	
90th %ile Term Code	Max	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	
70th %ile Green (s)	30.0	61.9		23.0	54.9		23.2	23.2	23.2	23.2	23.2	
70th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	
50th %ile Green (s)	26.4	68.4		20.0	62.0		19.7	19.7	19.7	19.7	19.7	
50th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	
30th %ile Green (s)	22.6	75.1		16.9	69.4		16.1	16.1	16.1	16.1	16.1	
30th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	
10th %ile Green (s)	17.1	84.5		12.5	79.9		11.1	11.1	11.1	11.1	11.1	
10th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	
Queue Length 50th (m)	49.2	20.7		43.1	102.7			7.2	0.0		29.0	
Queue Length 95th (m)	34.3	43.3		37.0 m	#142.6			6.9	0.0		26.1	
Internal Link Dist (m)		351.6			433.3			209.0			157.4	
Turn Bay Length (m)	30.0			80.0					20.0			
Base Capacity (vph)	326	820		342	707			350	520		322	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.70	0.23		0.53	0.81			0.10	0.40		0.42	

Intersection Summary

Area Type: CBD
Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 43.7 Intersection LOS: D
Intersection Capacity Utilization 62.3% ICU Level of Service B
Analysis Period (min) 15
Description: TMC Jun 26/19
Updated Sept 28/20
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 163: HICKORY ST & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	189	73	14	350	15	90	124	6	27	0	42
Future Volume (vph)	37	189	73	14	350	15	90	124	6	27	0	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	22.3		0.0	18.9		0.0	16.3		0.0	25.4		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.952			0.993			0.993			0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1684	1587	0	1668	1718	0	1463	1592	0	1668	1479	0
Flt Permitted	0.406			0.514			0.702			0.492		
Satd. Flow (perm)	720	1587	0	903	1718	0	1081	1592	0	864	1479	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		40			4			3			370	
Link Speed (k/h)		40			50			48			48	
Link Distance (m)		360.2			468.1			35.4			183.4	
Travel Time (s)		32.4			33.7			2.7			13.8	
Peak Hour Factor	0.36	0.84	0.68	0.70	0.80	0.75	0.56	0.47	0.50	0.54	0.50	0.50
Heavy Vehicles (%)	6%	14%	10%	7%	9%	0%	22%	18%	0%	7%	13%	8%
Adj. Flow (vph)	103	225	107	20	438	20	161	264	12	50	0	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	103	332	0	20	458	0	161	276	0	50	84	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Minimum Split (s)	26.3	26.3		26.3	26.3		26.0	26.0		26.0	26.0	
Total Split (s)	53.0	53.0		53.0	53.0		37.0	37.0		37.0	37.0	
Total Split (%)	58.9%	58.9%		58.9%	58.9%		41.1%	41.1%		41.1%	41.1%	
Maximum Green (s)	47.2	47.2		47.2	47.2		31.7	31.7		31.7	31.7	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.7	3.7		3.7	3.7	
All-Red Time (s)	1.8	1.8		1.8	1.8		1.6	1.6		1.6	1.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.8	5.8		5.8	5.8		5.3	5.3		5.3	5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	47.2	47.2		47.2	47.2		31.7	31.7		31.7	31.7	
Actuated g/C Ratio	0.52	0.52		0.52	0.52		0.35	0.35		0.35	0.35	
v/c Ratio	0.27	0.39		0.04	0.51		0.42	0.49		0.16	0.11	
Control Delay	13.7	12.7		15.1	18.0		26.5	26.2		21.9	0.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	13.7	12.7		15.1	18.0		26.5	26.2		21.9	0.3	
LOS	B	B		B	B		C	C		C	A	
Approach Delay		13.0			17.9			26.3			8.4	
Approach LOS		B			B			C			A	
Queue Length 50th (m)	13.6	40.9		1.7	39.7		19.3	33.6		5.4	0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	6.4	60.1		m2.5	46.5		19.7	24.3		7.4	0.0	
Internal Link Dist (m)		336.2			444.1			11.4			159.4	
Turn Bay Length (m)	22.3			18.9			16.3			25.4		
Base Capacity (vph)	377	851		473	902		380	562		304	760	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.27	0.39		0.04	0.51		0.42	0.49		0.16	0.11	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 55
Control Type: Pretimed
Maximum v/c Ratio: 0.51
Intersection Signal Delay: 18.1 Intersection LOS: B
Intersection Capacity Utilization 58.0% ICU Level of Service B
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 656: HICKORY ST & MARY ST E

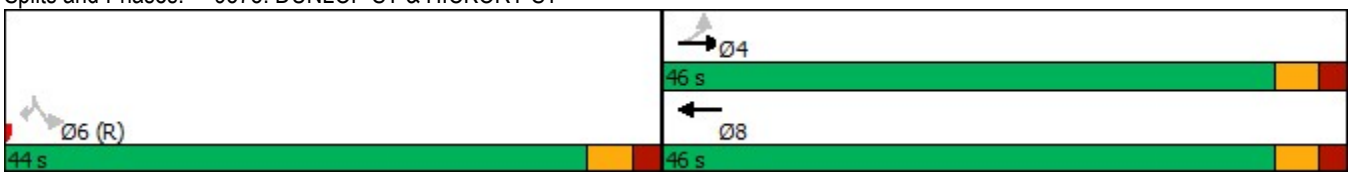
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	105	105	118	7	11	124
Future Volume (vph)	105	105	118	7	11	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0			35.0	0.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	25.0				25.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.992			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1733	1807	1715	0	1638	1536
Flt Permitted	0.670				0.950	
Satd. Flow (perm)	1222	1807	1715	0	1638	1536
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			5			135
Link Speed (k/h)		50	48		50	
Link Distance (m)		375.4	228.6		233.0	
Travel Time (s)		27.0	17.1		16.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	4%	9%	4%	9%	4%
Adj. Flow (vph)	114	114	128	8	12	135
Shared Lane Traffic (%)						
Lane Group Flow (vph)	114	114	136	0	12	135
Turn Type	Perm	NA	NA		Perm	Perm
Protected Phases		4	8			
Permitted Phases	4				6	6
Minimum Split (s)	22.0	22.0	22.0		22.0	22.0
Total Split (s)	46.0	46.0	46.0		44.0	44.0
Total Split (%)	51.1%	51.1%	51.1%		48.9%	48.9%
Maximum Green (s)	41.0	41.0	41.0		39.0	39.0
Yellow Time (s)	3.0	3.0	3.0		3.0	3.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	11.0	11.0	11.0		11.0	11.0
Flash Dont Walk (s)	5.0	5.0	5.0		5.0	5.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	41.0	41.0	41.0		39.0	39.0
Actuated g/C Ratio	0.46	0.46	0.46		0.43	0.43
v/c Ratio	0.21	0.14	0.17		0.02	0.18
Control Delay	22.1	21.0	14.7		14.7	3.5
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	22.1	21.0	14.7		14.7	3.5
LOS	C	C	B		B	A
Approach Delay		21.6	14.7		4.5	
Approach LOS		C	B		A	
Queue Length 50th (m)	10.9	10.8	11.9		1.1	0.0

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 95th (m)	m18.9	m18.6	21.8		3.9	8.9
Internal Link Dist (m)		351.4	204.6		209.0	
Turn Bay Length (m)	35.0					
Base Capacity (vph)	556	823	784		709	742
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.21	0.14	0.17		0.02	0.18

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.21	
Intersection Signal Delay: 14.8	Intersection LOS: B
Intersection Capacity Utilization 32.5%	ICU Level of Service A
Analysis Period (min) 15	

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

Splits and Phases: 9578: DUNLOP ST & HICKORY ST



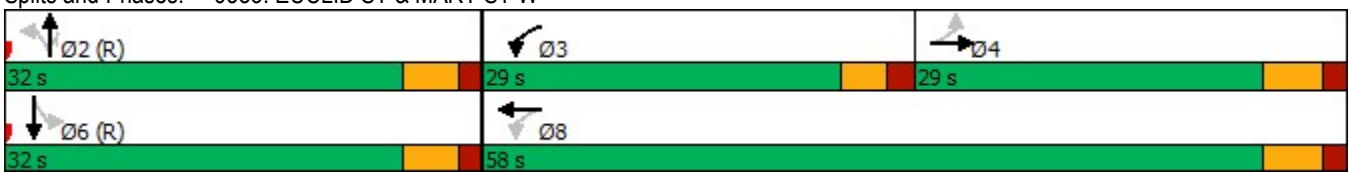
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	129	4	360	233	46	3	105	106	52	74	1
Future Volume (vph)	3	129	4	360	233	46	3	105	106	52	74	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	22.3		0.0	18.9		0.0	16.3		20.0	25.4		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.977				0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1785	1784	0	1785	1813	0	1785	1842	1551	1500	1850	0
Flt Permitted	0.540			0.435			0.694			0.672		
Satd. Flow (perm)	1015	1784	0	817	1813	0	1304	1842	1551	1061	1850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			17				128		2	
Link Speed (k/h)		48			50			50			48	
Link Distance (m)		204.5			414.4			228.8			243.5	
Travel Time (s)		15.3			29.8			16.5			18.3	
Peak Hour Factor	0.38	0.61	0.50	0.96	0.74	0.81	0.38	0.79	0.83	0.67	0.79	0.25
Heavy Vehicles (%)	0%	5%	0%	0%	0%	8%	0%	2%	3%	19%	1%	0%
Adj. Flow (vph)	8	211	8	375	315	57	8	133	128	78	94	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	8	219	0	375	372	0	8	133	128	78	98	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Minimum Split (s)	24.8	24.8		10.0	24.8		26.3	26.3	26.3	26.3	26.3	
Total Split (s)	29.0	29.0		29.0	58.0		32.0	32.0	32.0	32.0	32.0	
Total Split (%)	32.2%	32.2%		32.2%	64.4%		35.6%	35.6%	35.6%	35.6%	35.6%	
Maximum Green (s)	23.2	23.2		24.0	52.2		26.7	26.7	26.7	26.7	26.7	
Yellow Time (s)	4.0	4.0		3.0	4.0		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	1.8	1.8		2.0	1.8		1.6	1.6	1.6	1.6	1.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.8	5.8		5.0	5.8		5.3	5.3	5.3	5.3	5.3	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0			7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	12.0	12.0			12.0		14.0	14.0	14.0	14.0	14.0	
Pedestrian Calls (#/hr)	0	0			0		0	0	0	0	0	
Act Effct Green (s)	23.2	23.2		53.0	52.2		26.7	26.7	26.7	26.7	26.7	
Actuated g/C Ratio	0.26	0.26		0.59	0.58		0.30	0.30	0.30	0.30	0.30	
v/c Ratio	0.03	0.48		0.51	0.35		0.02	0.24	0.23	0.25	0.18	
Control Delay	25.7	32.1		16.7	15.7		22.7	25.5	5.8	26.7	24.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	25.7	32.1		16.7	15.7		22.7	25.5	5.8	26.7	24.1	
LOS	C	C		B	B		C	C	A	C	C	
Approach Delay		31.8			16.2			16.0			25.3	
Approach LOS		C			B			B			C	
Queue Length 50th (m)	1.0	29.2		43.4	42.4		0.9	16.0	0.0	9.4	11.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	1.7	30.6		m54.6	43.0		1.6	25.0	8.9	14.3	19.1	
Internal Link Dist (m)		180.5			390.4			204.8			219.5	
Turn Bay Length (m)	22.3			18.9			16.3		20.0	25.4		
Base Capacity (vph)	261	461		739	1058		386	546	550	314	550	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.03	0.48		0.51	0.35		0.02	0.24	0.23	0.25	0.18	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Pretimed
Maximum v/c Ratio: 0.51
Intersection Signal Delay: 19.8 Intersection LOS: B
Intersection Capacity Utilization 49.9% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9583: EUCLID ST & MARY ST W



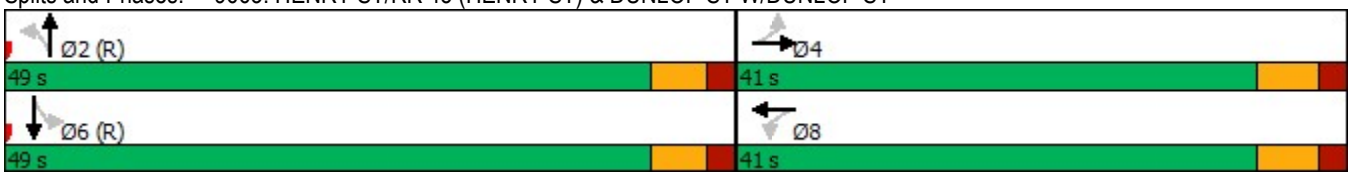
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	224	12	70	106	61	24	28	105	126	280	25
Future Volume (vph)	24	224	12	70	106	61	24	28	105	126	280	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	35.0		0.0	16.0		0.0	16.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.989			0.940			0.876			0.986	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1785	1841	0	1785	1705	0	1785	1499	0	1750	1736	0
Flt Permitted	0.625			0.516			0.490			0.640		
Satd. Flow (perm)	1174	1841	0	970	1705	0	921	1499	0	1179	1736	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			43			154			8	
Link Speed (k/h)		48			50			50			50	
Link Distance (m)		420.8			405.1			724.5			229.4	
Travel Time (s)		31.6			29.2			52.2			16.5	
Peak Hour Factor	0.75	0.85	0.60	0.54	0.90	0.78	0.50	0.84	0.68	0.65	0.91	0.78
Heavy Vehicles (%)	0%	1%	0%	0%	2%	6%	0%	4%	11%	2%	7%	4%
Adj. Flow (vph)	32	264	20	130	118	78	48	33	154	194	308	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	284	0	130	196	0	48	187	0	194	340	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	24.2	24.2		22.2	22.2		26.0	26.0		26.0	26.0	
Total Split (s)	41.0	41.0		41.0	41.0		49.0	49.0		49.0	49.0	
Total Split (%)	45.6%	45.6%		45.6%	45.6%		54.4%	54.4%		54.4%	54.4%	
Maximum Green (s)	34.8	34.8		34.8	34.8		43.3	43.3		43.3	43.3	
Yellow Time (s)	4.2	4.2		4.2	4.2		3.7	3.7		3.7	3.7	
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		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.2	6.2		6.2	6.2		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
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		5.0	5.0		9.0	9.0		9.0	9.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	34.8	34.8		34.8	34.8		43.3	43.3		43.3	43.3	
Actuated g/C Ratio	0.39	0.39		0.39	0.39		0.48	0.48		0.48	0.48	
v/c Ratio	0.07	0.40		0.35	0.29		0.11	0.23		0.34	0.41	
Control Delay	19.2	23.3		20.6	14.1		13.7	4.3		16.7	16.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.2	23.3		20.6	14.1		13.7	4.3		16.7	16.5	
LOS	B	C		C	B		B	A		B	B	
Approach Delay		22.9			16.7			6.2			16.6	
Approach LOS		C			B			A			B	
Queue Length 50th (m)	3.8	37.2		11.3	12.2		4.0	2.7		18.4	32.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	8.6	54.0		13.2	m24.7		5.1	10.5		21.4	51.3	
Internal Link Dist (m)		396.8			381.1			700.5			205.4	
Turn Bay Length (m)	35.0			35.0			16.0			16.0		
Base Capacity (vph)	453	714		375	685		443	801		567	839	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.07	0.40		0.35	0.29		0.11	0.23		0.34	0.41	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 55
Control Type: Pretimed
Maximum v/c Ratio: 0.41
Intersection Signal Delay: 16.3 Intersection LOS: B
Intersection Capacity Utilization 72.3% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9663: HENRY ST/RR 45 (HENRY ST) & DUNLOP ST W/DUNLOP ST

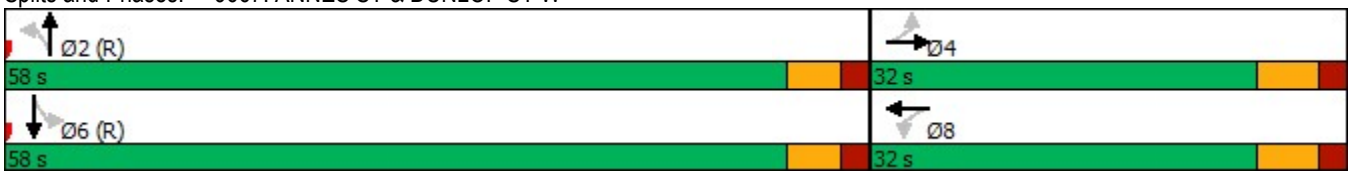


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	76	11	29	68	82	10	191	52	118	326	70
Future Volume (vph)	21	76	11	29	68	82	10	191	52	118	326	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	35.0		0.0	16.0		0.0	16.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.979			0.919			0.973			0.971	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1785	1778	0	1733	1669	0	1275	1742	0	1716	1683	0
Flt Permitted	0.571			0.685			0.396			0.526		
Satd. Flow (perm)	1073	1778	0	1250	1669	0	531	1742	0	950	1683	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			67			21			22	
Link Speed (k/h)		48			48			48			50	
Link Distance (m)		217.5			420.8			175.4			225.7	
Travel Time (s)		16.3			31.6			13.2			16.3	
Peak Hour Factor	0.88	0.79	0.69	0.66	0.71	0.72	0.63	0.69	0.86	0.73	0.80	0.73
Heavy Vehicles (%)	0%	4%	0%	3%	4%	3%	40%	6%	0%	4%	9%	6%
Adj. Flow (vph)	24	96	16	44	96	114	16	277	60	162	408	96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	112	0	44	210	0	16	337	0	162	504	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	24.2	24.2		24.2	24.2		26.0	26.0		26.0	26.0	
Total Split (s)	32.0	32.0		32.0	32.0		58.0	58.0		58.0	58.0	
Total Split (%)	35.6%	35.6%		35.6%	35.6%		64.4%	64.4%		64.4%	64.4%	
Maximum Green (s)	25.8	25.8		25.8	25.8		52.3	52.3		52.3	52.3	
Yellow Time (s)	4.2	4.2		4.2	4.2		3.7	3.7		3.7	3.7	
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		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.2	6.2		6.2	6.2		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
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		9.0	9.0		9.0	9.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.8	25.8		25.8	25.8		52.3	52.3		52.3	52.3	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.58	0.58		0.58	0.58	
v/c Ratio	0.08	0.22		0.12	0.40		0.05	0.33		0.29	0.51	
Control Delay	24.4	23.8		27.1	21.6		8.8	10.2		11.3	12.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.4	23.8		27.1	21.6		8.8	10.2		11.3	12.9	
LOS	C	C		C	C		A	B		B	B	
Approach Delay		23.9			22.6			10.1			12.5	
Approach LOS		C			C			B			B	
Queue Length 50th (m)	2.8	12.4		5.3	17.7		1.0	23.9		12.1	42.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	8.0	20.8		10.0	26.8		2.5	26.4		17.2	53.5	
Internal Link Dist (m)		193.5			396.8			151.4			201.7	
Turn Bay Length (m)	35.0			35.0			16.0			16.0		
Base Capacity (vph)	307	516		358	526		308	1021		552	987	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.08	0.22		0.12	0.40		0.05	0.33		0.29	0.51	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 55	
Control Type: Pretimed	
Maximum v/c Ratio: 0.51	
Intersection Signal Delay: 14.8	Intersection LOS: B
Intersection Capacity Utilization 70.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 9667: ANNES ST & DUNLOP ST W



Lanes, Volumes, Timings
90: BROCK ST & MARY ST W/MARY ST E

12/17/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	279	478	37	33	258	178	29	523	36	83	239	374
Future Volume (vph)	279	478	37	33	258	178	29	523	36	83	239	374
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	22.3		0.0	18.9		25.0	16.3		0.0	25.4		0.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	23.1			28.7			29.3			34.6		
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		0.99		0.94	0.94	0.98				0.90
Frt		0.983				0.850		0.985				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1474	1524	0	1516	1580	1208	1460	1466	0	1422	1510	1295
Flt Permitted	0.140			0.213			0.594			0.103		
Satd. Flow (perm)	217	1524	0	336	1580	1132	862	1466	0	154	1510	1165
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				104		5				473
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		409.8			360.6			134.9			82.0	
Travel Time (s)		29.5			26.0			9.7			5.9	
Confl. Peds. (#/hr)	11		11	11		11	23		51	51		23
Peak Hour Factor	0.85	0.83	0.51	0.75	0.78	0.73	0.73	0.83	0.50	0.74	0.89	0.79
Heavy Vehicles (%)	9%	8%	11%	6%	7%	19%	10%	11%	14%	13%	12%	11%
Adj. Flow (vph)	328	576	73	44	331	244	40	630	72	112	269	473
Shared Lane Traffic (%)												
Lane Group Flow (vph)	328	649	0	44	331	244	40	702	0	112	269	473
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2			6		6
Detector Phase	7	4		8	8	8	2	2		1	6	6
Switch Phase												
Minimum Initial (s)	4.0	8.0		8.0	8.0	8.0	20.0	20.0		4.0	20.0	20.0
Minimum Split (s)	10.0	26.0		26.0	26.0	26.0	28.0	28.0		10.0	28.0	28.0
Total Split (s)	30.0	66.0		36.0	36.0	36.0	72.0	72.0		12.0	84.0	84.0
Total Split (%)	20.0%	44.0%		24.0%	24.0%	24.0%	48.0%	48.0%		8.0%	56.0%	56.0%
Maximum Green (s)	24.0	60.2		30.2	30.2	30.2	66.7	66.7		6.0	78.7	78.7
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.7	3.7		4.0	3.7	3.7
All-Red Time (s)	2.0	1.8		1.8	1.8	1.8	1.6	1.6		2.0	1.6	1.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	5.8		5.8	5.8	5.8	5.3	5.3		6.0	5.3	5.3
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes									Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max		None	C-Max	C-Max
Walk Time (s)		7.0		7.0	7.0	7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)		12.0		12.0	12.0	12.0	14.0	14.0			14.0	14.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0			0	0
Act Effct Green (s)	60.0	60.2		30.2	30.2	30.2	66.7	66.7		78.0	78.7	78.7
Actuated g/C Ratio	0.40	0.40		0.20	0.20	0.20	0.44	0.44		0.52	0.52	0.52
v/c Ratio	1.14	1.06		0.66	1.04	0.79	0.10	1.07		0.86	0.34	0.57

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	145.4	111.9		111.9	130.6	65.8	35.1	97.2		72.7	22.1	4.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	145.4	111.9		111.9	130.6	65.8	35.1	97.2		72.7	22.1	4.4
LOS	F	F		F	F	E	D	F		E	C	A
Approach Delay		123.1			103.7			93.8			19.0	
Approach LOS		F			F			F			B	
90th %ile Green (s)	24.0	60.2		30.2	30.2	30.2	66.7	66.7		6.0	78.7	78.7
90th %ile Term Code	Max	Max		Max	Max	Max	Coord	Coord		Max	Coord	Coord
70th %ile Green (s)	24.0	60.2		30.2	30.2	30.2	66.7	66.7		6.0	78.7	78.7
70th %ile Term Code	Max	Max		Max	Max	Max	Coord	Coord		Max	Coord	Coord
50th %ile Green (s)	24.0	60.2		30.2	30.2	30.2	66.7	66.7		6.0	78.7	78.7
50th %ile Term Code	Max	Max		Max	Max	Max	Coord	Coord		Max	Coord	Coord
30th %ile Green (s)	24.0	60.2		30.2	30.2	30.2	66.7	66.7		6.0	78.7	78.7
30th %ile Term Code	Max	Max		Max	Max	Max	Coord	Coord		Max	Coord	Coord
10th %ile Green (s)	24.0	60.2		30.2	30.2	30.2	66.7	66.7		6.0	78.7	78.7
10th %ile Term Code	Max	Max		Max	Max	Max	Coord	Coord		Max	Coord	Coord
Queue Length 50th (m)	~91.5	~190.8		12.1	~99.4	43.3	6.5	~206.9		15.6	41.6	0.0
Queue Length 95th (m)	#135.1	#226.9		#22.9	#124.0	52.7	12.1	#241.9		#25.4	59.4	5.1
Internal Link Dist (m)		385.8			336.6			110.9			58.0	
Turn Bay Length (m)	22.3			18.9		25.0	16.3			25.4		
Base Capacity (vph)	287	614		67	318	310	383	654		130	792	836
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	1.14	1.06		0.66	1.04	0.79	0.10	1.07		0.86	0.34	0.57

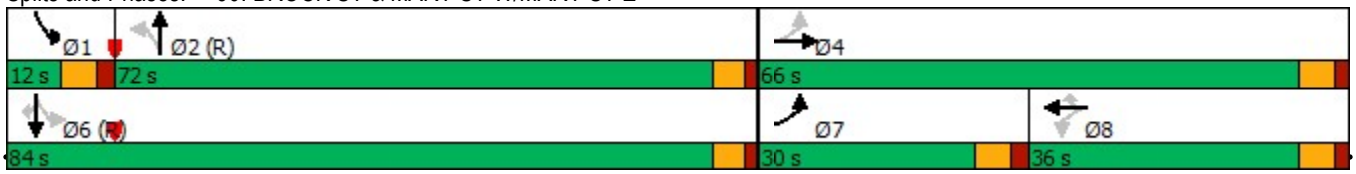
Intersection Summary

Area Type: CBD
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.14
Intersection Signal Delay: 84.7 Intersection LOS: F
Intersection Capacity Utilization 94.7% ICU Level of Service F
Analysis Period (min) 15
Description: TMC Sep 26/19
Updated Sept 17/20

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 90: BROCK ST & MARY ST W/MARY ST E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	442	222	65	196	21	3	431	193	5	554	19
Future Volume (vph)	34	442	222	65	196	21	3	431	193	5	554	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	35.1		0.0	16.0		0.0	16.1		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	25.0			21.2			15.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.92	0.97			0.99				0.75		0.99	
Frt		0.944			0.984				0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1606	1541	0	1575	1612	0	1606	1658	1437	1606	1617	0
Flt Permitted	0.595			0.104			0.105			0.276		
Satd. Flow (perm)	925	1541	0	172	1612	0	178	1658	1085	467	1617	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			6				246		2	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		407.9			373.1			117.4			239.3	
Travel Time (s)		29.4			26.9			8.5			17.2	
Confl. Peds. (#/hr)	28		33	33		28	52		49	49		52
Peak Hour Factor	0.85	0.93	0.79	0.65	0.82	0.75	0.38	0.96	0.74	0.42	0.94	0.79
Heavy Vehicles (%)	0%	0%	0%	2%	2%	0%	0%	2%	0%	0%	3%	0%
Adj. Flow (vph)	40	475	281	100	239	28	8	449	261	12	589	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	756	0	100	267	0	8	449	261	12	613	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		3	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		4.0	8.0		20.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	25.0	25.0		10.0	25.0		26.0	26.0	26.0	26.0	26.0	
Total Split (s)	78.0	78.0		10.0	88.0		62.0	62.0	62.0	62.0	62.0	
Total Split (%)	52.0%	52.0%		6.7%	58.7%		41.3%	41.3%	41.3%	41.3%	41.3%	
Maximum Green (s)	71.8	71.8		4.0	81.8		56.3	56.3	56.3	56.3	56.3	
Yellow Time (s)	4.2	4.2		4.0	4.2		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2		6.0	6.2		5.7	5.7	5.7	5.7	5.7	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0			11.0		9.0	9.0	9.0	9.0	9.0	
Pedestrian Calls (#/hr)	0	0			0		0	0	0	0	0	
Act Effct Green (s)	71.8	71.8		82.0	81.8		56.3	56.3	56.3	56.3	56.3	
Actuated g/C Ratio	0.48	0.48		0.55	0.55		0.38	0.38	0.38	0.38	0.38	
v/c Ratio	0.09	1.01		0.76	0.30		0.12	0.72	0.47	0.07	1.01	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	21.7	70.6		61.0	23.2		36.7	48.1	7.5	46.4	91.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	54.4	0.4	0.0	0.0	
Total Delay	21.7	70.6		61.0	23.2		36.7	102.5	7.9	46.4	91.7	
LOS	C	E		E	C		D	F	A	D	F	
Approach Delay		68.1			33.5			67.4			90.8	
Approach LOS		E			C			E			F	
90th %ile Green (s)	71.8	71.8		4.0	81.8		56.3	56.3	56.3	56.3	56.3	
90th %ile Term Code	Max	Max		Max	Hold		Coord	Coord	Coord	Coord	Coord	
70th %ile Green (s)	71.8	71.8		4.0	81.8		56.3	56.3	56.3	56.3	56.3	
70th %ile Term Code	Max	Max		Max	Hold		Coord	Coord	Coord	Coord	Coord	
50th %ile Green (s)	71.8	71.8		4.0	81.8		56.3	56.3	56.3	56.3	56.3	
50th %ile Term Code	Max	Max		Max	Hold		Coord	Coord	Coord	Coord	Coord	
30th %ile Green (s)	71.8	71.8		4.0	81.8		56.3	56.3	56.3	56.3	56.3	
30th %ile Term Code	Max	Max		Max	Hold		Coord	Coord	Coord	Coord	Coord	
10th %ile Green (s)	71.8	71.8		4.0	81.8		56.3	56.3	56.3	56.3	56.3	
10th %ile Term Code	Max	Max		Max	Hold		Coord	Coord	Coord	Coord	Coord	
Queue Length 50th (m)	4.6	~216.5		15.5	41.7		1.4	105.0	2.6	2.5	~143.8	
Queue Length 95th (m)	m9.6	#289.3		18.4	52.3		2.2	143.5	7.6	3.7	#239.5	
Internal Link Dist (m)		383.9			349.1			93.4			215.3	
Turn Bay Length (m)	35.0			35.1			16.0			16.1		
Base Capacity (vph)	442	751		131	881		66	622	560	175	608	
Starvation Cap Reductn	0	0		0	0		0	217	70	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.09	1.01		0.76	0.30		0.12	1.11	0.53	0.07	1.01	

Intersection Summary

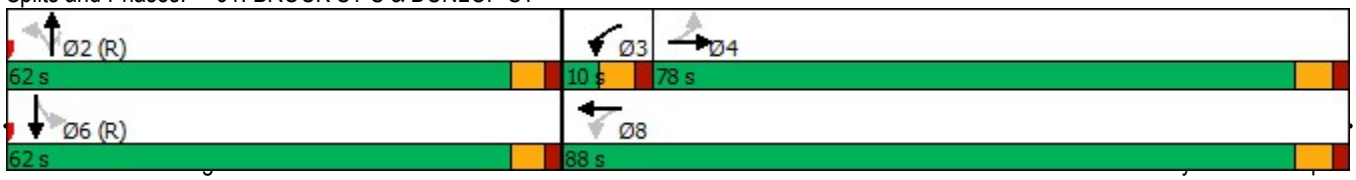
Area Type: CBD
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 68.5 Intersection LOS: E
Intersection Capacity Utilization 94.6% ICU Level of Service F
Analysis Period (min) 15
Description: TMC Oct 4/18
Updated Sept 17/20

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

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

Splits and Phases: 91: BROCK ST S & DUNLOP ST



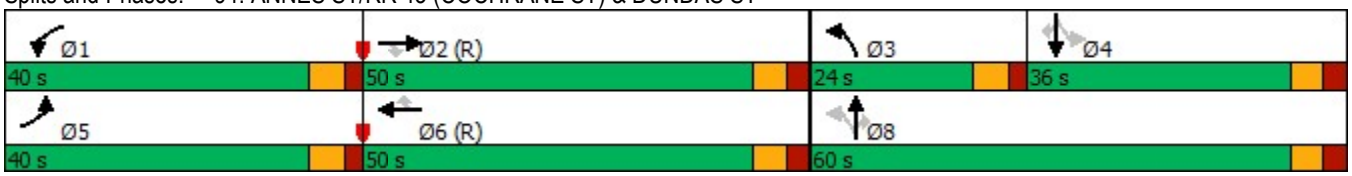
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	281	805	433	21	360	110	204	201	1	1	157	237
Future Volume (vph)	281	805	433	21	360	110	204	201	1	1	157	237
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	44.5		40.0	0.0		157.1	23.4		14.6	35.0		0.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	31.3			29.4			40.9			25.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98		0.91	0.98		0.95	0.99		0.98	0.99		0.98
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1560	3181	1437	1606	3150	1409	1606	1691	1437	1591	1691	1423
Flt Permitted	0.950			0.950			0.419			0.582		
Satd. Flow (perm)	1534	3181	1314	1572	3150	1343	705	1691	1409	969	1691	1392
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			267			128			69			339
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		281.1			304.8			219.5			1140.1	
Travel Time (s)		20.2			21.9			15.8			82.1	
Confl. Peds. (#/hr)	7		17	17		7	5		4	4		5
Peak Hour Factor	0.80	0.98	0.85	0.85	0.93	0.86	0.85	0.69	0.54	0.78	0.77	0.70
Heavy Vehicles (%)	3%	1%	0%	0%	2%	2%	0%	0%	0%	1%	0%	1%
Adj. Flow (vph)	351	821	509	25	387	128	240	291	2	1	204	339
Shared Lane Traffic (%)												
Lane Group Flow (vph)	351	821	509	25	387	128	240	291	2	1	204	339
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases			2			6	8		8	4		4
Minimum Split (s)	10.0	29.0	29.0	10.0	29.0	29.0	10.0	30.0	30.0	30.0	30.0	30.0
Total Split (s)	40.0	50.0	50.0	40.0	50.0	50.0	24.0	60.0	60.0	36.0	36.0	36.0
Total Split (%)	26.7%	33.3%	33.3%	26.7%	33.3%	33.3%	16.0%	40.0%	40.0%	24.0%	24.0%	24.0%
Maximum Green (s)	34.0	43.5	43.5	34.0	43.5	43.5	18.0	53.5	53.5	29.5	29.5	29.5
Yellow Time (s)	4.0	3.7	3.7	4.0	3.7	3.7	4.0	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	2.8	2.8	2.0	2.8	2.8	2.0	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.5	6.5	6.0	6.5	6.5	3.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes			Yes					
Walk Time (s)		14.0	14.0		14.0	14.0		17.0	17.0	17.0	17.0	17.0
Flash Dont Walk (s)		5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0	0	0	0
Act Effct Green (s)	34.0	43.5	43.5	34.0	43.5	43.5	57.0	53.5	53.5	29.5	29.5	29.5
Actuated g/C Ratio	0.23	0.29	0.29	0.23	0.29	0.29	0.38	0.36	0.36	0.20	0.20	0.20
v/c Ratio	0.99	0.89	0.89	0.07	0.42	0.27	0.61	0.48	0.00	0.01	0.61	0.62
Control Delay	103.5	63.8	43.0	50.5	31.7	7.8	38.2	37.0	0.0	49.0	64.1	10.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	103.5	63.8	43.0	50.5	31.7	7.8	38.2	37.0	0.0	49.0	64.1	10.4
LOS	F	E	D	D	C	A	D	D	A	D	E	B
Approach Delay		65.8			26.9			37.4			30.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			C			D			C	
Queue Length 50th (m)	96.9	113.7	72.1	4.1	52.9	11.3	34.5	49.8	0.0	0.2	51.7	0.0
Queue Length 95th (m)	#127.9	#145.2	#116.2	m7.9	64.0	m16.7	51.9	48.6	m0.0	1.6	64.1	0.5
Internal Link Dist (m)		257.1			280.8			195.5			1116.1	
Turn Bay Length (m)	44.5		40.0			157.1	23.4		14.6	35.0		
Base Capacity (vph)	353	922	570	364	913	480	394	603	546	190	332	546
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.99	0.89	0.89	0.07	0.42	0.27	0.61	0.48	0.00	0.01	0.61	0.62

Intersection Summary

Area Type: CBD
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 112 (75%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Pretimed
Maximum v/c Ratio: 0.99
Intersection Signal Delay: 49.0 Intersection LOS: D
Intersection Capacity Utilization 84.0% ICU Level of Service E
Analysis Period (min) 15
Description: TMC Oct 24/17
Updated Sept 23/20
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 94: ANNES ST/RR 43 (COCHRANE ST) & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	297	239	155	38	24	172	405	1	1	233	219
Future Volume (vph)	180	297	239	155	38	24	172	405	1	1	233	219
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	24.7		0.0	30.2		16.0	7.6		11.0	13.8		0.0
Storage Lanes	1		1	0		1	1		1	1		1
Taper Length (m)	32.9			38.5			41.4			24.7		
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	0.98		0.91	0.96		0.96	0.99		0.86	0.94		0.95
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1606	1674	1437	1606	1658	1437	1591	1691	1437	1560	1674	1437
Flt Permitted	0.950			0.950			0.310			0.446		
Satd. Flow (perm)	1579	1674	1313	1536	1658	1383	512	1691	1229	687	1674	1363
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			303			113			69			300
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		118.8			293.5			227.2			234.4	
Travel Time (s)		8.6			21.1			16.4			16.9	
Confl. Peds. (#/hr)	5		19	19		5	10		39	39		10
Peak Hour Factor	0.83	0.93	0.79	0.65	0.94	0.66	0.78	0.86	0.81	0.66	0.88	0.73
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	1%	0%	0%	3%	1%	0%
Adj. Flow (vph)	217	319	303	238	40	36	221	471	1	2	265	300
Shared Lane Traffic (%)												
Lane Group Flow (vph)	217	319	303	238	40	36	221	471	1	2	265	300
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases			2			6	8		8	4		4
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	10.0	29.5	29.5	29.5	29.5	29.5
Total Split (s)	38.0	48.0	48.0	38.0	48.0	48.0	23.0	64.0	64.0	41.0	41.0	41.0
Total Split (%)	25.3%	32.0%	32.0%	25.3%	32.0%	32.0%	15.3%	42.7%	42.7%	27.3%	27.3%	27.3%
Maximum Green (s)	32.0	41.5	41.5	32.0	41.5	41.5	17.0	57.5	57.5	34.5	34.5	34.5
Yellow Time (s)	4.0	3.7	3.7	4.0	3.7	3.7	4.0	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	2.8	2.8	2.0	2.8	2.8	2.0	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.5	6.5	6.0	6.5	6.5	6.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes			Yes					
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		14.0	14.0		14.0	14.0		16.0	16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0	0	0	0
Act Effct Green (s)	32.0	41.5	41.5	32.0	41.5	41.5	58.0	57.5	57.5	34.5	34.5	34.5
Actuated g/C Ratio	0.21	0.28	0.28	0.21	0.28	0.28	0.39	0.38	0.38	0.23	0.23	0.23
v/c Ratio	0.63	0.69	0.52	0.70	0.09	0.08	0.69	0.73	0.00	0.01	0.69	0.55
Control Delay	108.6	8.2	5.8	67.7	44.3	0.5	44.2	46.1	0.0	28.0	40.4	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	108.6	8.2	5.8	67.7	44.3	0.5	44.2	46.1	0.0	28.0	40.4	5.1
LOS	F	A	A	E	D	A	D	D	A	C	D	A
Approach Delay		33.3			57.0			45.4			21.7	

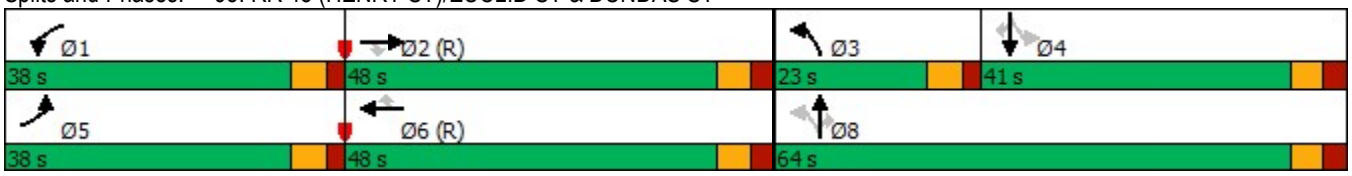
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			E			D			C	
Queue Length 50th (m)	60.9	18.3	7.4	61.6	8.4	0.1	37.4	113.0	0.0	0.2	63.9	8.2
Queue Length 95th (m)	m68.7	m19.8	m7.6	60.8	17.8	0.0	46.1	142.4	m0.0	m0.3	74.0	5.1
Internal Link Dist (m)		94.8			269.5			203.2			210.4	
Turn Bay Length (m)	24.7			30.2		16.0	7.6		11.0	13.8		
Base Capacity (vph)	342	463	582	342	458	464	320	648	513	158	385	544
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.69	0.52	0.70	0.09	0.08	0.69	0.73	0.00	0.01	0.69	0.55

Intersection Summary

Area Type: CBD
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Pretimed
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 37.1 Intersection LOS: D
Intersection Capacity Utilization 80.2% ICU Level of Service D
Analysis Period (min) 15
Description: TMC May 30 2017
Updated Sept 23/20

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

Splits and Phases: 95: RR 45 (HENRY ST)/EUCLID ST & DUNDAS ST



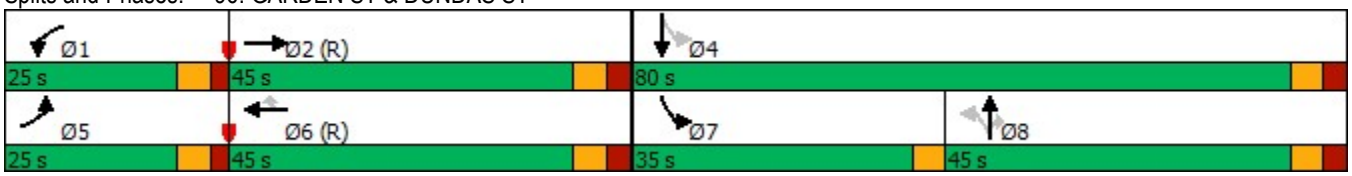
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	504	23	145	359	339	16	650	256	384	424	0
Future Volume (vph)	145	504	23	145	359	339	16	650	256	384	424	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	17.1		0.0	98.4		0.0	23.5		30.0	102.4		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	37.0			12.6			27.3			30.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00		0.98	1.00		0.96	0.99		
Frt		0.989				0.850			0.850			
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1591	3144	0	1591	1658	1423	1606	3213	1423	1606	3213	0
Flt Permitted	0.950			0.950			0.482			0.120		
Satd. Flow (perm)	1583	3144	0	1586	1658	1394	812	3213	1363	202	3213	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				394			134			
Link Speed (k/h)		50			50			50			40	
Link Distance (m)		457.3			160.3			1037.5			218.0	
Travel Time (s)		32.9			11.5			74.7			19.6	
Confl. Peds. (#/hr)	6		5	5		6	3		19	19		3
Peak Hour Factor	0.85	0.90	0.52	0.77	0.94	0.80	0.73	0.82	0.78	0.93	0.90	0.83
Heavy Vehicles (%)	1%	1%	0%	1%	2%	1%	0%	0%	1%	0%	0%	0%
Adj. Flow (vph)	171	560	44	188	382	424	22	793	328	413	471	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	171	604	0	188	382	424	22	793	328	413	471	0
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases						6	8		8	4		
Minimum Split (s)	10.5	41.0		10.5	41.0	41.0	35.0	35.0	35.0	11.5	35.0	
Total Split (s)	25.0	45.0		25.0	45.0	45.0	45.0	45.0	45.0	35.0	80.0	
Total Split (%)	16.7%	30.0%		16.7%	30.0%	30.0%	30.0%	30.0%	30.0%	23.3%	53.3%	
Maximum Green (s)	19.3	38.5		19.3	38.5	38.5	38.5	38.5	38.5	31.3	73.5	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.8		2.0	2.8	2.8	2.8	2.8	2.8	0.0	2.8	
Lost Time Adjust (s)	-3.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	-3.0	0.0	
Total Lost Time (s)	2.7	6.5		5.7	6.5	6.5	6.5	6.5	6.5	0.7	6.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes			Yes						Yes		
Walk Time (s)		7.0			7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)		25.0			25.0	25.0	21.0	21.0	21.0		21.0	
Pedestrian Calls (#/hr)		0			0	0	0	0	0		0	
Act Effct Green (s)	22.3	38.5		19.3	38.5	38.5	38.5	38.5	38.5	79.3	73.5	
Actuated g/C Ratio	0.15	0.26		0.13	0.26	0.26	0.26	0.26	0.26	0.53	0.49	
v/c Ratio	0.72	0.75		0.92	0.90	0.65	0.11	0.96	0.73	0.97	0.30	
Control Delay	75.6	66.5		109.2	78.4	11.1	44.4	78.1	40.2	70.3	25.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	75.6	66.5		109.2	78.4	11.1	44.4	78.1	40.2	70.3	25.5	
LOS	E	E		F	E	B	D	E	D	E	C	
Approach Delay		68.5			55.5			66.6			46.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			E			E			D	
Queue Length 50th (m)	49.1	79.8		51.7	101.8	6.3	4.6	113.7	50.3	99.1	47.6	
Queue Length 95th (m)	m65.4	102.5		#71.9	#155.2	17.3	9.6	#124.3	64.3	#158.6	65.8	
Internal Link Dist (m)		433.3			136.3			1013.5			194.0	
Turn Bay Length (m)	17.1			98.4			23.5		30.0	102.4		
Base Capacity (vph)	236	810		204	425	650	208	824	449	427	1574	
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	0.72	0.75		0.92	0.90	0.65	0.11	0.96	0.73	0.97	0.30	

Intersection Summary

Area Type: CBD
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 120
Control Type: Pretimed
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 59.4 Intersection LOS: E
Intersection Capacity Utilization 101.5% ICU Level of Service G
Analysis Period (min) 15
Description: TMC Oct 19/16
Updated Sept 23/20
Phase 1 minimum timing error due to 2 second COMM delay
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 96: GARDEN ST & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	4	286	10	2	26	159	831	21	12	551	171
Future Volume (vph)	223	4	286	10	2	26	159	831	21	12	551	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	34.4		0.0	33.8		0.0	51.6		0.0	79.3		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	20.4			18.0			30.4			24.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00	0.98		1.00	0.98			1.00		1.00		0.97
Frt		0.853			0.861			0.995				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1474	1259	0	1606	1279	0	1501	3047	0	1606	3031	1307
Flt Permitted	0.412			0.554			0.293			0.317		
Satd. Flow (perm)	637	1259	0	934	1279	0	463	3047	0	535	3031	1266
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		336			52			4				267
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		467.7			161.7			218.0			150.1	
Travel Time (s)		42.1			14.6			19.6			13.5	
Confl. Peds. (#/hr)	2		2	2		2	3		2	2		3
Peak Hour Factor	0.76	0.50	0.85	0.50	0.50	0.50	0.74	0.96	0.66	0.60	0.79	0.64
Heavy Vehicles (%)	9%	0%	13%	0%	0%	13%	7%	5%	0%	0%	6%	10%
Adj. Flow (vph)	293	8	336	20	4	52	215	866	32	20	697	267
Shared Lane Traffic (%)												
Lane Group Flow (vph)	293	344	0	20	56	0	215	898	0	20	697	267
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		8	8		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	4.0	8.0		8.0	8.0		4.0	20.0		20.0	20.0	20.0
Minimum Split (s)	10.0	28.0		28.0	28.0		10.0	27.0		27.0	27.0	27.0
Total Split (s)	37.0	65.0		28.0	28.0		28.0	85.0		57.0	57.0	57.0
Total Split (%)	24.7%	43.3%		18.7%	18.7%		18.7%	56.7%		38.0%	38.0%	38.0%
Maximum Green (s)	31.0	58.7		21.7	21.7		22.0	79.1		51.1	51.1	51.1
Yellow Time (s)	4.0	3.0		3.0	3.0		4.0	3.7		3.7	3.7	3.7
All-Red Time (s)	2.0	3.3		3.3	3.3		2.0	2.2		2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.3		6.3	6.3		6.0	5.9		5.9	5.9	5.9
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes						Yes					
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		C-Max	C-Max	C-Max
Walk Time (s)		15.0		15.0	15.0			15.0		15.0	15.0	15.0
Flash Dont Walk (s)		5.0		5.0	5.0			5.0		5.0	5.0	5.0
Pedestrian Calls (#/hr)		0		0	0			0		0	0	0
Act Effct Green (s)	42.8	42.5		9.6	9.6		95.2	95.3		75.4	75.4	75.4
Actuated g/C Ratio	0.29	0.28		0.06	0.06		0.63	0.64		0.50	0.50	0.50
v/c Ratio	0.84	0.58		0.34	0.43		0.55	0.46		0.07	0.46	0.35

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	41.8	4.9		81.6	28.3		8.5	9.4		25.6	27.6	4.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	41.8	4.9		81.6	28.3		8.5	9.4		25.6	27.6	4.2
LOS	D	A		F	C		A	A		C	C	A
Approach Delay		21.9			42.3			9.3			21.2	
Approach LOS		C			D			A			C	
90th %ile Green (s)	31.0	50.0		13.0	13.0		20.2	87.8		61.6	61.6	61.6
90th %ile Term Code	Max	Hold		Gap	Gap		Gap	Coord		Coord	Coord	Coord
70th %ile Green (s)	31.0	47.5		10.5	10.5		16.3	90.3		68.0	68.0	68.0
70th %ile Term Code	Max	Hold		Gap	Gap		Gap	Coord		Coord	Coord	Coord
50th %ile Green (s)	31.0	45.6		8.6	8.6		13.8	92.2		72.4	72.4	72.4
50th %ile Term Code	Max	Hold		Gap	Gap		Gap	Coord		Coord	Coord	Coord
30th %ile Green (s)	31.0	45.0		8.0	8.0		11.8	92.8		75.0	75.0	75.0
30th %ile Term Code	Max	Hold		Min	Min		Gap	Coord		Coord	Coord	Coord
10th %ile Green (s)	24.7	24.4		0.0	0.0		7.4	113.4		100.0	100.0	100.0
10th %ile Term Code	Gap	Hold		Skip	Skip		Gap	Coord		Coord	Coord	Coord
Queue Length 50th (m)	50.0	8.8		5.4	1.1		15.1	88.3		2.9	66.3	0.0
Queue Length 95th (m)	58.2	1.3		7.4	1.5		m22.1	m105.3		5.8	79.5	0.0
Internal Link Dist (m)		443.7			137.7			194.0			126.1	
Turn Bay Length (m)	34.4			33.8			51.6			79.3		
Base Capacity (vph)	359	697		135	229		445	1937		268	1523	769
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.82	0.49		0.15	0.24		0.48	0.46		0.07	0.46	0.35

Intersection Summary

Area Type: CBD
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 17.2 Intersection LOS: B
Intersection Capacity Utilization 78.4% ICU Level of Service D
Analysis Period (min) 15
Description: TMC Nov 27/19
Updated Sept 17/20
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 139: GARDEN ST & MARY ST E/MARY ST

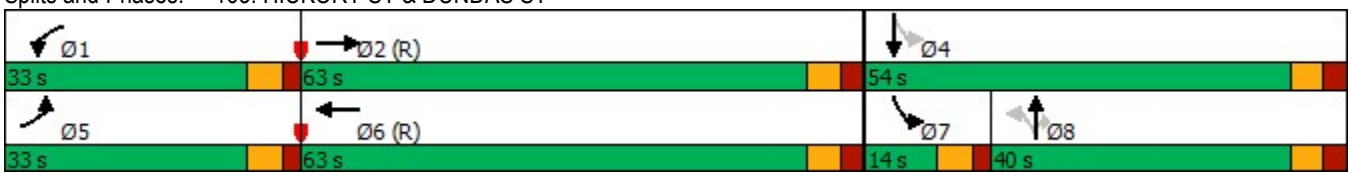
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	470	6	162	351	110	6	39	210	112	18	1
Future Volume (vph)	84	470	6	162	351	110	6	39	210	112	18	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	80.0		0.0	0.0		20.0	0.0		0.0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (m)	0.0			0.0			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98	1.00		0.96	0.98			0.99	0.96		0.98	
Frt		0.995			0.946				0.850		0.999	
Flt Protected	0.950			0.950				0.993			0.960	
Satd. Flow (prot)	1606	1529	0	1422	1426	0	0	1312	1356	0	1493	0
Flt Permitted	0.950			0.950				0.944			0.710	
Satd. Flow (perm)	1579	1529	0	1368	1426	0	0	1240	1307	0	1087	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			22				362			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		375.6			457.3			241.7			181.4	
Travel Time (s)		27.0			32.9			17.4			13.1	
Confl. Peds. (#/hr)	10		19	19		10	13		11	11		13
Peak Hour Factor	0.46	0.91	0.38	0.72	0.87	0.48	0.54	0.63	0.58	0.64	0.56	0.58
Heavy Vehicles (%)	0%	10%	0%	13%	9%	11%	0%	33%	6%	6%	22%	14%
Adj. Flow (vph)	183	516	16	225	403	229	11	62	362	175	32	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	183	532	0	225	632	0	0	73	362	0	209	0
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases							8		8	4		
Detector Phase	5	2		1	6		8	8	8	7	4	
Switch Phase												
Minimum Initial (s)	4.0	20.0		4.0	20.0		8.0	8.0	8.0	4.0	8.0	
Minimum Split (s)	10.0	28.0		10.0	28.0		26.5	26.5	26.5	10.0	26.5	
Total Split (s)	33.0	63.0		33.0	63.0		40.0	40.0	40.0	14.0	54.0	
Total Split (%)	22.0%	42.0%		22.0%	42.0%		26.7%	26.7%	26.7%	9.3%	36.0%	
Maximum Green (s)	27.0	56.5		27.0	56.5		33.5	33.5	33.5	8.0	47.5	
Yellow Time (s)	4.0	3.7		4.0	3.7		3.7	3.7	3.7	4.0	3.7	
All-Red Time (s)	2.0	2.8		2.0	2.8		2.8	2.8	2.8	2.0	2.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	6.0	6.5		6.0	6.5			6.5	6.5		6.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes			Yes						Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None	None	None	None	
Walk Time (s)		7.0			7.0		7.0	7.0	7.0		7.0	
Flash Dont Walk (s)		11.0			11.0		13.0	13.0	13.0		13.0	
Pedestrian Calls (#/hr)		0			0		0	0	0		0	
Act Effct Green (s)	21.7	65.6		27.3	71.3			38.1	38.1		38.1	
Actuated g/C Ratio	0.14	0.44		0.18	0.48			0.25	0.25		0.25	
v/c Ratio	0.79	0.80		0.87	0.92			0.23	0.60		0.76	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	84.0	50.5		92.8	51.8			42.7	9.8		53.4	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	84.0	50.5		92.8	51.8			42.7	9.8		53.4	
LOS	F	D		F	D			D	A		D	
Approach Delay		59.1			62.5			15.3			53.4	
Approach LOS		E			E			B			D	
90th %ile Green (s)	27.0	56.5		27.0	56.5		47.5	47.5	47.5	0.0	47.5	
90th %ile Term Code	Max	Coord		Max	Coord		Hold	Hold	Hold	Skip	Max	
70th %ile Green (s)	25.4	56.5		29.5	60.6		45.0	45.0	45.0	0.0	45.0	
70th %ile Term Code	Gap	Coord		Max	Coord		Hold	Hold	Hold	Skip	Gap	
50th %ile Green (s)	22.3	60.4		31.1	69.2		39.5	39.5	39.5	0.0	39.5	
50th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Skip	Gap	
30th %ile Green (s)	19.1	70.2		27.2	78.3		33.6	33.6	33.6	0.0	33.6	
30th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Skip	Gap	
10th %ile Green (s)	14.5	84.6		21.6	91.7		24.8	24.8	24.8	0.0	24.8	
10th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Skip	Gap	
Queue Length 50th (m)	49.0	133.4		62.2	107.4			13.0	11.6		57.8	
Queue Length 95th (m)	33.4	#203.3		70.8 m	#241.5			14.4	2.7		43.1	
Internal Link Dist (m)		351.6			433.3			217.7			157.4	
Turn Bay Length (m)	30.0			80.0					20.0			
Base Capacity (vph)	289	669		268	688			329	612		344	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.63	0.80		0.84	0.92			0.22	0.59		0.61	

Intersection Summary

Area Type: CBD
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.92
Intersection Signal Delay: 51.3 Intersection LOS: D
Intersection Capacity Utilization 71.1% ICU Level of Service C
Analysis Period (min) 15
Description: TMC June 26/19
Updated Sept 28/20
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 163: HICKORY ST & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	452	119	15	297	31	111	82	35	25	1	30
Future Volume (vph)	55	452	119	15	297	31	111	82	35	25	1	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	22.3		0.0	18.9		0.0	16.3		0.0	25.4		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.967			0.985			0.947			0.857	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1580	1662	0	1668	1661	0	1716	1743	0	1785	1492	0
Flt Permitted	0.532			0.304			0.551			0.669		
Satd. Flow (perm)	885	1662	0	534	1661	0	995	1743	0	1257	1492	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			9			17			60	
Link Speed (k/h)		40			50			48			48	
Link Distance (m)		360.6			467.7			35.4			173.4	
Travel Time (s)		32.5			33.7			2.7			13.0	
Peak Hour Factor	0.63	0.81	0.75	0.94	0.96	0.91	0.79	0.92	0.73	0.69	0.40	0.50
Heavy Vehicles (%)	13%	10%	7%	7%	12%	6%	4%	0%	6%	0%	6%	8%
Adj. Flow (vph)	87	558	159	16	309	34	141	89	48	36	3	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	717	0	16	343	0	141	137	0	36	63	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			2		3	8			4	
Permitted Phases	2			2			8			4		
Minimum Split (s)	26.3	26.3		26.3	26.3		10.0	25.9		25.9	25.9	
Total Split (s)	111.0	111.0		111.0	111.0		13.0	39.0		26.0	26.0	
Total Split (%)	74.0%	74.0%		74.0%	74.0%		8.7%	26.0%		17.3%	17.3%	
Maximum Green (s)	104.7	104.7		104.7	104.7		7.0	33.1		20.1	20.1	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	3.7		3.7	3.7	
All-Red Time (s)	3.3	3.3		3.3	3.3		2.0	2.2		2.2	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		6.0	5.9		5.9	5.9	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Walk Time (s)	15.0	15.0		15.0	15.0			15.0		15.0	15.0	
Flash Dont Walk (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Pedestrian Calls (#/hr)	0	0		0	0			0		0	0	
Act Effct Green (s)	104.7	104.7		104.7	104.7		33.0	33.1		20.1	20.1	
Actuated g/C Ratio	0.70	0.70		0.70	0.70		0.22	0.22		0.13	0.13	
v/c Ratio	0.14	0.61		0.04	0.30		0.56	0.35		0.21	0.25	
Control Delay	16.7	32.8		3.9	6.6		57.2	45.6		61.7	16.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.7	32.8		3.9	6.6		57.2	45.6		61.7	16.9	
LOS	B	C		A	A		E	D		E	B	
Approach Delay		31.0			6.5			51.5			33.2	
Approach LOS		C			A			D			C	
Queue Length 50th (m)	14.9	178.7		0.9	40.5		25.3	20.7		8.9	0.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	m14.7	m169.2		m1.3	23.6		m40.7	m38.8		14.6	0.0	
Internal Link Dist (m)		336.6			443.7			11.4			149.4	
Turn Bay Length (m)	22.3			18.9			16.3			25.4		
Base Capacity (vph)	617	1167		372	1162		252	397		168	251	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.14	0.61		0.04	0.30		0.56	0.35		0.21	0.25	

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green
Natural Cycle: 80
Control Type: Pretimed
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 29.1 Intersection LOS: C
Intersection Capacity Utilization 69.8% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 656: HICKORY ST & MARY ST E

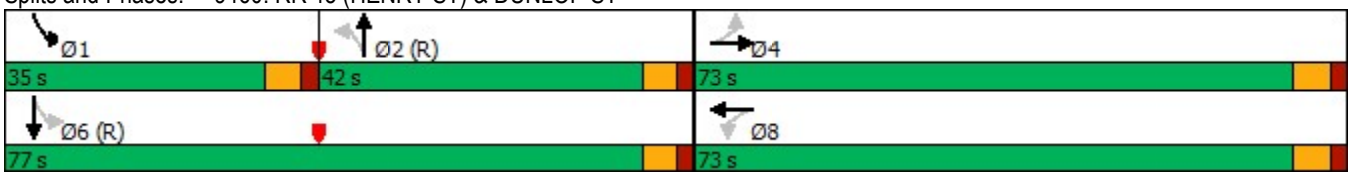
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	321	13	71	193	89	25	1	164	166	241	14
Future Volume (vph)	27	321	13	71	193	89	25	1	164	166	241	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	35.0		0.0	16.0		0.0	16.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.950			0.851			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1785	1869	0	1785	1750	0	1653	1599	0	1785	1846	0
Flt Permitted	0.441			0.346			0.581			0.384		
Satd. Flow (perm)	829	1869	0	650	1750	0	1011	1599	0	721	1846	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			22			219			3	
Link Speed (k/h)		48			50			50			50	
Link Distance (m)		418.0			407.9			725.2			227.2	
Travel Time (s)		31.4			29.4			52.2			16.4	
Peak Hour Factor	0.75	0.75	0.81	0.63	0.84	0.77	0.63	0.89	0.75	0.70	0.87	0.88
Heavy Vehicles (%)	0%	0%	0%	0%	1%	4%	8%	1%	0%	0%	1%	0%
Adj. Flow (vph)	36	428	16	113	230	116	40	1	219	237	277	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	36	444	0	113	346	0	40	220	0	237	293	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	24.2	24.2		24.2	24.2		25.7	25.7		14.0	25.7	
Total Split (s)	73.0	73.0		73.0	73.0		42.0	42.0		35.0	77.0	
Total Split (%)	48.7%	48.7%		48.7%	48.7%		28.0%	28.0%		23.3%	51.3%	
Maximum Green (s)	66.8	66.8		66.8	66.8		36.3	36.3		29.0	71.3	
Yellow Time (s)	4.2	4.2		4.2	4.2		3.7	3.7		4.0	3.7	
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		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.2	6.2		6.2	6.2		5.7	5.7		6.0	5.7	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		9.0	9.0			9.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	
Act Effct Green (s)	66.8	66.8		66.8	66.8		36.3	36.3		71.0	71.3	
Actuated g/C Ratio	0.45	0.45		0.45	0.45		0.24	0.24		0.47	0.48	
v/c Ratio	0.10	0.53		0.39	0.44		0.16	0.40		0.43	0.33	
Control Delay	19.4	26.2		32.1	27.8		47.2	7.7		19.5	18.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.4	26.2		32.1	27.8		47.2	7.7		19.5	18.2	
LOS	B	C		C	C		D	A		B	B	
Approach Delay		25.7			28.9			13.8			18.8	
Approach LOS		C			C			B			B	
Queue Length 50th (m)	5.2	82.1		16.9	49.0		8.7	0.2		32.2	39.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	9.4	92.3		m19.7	m63.4		12.6	18.6		39.1	57.7	
Internal Link Dist (m)		394.0			383.9			701.2			203.2	
Turn Bay Length (m)	35.0			35.0			16.0			16.0		
Base Capacity (vph)	369	833		289	791		244	552		546	879	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.10	0.53		0.39	0.44		0.16	0.40		0.43	0.33	

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Pretimed
Maximum v/c Ratio: 0.53
Intersection Signal Delay: 22.6 Intersection LOS: C
Intersection Capacity Utilization 77.5% ICU Level of Service D
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9460: RR 45 (HENRY ST) & DUNLOP ST



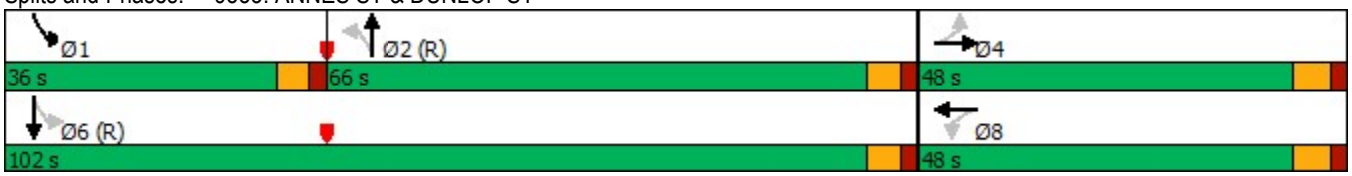
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	101	12	33	62	110	7	222	65	176	373	55
Future Volume (vph)	26	101	12	33	62	110	7	222	65	176	373	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	35.0		0.0	16.0		0.0	16.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982			0.899			0.964			0.976	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1785	1845	0	1785	1678	0	1785	1784	0	1750	1803	0
Flt Permitted	0.488			0.635			0.478			0.395		
Satd. Flow (perm)	917	1845	0	1193	1678	0	898	1784	0	728	1803	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			69			13			13	
Link Speed (k/h)		48			48			48			50	
Link Distance (m)		208.7			418.0			214.5			219.5	
Travel Time (s)		15.7			31.4			16.1			15.8	
Peak Hour Factor	0.81	0.87	0.75	0.75	0.86	0.74	0.58	0.90	0.83	0.77	0.88	0.69
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	2%	0%	2%	2%	0%
Adj. Flow (vph)	32	116	16	44	72	149	12	247	78	229	424	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	132	0	44	221	0	12	325	0	229	504	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	24.2	24.2		24.2	24.2		26.0	26.0		26.0	22.0	
Total Split (s)	48.0	48.0		48.0	48.0		66.0	66.0		36.0	102.0	
Total Split (%)	32.0%	32.0%		32.0%	32.0%		44.0%	44.0%		24.0%	68.0%	
Maximum Green (s)	41.8	41.8		41.8	41.8		60.3	60.3		30.3	96.3	
Yellow Time (s)	4.2	4.2		4.2	4.2		3.7	3.7		3.7	3.7	
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		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.2	6.2		6.2	6.2		5.7	5.7		5.7	5.7	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		9.0	9.0			9.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	
Act Effct Green (s)	41.8	41.8		41.8	41.8		60.3	60.3		96.3	96.3	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.40	0.40		0.64	0.64	
v/c Ratio	0.13	0.26		0.13	0.43		0.03	0.45		0.34	0.43	
Control Delay	42.3	42.0		36.4	26.1		27.7	33.7		12.9	13.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.9	
Total Delay	42.3	42.0		36.4	26.1		27.7	33.7		12.9	14.5	
LOS	D	D		D	C		C	C		B	B	
Approach Delay		42.0			27.8			33.5			14.0	
Approach LOS		D			C			C			B	
Queue Length 50th (m)	6.6	27.1		6.8	20.9		2.0	61.9		20.7	47.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	13.5	42.4		10.7	29.0		3.8	87.4		m25.7	m59.2	
Internal Link Dist (m)		184.7			394.0			190.5			195.5	
Turn Bay Length (m)	35.0			35.0			16.0			16.0		
Base Capacity (vph)	255	517		332	517		360	724		673	1162	
Starvation Cap Reductn	0	0		0	0		0	0		0	379	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.13	0.26		0.13	0.43		0.03	0.45		0.34	0.64	

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Pretimed
Maximum v/c Ratio: 0.45
Intersection Signal Delay: 23.9 Intersection LOS: C
Intersection Capacity Utilization 75.9% ICU Level of Service D
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9553: ANNES ST & DUNLOP ST



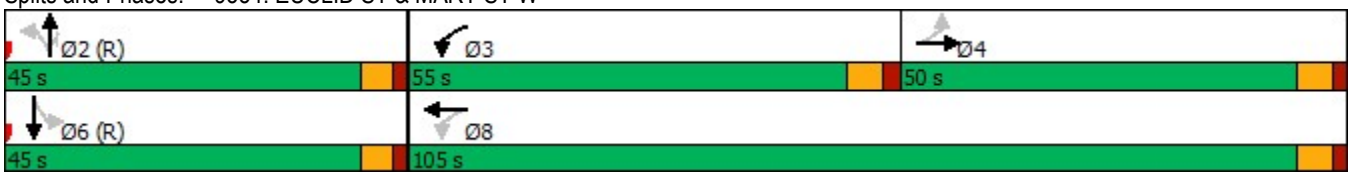
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	254	7	361	180	52	7	160	373	81	14	1
Future Volume (vph)	2	254	7	361	180	52	7	160	373	81	14	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	22.3		0.0	18.9		0.0	16.3		20.0	25.4		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.953				0.850		0.973	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1785	1869	0	1785	1791	0	1785	1879	1597	1785	1828	0
Flt Permitted	0.569			0.256			0.743			0.509		
Satd. Flow (perm)	1069	1869	0	481	1791	0	1396	1879	1597	956	1828	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			32				256		4	
Link Speed (k/h)		48			50			50			48	
Link Distance (m)		208.2			409.8			234.4			259.5	
Travel Time (s)		15.6			29.5			16.9			19.5	
Peak Hour Factor	0.25	0.73	0.58	0.75	0.83	0.53	0.88	0.83	0.95	0.90	0.80	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	8	348	12	481	217	98	8	193	393	90	18	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	8	360	0	481	315	0	8	193	393	90	22	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Minimum Split (s)	24.8	24.8		10.0	24.8		26.3	26.3	26.3	26.3	26.3	
Total Split (s)	50.0	50.0		55.0	105.0		45.0	45.0	45.0	45.0	45.0	
Total Split (%)	33.3%	33.3%		36.7%	70.0%		30.0%	30.0%	30.0%	30.0%	30.0%	
Maximum Green (s)	44.2	44.2		49.0	99.2		39.7	39.7	39.7	39.7	39.7	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	1.8	1.8		2.0	1.8		1.6	1.6	1.6	1.6	1.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.8	5.8		6.0	5.8		5.3	5.3	5.3	5.3	5.3	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Walk Time (s)	7.0	7.0			7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	12.0	12.0			12.0		14.0	14.0	14.0	14.0	14.0	
Pedestrian Calls (#/hr)	0	0			0		0	0	0	0	0	
Act Effct Green (s)	44.2	44.2		99.0	99.2		39.7	39.7	39.7	39.7	39.7	
Actuated g/C Ratio	0.29	0.29		0.66	0.66		0.26	0.26	0.26	0.26	0.26	
v/c Ratio	0.03	0.65		0.65	0.26		0.02	0.39	0.64	0.36	0.05	
Control Delay	38.0	52.7		34.3	16.8		46.4	55.4	40.8	49.7	35.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	38.0	52.7		34.3	16.8		46.4	55.4	40.8	49.7	35.9	
LOS	D	D		C	B		D	E	D	D	D	
Approach Delay		52.3			27.4			45.6			47.0	
Approach LOS		D			C			D			D	
Queue Length 50th (m)	1.6	86.3		91.8	39.8		2.1	55.1	71.4	20.2	3.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	1.6	90.5		m97.0	m49.9		m3.1	73.4	99.7	35.8	9.1	
Internal Link Dist (m)		184.2			385.8			210.4			235.5	
Turn Bay Length (m)	22.3			18.9			16.3		20.0	25.4		
Base Capacity (vph)	314	551		743	1195		369	497	610	253	486	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.03	0.65		0.65	0.26		0.02	0.39	0.64	0.36	0.05	

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Pretimed
Maximum v/c Ratio: 0.65
Intersection Signal Delay: 39.3 Intersection LOS: D
Intersection Capacity Utilization 85.6% ICU Level of Service E
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9554: EUCLID ST & MARY ST W



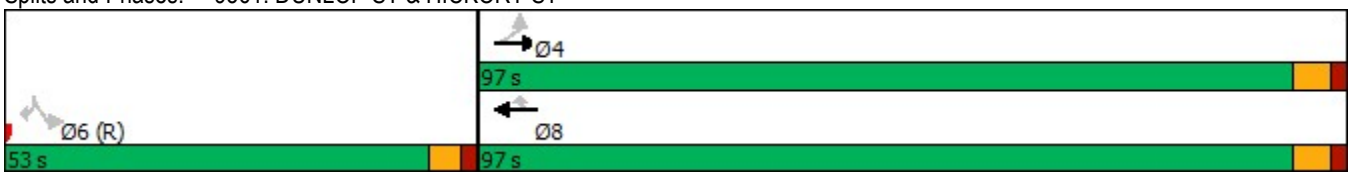
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	239	221	110	9	47	141
Future Volume (vph)	239	221	110	9	47	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0			35.0	16.0	16.0
Storage Lanes	1			1	1	0
Taper Length (m)	25.0				25.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1785	1879	1824	1597	1785	1566
Flt Permitted	0.680				0.950	
Satd. Flow (perm)	1278	1879	1824	1597	1785	1566
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				10		153
Link Speed (k/h)		50	48		50	
Link Distance (m)		373.1	229.4		241.7	
Travel Time (s)		26.9	17.2		17.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	3%	0%	0%	2%
Adj. Flow (vph)	260	240	120	10	51	153
Shared Lane Traffic (%)						
Lane Group Flow (vph)	260	240	120	10	51	153
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			
Permitted Phases	4			8	6	6
Minimum Split (s)	24.2	24.2	24.2	24.2	25.7	25.7
Total Split (s)	97.0	97.0	97.0	97.0	53.0	53.0
Total Split (%)	64.7%	64.7%	64.7%	64.7%	35.3%	35.3%
Maximum Green (s)	90.8	90.8	90.8	90.8	47.3	47.3
Yellow Time (s)	4.2	4.2	4.2	4.2	3.7	3.7
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	5.7	5.7
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	9.0	9.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	90.8	90.8	90.8	90.8	47.3	47.3
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.32	0.32
v/c Ratio	0.34	0.21	0.11	0.01	0.09	0.26
Control Delay	18.1	16.6	12.8	5.6	17.7	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.1	16.6	12.8	5.6	17.7	10.7
LOS	B	B	B	A	B	B
Approach Delay		17.4	12.3		12.4	
Approach LOS		B	B		B	
Queue Length 50th (m)	31.5	28.2	13.3	0.0	13.2	29.5

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 95th (m)	m39.1	m35.3	21.5	2.3	m9.8	m26.0
Internal Link Dist (m)		349.1	205.4		217.7	
Turn Bay Length (m)	35.0			35.0	16.0	16.0
Base Capacity (vph)	773	1137	1104	970	562	598
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.21	0.11	0.01	0.09	0.26

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green
Natural Cycle: 50
Control Type: Pretimed
Maximum v/c Ratio: 0.34
Intersection Signal Delay: 15.4 Intersection LOS: B
Intersection Capacity Utilization 46.5% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9561: DUNLOP ST & HICKORY ST



Lanes, Volumes, Timings
90: BROCK ST N & MARY ST W/MARY ST E

12/17/2020

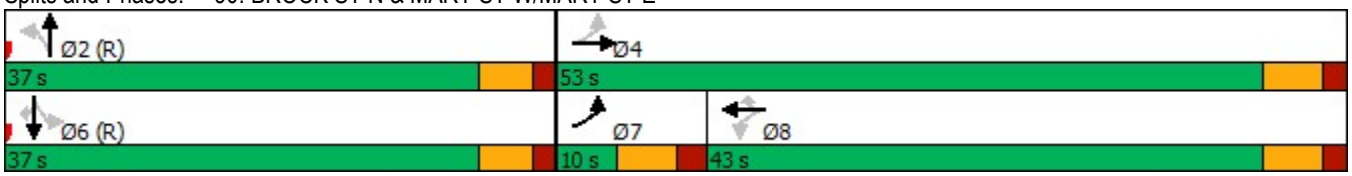
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	237	12	39	329	173	40	367	16	53	451	426
Future Volume (vph)	95	237	12	39	329	173	40	367	16	53	451	426
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	22.3		0.0	18.9		25.0	16.3		0.0	25.4		0.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	23.1			28.7			29.3			34.6		
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	1.00		1.00		0.96	1.00	1.00		0.99		0.97
Frt		0.988				0.850		0.991				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1434	1471	0	1422	1580	1331	1306	1427	0	1447	1523	1319
Flt Permitted	0.225			0.554			0.307			0.326		
Satd. Flow (perm)	338	1471	0	825	1580	1283	420	1427	0	493	1523	1276
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				176		4				325
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		414.4			360.2			133.8			82.0	
Travel Time (s)		29.8			25.9			9.6			5.9	
Confl. Peds. (#/hr)	7		3	3		7	6		10	10		6
Peak Hour Factor	0.84	0.75	0.43	0.81	0.71	0.66	0.71	0.83	0.57	0.74	0.92	0.85
Heavy Vehicles (%)	12%	13%	17%	13%	7%	8%	23%	17%	19%	11%	11%	9%
Adj. Flow (vph)	113	316	28	48	463	262	56	442	28	72	490	501
Shared Lane Traffic (%)												
Lane Group Flow (vph)	113	344	0	48	463	262	56	470	0	72	490	501
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Detector Phase	7	4		8	8	8	2	2		6	6	6
Switch Phase												
Minimum Initial (s)	4.0	8.0		8.0	8.0	8.0	20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	10.0	26.0		26.0	26.0	26.0	28.0	28.0		28.0	28.0	28.0
Total Split (s)	10.0	53.0		43.0	43.0	43.0	37.0	37.0		37.0	37.0	37.0
Total Split (%)	11.1%	58.9%		47.8%	47.8%	47.8%	41.1%	41.1%		41.1%	41.1%	41.1%
Maximum Green (s)	4.0	47.2		37.2	37.2	37.2	31.7	31.7		31.7	31.7	31.7
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.7	3.7		3.7	3.7	3.7
All-Red Time (s)	2.0	1.8		1.8	1.8	1.8	1.6	1.6		1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	5.8		5.8	5.8	5.8	5.3	5.3		5.3	5.3	5.3
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes											
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)		7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)		12.0		12.0	12.0	12.0	14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0		0	0	0
Act Effct Green (s)	39.2	39.4		31.4	31.4	31.4	39.5	39.5		39.5	39.5	39.5
Actuated g/C Ratio	0.44	0.44		0.35	0.35	0.35	0.44	0.44		0.44	0.44	0.44
v/c Ratio	0.58	0.53		0.17	0.84	0.47	0.30	0.75		0.33	0.73	0.68

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	29.1	22.6		19.1	40.2	9.9	26.7	33.6		26.5	32.4	13.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	29.1	22.6		19.1	40.2	9.9	26.7	33.6		26.5	32.4	13.8
LOS	C	C		B	D	A	C	C		C	C	B
Approach Delay		24.2			28.6			32.9			23.2	
Approach LOS		C			C			C			C	
90th %ile Green (s)	4.0	47.2		37.2	37.2	37.2	31.7	31.7		31.7	31.7	31.7
90th %ile Term Code	Max	Hold		Max	Max	Max	Coord	Coord		Coord	Coord	Coord
70th %ile Green (s)	4.0	46.4		36.4	36.4	36.4	32.5	32.5		32.5	32.5	32.5
70th %ile Term Code	Max	Hold		Gap	Gap	Gap	Coord	Coord		Coord	Coord	Coord
50th %ile Green (s)	4.0	42.6		32.6	32.6	32.6	36.3	36.3		36.3	36.3	36.3
50th %ile Term Code	Max	Hold		Gap	Gap	Gap	Coord	Coord		Coord	Coord	Coord
30th %ile Green (s)	4.0	38.8		28.8	28.8	28.8	40.1	40.1		40.1	40.1	40.1
30th %ile Term Code	Max	Hold		Gap	Gap	Gap	Coord	Coord		Coord	Coord	Coord
10th %ile Green (s)	0.0	22.2		22.2	22.2	22.2	56.7	56.7		56.7	56.7	56.7
10th %ile Term Code	Skip	Hold		Gap	Gap	Gap	Coord	Coord		Coord	Coord	Coord
Queue Length 50th (m)	12.8	45.7		6.0	74.3	8.9	6.0	64.4		7.8	67.0	20.7
Queue Length 95th (m)	23.4	59.2		m10.7	68.6	13.3	12.5	#109.0		15.8	#127.1	52.2
Internal Link Dist (m)		390.4			336.2			109.8			58.0	
Turn Bay Length (m)	22.3			18.9		25.0	16.3			25.4		
Base Capacity (vph)	196	774		341	653	633	184	627		216	667	741
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	0.58	0.44		0.14	0.71	0.41	0.30	0.75		0.33	0.73	0.68

Intersection Summary

Area Type: CBD
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 26.7 Intersection LOS: C
Intersection Capacity Utilization 86.8% ICU Level of Service E
Analysis Period (min) 15
Description: TMC Sep 26/19
Updated Sept 17/20
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 90: BROCK ST N & MARY ST W/MARY ST E



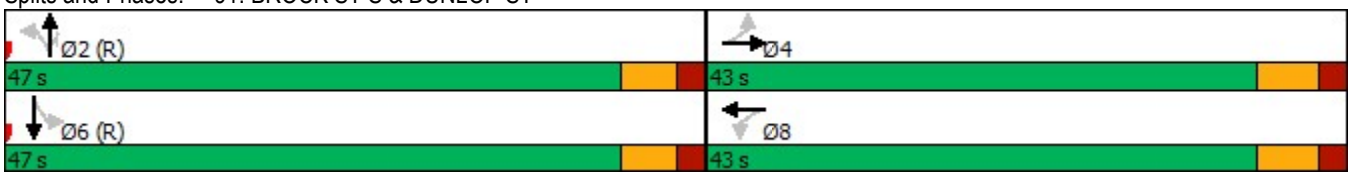
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	241	132	43	186	16	6	382	107	0	572	29
Future Volume (vph)	18	241	132	43	186	16	6	382	107	0	572	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	35.1		0.0	16.0		0.0	16.1		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	25.0			21.2			15.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.96	0.98		0.99	0.99				0.90		0.99	
Frt		0.951			0.983				0.850		0.990	
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1516	1567	0	1606	1584	0	1606	1595	1409	1691	1599	0
Flt Permitted	0.547			0.214			0.187					
Satd. Flow (perm)	841	1567	0	357	1584	0	316	1595	1268	1691	1599	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33			8				143		5	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		405.1			375.4			117.4			239.3	
Travel Time (s)		29.2			27.0			8.5			17.2	
Confl. Peds. (#/hr)	22		31	31		22	31		29	29		31
Peak Hour Factor	0.64	0.67	0.76	0.71	0.83	0.57	0.50	0.78	0.75	0.25	0.86	0.60
Heavy Vehicles (%)	6%	1%	0%	0%	3%	13%	0%	6%	2%	0%	4%	3%
Adj. Flow (vph)	28	360	174	61	224	28	12	490	143	0	665	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	534	0	61	252	0	12	490	143	0	713	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		20.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		26.0	26.0	26.0	26.0	26.0	
Total Split (s)	43.0	43.0		43.0	43.0		47.0	47.0	47.0	47.0	47.0	
Total Split (%)	47.8%	47.8%		47.8%	47.8%		52.2%	52.2%	52.2%	52.2%	52.2%	
Maximum Green (s)	36.8	36.8		36.8	36.8		41.3	41.3	41.3	41.3	41.3	
Yellow Time (s)	4.2	4.2		4.2	4.2		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2		6.2	6.2		5.7	5.7	5.7	5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		9.0	9.0	9.0	9.0	9.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	33.0	33.0		33.0	33.0		45.1	45.1	45.1		45.1	
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.50	0.50	0.50		0.50	
v/c Ratio	0.09	0.90		0.47	0.43		0.08	0.61	0.20		0.89	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	16.5	42.8		33.1	22.2		15.3	21.5	3.4		37.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	1.5	0.0		0.0	
Total Delay	16.5	42.8		33.1	22.2		15.3	23.0	3.4		37.1	
LOS	B	D		C	C		B	C	A		D	
Approach Delay		41.5			24.3			18.5			37.1	
Approach LOS		D			C			B			D	
90th %ile Green (s)	36.8	36.8		36.8	36.8		41.3	41.3	41.3	41.3	41.3	
90th %ile Term Code	Max	Max		Hold	Hold		Coord	Coord	Coord	Coord	Coord	
70th %ile Green (s)	36.8	36.8		36.8	36.8		41.3	41.3	41.3	41.3	41.3	
70th %ile Term Code	Max	Max		Hold	Hold		Coord	Coord	Coord	Coord	Coord	
50th %ile Green (s)	35.2	35.2		35.2	35.2		42.9	42.9	42.9	42.9	42.9	
50th %ile Term Code	Gap	Gap		Hold	Hold		Coord	Coord	Coord	Coord	Coord	
30th %ile Green (s)	31.3	31.3		31.3	31.3		46.8	46.8	46.8	46.8	46.8	
30th %ile Term Code	Gap	Gap		Hold	Hold		Coord	Coord	Coord	Coord	Coord	
10th %ile Green (s)	25.0	25.0		25.0	25.0		53.1	53.1	53.1	53.1	53.1	
10th %ile Term Code	Gap	Gap		Hold	Hold		Coord	Coord	Coord	Coord	Coord	
Queue Length 50th (m)	3.0	78.3		7.7	30.6		1.0	56.6	0.0		102.1	
Queue Length 95th (m)	5.4	70.0		11.4	36.0		2.2	72.1	4.9		#162.3	
Internal Link Dist (m)		381.1			351.4			93.4			215.3	
Turn Bay Length (m)	35.0			35.1			16.0					
Base Capacity (vph)	343	660		145	652		158	798	706		803	
Starvation Cap Reductn	0	0		0	0		0	152	0		0	
Spillback Cap Reductn	0	0		0	0		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.08	0.81		0.42	0.39		0.08	0.76	0.20		0.89	

Intersection Summary

Area Type: CBD
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 49.6 (55%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 31.1 Intersection LOS: C
Intersection Capacity Utilization 81.3% ICU Level of Service D
Analysis Period (min) 15
Description: TMC Oct 4/18
Updated Sept 17/20
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 91: BROCK ST S & DUNLOP ST



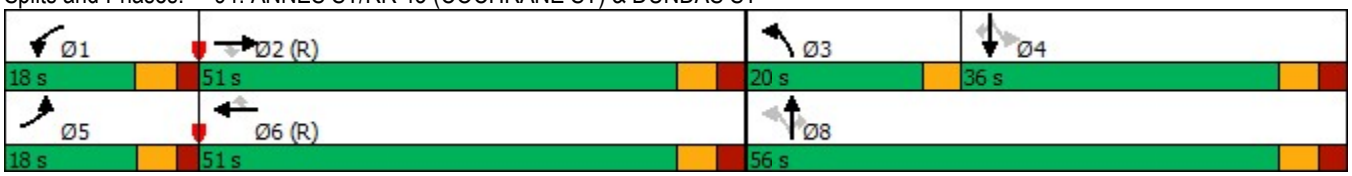
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	376	291	13	893	40	215	114	14	61	239	310
Future Volume (vph)	118	376	291	13	893	40	215	114	14	61	239	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	44.5		40.0	0.0		157.1	23.4		14.6	35.0		0.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	31.3			29.4			40.9			25.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.97	0.99		0.96	1.00		0.98	0.99		0.99
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1545	3031	1437	1361	3150	1331	1560	1626	1261	1591	1642	1437
Flt Permitted	0.950			0.950			0.315			0.671		
Satd. Flow (perm)	1538	3031	1390	1351	3150	1283	517	1626	1233	1114	1642	1418
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			355			115			83			238
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		281.1			304.8			225.7			1140.1	
Travel Time (s)		20.2			21.9			16.3			82.1	
Confl. Peds. (#/hr)	5		4	4		5	1		6	6		1
Peak Hour Factor	0.82	0.89	0.82	0.69	0.89	0.75	0.66	0.85	0.58	0.74	0.75	0.80
Heavy Vehicles (%)	4%	6%	0%	18%	2%	8%	3%	4%	14%	1%	3%	0%
Adj. Flow (vph)	144	422	355	19	1003	53	326	134	24	82	319	388
Shared Lane Traffic (%)												
Lane Group Flow (vph)	144	422	355	19	1003	53	326	134	24	82	319	388
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases			2			6	8		8	4		4
Minimum Split (s)	7.0	29.0	29.0	10.0	29.0	29.0	5.0	30.0	30.0	30.0	30.0	30.0
Total Split (s)	18.0	51.0	51.0	18.0	51.0	51.0	20.0	56.0	56.0	36.0	36.0	36.0
Total Split (%)	14.4%	40.8%	40.8%	14.4%	40.8%	40.8%	16.0%	44.8%	44.8%	28.8%	28.8%	28.8%
Maximum Green (s)	12.3	44.5	44.5	12.0	44.5	44.5	16.3	49.5	49.5	29.5	29.5	29.5
Yellow Time (s)	3.7	3.7	3.7	4.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	2.8	2.8	2.0	2.8	2.8	0.0	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	-3.0	0.0	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	2.7	6.5	6.5	6.0	6.5	6.5	0.7	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes			Yes					
Walk Time (s)		14.0	14.0		14.0	14.0		17.0	17.0	17.0	17.0	17.0
Flash Dont Walk (s)		5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0	0	0	0
Act Effct Green (s)	15.3	44.5	44.5	12.0	44.5	44.5	55.3	49.5	49.5	29.5	29.5	29.5
Actuated g/C Ratio	0.12	0.36	0.36	0.10	0.36	0.36	0.44	0.40	0.40	0.24	0.24	0.24
v/c Ratio	0.76	0.39	0.49	0.15	0.89	0.10	0.84	0.21	0.04	0.31	0.82	0.75
Control Delay	78.5	31.5	5.4	53.0	48.5	1.3	45.5	26.0	0.1	43.4	63.8	26.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.5	31.5	5.4	53.0	48.5	1.3	45.5	26.0	0.1	43.4	63.8	26.9
LOS	E	C	A	D	D	A	D	C	A	D	E	C
Approach Delay		28.8			46.2			37.9			43.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			D			D			D	
Queue Length 50th (m)	32.0	37.3	0.0	4.2	97.9	0.0	51.1	19.7	0.0	15.4	69.0	32.1
Queue Length 95th (m)	#52.0	49.7	11.0	m7.7	#130.0	m0.2	49.9	31.0	0.0	23.4	79.7	50.1
Internal Link Dist (m)		257.1			280.8			201.7			1116.1	
Turn Bay Length (m)	44.5		40.0			157.1	23.4		14.6	35.0		
Base Capacity (vph)	189	1079	723	130	1121	530	389	643	538	262	387	516
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.39	0.49	0.15	0.89	0.10	0.84	0.21	0.04	0.31	0.82	0.75

Intersection Summary

Area Type: CBD
Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Pretimed
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 39.4 Intersection LOS: D
Intersection Capacity Utilization 83.8% ICU Level of Service E
Analysis Period (min) 15
Description: TMC Oct 24/17
Updated Sept 23/20
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 94: ANNES ST/RR 43 (COCHRANE ST) & DUNDAS ST



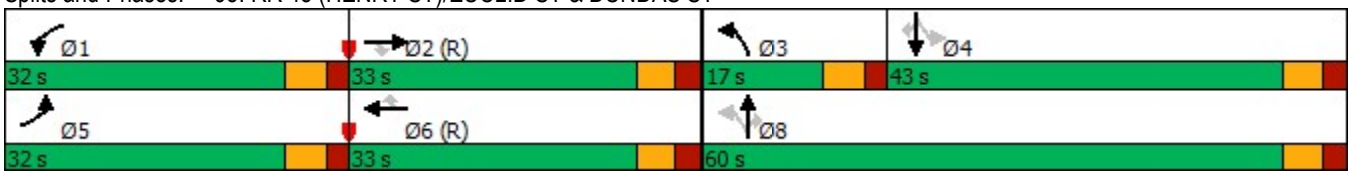
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	143	142	176	113	126	14	136	128	0	1	239	350
Future Volume (vph)	143	142	176	113	126	14	136	128	0	1	239	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	24.7		0.0	30.2		16.0	7.6		11.0	13.8		0.0
Storage Lanes	1		1	0		1	1		1	1		1
Taper Length (m)	32.9			38.5			41.4			24.7		
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	0.98		0.96	0.98		0.95	0.98			0.99		0.92
Frt			0.850			0.850						0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1575	1610	1382	1606	1642	1437	1560	1691	1691	1606	1691	1423
Flt Permitted	0.950			0.950			0.318			0.647		
Satd. Flow (perm)	1537	1610	1326	1580	1642	1367	510	1691	1691	1079	1691	1311
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			267			132						427
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		118.8			293.5			229.4			228.8	
Travel Time (s)		8.6			21.1			16.5			16.5	
Confl. Peds. (#/hr)	10		7	7		10	22		11	11		22
Peak Hour Factor	0.73	0.81	0.66	0.78	0.88	0.70	0.93	0.73	0.81	0.70	0.75	0.82
Heavy Vehicles (%)	2%	5%	4%	0%	3%	0%	3%	0%	0%	0%	0%	1%
Adj. Flow (vph)	196	175	267	145	143	20	146	175	0	1	319	427
Shared Lane Traffic (%)												
Lane Group Flow (vph)	196	175	267	145	143	20	146	175	0	1	319	427
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases			2			6	8		8	4		4
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	10.0	29.1	29.1	29.1	29.1	29.1
Total Split (s)	32.0	33.0	33.0	32.0	33.0	33.0	17.0	60.0	60.0	43.0	43.0	43.0
Total Split (%)	25.6%	26.4%	26.4%	25.6%	26.4%	26.4%	13.6%	48.0%	48.0%	34.4%	34.4%	34.4%
Maximum Green (s)	26.0	26.7	26.7	26.0	26.7	26.7	11.0	53.9	53.9	36.9	36.9	36.9
Yellow Time (s)	4.0	3.7	3.7	4.0	3.7	3.7	4.0	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	2.6	2.6	2.0	2.6	2.6	2.0	2.4	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.3	6.3	6.0	6.3	6.3	6.0	6.1	6.1	6.1	6.1	6.1
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes			Yes					
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		14.0	14.0		14.0	14.0		16.0	16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0	0	0	0
Act Effct Green (s)	26.0	26.7	26.7	26.0	26.7	26.7	54.0	53.9		36.9	36.9	36.9
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21	0.21	0.43	0.43		0.30	0.30	0.30
v/c Ratio	0.60	0.51	0.54	0.43	0.41	0.05	0.47	0.24		0.00	0.64	0.62
Control Delay	56.9	77.0	34.6	47.9	46.5	0.2	27.6	23.7		31.0	45.2	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	56.9	77.0	34.6	47.9	46.5	0.2	27.6	23.7		31.0	45.2	7.6
LOS	E	E	C	D	D	A	C	C		C	D	A
Approach Delay		53.1			44.1			25.5			23.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			C			C	
Queue Length 50th (m)	40.6	41.2	29.3	28.8	28.1	0.0	20.4	24.7		0.2	62.7	0.0
Queue Length 95th (m)	49.5	56.3	29.5	40.4	45.4	0.0	33.8	30.9		1.1	72.5	12.2
Internal Link Dist (m)		94.8			269.5			205.4			204.8	
Turn Bay Length (m)	24.7			30.2		16.0	7.6			13.8		
Base Capacity (vph)	327	343	493	334	350	395	312	729		318	499	687
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.60	0.51	0.54	0.43	0.41	0.05	0.47	0.24		0.00	0.64	0.62

Intersection Summary

Area Type: CBD
Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Pretimed
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 36.4 Intersection LOS: D
Intersection Capacity Utilization 74.2% ICU Level of Service D
Analysis Period (min) 15
Description: TMC May 30 2017
Updated Sept 23/20

Splits and Phases: 95: RR 45 (HENRY ST)/EUCLID ST & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	258	18	99	526	254	23	323	76	265	560	16
Future Volume (vph)	58	258	18	99	526	254	23	323	76	265	560	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	17.1		0.0	98.4		0.0	23.5		30.0	102.4		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	37.0			12.6			27.3			30.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		0.98		0.97	0.98		0.97	0.99	1.00	
Frt		0.985				0.850			0.850		0.996	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1545	2998	0	1545	1626	1356	1447	3119	1382	1501	3131	0
Flt Permitted	0.216			0.545			0.409			0.413		
Satd. Flow (perm)	350	2998	0	869	1626	1319	610	3119	1335	645	3131	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13				275			101		3	
Link Speed (k/h)		50			50			50			40	
Link Distance (m)		457.3			160.3			1037.5			218.0	
Travel Time (s)		32.9			11.5			74.7			19.6	
Confl. Peds. (#/hr)	13		26	26		13	23		17	17		23
Peak Hour Factor	0.74	0.86	0.53	0.73	0.84	0.88	0.63	0.82	0.89	0.93	0.90	0.88
Heavy Vehicles (%)	4%	5%	6%	4%	4%	6%	11%	3%	4%	7%	2%	2%
Adj. Flow (vph)	78	300	34	136	626	289	37	394	85	285	622	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	334	0	136	626	289	37	394	85	285	640	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2			6		6	8		8	4		
Minimum Split (s)	10.0	41.0		10.0	41.0	41.0	35.0	35.0	35.0	9.0	35.0	
Total Split (s)	10.0	65.0		10.0	65.0	65.0	35.0	35.0	35.0	15.0	50.0	
Total Split (%)	8.0%	52.0%		8.0%	52.0%	52.0%	28.0%	28.0%	28.0%	12.0%	40.0%	
Maximum Green (s)	5.0	58.4		5.0	58.4	58.4	29.1	29.1	29.1	12.0	44.1	
Yellow Time (s)	3.0	4.1		3.0	4.1	4.1	3.7	3.7	3.7	3.0	3.7	
All-Red Time (s)	2.0	2.5		2.0	2.5	2.5	2.2	2.2	2.2	0.0	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	-3.0	0.0	
Total Lost Time (s)	5.0	6.6		5.0	6.6	6.6	5.9	5.9	5.9	0.0	5.9	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes				Yes		
Walk Time (s)		7.0			7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)		25.0			25.0	25.0	21.0	21.0	21.0		21.0	
Pedestrian Calls (#/hr)		0			0	0	0	0	0		0	
Act Effct Green (s)	65.0	58.4		65.0	58.4	58.4	29.1	29.1	29.1	50.0	44.1	
Actuated g/C Ratio	0.52	0.47		0.52	0.47	0.47	0.23	0.23	0.23	0.40	0.35	
v/c Ratio	0.34	0.24		0.28	0.82	0.38	0.26	0.54	0.22	0.79	0.58	
Control Delay	21.0	23.0		15.9	39.7	4.3	45.0	45.4	6.4	46.3	35.3	
Queue Delay	0.0	0.0		0.0	13.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	21.0	23.0		15.9	52.7	4.3	45.0	45.4	6.4	46.3	35.3	
LOS	C	C		B	D	A	D	D	A	D	D	
Approach Delay		22.6			34.6			38.9			38.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			D			D	
Queue Length 50th (m)	7.4	21.5		14.2	120.0	1.7	6.9	41.5	0.0	47.3	61.3	
Queue Length 95th (m)	13.5	28.4		18.7	149.0	14.3	11.0	50.5	8.5	#80.1	78.8	
Internal Link Dist (m)		433.3			136.3			1013.5			194.0	
Turn Bay Length (m)	17.1			98.4			23.5		30.0	102.4		
Base Capacity (vph)	229	1407		478	759	762	142	726	388	360	1106	
Starvation Cap Reductn	0	0		0	123	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	0.34	0.24		0.28	0.98	0.38	0.26	0.54	0.22	0.79	0.58	

Intersection Summary

Area Type: CBD
Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Pretimed
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 35.0 Intersection LOS: C
Intersection Capacity Utilization 92.5% ICU Level of Service F
Analysis Period (min) 15
Description: TMC Oct 19/16
Updated Sept 23/20
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 96: GARDEN ST & DUNDAS ST

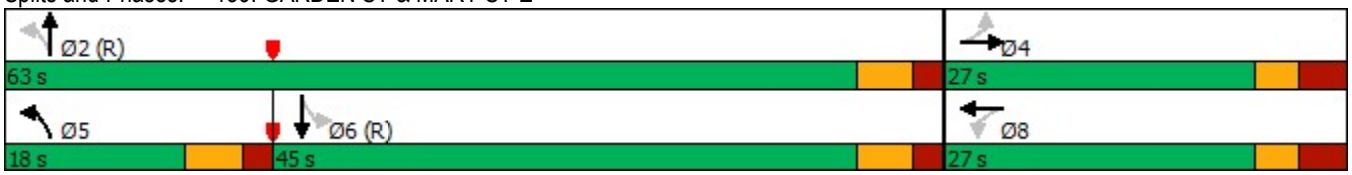
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	0	160	13	6	42	147	573	3	19	668	244
Future Volume (vph)	99	0	160	13	6	42	147	573	3	19	668	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	34.4		0.0	33.8		0.0	51.6		0.0	79.3		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.4			18.0			30.4			24.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	0.99	0.98		1.00	0.98			1.00		1.00	0.98	
Frt		0.850			0.866			0.998			0.954	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1422	1241	0	1397	1437	0	1373	2917	0	1447	2765	0
Flt Permitted	0.709			0.574			0.165			0.421		
Satd. Flow (perm)	1052	1241	0	841	1437	0	238	2917	0	638	2765	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		334			65			3			97	
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		468.1			161.7			218.0			150.1	
Travel Time (s)		42.1			14.6			19.6			13.5	
Confl. Peds. (#/hr)	7		3	3		7	21		5	5		21
Peak Hour Factor	0.65	0.25	0.89	0.65	0.75	0.65	0.75	0.95	0.38	0.59	0.91	0.76
Heavy Vehicles (%)	13%	0%	14%	15%	0%	0%	17%	10%	0%	11%	8%	10%
Adj. Flow (vph)	152	0	180	20	8	65	196	603	8	32	734	321
Shared Lane Traffic (%)												
Lane Group Flow (vph)	152	180	0	20	73	0	196	611	0	32	1055	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		4.0	20.0		20.0	20.0	
Minimum Split (s)	26.3	26.3		26.3	26.3		10.0	27.0		27.0	27.0	
Total Split (s)	27.0	27.0		27.0	27.0		18.0	63.0		45.0	45.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		20.0%	70.0%		50.0%	50.0%	
Maximum Green (s)	20.7	20.7		20.7	20.7		12.0	57.1		39.1	39.1	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	3.7		3.7	3.7	
All-Red Time (s)	3.3	3.3		3.3	3.3		2.0	2.2		2.2	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		6.0	5.9		5.9	5.9	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes					
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	C-Max		C-Max	C-Max	
Walk Time (s)	15.0	15.0		15.0	15.0			15.0		15.0	15.0	
Flash Dont Walk (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Pedestrian Calls (#/hr)	0	0		0	0			0		0	0	
Act Effct Green (s)	16.9	16.9		16.9	16.9		60.8	60.9		45.3	45.3	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.68	0.68		0.50	0.50	
v/c Ratio	0.77	0.36		0.13	0.23		0.70	0.31		0.10	0.73	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	46.8	2.2		30.2	10.9		22.5	7.0		13.4	16.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	46.8	2.2		30.2	10.9		22.5	7.0		13.4	16.0	
LOS	D	A		C	B		C	A		B	B	
Approach Delay		22.6			15.1			10.7			15.9	
Approach LOS		C			B			B			B	
90th %ile Green (s)	20.7	20.7		20.7	20.7		12.0	57.1		39.1	39.1	
90th %ile Term Code	Max	Max		Hold	Hold		Max	Coord		Coord	Coord	
70th %ile Green (s)	20.7	20.7		20.7	20.7		12.0	57.1		39.1	39.1	
70th %ile Term Code	Max	Max		Hold	Hold		Max	Coord		Coord	Coord	
50th %ile Green (s)	18.3	18.3		18.3	18.3		9.9	59.5		43.6	43.6	
50th %ile Term Code	Gap	Gap		Hold	Hold		Gap	Coord		Coord	Coord	
30th %ile Green (s)	14.9	14.9		14.9	14.9		8.0	62.9		48.9	48.9	
30th %ile Term Code	Gap	Gap		Hold	Hold		Gap	Coord		Coord	Coord	
10th %ile Green (s)	10.0	10.0		10.0	10.0		6.1	67.8		55.7	55.7	
10th %ile Term Code	Gap	Gap		Hold	Hold		Gap	Coord		Coord	Coord	
Queue Length 50th (m)	18.1	0.0		2.6	1.0		10.9	19.2		1.5	31.8	
Queue Length 95th (m)	18.1	0.0		5.7	7.3		18.6	29.2		4.5	53.7	
Internal Link Dist (m)		444.1			137.7			194.0			126.1	
Turn Bay Length (m)	34.4			33.8			51.6			79.3		
Base Capacity (vph)	241	542		193	380		312	1974		321	1439	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.63	0.33		0.10	0.19		0.63	0.31		0.10	0.73	

Intersection Summary

Area Type: CBD
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 15.1 Intersection LOS: B
Intersection Capacity Utilization 67.1% ICU Level of Service C
Analysis Period (min) 15
Description: TMC Nov 27/19
Updated Sept 17/20

Splits and Phases: 139: GARDEN ST & MARY ST E



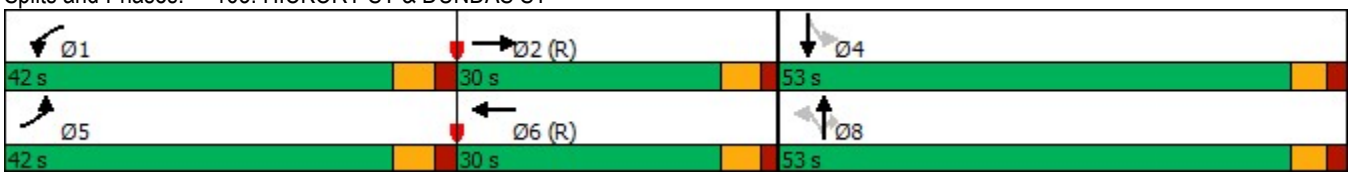
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	163	1	156	377	87	4	14	188	65	17	1
Future Volume (vph)	114	163	1	156	377	87	4	14	188	65	17	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	80.0		0.0	0.0		20.0	0.0		0.0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (m)	0.0			0.0			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.98	0.99			0.99	0.98		1.00	
Frt		0.997			0.955				0.850		0.998	
Flt Protected	0.950			0.950				0.987			0.963	
Satd. Flow (prot)	1373	1494	0	1530	1398	0	0	1344	1356	0	1493	0
Flt Permitted	0.950			0.950				0.923			0.748	
Satd. Flow (perm)	1362	1494	0	1497	1398	0	0	1249	1332	0	1155	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			16				362		1	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		375.6			457.3			233.0			181.4	
Travel Time (s)		27.0			32.9			16.8			13.1	
Confl. Peds. (#/hr)	5		8	8		5	10		3	3		10
Peak Hour Factor	0.50	0.90	0.25	0.55	0.94	0.50	0.33	0.43	0.52	0.64	0.56	0.58
Heavy Vehicles (%)	17%	13%	0%	5%	13%	17%	0%	33%	6%	11%	0%	27%
Adj. Flow (vph)	228	181	4	284	401	174	12	33	362	102	30	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	228	185	0	284	575	0	0	45	362	0	134	0
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		
Detector Phase	5	2		1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	4.0	20.0		4.0	20.0		8.0	8.0	8.0	8.0	8.0	
Minimum Split (s)	10.0	28.0		10.0	28.0		26.0	26.0	26.0	26.0	26.0	
Total Split (s)	42.0	30.0		42.0	30.0		53.0	53.0	53.0	53.0	53.0	
Total Split (%)	33.6%	24.0%		33.6%	24.0%		42.4%	42.4%	42.4%	42.4%	42.4%	
Maximum Green (s)	36.0	24.5		36.0	24.5		47.6	47.6	47.6	47.6	47.6	
Yellow Time (s)	4.0	3.8		4.0	3.8		3.3	3.3	3.3	3.3	3.3	
All-Red Time (s)	2.0	1.7		2.0	1.7		2.1	2.1	2.1	2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	6.0	5.5		6.0	5.5			5.4	5.4		5.4	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes			Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None	None	None	None	
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		11.0			11.0		13.0	13.0	13.0	13.0	13.0	
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	
Act Effct Green (s)	26.0	59.9		28.4	62.2			19.9	19.9		19.9	
Actuated g/C Ratio	0.21	0.48		0.23	0.50			0.16	0.16		0.16	
v/c Ratio	0.80	0.26		0.82	0.82			0.23	0.70		0.73	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	66.6	24.0		42.9	53.4			45.8	12.2		70.7	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	66.6	24.0		42.9	53.4			45.8	12.2		70.7	
LOS	E	C		D	D			D	B		E	
Approach Delay		47.5			49.9			15.9			70.7	
Approach LOS		D			D			B			E	
90th %ile Green (s)	35.1	42.2		37.2	44.3		28.7	28.7	28.7	28.7	28.7	
90th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	
70th %ile Green (s)	29.9	52.4		32.2	54.7		23.5	23.5	23.5	23.5	23.5	
70th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	
50th %ile Green (s)	26.1	59.8		28.5	62.2		19.8	19.8	19.8	19.8	19.8	
50th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	
30th %ile Green (s)	22.2	67.1		24.8	69.7		16.2	16.2	16.2	16.2	16.2	
30th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	
10th %ile Green (s)	16.7	77.9		19.1	80.3		11.1	11.1	11.1	11.1	11.1	
10th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	
Queue Length 50th (m)	49.4	24.2		57.4	132.5			9.0	0.0		29.0	
Queue Length 95th (m)	34.0	50.2		40.6 m	#214.9			8.2	0.0		26.0	
Internal Link Dist (m)		351.6			433.3			209.0			157.4	
Turn Bay Length (m)	30.0			80.0					20.0			
Base Capacity (vph)	395	716		443	703			475	731		440	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.58	0.26		0.64	0.82			0.09	0.50		0.30	

Intersection Summary

Area Type: CBD
Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 43.3 Intersection LOS: D
Intersection Capacity Utilization 62.3% ICU Level of Service B
Analysis Period (min) 15
Description: TMC Jun 26/19
Updated Sept 28/20
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 163: HICKORY ST & DUNDAS ST



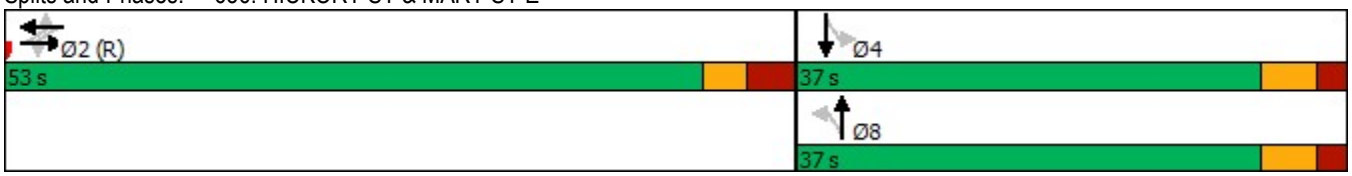
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	189	73	14	350	15	90	124	6	27	0	42
Future Volume (vph)	37	189	73	14	350	15	90	124	6	27	0	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	22.3		0.0	18.9		0.0	16.3		0.0	25.4		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.952			0.993			0.993			0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1684	1587	0	1668	1718	0	1463	1592	0	1668	1479	0
Flt Permitted	0.409			0.518			0.702			0.499		
Satd. Flow (perm)	725	1587	0	910	1718	0	1081	1592	0	876	1479	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		40			4			3			366	
Link Speed (k/h)		40			50			48			48	
Link Distance (m)		360.2			468.1			35.4			183.4	
Travel Time (s)		32.4			33.7			2.7			13.8	
Peak Hour Factor	0.36	0.84	0.68	0.70	0.80	0.75	0.56	0.47	0.50	0.54	0.50	0.50
Heavy Vehicles (%)	6%	14%	10%	7%	9%	0%	22%	18%	0%	7%	13%	8%
Adj. Flow (vph)	103	225	107	20	438	20	161	264	12	50	0	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	103	332	0	20	458	0	161	276	0	50	84	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			8			4	
Permitted Phases	2			2			8			4		
Minimum Split (s)	33.3	33.3		33.3	33.3		34.9	34.9		34.9	34.9	
Total Split (s)	53.0	53.0		53.0	53.0		37.0	37.0		37.0	37.0	
Total Split (%)	58.9%	58.9%		58.9%	58.9%		41.1%	41.1%		41.1%	41.1%	
Maximum Green (s)	46.7	46.7		46.7	46.7		31.1	31.1		31.1	31.1	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.7	3.7		3.7	3.7	
All-Red Time (s)	3.3	3.3		3.3	3.3		2.2	2.2		2.2	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		5.9	5.9		5.9	5.9	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	46.7	46.7		46.7	46.7		31.1	31.1		31.1	31.1	
Actuated g/C Ratio	0.52	0.52		0.52	0.52		0.35	0.35		0.35	0.35	
v/c Ratio	0.27	0.39		0.04	0.51		0.43	0.50		0.17	0.11	
Control Delay	16.1	15.0		15.4	18.5		27.1	26.9		22.3	0.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.1	15.0		15.4	18.5		27.1	26.9		22.3	0.3	
LOS	B	B		B	B		C	C		C	A	
Approach Delay		15.2			18.4			27.0			8.5	
Approach LOS		B			B			C			A	
Queue Length 50th (m)	12.9	39.1		1.7	39.9		19.5	33.9		5.5	0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	8.0	59.1		m2.6	47.4		19.9	24.6		7.5	0.0	
Internal Link Dist (m)		336.2			444.1			11.4			159.4	
Turn Bay Length (m)	22.3			18.9			16.3			25.4		
Base Capacity (vph)	376	842		472	893		373	552		302	750	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.27	0.39		0.04	0.51		0.43	0.50		0.17	0.11	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green
Natural Cycle: 70
Control Type: Pretimed
Maximum v/c Ratio: 0.51
Intersection Signal Delay: 19.1 Intersection LOS: B
Intersection Capacity Utilization 63.4% ICU Level of Service B
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 656: HICKORY ST & MARY ST E



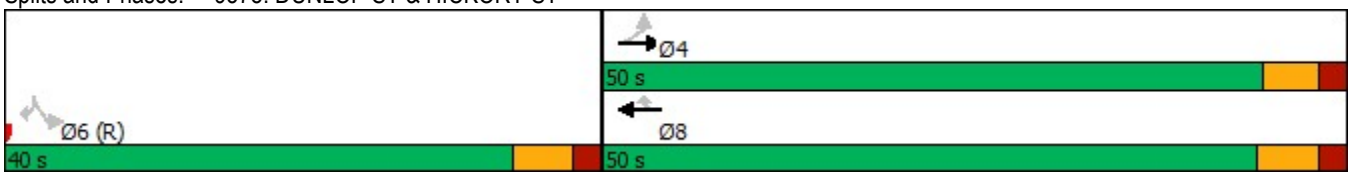
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	184	26	69	7	11	181
Future Volume (vph)	184	26	69	7	11	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0			35.0	16.0	16.0
Storage Lanes	1			1	1	0
Taper Length (m)	25.0				25.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1733	1807	1724	1536	1638	1536
Flt Permitted	0.708				0.950	
Satd. Flow (perm)	1292	1807	1724	1536	1638	1536
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				8		197
Link Speed (k/h)		50	48		50	
Link Distance (m)		375.4	228.6		233.0	
Travel Time (s)		27.0	17.1		16.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	4%	9%	4%	9%	4%
Adj. Flow (vph)	200	28	75	8	12	197
Shared Lane Traffic (%)						
Lane Group Flow (vph)	200	28	75	8	12	197
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			
Permitted Phases	4			8	6	6
Minimum Split (s)	26.0	26.0	22.2	22.2	22.0	22.0
Total Split (s)	50.0	50.0	50.0	50.0	40.0	40.0
Total Split (%)	55.6%	55.6%	55.6%	55.6%	44.4%	44.4%
Maximum Green (s)	44.3	44.3	43.8	43.8	34.0	34.0
Yellow Time (s)	3.7	3.7	4.2	4.2	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	6.2	6.2	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	9.0	9.0	9.0	9.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	44.3	44.3	43.8	43.8	34.0	34.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.38	0.38
v/c Ratio	0.31	0.03	0.09	0.01	0.02	0.28
Control Delay	6.4	4.4	12.8	6.9	17.8	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.4	4.4	12.8	6.9	17.8	4.1
LOS	A	A	B	A	B	A
Approach Delay		6.1	12.3		4.9	
Approach LOS		A	B		A	
Queue Length 50th (m)	8.6	0.8	6.1	0.0	1.2	0.0

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Length 95th (m)	m10.8	m1.2	12.7	2.0	4.3	11.8
Internal Link Dist (m)		351.4	204.6		209.0	
Turn Bay Length (m)	35.0			35.0	16.0	16.0
Base Capacity (vph)	635	889	839	751	618	702
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.03	0.09	0.01	0.02	0.28

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green
Natural Cycle: 50
Control Type: Pretimed
Maximum v/c Ratio: 0.31
Intersection Signal Delay: 6.6 Intersection LOS: A
Intersection Capacity Utilization 33.3% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9578: DUNLOP ST & HICKORY ST



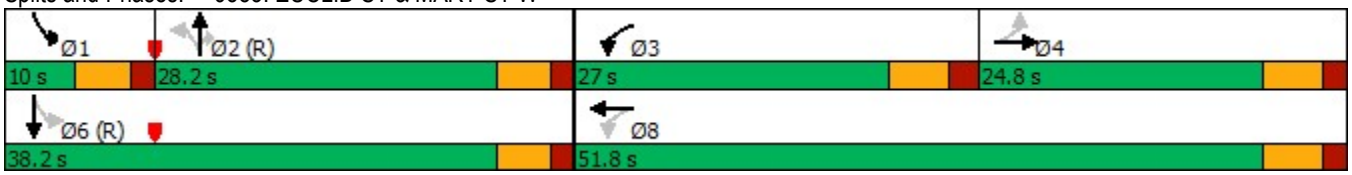
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	22	4	489	104	46	3	105	156	109	74	1
Future Volume (vph)	3	22	4	489	104	46	3	105	156	109	74	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	22.3		0.0	18.9		0.0	16.3		20.0	25.4		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.973			0.957				0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1785	1756	0	1785	1758	0	1785	1842	1551	1500	1850	0
Flt Permitted	0.633			0.554			0.694			0.544		
Satd. Flow (perm)	1189	1756	0	1041	1758	0	1304	1842	1551	859	1850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			33				188		3	
Link Speed (k/h)		48			50			50			48	
Link Distance (m)		204.5			414.4			228.8			243.5	
Travel Time (s)		15.3			29.8			16.5			18.3	
Peak Hour Factor	0.38	0.61	0.50	0.96	0.74	0.81	0.38	0.79	0.83	0.67	0.79	0.25
Heavy Vehicles (%)	0%	5%	0%	0%	0%	8%	0%	2%	3%	19%	1%	0%
Adj. Flow (vph)	8	36	8	509	141	57	8	133	188	163	94	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	8	44	0	509	198	0	8	133	188	163	98	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8			2		2	6		
Minimum Split (s)	24.8	24.8		10.0	24.8		26.3	26.3	26.3	10.0	26.3	
Total Split (s)	24.8	24.8		27.0	51.8		28.2	28.2	28.2	10.0	38.2	
Total Split (%)	27.6%	27.6%		30.0%	57.6%		31.3%	31.3%	31.3%	11.1%	42.4%	
Maximum Green (s)	19.0	19.0		21.0	46.0		22.9	22.9	22.9	4.7	32.9	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	1.8	1.8		2.0	1.8		1.6	1.6	1.6	1.6	1.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.8	5.8		6.0	5.8		5.3	5.3	5.3	5.3	5.3	
Lead/Lag	Lag	Lag		Lead			Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Walk Time (s)	7.0	7.0			7.0		7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0			12.0		14.0	14.0	14.0		14.0	
Pedestrian Calls (#/hr)	0	0			0		0	0	0		0	
Act Effct Green (s)	19.0	19.0		45.8	46.0		22.9	22.9	22.9	32.9	32.9	
Actuated g/C Ratio	0.21	0.21		0.51	0.51		0.25	0.25	0.25	0.37	0.37	
v/c Ratio	0.03	0.12		0.72	0.22		0.02	0.28	0.35	0.47	0.14	
Control Delay	28.7	25.7		28.5	15.8		25.7	29.0	6.3	26.1	19.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	28.7	25.7		28.5	15.8		25.7	29.0	6.3	26.1	19.3	
LOS	C	C		C	B		C	C	A	C	B	
Approach Delay		26.1			24.9			15.9			23.5	
Approach LOS		C			C			B			C	
Queue Length 50th (m)	1.0	4.7		75.8	19.7		1.0	17.0	0.0	18.2	10.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	1.8	8.0		99.2	22.9		1.7	26.7	11.0	22.7	16.9	
Internal Link Dist (m)		180.5			390.4			204.8			219.5	
Turn Bay Length (m)	22.3			18.9			16.3		20.0	25.4		
Base Capacity (vph)	251	377		703	914		331	468	534	347	678	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.03	0.12		0.72	0.22		0.02	0.28	0.35	0.47	0.14	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Pretimed
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 22.5 Intersection LOS: C
Intersection Capacity Utilization 59.7% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 9583: EUCLID ST & MARY ST W



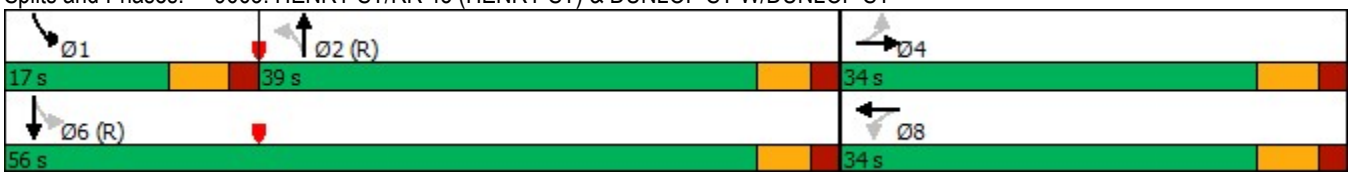
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	224	12	70	106	61	24	28	105	126	280	25
Future Volume (vph)	24	224	12	70	106	61	24	28	105	126	280	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	35.0		0.0	16.0		0.0	16.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.989			0.940			0.876			0.986	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1785	1841	0	1785	1705	0	1785	1499	0	1750	1736	0
Flt Permitted	0.603			0.471			0.556			0.528		
Satd. Flow (perm)	1133	1841	0	885	1705	0	1045	1499	0	973	1736	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			38			154			9	
Link Speed (k/h)		48			50			50			50	
Link Distance (m)		420.8			405.1			724.5			229.4	
Travel Time (s)		31.6			29.2			52.2			16.5	
Peak Hour Factor	0.75	0.85	0.60	0.54	0.90	0.78	0.50	0.84	0.68	0.65	0.91	0.78
Heavy Vehicles (%)	0%	1%	0%	0%	2%	6%	0%	4%	11%	2%	7%	4%
Adj. Flow (vph)	32	264	20	130	118	78	48	33	154	194	308	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	284	0	130	196	0	48	187	0	194	340	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	24.2	24.2		24.2	24.2		26.0	26.0		10.0	26.0	
Total Split (s)	34.0	34.0		34.0	34.0		39.0	39.0		17.0	56.0	
Total Split (%)	37.8%	37.8%		37.8%	37.8%		43.3%	43.3%		18.9%	62.2%	
Maximum Green (s)	27.8	27.8		27.8	27.8		33.3	33.3		11.0	50.3	
Yellow Time (s)	4.2	4.2		4.2	4.2		3.7	3.7		4.0	3.7	
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		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.2	6.2		6.2	6.2		5.7	5.7		6.0	5.7	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		9.0	9.0			1.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	
Act Effct Green (s)	27.8	27.8		27.8	27.8		33.3	33.3		50.0	50.3	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.37	0.37		0.56	0.56	
v/c Ratio	0.09	0.50		0.48	0.36		0.12	0.29		0.31	0.35	
Control Delay	20.1	26.1		20.3	9.8		19.9	6.4		11.5	11.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.1	26.1		20.3	9.8		19.9	6.4		11.5	11.8	
LOS	C	C		C	A		B	A		B	B	
Approach Delay		25.5			14.0			9.2			11.7	
Approach LOS		C			B			A			B	
Queue Length 50th (m)	3.1	40.4		11.4	6.1		5.0	3.3		14.4	26.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	6.8	58.5		9.3	m14.3		6.3	13.1		16.6	42.4	
Internal Link Dist (m)		396.8			381.1			700.5			205.4	
Turn Bay Length (m)	35.0			35.0			16.0			16.0		
Base Capacity (vph)	349	571		273	552		386	651		635	974	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.09	0.50		0.48	0.36		0.12	0.29		0.31	0.35	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Pretimed
Maximum v/c Ratio: 0.50
Intersection Signal Delay: 14.9 Intersection LOS: B
Intersection Capacity Utilization 72.3% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9663: HENRY ST/RR 45 (HENRY ST) & DUNLOP ST W/DUNLOP ST

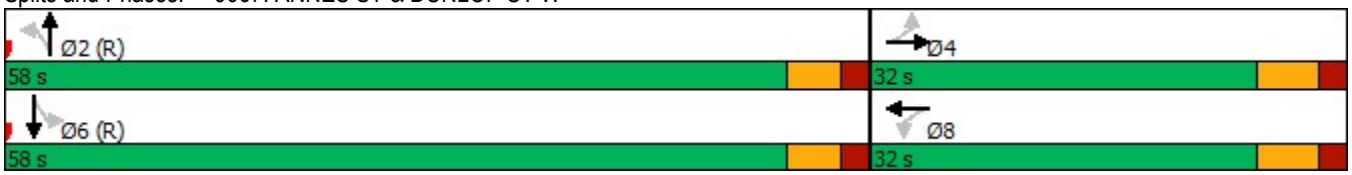


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	76	11	29	68	82	10	191	52	118	326	70
Future Volume (vph)	21	76	11	29	68	82	10	191	52	118	326	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	35.0		0.0	16.0		0.0	16.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.979			0.919			0.973			0.971	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1785	1778	0	1733	1669	0	1275	1742	0	1716	1683	0
Flt Permitted	0.571			0.685			0.396			0.526		
Satd. Flow (perm)	1073	1778	0	1250	1669	0	531	1742	0	950	1683	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			67			21			22	
Link Speed (k/h)		48			48			48			50	
Link Distance (m)		217.5			420.8			175.4			225.7	
Travel Time (s)		16.3			31.6			13.2			16.3	
Peak Hour Factor	0.88	0.79	0.69	0.66	0.71	0.72	0.63	0.69	0.86	0.73	0.80	0.73
Heavy Vehicles (%)	0%	4%	0%	3%	4%	3%	40%	6%	0%	4%	9%	6%
Adj. Flow (vph)	24	96	16	44	96	114	16	277	60	162	408	96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	112	0	44	210	0	16	337	0	162	504	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	26.2	26.2		26.2	26.2		26.0	26.0		26.0	26.0	
Total Split (s)	32.0	32.0		32.0	32.0		58.0	58.0		58.0	58.0	
Total Split (%)	35.6%	35.6%		35.6%	35.6%		64.4%	64.4%		64.4%	64.4%	
Maximum Green (s)	25.8	25.8		25.8	25.8		52.3	52.3		52.3	52.3	
Yellow Time (s)	4.2	4.2		4.2	4.2		3.7	3.7		3.7	3.7	
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		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.2	6.2		6.2	6.2		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.8	25.8		25.8	25.8		52.3	52.3		52.3	52.3	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.58	0.58		0.58	0.58	
v/c Ratio	0.08	0.22		0.12	0.40		0.05	0.33		0.29	0.51	
Control Delay	24.4	23.8		19.0	13.3		8.8	10.2		11.3	12.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.4	23.8		19.0	13.3		8.8	10.2		11.3	12.9	
LOS	C	C		B	B		A	B		B	B	
Approach Delay		23.9			14.3			10.1			12.5	
Approach LOS		C			B			B			B	
Queue Length 50th (m)	2.8	12.4		4.0	11.6		1.0	23.9		12.1	42.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	8.0	20.8		7.3	17.1		2.5	26.4		17.2	53.5	
Internal Link Dist (m)		193.5			396.8			151.4			201.7	
Turn Bay Length (m)	35.0			35.0			16.0			16.0		
Base Capacity (vph)	307	516		358	526		308	1021		552	987	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.08	0.22		0.12	0.40		0.05	0.33		0.29	0.51	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 55	
Control Type: Pretimed	
Maximum v/c Ratio: 0.51	
Intersection Signal Delay: 13.3	Intersection LOS: B
Intersection Capacity Utilization 70.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 9667: ANNES ST & DUNLOP ST W



Lanes, Volumes, Timings
90: BROCK ST & MARY ST W/MARY ST E

12/17/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	279	478	37	33	258	178	29	523	36	83	239	374
Future Volume (vph)	279	478	37	33	258	178	29	523	36	83	239	374
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	22.3		0.0	18.9		25.0	16.3		0.0	25.4		0.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	23.1			28.7			29.3			34.6		
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		0.99		0.94	0.97	0.99				0.94
Frt		0.983				0.850		0.985				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1474	1524	0	1516	1580	1208	1460	1478	0	1422	1510	1295
Flt Permitted	0.154			0.227			0.594			0.095		
Satd. Flow (perm)	239	1524	0	358	1580	1132	882	1478	0	142	1510	1217
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				104		5				473
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		409.8			360.6			134.9			82.0	
Travel Time (s)		29.5			26.0			9.7			5.9	
Confl. Peds. (#/hr)	11		11	11		11	23		51	51		23
Peak Hour Factor	0.85	0.83	0.51	0.75	0.78	0.73	0.73	0.83	0.50	0.74	0.89	0.79
Heavy Vehicles (%)	9%	8%	11%	6%	7%	19%	10%	11%	14%	13%	12%	11%
Adj. Flow (vph)	328	576	73	44	331	244	40	630	72	112	269	473
Shared Lane Traffic (%)												
Lane Group Flow (vph)	328	649	0	44	331	244	40	702	0	112	269	473
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2			6		6
Detector Phase	7	4		8	8	8	2	2		1	6	6
Switch Phase												
Minimum Initial (s)	4.0	8.0		8.0	8.0	8.0	20.0	20.0		4.0	20.0	20.0
Minimum Split (s)	10.0	26.0		26.0	26.0	26.0	28.0	28.0		10.0	28.0	28.0
Total Split (s)	30.0	67.0		37.0	37.0	37.0	71.0	71.0		12.0	83.0	83.0
Total Split (%)	20.0%	44.7%		24.7%	24.7%	24.7%	47.3%	47.3%		8.0%	55.3%	55.3%
Maximum Green (s)	24.0	61.2		31.2	31.2	31.2	65.7	65.7		6.0	77.7	77.7
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.7	3.7		4.0	3.7	3.7
All-Red Time (s)	2.0	1.8		1.8	1.8	1.8	1.6	1.6		2.0	1.6	1.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	5.8		5.8	5.8	5.8	5.3	5.3		6.0	5.3	5.3
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes									Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max		None	C-Max	C-Max
Walk Time (s)		7.0		7.0	7.0	7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)		12.0		12.0	12.0	12.0	14.0	14.0			14.0	14.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0			0	0
Act Effct Green (s)	61.0	61.2		31.2	31.2	31.2	65.7	65.7		77.0	77.7	77.7
Actuated g/C Ratio	0.41	0.41		0.21	0.21	0.21	0.44	0.44		0.51	0.52	0.52
v/c Ratio	1.12	1.04		0.59	1.01	0.77	0.10	1.08		0.90	0.34	0.55

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	127.7	96.2		87.4	109.0	49.0	25.9	98.6		83.4	22.8	4.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	127.7	96.2		87.4	109.0	49.0	25.9	98.6		83.4	22.8	4.2
LOS	F	F		F	F	D	C	F		F	C	A
Approach Delay		106.7			83.8			94.7			20.4	
Approach LOS		F			F			F			C	
90th %ile Green (s)	24.0	61.2		31.2	31.2	31.2	65.7	65.7		6.0	77.7	77.7
90th %ile Term Code	Max	Max		Max	Max	Max	Coord	Coord		Max	Coord	Coord
70th %ile Green (s)	24.0	61.2		31.2	31.2	31.2	65.7	65.7		6.0	77.7	77.7
70th %ile Term Code	Max	Max		Max	Max	Max	Coord	Coord		Max	Coord	Coord
50th %ile Green (s)	24.0	61.2		31.2	31.2	31.2	65.7	65.7		6.0	77.7	77.7
50th %ile Term Code	Max	Max		Max	Max	Max	Coord	Coord		Max	Coord	Coord
30th %ile Green (s)	24.0	61.2		31.2	31.2	31.2	65.7	65.7		6.0	77.7	77.7
30th %ile Term Code	Max	Max		Max	Max	Max	Coord	Coord		Max	Coord	Coord
10th %ile Green (s)	24.0	61.2		31.2	31.2	31.2	65.7	65.7		6.0	77.7	77.7
10th %ile Term Code	Max	Max		Max	Max	Max	Coord	Coord		Max	Coord	Coord
Queue Length 50th (m)	~86.6	~185.2		11.2	~88.9	38.9	6.4	~213.7		15.8	42.2	0.0
Queue Length 95th (m)	#130.9	#223.9		20.1	#116.5	49.4	10.9	#247.0		#27.8	60.3	5.2
Internal Link Dist (m)		385.8			336.6			110.9			58.0	
Turn Bay Length (m)	22.3			18.9		25.0	16.3			25.4		
Base Capacity (vph)	294	624		74	328	317	386	650		124	782	858
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	1.12	1.04		0.59	1.01	0.77	0.10	1.08		0.90	0.34	0.55

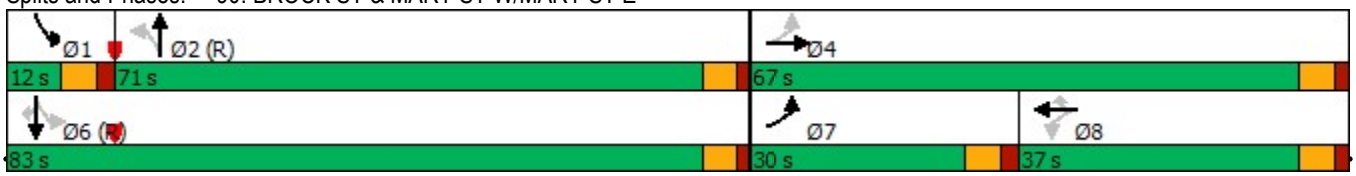
Intersection Summary

Area Type: CBD
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.12
Intersection Signal Delay: 76.4 Intersection LOS: E
Intersection Capacity Utilization 94.7% ICU Level of Service F
Analysis Period (min) 15
Description: TMC Sep 26/19
Updated Sept 17/20

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 90: BROCK ST & MARY ST W/MARY ST E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	442	222	65	196	21	3	431	193	5	554	19
Future Volume (vph)	34	442	222	65	196	21	3	431	193	5	554	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	35.1		0.0	16.0		0.0	16.1		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	25.0			21.2			15.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.92	0.97			0.99				0.85		0.99	
Frt		0.944			0.984				0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1606	1541	0	1575	1612	0	1606	1658	1437	1606	1624	0
Flt Permitted	0.595			0.104			0.105			0.276		
Satd. Flow (perm)	925	1541	0	172	1612	0	178	1658	1226	467	1624	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			6				246		2	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		407.9			373.1			117.4			239.3	
Travel Time (s)		29.4			26.9			8.5			17.2	
Confl. Peds. (#/hr)	28		33	33		28	52		49	49		52
Peak Hour Factor	0.85	0.93	0.79	0.65	0.82	0.75	0.38	0.96	0.74	0.42	0.94	0.79
Heavy Vehicles (%)	0%	0%	0%	2%	2%	0%	0%	2%	0%	0%	3%	0%
Adj. Flow (vph)	40	475	281	100	239	28	8	449	261	12	589	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	756	0	100	267	0	8	449	261	12	613	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		3	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		4.0	8.0		20.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	25.0	25.0		10.0	25.0		26.0	26.0	26.0	26.0	26.0	
Total Split (s)	78.0	78.0		10.0	88.0		62.0	62.0	62.0	62.0	62.0	
Total Split (%)	52.0%	52.0%		6.7%	58.7%		41.3%	41.3%	41.3%	41.3%	41.3%	
Maximum Green (s)	71.8	71.8		4.0	81.8		56.3	56.3	56.3	56.3	56.3	
Yellow Time (s)	4.2	4.2		4.0	4.2		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2		6.0	6.2		5.7	5.7	5.7	5.7	5.7	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?				Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0			11.0		9.0	9.0	9.0	9.0	9.0	
Pedestrian Calls (#/hr)	0	0			0		0	0	0	0	0	
Act Effct Green (s)	71.8	71.8		82.0	81.8		56.3	56.3	56.3	56.3	56.3	
Actuated g/C Ratio	0.48	0.48		0.55	0.55		0.38	0.38	0.38	0.38	0.38	
v/c Ratio	0.09	1.01		0.76	0.30		0.12	0.72	0.43	0.07	1.00	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	23.2	73.3		67.2	28.7		36.7	48.1	6.8	31.6	83.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	54.4	0.5	0.0	0.0	
Total Delay	23.2	73.3		67.2	28.7		36.7	102.5	7.3	31.6	83.7	
LOS	C	E		E	C		D	F	A	C	F	
Approach Delay		70.8			39.2			67.2			82.7	
Approach LOS		E			D			E			F	
90th %ile Green (s)	71.8	71.8		4.0	81.8		56.3	56.3	56.3	56.3	56.3	
90th %ile Term Code	Max	Max		Max	Hold		Coord	Coord	Coord	Coord	Coord	
70th %ile Green (s)	71.8	71.8		4.0	81.8		56.3	56.3	56.3	56.3	56.3	
70th %ile Term Code	Max	Max		Max	Hold		Coord	Coord	Coord	Coord	Coord	
50th %ile Green (s)	71.8	71.8		4.0	81.8		56.3	56.3	56.3	56.3	56.3	
50th %ile Term Code	Max	Max		Max	Hold		Coord	Coord	Coord	Coord	Coord	
30th %ile Green (s)	71.8	71.8		4.0	81.8		56.3	56.3	56.3	56.3	56.3	
30th %ile Term Code	Max	Max		Max	Hold		Coord	Coord	Coord	Coord	Coord	
10th %ile Green (s)	71.8	71.8		4.0	81.8		56.3	56.3	56.3	56.3	56.3	
10th %ile Term Code	Max	Max		Max	Hold		Coord	Coord	Coord	Coord	Coord	
Queue Length 50th (m)	4.6	~217.0		19.2	52.0		1.4	105.0	2.6	2.1	~168.5	
Queue Length 95th (m)	m9.7	#289.4		23.0	72.5		2.2	143.5	7.6	3.0	#242.9	
Internal Link Dist (m)		383.9			349.1			93.4			215.3	
Turn Bay Length (m)	35.0			35.1			16.0			16.1		
Base Capacity (vph)	442	751		131	881		66	622	613	175	610	
Starvation Cap Reductn	0	0		0	0		0	217	112	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.09	1.01		0.76	0.30		0.12	1.11	0.52	0.07	1.00	

Intersection Summary

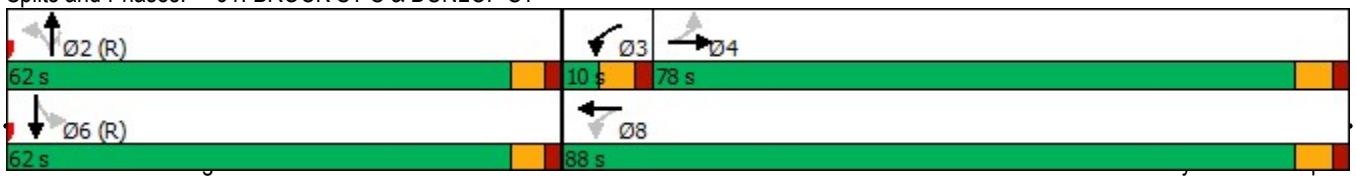
Area Type: CBD
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 68.1 Intersection LOS: E
Intersection Capacity Utilization 94.6% ICU Level of Service F
Analysis Period (min) 15
Description: TMC Oct 4/18
Updated Sept 17/20

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

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

Splits and Phases: 91: BROCK ST S & DUNLOP ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	193	893	433	21	500	110	204	201	1	1	157	97
Future Volume (vph)	193	893	433	21	500	110	204	201	1	1	157	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	44.5		40.0	0.0		157.1	23.4		14.6	35.0		0.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	31.3			29.4			40.9			25.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99		0.95	0.99		0.95	0.99		0.98	0.99		0.98
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1560	3181	1437	1606	3150	1409	1606	1691	1437	1591	1691	1423
Flt Permitted	0.950			0.950			0.434			0.582		
Satd. Flow (perm)	1539	3181	1363	1588	3150	1343	730	1691	1409	969	1691	1392
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			269			128			69			139
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		281.1			304.8			219.5			1140.1	
Travel Time (s)		20.2			21.9			15.8			82.1	
Confl. Peds. (#/hr)	7		17	17		7	5		4	4		5
Peak Hour Factor	0.80	0.98	0.85	0.85	0.93	0.86	0.85	0.69	0.54	0.78	0.77	0.70
Heavy Vehicles (%)	3%	1%	0%	0%	2%	2%	0%	0%	0%	1%	0%	1%
Adj. Flow (vph)	241	911	509	25	538	128	240	291	2	1	204	139
Shared Lane Traffic (%)												
Lane Group Flow (vph)	241	911	509	25	538	128	240	291	2	1	204	139
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases			2			6	8		8	4		4
Minimum Split (s)	10.0	29.0	29.0	10.0	29.0	29.0	10.0	30.0	30.0	30.0	30.0	30.0
Total Split (s)	35.0	61.0	61.0	35.0	61.0	61.0	16.0	54.0	54.0	38.0	38.0	38.0
Total Split (%)	23.3%	40.7%	40.7%	23.3%	40.7%	40.7%	10.7%	36.0%	36.0%	25.3%	25.3%	25.3%
Maximum Green (s)	29.0	54.5	54.5	29.0	54.5	54.5	10.0	47.5	47.5	31.5	31.5	31.5
Yellow Time (s)	4.0	3.7	3.7	4.0	3.7	3.7	4.0	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	2.8	2.8	2.0	2.8	2.8	2.0	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.5	6.5	6.0	6.5	6.5	3.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes			Yes					
Walk Time (s)		14.0	14.0		14.0	14.0		17.0	17.0	17.0	17.0	17.0
Flash Dont Walk (s)		5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0	0	0	0
Act Effct Green (s)	29.0	54.5	54.5	29.0	54.5	54.5	51.0	47.5	47.5	31.5	31.5	31.5
Actuated g/C Ratio	0.19	0.36	0.36	0.19	0.36	0.36	0.34	0.32	0.32	0.21	0.21	0.21
v/c Ratio	0.80	0.79	0.76	0.08	0.47	0.22	0.74	0.54	0.00	0.00	0.57	0.35
Control Delay	77.8	48.6	27.6	37.3	46.6	16.1	43.5	34.4	0.0	47.0	60.6	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.8	48.6	27.6	37.3	46.6	16.1	43.5	34.4	0.0	47.0	60.6	9.7
LOS	E	D	C	D	D	B	D	C	A	D	E	A
Approach Delay		46.4			40.6			38.4			40.0	

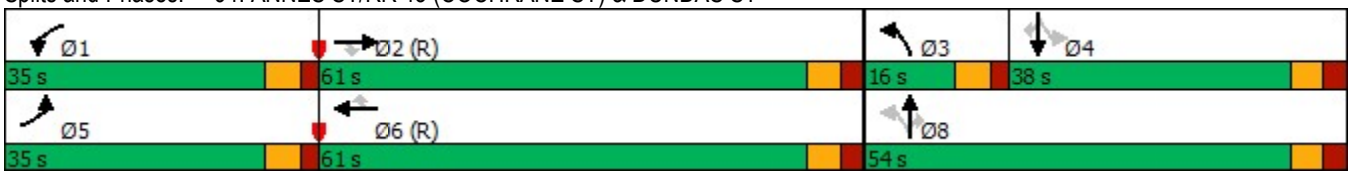
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			D			D	
Queue Length 50th (m)	63.8	116.9	61.6	5.0	70.7	11.3	45.7	57.2	0.0	0.2	50.8	0.0
Queue Length 95th (m)	80.6	141.3	91.8	m7.7	83.7	m18.2	59.7	57.8	m0.0	1.5	63.0	5.6
Internal Link Dist (m)		257.1			280.8			195.5			1116.1	
Turn Bay Length (m)	44.5		40.0			157.1	23.4		14.6	35.0		
Base Capacity (vph)	301	1155	666	310	1144	569	324	535	493	203	355	402
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.79	0.76	0.08	0.47	0.22	0.74	0.54	0.00	0.00	0.57	0.35

Intersection Summary

Area Type: CBD
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Pretimed
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 43.1 Intersection LOS: D
Intersection Capacity Utilization 80.8% ICU Level of Service D
Analysis Period (min) 15
Description: TMC Oct 24/17
Updated Sept 23/20

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

Splits and Phases: 94: ANNES ST/RR 43 (COCHRANE ST) & DUNDAS ST



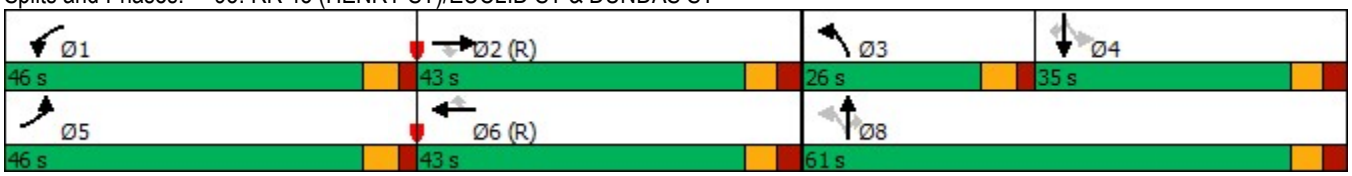
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	268	297	239	155	38	24	172	405	1	1	233	359
Future Volume (vph)	268	297	239	155	38	24	172	405	1	1	233	359
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	24.7		0.0	30.2		16.0	7.6		11.0	13.8		0.0
Storage Lanes	1		1	0		1	1		1	1		1
Taper Length (m)	32.9			38.5			41.4			24.7		
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		0.95	0.97		0.98	0.99		0.86	0.94		0.95
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1606	1674	1437	1606	1658	1437	1591	1691	1437	1560	1674	1437
Flt Permitted	0.950			0.950			0.242			0.470		
Satd. Flow (perm)	1590	1674	1363	1564	1658	1405	400	1691	1229	722	1674	1363
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			303			113			69			492
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		118.8			293.5			227.2			234.4	
Travel Time (s)		8.6			21.1			16.4			16.9	
Confl. Peds. (#/hr)	5		19	19		5	10		39	39		10
Peak Hour Factor	0.83	0.93	0.79	0.65	0.94	0.66	0.78	0.86	0.81	0.66	0.88	0.73
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	1%	0%	0%	3%	1%	0%
Adj. Flow (vph)	323	319	303	238	40	36	221	471	1	2	265	492
Shared Lane Traffic (%)												
Lane Group Flow (vph)	323	319	303	238	40	36	221	471	1	2	265	492
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases			2			6	8		8	4		4
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	10.0	29.5	29.5	29.5	29.5	29.5
Total Split (s)	46.0	43.0	43.0	46.0	43.0	43.0	26.0	61.0	61.0	35.0	35.0	35.0
Total Split (%)	30.7%	28.7%	28.7%	30.7%	28.7%	28.7%	17.3%	40.7%	40.7%	23.3%	23.3%	23.3%
Maximum Green (s)	40.0	36.5	36.5	40.0	36.5	36.5	20.0	54.5	54.5	28.5	28.5	28.5
Yellow Time (s)	4.0	3.7	3.7	4.0	3.7	3.7	4.0	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	2.8	2.8	2.0	2.8	2.8	2.0	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.5	6.5	6.0	6.5	6.5	6.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?												
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		14.0	14.0		14.0	14.0		16.0	16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0	0	0	0
Act Effct Green (s)	40.0	36.5	36.5	40.0	36.5	36.5	55.0	54.5	54.5	28.5	28.5	28.5
Actuated g/C Ratio	0.27	0.24	0.24	0.27	0.24	0.24	0.37	0.36	0.36	0.19	0.19	0.19
v/c Ratio	0.75	0.78	0.54	0.56	0.10	0.08	0.72	0.77	0.00	0.01	0.83	0.75
Control Delay	73.6	99.3	40.5	53.2	45.0	0.4	49.0	50.9	0.0	54.0	63.6	13.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.6	99.3	40.5	53.2	45.0	0.4	49.0	50.9	0.0	54.0	63.6	13.5
LOS	E	F	D	D	D	A	D	D	A	D	E	B
Approach Delay		71.7			46.1			50.2			31.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			D			D			C	
Queue Length 50th (m)	94.0	80.1	46.0	56.5	8.6	0.0	40.2	116.4	0.0	0.2	55.4	19.5
Queue Length 95th (m)	113.0	m104.8	60.2	55.7	18.0	0.0	48.4	146.1	m0.0	m0.4	m#87.2	21.0
Internal Link Dist (m)		94.8			269.5			203.2			210.4	
Turn Bay Length (m)	24.7			30.2		16.0	7.6		11.0	13.8		
Base Capacity (vph)	428	407	560	428	403	427	305	614	490	137	318	657
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.78	0.54	0.56	0.10	0.08	0.72	0.77	0.00	0.01	0.83	0.75

Intersection Summary

Area Type: CBD
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Pretimed
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 51.8 Intersection LOS: D
Intersection Capacity Utilization 85.6% ICU Level of Service E
Analysis Period (min) 15
Description: TMC May 30 2017
Updated Sept 23/20
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 95: RR 45 (HENRY ST)/EUCLID ST & DUNDAS ST



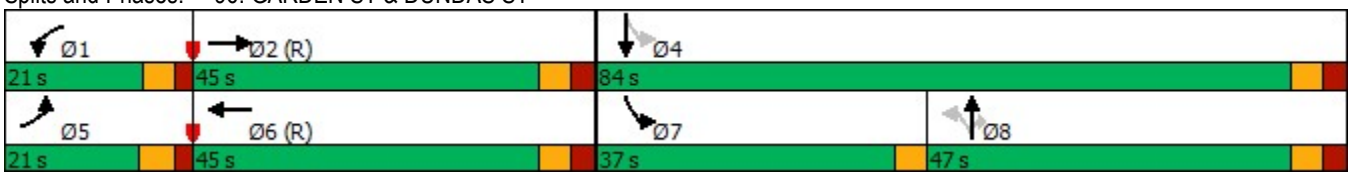
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	643	23	84	359	339	16	650	117	384	424	0
Future Volume (vph)	145	643	23	84	359	339	16	650	117	384	424	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	17.1		0.0	98.4		0.0	23.5		30.0	102.4		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	37.0			12.6			27.3			30.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	0.99		1.00		0.96	0.99		
Frt		0.991			0.921				0.850			
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1591	3151	0	1591	2885	0	1606	3213	1423	1606	3213	0
Flt Permitted	0.950			0.950			0.482			0.135		
Satd. Flow (perm)	1586	3151	0	1587	2885	0	812	3213	1363	227	3213	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			180				96			
Link Speed (k/h)		50			50			50			40	
Link Distance (m)		457.3			160.3			1037.5			218.0	
Travel Time (s)		32.9			11.5			74.7			19.6	
Confl. Peds. (#/hr)	6		5	5		6	3		19	19		3
Peak Hour Factor	0.85	0.90	0.52	0.77	0.94	0.80	0.73	0.82	0.78	0.93	0.90	0.83
Heavy Vehicles (%)	1%	1%	0%	1%	2%	1%	0%	0%	1%	0%	0%	0%
Adj. Flow (vph)	171	714	44	109	382	424	22	793	150	413	471	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	171	758	0	109	806	0	22	793	150	413	471	0
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases							8		8	4		
Minimum Split (s)	10.0	41.0		10.5	41.0		35.0	35.0	35.0	11.5	35.0	
Total Split (s)	21.0	45.0		21.0	45.0		47.0	47.0	47.0	37.0	84.0	
Total Split (%)	14.0%	30.0%		14.0%	30.0%		31.3%	31.3%	31.3%	24.7%	56.0%	
Maximum Green (s)	15.0	38.5		15.3	38.5		40.5	40.5	40.5	33.3	77.5	
Yellow Time (s)	4.0	3.7		3.7	3.7		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.8		2.0	2.8		2.8	2.8	2.8	0.0	2.8	
Lost Time Adjust (s)	-3.0	0.0		0.0	0.0		0.0	0.0	0.0	-3.0	0.0	
Total Lost Time (s)	3.0	6.5		5.7	6.5		6.5	6.5	6.5	0.7	6.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag	Lag	Lead		
Lead-Lag Optimize?												
Walk Time (s)		7.0			7.0		7.0	7.0	7.0		7.0	
Flash Dont Walk (s)		25.0			25.0		21.0	21.0	21.0		21.0	
Pedestrian Calls (#/hr)		0			0		0	0	0		0	
Act Effct Green (s)	18.0	38.5		15.3	38.5		40.5	40.5	40.5	83.3	77.5	
Actuated g/C Ratio	0.12	0.26		0.10	0.26		0.27	0.27	0.27	0.56	0.52	
v/c Ratio	0.90	0.93		0.67	0.92		0.10	0.91	0.34	0.90	0.28	
Control Delay	95.4	76.5		85.5	58.5		42.8	68.9	19.0	45.2	15.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	95.4	76.5		85.5	58.5		42.8	68.9	19.0	45.2	15.8	
LOS	F	E		F	E		D	E	B	D	B	
Approach Delay		80.0			61.7			60.5			29.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			E			E			C	
Queue Length 50th (m)	49.2	101.6		29.3	92.2		4.6	111.5	11.3	93.5	41.6	
Queue Length 95th (m)	m#67.1	m#138.5		41.2	#127.6		9.4	119.7	21.7	#147.4	47.1	
Internal Link Dist (m)		433.3			136.3			1013.5			194.0	
Turn Bay Length (m)	17.1			98.4			23.5		30.0	102.4		
Base Capacity (vph)	190	811		162	874		219	867	438	459	1660	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.90	0.93		0.67	0.92		0.10	0.91	0.34	0.90	0.28	

Intersection Summary

Area Type: CBD
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 120
Control Type: Pretimed
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 58.3 Intersection LOS: E
Intersection Capacity Utilization 100.1% ICU Level of Service G
Analysis Period (min) 15
Description: TMC Oct 19/16
Updated Sept 23/20
Phase 1 minimum timing error due to 2 second COMM delay
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 96: GARDEN ST & DUNDAS ST



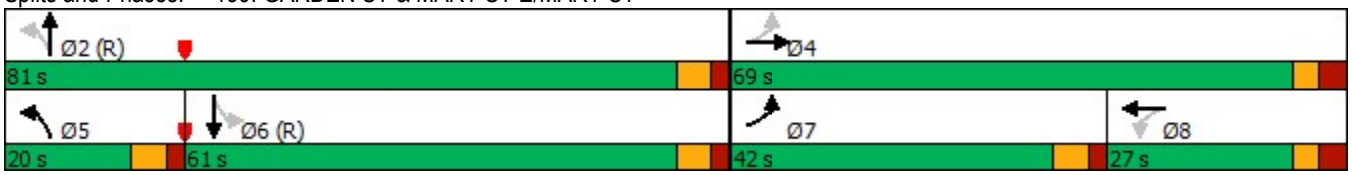
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	4	286	10	2	26	159	831	21	12	551	171
Future Volume (vph)	223	4	286	10	2	26	159	831	21	12	551	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	34.4		0.0	33.8		0.0	51.6		0.0	79.3		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.4			18.0			30.4			24.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	0.98		1.00	0.98			1.00		1.00	0.99	
Frt		0.853			0.861			0.995			0.958	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1474	1259	0	1606	1279	0	1501	3047	0	1606	2859	0
Flt Permitted	0.412			0.554			0.153			0.317		
Satd. Flow (perm)	637	1259	0	934	1279	0	242	3047	0	535	2859	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		289			52			3			42	
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		467.7			161.7			218.0			150.1	
Travel Time (s)		42.1			14.6			19.6			13.5	
Confl. Peds. (#/hr)	2		2	2		2	3		2	2		3
Peak Hour Factor	0.76	0.50	0.85	0.50	0.50	0.50	0.74	0.96	0.66	0.60	0.79	0.64
Heavy Vehicles (%)	9%	0%	13%	0%	0%	13%	7%	5%	0%	0%	6%	10%
Adj. Flow (vph)	293	8	336	20	4	52	215	866	32	20	697	267
Shared Lane Traffic (%)												
Lane Group Flow (vph)	293	344	0	20	56	0	215	898	0	20	964	0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	8.0		8.0	8.0		4.0	20.0		20.0	20.0	
Minimum Split (s)	10.0	28.0		26.3	26.3		10.0	27.0		27.0	27.0	
Total Split (s)	42.0	69.0		27.0	27.0		20.0	81.0		61.0	61.0	
Total Split (%)	28.0%	46.0%		18.0%	18.0%		13.3%	54.0%		40.7%	40.7%	
Maximum Green (s)	36.0	62.7		20.7	20.7		14.0	75.1		55.1	55.1	
Yellow Time (s)	4.0	3.0		3.0	3.0		4.0	3.7		3.7	3.7	
All-Red Time (s)	2.0	3.3		3.3	3.3		2.0	2.2		2.2	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.3		6.3	6.3		6.0	5.9		5.9	5.9	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		C-Max	C-Max	
Walk Time (s)		15.0		15.0	15.0			15.0		15.0	15.0	
Flash Dont Walk (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Pedestrian Calls (#/hr)		0		0	0			0		0	0	
Act Effct Green (s)	46.0	45.7		9.6	9.6		92.0	92.1		65.3	65.3	
Actuated g/C Ratio	0.31	0.30		0.06	0.06		0.61	0.61		0.44	0.44	
v/c Ratio	0.77	0.59		0.34	0.43		0.67	0.48		0.09	0.76	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	33.0	6.0		81.6	28.3		12.7	8.4		31.8	41.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	33.0	6.0		81.6	28.3		12.7	8.4		31.8	41.1	
LOS	C	A		F	C		B	A		C	D	
Approach Delay		18.4			42.3			9.2			40.9	
Approach LOS		B			D			A			D	
90th %ile Green (s)	36.0	55.0		13.0	13.0		21.7	82.8		55.1	55.1	
90th %ile Term Code	Max	Hold		Gap	Gap		Max	Coord		Coord	Coord	
70th %ile Green (s)	36.0	52.5		10.5	10.5		23.7	85.3		55.6	55.6	
70th %ile Term Code	Max	Hold		Gap	Gap		Gap	Coord		Coord	Coord	
50th %ile Green (s)	36.0	50.6		8.6	8.6		21.5	87.2		59.7	59.7	
50th %ile Term Code	Max	Hold		Gap	Gap		Gap	Coord		Coord	Coord	
30th %ile Green (s)	31.8	45.8		8.0	8.0		19.5	92.0		66.5	66.5	
30th %ile Term Code	Gap	Hold		Min	Min		Gap	Coord		Coord	Coord	
10th %ile Green (s)	24.8	24.5		0.0	0.0		17.9	113.3		89.4	89.4	
10th %ile Term Code	Gap	Hold		Skip	Skip		Gap	Coord		Coord	Coord	
Queue Length 50th (m)	53.2	15.4		5.4	1.1		18.2	82.5		3.4	119.6	
Queue Length 95th (m)	50.0	3.2		7.4	1.5		m26.4	m94.6		6.3	125.2	
Internal Link Dist (m)		443.7			137.7			194.0			126.1	
Turn Bay Length (m)	34.4			33.8			51.6			79.3		
Base Capacity (vph)	405	694		128	221		323	1872		232	1267	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.72	0.50		0.16	0.25		0.67	0.48		0.09	0.76	

Intersection Summary

Area Type: CBD
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 23.3 Intersection LOS: C
Intersection Capacity Utilization 78.4% ICU Level of Service D
Analysis Period (min) 15
Description: TMC Nov 27/19
Updated Sept 17/20
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 139: GARDEN ST & MARY ST E/MARY ST



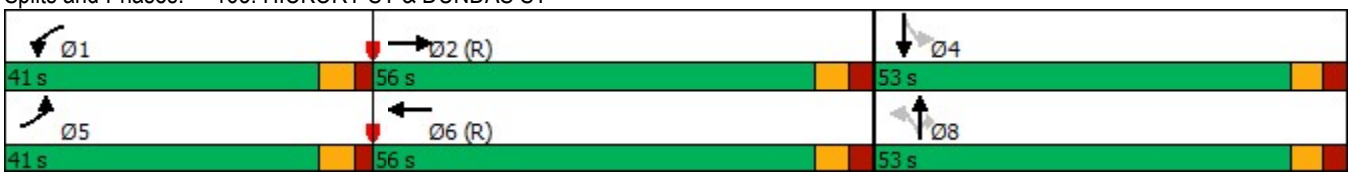
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	470	6	223	351	110	6	39	349	112	18	1
Future Volume (vph)	84	470	6	223	351	110	6	39	349	112	18	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	80.0		0.0	0.0		20.0	0.0		0.0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (m)	0.0			0.0			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.98	0.99			1.00	0.96		0.98	
Frt		0.995			0.946				0.850		0.999	
Flt Protected	0.950			0.950				0.993			0.960	
Satd. Flow (prot)	1606	1531	0	1422	1439	0	0	1312	1356	0	1493	0
Flt Permitted	0.950			0.950				0.942			0.710	
Satd. Flow (perm)	1590	1531	0	1389	1439	0	0	1239	1307	0	1084	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			20				521			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		375.6			457.3			241.7			181.4	
Travel Time (s)		27.0			32.9			17.4			13.1	
Confl. Peds. (#/hr)	10		19	19		10	13		11	11		13
Peak Hour Factor	0.46	0.91	0.38	0.72	0.87	0.48	0.54	0.63	0.58	0.64	0.56	0.58
Heavy Vehicles (%)	0%	10%	0%	13%	9%	11%	0%	33%	6%	6%	22%	14%
Adj. Flow (vph)	183	516	16	310	403	229	11	62	602	175	32	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	183	532	0	310	632	0	0	73	602	0	209	0
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		
Detector Phase	5	2		1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	4.0	20.0		4.0	20.0		8.0	8.0	8.0	8.0	8.0	
Minimum Split (s)	10.0	28.0		10.0	28.0		26.5	26.5	26.5	26.5	26.5	
Total Split (s)	41.0	56.0		41.0	56.0		53.0	53.0	53.0	53.0	53.0	
Total Split (%)	27.3%	37.3%		27.3%	37.3%		35.3%	35.3%	35.3%	35.3%	35.3%	
Maximum Green (s)	35.0	49.5		35.0	49.5		46.5	46.5	46.5	46.5	46.5	
Yellow Time (s)	4.0	3.7		4.0	3.7		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.8		2.0	2.8		2.8	2.8	2.8	2.8	2.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	6.0	6.5		6.0	6.5			6.5	6.5		6.5	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes			Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None	None	None	None	
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		11.0			11.0		13.0	13.0	13.0	13.0	13.0	
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	
Act Effct Green (s)	22.4	59.3		37.3	74.3			34.3	34.3		34.3	
Actuated g/C Ratio	0.15	0.40		0.25	0.50			0.23	0.23		0.23	
v/c Ratio	0.77	0.88		0.88	0.88			0.26	0.86		0.84	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	80.9	60.1		80.2	50.2			43.8	21.8		59.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0	2.8		0.0	
Total Delay	80.9	60.1		80.2	50.2			43.8	24.6		59.1	
LOS	F	E		F	D			D	C		E	
Approach Delay		65.4			60.1			26.7			59.1	
Approach LOS		E			E			C			E	
90th %ile Green (s)	30.2	49.5		35.0	54.3		46.5	46.5	46.5	46.5	46.5	
90th %ile Term Code	Gap	Coord		Max	Coord		Max	Max	Max	Hold	Hold	
70th %ile Green (s)	25.6	49.5		42.0	65.9		39.5	39.5	39.5	39.5	39.5	
70th %ile Term Code	Gap	Coord		Max	Coord		Hold	Hold	Hold	Gap	Gap	
50th %ile Green (s)	22.4	55.5		41.0	74.1		34.5	34.5	34.5	34.5	34.5	
50th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	
30th %ile Green (s)	19.2	64.0		37.6	82.4		29.4	29.4	29.4	29.4	29.4	
30th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	
10th %ile Green (s)	14.5	78.2		31.0	94.7		21.8	21.8	21.8	21.8	21.8	
10th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	
Queue Length 50th (m)	48.8	140.0		83.5	124.9			13.5	30.5		58.7	
Queue Length 95th (m)	32.4	#224.1		91.7 m	#244.3			14.5	8.1		37.3	
Internal Link Dist (m)		351.6			433.3			217.7			157.4	
Turn Bay Length (m)	30.0			80.0					20.0			
Base Capacity (vph)	374	606		361	722			384	764		336	
Starvation Cap Reductn	0	0		0	0			0	81		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.49	0.88		0.86	0.88			0.19	0.88		0.62	

Intersection Summary

Area Type: CBD
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 52.6 Intersection LOS: D
Intersection Capacity Utilization 80.4% ICU Level of Service D
Analysis Period (min) 15
Description: TMC June 26/19
Updated Sept 28/20
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 163: HICKORY ST & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	452	119	15	297	31	111	82	35	25	1	30
Future Volume (vph)	55	452	119	15	297	31	111	82	35	25	1	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.967			0.985			0.947			0.857	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1580	1662	0	1668	1661	0	1716	1743	0	1785	1492	0
Flt Permitted	0.515			0.271			0.605			0.669		
Satd. Flow (perm)	856	1662	0	476	1661	0	1093	1743	0	1257	1492	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			7			18			60	
Link Speed (k/h)		40			50			48			48	
Link Distance (m)		360.6			467.7			35.4			173.4	
Travel Time (s)		32.5			33.7			2.7			13.0	
Peak Hour Factor	0.63	0.81	0.75	0.94	0.96	0.91	0.79	0.92	0.73	0.69	0.40	0.50
Heavy Vehicles (%)	13%	10%	7%	7%	12%	6%	4%	0%	6%	0%	6%	8%
Adj. Flow (vph)	87	558	159	16	309	34	141	89	48	36	3	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	717	0	16	343	0	141	137	0	36	63	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			2		3	8			4	
Permitted Phases	2			2			8			4		
Minimum Split (s)	24.8	24.8		24.8	24.8		10.0	26.3		26.3	26.3	
Total Split (s)	102.0	102.0		102.0	102.0		10.0	48.0		38.0	38.0	
Total Split (%)	68.0%	68.0%		68.0%	68.0%		6.7%	32.0%		25.3%	25.3%	
Maximum Green (s)	96.2	96.2		96.2	96.2		4.0	42.7		32.7	32.7	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	3.7		3.7	3.7	
All-Red Time (s)	1.8	1.8		1.8	1.8		2.0	1.6		1.6	1.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.8	5.8		5.8	5.8		6.0	5.3		5.3	5.3	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0		7.0	7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0			14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0			0		0	0	
Act Effct Green (s)	96.2	96.2		96.2	96.2		42.0	42.7		32.7	32.7	
Actuated g/C Ratio	0.64	0.64		0.64	0.64		0.28	0.28		0.22	0.22	
v/c Ratio	0.16	0.67		0.05	0.32		0.44	0.27		0.13	0.17	
Control Delay	17.8	34.5		0.5	0.9		42.7	33.5		48.9	12.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.8	34.5		0.5	0.9		42.7	33.5		48.9	12.8	
LOS	B	C		A	A		D	C		D	B	
Approach Delay		32.7			0.9			38.2			26.0	
Approach LOS		C			A			D			C	
Queue Length 50th (m)	15.4	181.5		0.0	0.4		24.2	19.3		8.0	0.7	
Queue Length 95th (m)	m15.1	m174.6		m0.0	0.7		m35.1	m32.4		13.2	0.0	
Internal Link Dist (m)		336.6			443.7			11.4			149.4	
Turn Bay Length (m)												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	548	1072		305	1067		322	509		274	372	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.16	0.67		0.05	0.32		0.44	0.27		0.13	0.17	

Intersection Summary	
Area Type: Other	
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green	
Natural Cycle: 80	
Control Type: Pretimed	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 25.9	Intersection LOS: C
Intersection Capacity Utilization 68.4%	ICU Level of Service C
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

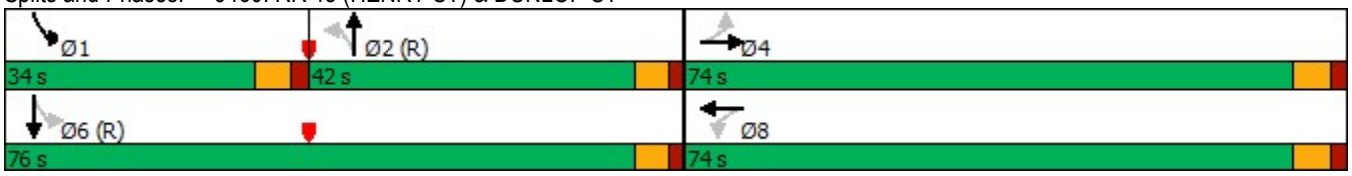
Splits and Phases: 656: HICKORY ST & MARY ST E

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	321	13	71	193	89	25	1	164	166	241	14
Future Volume (vph)	27	321	13	71	193	89	25	1	164	166	241	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.950			0.851			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1785	1869	0	1785	1750	0	1653	1599	0	1785	1846	0
Flt Permitted	0.444			0.351			0.581			0.384		
Satd. Flow (perm)	834	1869	0	659	1750	0	1011	1599	0	721	1846	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			22			219			3	
Link Speed (k/h)		48			50			50			50	
Link Distance (m)		418.0			407.9			725.2			227.2	
Travel Time (s)		31.4			29.4			52.2			16.4	
Peak Hour Factor	0.75	0.75	0.81	0.63	0.84	0.77	0.63	0.89	0.75	0.70	0.87	0.88
Heavy Vehicles (%)	0%	0%	0%	0%	1%	4%	8%	1%	0%	0%	1%	0%
Adj. Flow (vph)	36	428	16	113	230	116	40	1	219	237	277	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	36	444	0	113	346	0	40	220	0	237	293	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	24.2	24.2		24.2	24.2		26.0	26.0		11.0	26.0	
Total Split (s)	74.0	74.0		74.0	74.0		42.0	42.0		34.0	76.0	
Total Split (%)	49.3%	49.3%		49.3%	49.3%		28.0%	28.0%		22.7%	50.7%	
Maximum Green (s)	67.8	67.8		67.8	67.8		36.3	36.3		28.0	70.3	
Yellow Time (s)	4.2	4.2		4.2	4.2		3.7	3.7		4.0	3.7	
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		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.2	6.2		6.2	6.2		5.7	5.7		6.0	5.7	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		9.0	9.0			9.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	
Act Effct Green (s)	67.8	67.8		67.8	67.8		36.3	36.3		70.0	70.3	
Actuated g/C Ratio	0.45	0.45		0.45	0.45		0.24	0.24		0.47	0.47	
v/c Ratio	0.10	0.53		0.38	0.43		0.16	0.40		0.44	0.34	
Control Delay	18.3	25.0		27.1	22.7		47.2	7.7		19.9	19.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	18.3	25.0		27.1	22.7		47.2	7.7		19.9	19.5	
LOS	B	C		C	C		D	A		B	B	
Approach Delay		24.5			23.8			13.8			19.7	
Approach LOS		C			C			B			B	
Queue Length 50th (m)	4.4	76.8		13.0	36.8		8.7	0.2		39.0	52.5	
Queue Length 95th (m)	7.7	76.6		m19.0	m60.9		12.6	18.6		36.9	m61.0	
Internal Link Dist (m)		394.0			383.9			701.2			203.2	
Turn Bay Length (m)												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	376	845		297	803		244	552		535	866	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.10	0.53		0.38	0.43		0.16	0.40		0.44	0.34	

Intersection Summary	
Area Type: Other	
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 65	
Control Type: Pretimed	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 21.2	Intersection LOS: C
Intersection Capacity Utilization 77.5%	ICU Level of Service D
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 9460: RR 45 (HENRY ST) & DUNLOP ST

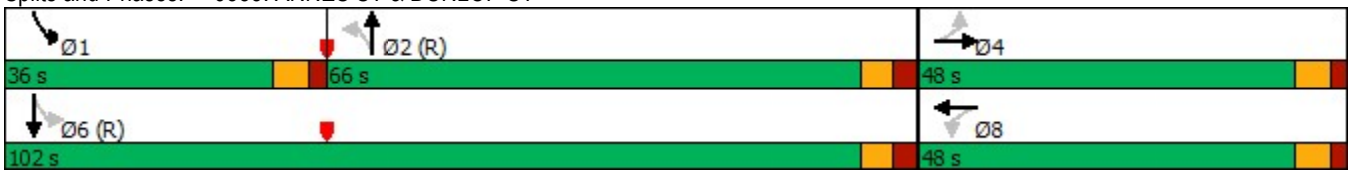


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	101	12	33	62	110	7	222	65	176	373	55
Future Volume (vph)	26	101	12	33	62	110	7	222	65	176	373	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982			0.899			0.964			0.976	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1785	1845	0	1785	1678	0	1785	1784	0	1750	1803	0
Flt Permitted	0.486			0.632			0.478			0.397		
Satd. Flow (perm)	913	1845	0	1187	1678	0	898	1784	0	731	1803	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			69			13			12	
Link Speed (k/h)		48			48			48			50	
Link Distance (m)		208.7			418.0			214.5			219.5	
Travel Time (s)		15.7			31.4			16.1			15.8	
Peak Hour Factor	0.81	0.87	0.75	0.75	0.86	0.74	0.58	0.90	0.83	0.77	0.88	0.69
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	2%	0%	2%	2%	0%
Adj. Flow (vph)	32	116	16	44	72	149	12	247	78	229	424	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	132	0	44	221	0	12	325	0	229	504	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	26.0	26.0		22.8	22.8		22.5	22.5		10.0	22.5	
Total Split (s)	48.0	48.0		48.0	48.0		66.0	66.0		36.0	102.0	
Total Split (%)	32.0%	32.0%		32.0%	32.0%		44.0%	44.0%		24.0%	68.0%	
Maximum Green (s)	42.0	42.0		42.0	42.0		59.5	59.5		30.0	95.5	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.7	3.7		4.0	3.7	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.8	2.8		2.0	2.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.5	6.5		6.0	6.5	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?												
Walk Time (s)	11.0	11.0		11.0	11.0		11.0	11.0			11.0	
Flash Dont Walk (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	
Act Effct Green (s)	42.0	42.0		42.0	42.0		59.5	59.5		96.0	95.5	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.40	0.40		0.64	0.64	
v/c Ratio	0.13	0.25		0.13	0.43		0.03	0.45		0.34	0.44	
Control Delay	42.1	41.8		39.8	30.2		28.3	34.4		11.2	13.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.4	
Total Delay	42.1	41.8		39.8	30.2		28.3	34.4		11.2	14.0	
LOS	D	D		D	C		C	C		B	B	
Approach Delay		41.9			31.8			34.2			13.1	
Approach LOS		D			C			C			B	
Queue Length 50th (m)	6.6	27.1		7.8	26.4		2.0	62.5		28.2	67.1	
Queue Length 95th (m)	13.4	42.3		11.0	30.4		3.9	88.2		34.6	85.5	
Internal Link Dist (m)		184.7			394.0			190.5			195.5	
Turn Bay Length (m)												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	255	520		332	519		356	715		671	1152	
Starvation Cap Reductn	0	0		0	0		0	0		0	242	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.13	0.25		0.13	0.43		0.03	0.45		0.34	0.55	

Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.45	
Intersection Signal Delay: 24.3	Intersection LOS: C
Intersection Capacity Utilization 67.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 9553: ANNES ST & DUNLOP ST



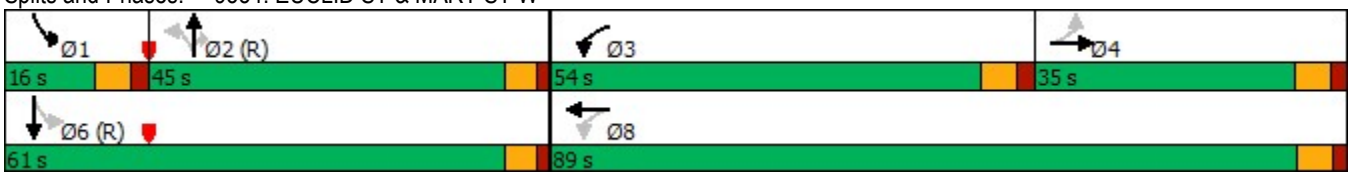
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	64	7	501	40	52	7	160	461	183	14	1
Future Volume (vph)	2	64	7	501	40	52	7	160	461	183	14	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		20.0	0.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982			0.899				0.850		0.973	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1785	1845	0	1785	1689	0	1785	1879	1597	1785	1828	0
Flt Permitted	0.664			0.552			0.743			0.442		
Satd. Flow (perm)	1248	1845	0	1037	1689	0	1396	1879	1597	830	1828	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			98				316		4	
Link Speed (k/h)		48			50			50			48	
Link Distance (m)		208.2			409.8			234.4			259.5	
Travel Time (s)		15.6			29.5			16.9			19.5	
Peak Hour Factor	0.25	0.73	0.58	0.75	0.83	0.53	0.88	0.83	0.95	0.90	0.80	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	8	88	12	668	48	98	8	193	485	203	18	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	8	100	0	668	146	0	8	193	485	203	22	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8			2		2	6		
Minimum Split (s)	25.0	25.0		10.0	24.8		26.3	26.3	26.3	10.0	26.3	
Total Split (s)	35.0	35.0		54.0	89.0		45.0	45.0	45.0	16.0	61.0	
Total Split (%)	23.3%	23.3%		36.0%	59.3%		30.0%	30.0%	30.0%	10.7%	40.7%	
Maximum Green (s)	29.0	29.0		48.0	83.2		39.7	39.7	39.7	10.0	55.7	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.7	3.7	3.7	4.0	3.7	
All-Red Time (s)	2.0	2.0		2.0	1.8		1.6	1.6	1.6	2.0	1.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	5.8		5.3	5.3	5.3	6.0	5.3	
Lead/Lag	Lag	Lag		Lead			Lag	Lag	Lag	Lead		
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0			7.0		7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0			12.0		14.0	14.0	14.0		14.0	
Pedestrian Calls (#/hr)	0	0			0		0	0	0		0	
Act Effct Green (s)	29.0	29.0		83.0	83.2		39.7	39.7	39.7	55.0	55.7	
Actuated g/C Ratio	0.19	0.19		0.55	0.55		0.26	0.26	0.26	0.37	0.37	
v/c Ratio	0.03	0.28		0.82	0.15		0.02	0.39	0.74	0.55	0.03	
Control Delay	50.0	51.9		53.0	20.0		46.6	54.9	41.1	41.1	26.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	50.0	51.9		53.0	20.0		46.6	54.9	41.1	41.1	26.1	
LOS	D	D		D	C		D	D	D	D	C	
Approach Delay		51.8			47.1			45.1			39.6	
Approach LOS		D			D			D			D	
Queue Length 50th (m)	1.8	22.7		164.2	15.1		2.0	55.7	84.6	39.7	3.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	1.8	30.8		167.8	m24.5		m2.5	m73.0	106.2	59.0	7.8	
Internal Link Dist (m)		184.2			385.8			210.4			235.5	
Turn Bay Length (m)									20.0			
Base Capacity (vph)	241	359		813	980		369	497	655	368	681	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.03	0.28		0.82	0.15		0.02	0.39	0.74	0.55	0.03	

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Pretimed
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 45.7 Intersection LOS: D
Intersection Capacity Utilization 81.4% ICU Level of Service D
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9554: EUCLID ST & MARY ST W

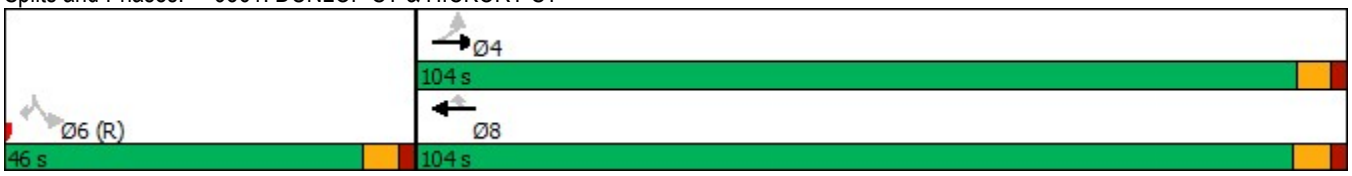


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	378	82	58	9	47	202
Future Volume (vph)	378	82	58	9	47	202
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1785	1879	1824	1597	1785	1566
Flt Permitted	0.716				0.950	
Satd. Flow (perm)	1345	1879	1824	1597	1785	1566
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				10		220
Link Speed (k/h)		50	48		50	
Link Distance (m)		373.1	229.4		241.7	
Travel Time (s)		26.9	17.2		17.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	3%	0%	0%	2%
Adj. Flow (vph)	411	89	63	10	51	220
Shared Lane Traffic (%)						
Lane Group Flow (vph)	411	89	63	10	51	220
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			
Permitted Phases	4			8	6	6
Minimum Split (s)	26.0	26.0	22.2	22.2	22.0	22.0
Total Split (s)	104.0	104.0	104.0	104.0	46.0	46.0
Total Split (%)	69.3%	69.3%	69.3%	69.3%	30.7%	30.7%
Maximum Green (s)	98.3	98.3	97.8	97.8	40.0	40.0
Yellow Time (s)	3.7	3.7	4.2	4.2	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	6.2	6.2	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	9.0	9.0	9.0	9.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	98.3	98.3	97.8	97.8	40.0	40.0
Actuated g/C Ratio	0.66	0.66	0.65	0.65	0.27	0.27
v/c Ratio	0.47	0.07	0.05	0.01	0.11	0.38
Control Delay	16.4	12.6	9.6	4.3	22.4	16.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.4	12.6	9.6	4.3	22.4	16.5
LOS	B	B	A	A	C	B
Approach Delay		15.8	8.9		17.6	
Approach LOS		B	A		B	
Queue Length 50th (m)	48.8	9.5	5.9	0.0	14.1	41.8
Queue Length 95th (m)	m59.4	m13.0	10.9	2.0	m11.2	m55.7
Internal Link Dist (m)		349.1	205.4		217.7	
Turn Bay Length (m)						

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Base Capacity (vph)	881	1231	1189	1044	476	578
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.07	0.05	0.01	0.11	0.38

Intersection Summary	
Area Type: Other	
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green	
Natural Cycle: 50	
Control Type: Pretimed	
Maximum v/c Ratio: 0.47	
Intersection Signal Delay: 15.7	Intersection LOS: B
Intersection Capacity Utilization 44.0%	ICU Level of Service A
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 9561: DUNLOP ST & HICKORY ST



Lanes, Volumes, Timings
1: DUNDAS ST & HICKORY ST

03/24/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	526	1	35	446	5	3	14	31	63	17	9
Future Volume (vph)	114	526	1	35	446	5	3	14	31	63	17	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	80.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	1606	1537	0	1422	1547	0	0	1301	0	0	1459	0
Flt Permitted	0.950			0.950				0.984			0.799	
Satd. Flow (perm)	1577	1537	0	1384	1547	0	0	1282	0	0	1192	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					1			34			4	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		339.9			146.3			123.7			200.2	
Travel Time (s)		24.5			10.5			8.9			14.4	
Confl. Peds. (#/hr)	11		18	18		11	9		6	6		9
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	10%	0%	13%	9%	11%	8%	8%	19%	6%	22%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	124	573	0	38	490	0	0	52	0	0	96	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Detector Phase	1	6		5	2		8	8		4	4	
Switch Phase												
Minimum Initial (s)	4.0	20.0		4.0	20.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	9.4	25.9		9.4	25.9		25.4	25.4		25.4	25.4	
Total Split (s)	27.0	85.0		16.0	74.0		29.0	29.0		29.0	29.0	
Total Split (%)	20.8%	65.4%		12.3%	56.9%		22.3%	22.3%		22.3%	22.3%	
Yellow Time (s)	3.7	3.8		3.7	3.8		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.7	1.7		1.7	1.7		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.4	5.5		5.4	5.5			5.4			5.4	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?		Yes		Yes	Yes							
Recall Mode	Max	C-Max		Max	C-Max		None	None		None	None	
Act Effct Green (s)	29.7	79.5		18.7	68.5			15.5			15.5	
Actuated g/C Ratio	0.23	0.61		0.14	0.53			0.12			0.12	
v/c Ratio	0.34	0.61		0.19	0.60			0.29			0.66	
Control Delay	46.9	19.1		54.9	25.1			26.8			72.7	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	46.9	19.1		54.9	25.1			26.8			72.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	B		D	C			C			E	
Approach Delay		24.1			27.3			26.8			72.7	
Approach LOS		C			C			C			E	
Queue Length 50th (m)	24.6	79.2		8.0	77.3			3.9			21.1	
Queue Length 95th (m)	44.6	111.9		19.0	109.8			14.4			36.3	
Internal Link Dist (m)		315.9			122.3			99.7			176.2	
Turn Bay Length (m)	30.0			80.0								
Base Capacity (vph)	367	939		204	815			260			219	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.34	0.61		0.19	0.60			0.20			0.44	

Intersection Summary

Area Type: CBD
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.66
Intersection Signal Delay: 28.8 Intersection LOS: C
Intersection Capacity Utilization 61.1% ICU Level of Service B
Analysis Period (min) 15
Description: 2041 IBI BRT Volumes

Splits and Phases: 1: DUNDAS ST & HICKORY ST

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	564	13	0	0	0	0	0	12	0	0	425
Future Volume (vph)	0	564	13	0	0	0	0	0	12	0	0	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.4	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1816	0	0	0	0	0	0	1593	0	0	1593
Flt Permitted												
Satd. Flow (perm)	0	1816	0	0	0	0	0	0	1593	0	0	1593
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		29.0			106.9			182.6			76.0	
Travel Time (s)		2.1			7.7			13.1			5.5	
Confl. Peds. (#/hr)						21						
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	627	0	0	0	0	0	0	13	0	0	462
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 40.5%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	231	5	320	601	20	5	100	10	10	100	5
Future Volume (vph)	5	231	5	320	601	20	5	100	10	10	100	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1649	0	0	1700	0	0	1837	0	0	1846	0
Flt Permitted		0.999			0.983			0.998			0.996	
Satd. Flow (perm)	0	1649	0	0	1700	0	0	1837	0	0	1846	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		85.0			119.5			122.1			70.9	
Travel Time (s)		6.4			9.0			9.2			5.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	14%	0%	0%	13%	0%	0%	1%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	261	0	0	1023	0	0	125	0	0	125	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	82.7%
ICU Level of Service	E
Analysis Period (min)	15

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	170	75	14	196	15	9	92	6	27	16	26
Future Volume (vph)	16	170	75	14	196	15	9	92	6	27	16	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1602	0	0	1714	0	0	1583	0	0	1608	0
Flt Permitted		0.997			0.997			0.996			0.981	
Satd. Flow (perm)	0	1602	0	0	1714	0	0	1583	0	0	1608	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		322.3			155.6			200.2			90.4	
Travel Time (s)		24.2			11.7			15.0			6.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	14%	10%	7%	9%	0%	22%	18%	0%	7%	13%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	284	0	0	244	0	0	117	0	0	74	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 35.7%	ICU Level of Service A
Analysis Period (min) 15	
Description: 2041 Background Volumes	

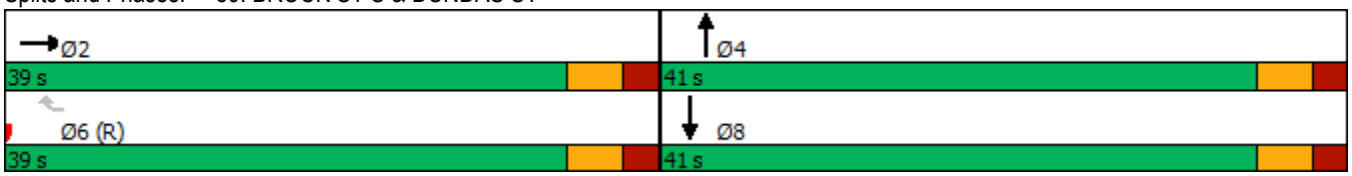
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	525	51	0	0	439	0	491	20	0	609	0
Future Volume (vph)	0	525	51	0	0	439	0	491	20	0	609	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.4	3.4	3.4	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		24.2	40.0		40.0	0.0		0.0	0.0		16.9
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	0.0			0.0			0.0			0.0		
Satd. Flow (prot)	0	1605	0	0	0	1340	0	1624	0	0	1658	0
Flt Permitted												
Satd. Flow (perm)	0	1605	0	0	0	1181	0	1624	0	0	1658	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				143		3				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		106.9			339.9			239.3			74.0	
Travel Time (s)		7.7			24.5			17.2			5.3	
Confl. Peds. (#/hr)	48		45	45		48	83		75	75		83
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	0%	0%	2%	3%	0%	3%	0%	0%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	626	0	0	0	477	0	556	0	0	662	0
Turn Type		NA				Perm		NA			NA	
Protected Phases		2						4			8	
Permitted Phases						6						
Detector Phase		2				6		4			8	
Switch Phase												
Minimum Initial (s)		8.0				8.0		8.0			8.0	
Minimum Split (s)		24.0				24.5		24.5			24.5	
Total Split (s)		39.0				39.0		41.0			41.0	
Total Split (%)		48.8%				48.8%		51.3%			51.3%	
Yellow Time (s)		3.3				3.3		3.3			3.3	
All-Red Time (s)		2.2				2.2		2.2			2.2	
Lost Time Adjust (s)		0.0				0.0		0.0			0.0	
Total Lost Time (s)		5.5				5.5		5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		Max				C-Max		None			None	
Act Effct Green (s)		34.8				34.8		34.2			34.2	
Actuated g/C Ratio		0.44				0.44		0.43			0.43	
v/c Ratio		0.89				0.80		0.80			0.94	
Control Delay		39.2				26.7		29.9			42.3	
Queue Delay		0.0				0.0		0.0			0.0	
Total Delay		39.2				26.7		29.9			42.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		D				C		C			D	
Approach Delay		39.2			26.7			29.9			42.3	
Approach LOS		D			C			C			D	
Queue Length 50th (m)		79.9				41.4		62.9			100.2	
Queue Length 95th (m)		#140.6				#93.2		#103.3			m#116.6	
Internal Link Dist (m)		82.9			315.9			215.3			50.0	
Turn Bay Length (m)						40.0						
Base Capacity (vph)		702				594		722			735	
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		0.89				0.80		0.77			0.90	

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 6:WBR, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 35.3 Intersection LOS: D
Intersection Capacity Utilization 79.2% 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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 89: BROCK ST S & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	165	12	39	175	173	340	367	16	53	451	426
Future Volume (vph)	74	165	12	39	175	173	340	367	16	53	451	426
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	40.0		0.0	40.0		0.0	34.0		0.0	45.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	25.0			25.0			29.3			25.0		
Satd. Flow (prot)	1434	1478	0	1422	1455	0	1306	1436	0	1447	1523	1319
Flt Permitted	0.279			0.615			0.205			0.519		
Satd. Flow (perm)	421	1478	0	920	1455	0	282	1436	0	791	1523	1319
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			60			5				318
Link Speed (k/h)		48			48			50			48	
Link Distance (m)		119.5			322.3			133.4			69.9	
Travel Time (s)		9.0			24.2			9.6			5.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	12%	13%	17%	13%	7%	8%	23%	17%	19%	11%	11%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	80	192	0	42	378	0	370	416	0	58	490	463
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	22.5	22.5		22.5	22.5		10.5	22.5		22.5	22.5	22.5
Total Split (s)	27.0	27.0		27.0	27.0		19.0	53.0		34.0	34.0	34.0
Total Split (%)	33.8%	33.8%		33.8%	33.8%		23.8%	66.3%		42.5%	42.5%	42.5%
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7		3.7	3.7	3.7
All-Red Time (s)	2.8	2.8		2.8	2.8		2.8	2.8		2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5		6.5	6.5		6.5	6.5		6.5	6.5	6.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	19.8	19.8		19.8	19.8		47.2	47.2		27.5	27.5	27.5
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.59	0.59		0.34	0.34	0.34
v/c Ratio	0.77	0.52		0.19	0.93		1.11	0.49		0.21	0.94	0.70
Control Delay	74.5	31.0		25.8	57.4		89.5	9.9		21.2	54.3	13.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	74.5	31.0		25.8	57.4		89.5	9.9		21.2	54.3	13.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	C		C	E		F	A		C	D	B
Approach Delay		43.8			54.2			47.4			33.8	
Approach LOS		D			D			D			C	
Queue Length 50th (m)	10.3	22.4		4.6	43.7		~41.3	29.7		5.7	65.4	14.7
Queue Length 95th (m)	#31.7	40.4		12.1	#90.2		m#73.2	m43.8		13.8	#118.1	47.0
Internal Link Dist (m)		95.5			298.3			109.4			45.9	
Turn Bay Length (m)	40.0			40.0			34.0			45.0		
Base Capacity (vph)	107	381		235	417		334	848		271	523	662
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.75	0.50		0.18	0.91		1.11	0.49		0.21	0.94	0.70

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.11
Intersection Signal Delay: 42.6 Intersection LOS: D
Intersection Capacity Utilization 95.5% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 90: BROCK ST & MARY ST'

Lanes, Volumes, Timings
4: HICKORY ST & DUNDAS ST

03/24/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	722	3	101	373	19	13	39	74	114	18	7
Future Volume (vph)	84	722	3	101	373	19	13	39	74	114	18	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	80.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	1526	1662	0	1700	1644	0	0	1488	0	0	1619	0
Flt Permitted	0.950			0.950				0.962			0.579	
Satd. Flow (perm)	1501	1662	0	1694	1644	0	0	1435	0	0	970	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					3			49			2	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		362.3			127.9			74.3			212.9	
Travel Time (s)		26.1			9.2			5.3			15.3	
Confl. Peds. (#/hr)	8		3	3		8	11		3	3		11
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	17%	13%	0%	5%	13%	17%	0%	33%	6%	11%	0%	27%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	788	0	110	426	0	0	136	0	0	152	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Detector Phase	1	6		5	2		8	8		4	4	
Switch Phase												
Minimum Initial (s)	4.0	20.0		4.0	20.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	10.5	26.5		10.5	26.5		26.5	26.5		26.5	26.5	
Total Split (s)	21.6	79.0		19.0	76.4		32.0	32.0		32.0	32.0	
Total Split (%)	16.6%	60.8%		14.6%	58.8%		24.6%	24.6%		24.6%	24.6%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7		3.7	3.7	
All-Red Time (s)	2.8	2.8		2.8	2.8		2.8	2.8		2.8	2.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.5	6.5		6.5	6.5			6.5			6.5	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Recall Mode	Max	C-Max		Max	C-Max		None	None		None	None	
Act Effct Green (s)	18.0	72.5		15.4	69.9			22.6			22.6	
Actuated g/C Ratio	0.14	0.56		0.12	0.54			0.17			0.17	
v/c Ratio	0.43	0.85		0.55	0.48			0.47			0.89	
Control Delay	60.1	34.9		66.5	20.9			35.2			97.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	60.1	34.9		66.5	20.9			35.2			97.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	C		E	C			D			F	
Approach Delay		37.5			30.3			35.2			97.3	
Approach LOS		D			C			D			F	
Queue Length 50th (m)	20.5	150.1		25.5	60.0			17.8			34.0	
Queue Length 95th (m)	37.1	#211.1		#48.7	85.3			36.2			#67.1	
Internal Link Dist (m)		338.3			103.9			50.3			188.9	
Turn Bay Length (m)	30.0			80.0								
Base Capacity (vph)	211	926		201	885			320			191	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.43	0.85		0.55	0.48			0.42			0.80	

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 40.4 Intersection LOS: D
Intersection Capacity Utilization 75.1% ICU Level of Service D
Analysis Period (min) 15
Description: 2041 IBI BRT Volumes
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: HICKORY ST & DUNDAS ST

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	761	15	0	0	0	0	0	16	0	0	425
Future Volume (vph)	0	761	15	0	0	0	0	0	16	0	0	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.4	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1816	0	0	0	0	0	0	1593	0	0	1593
Flt Permitted												
Satd. Flow (perm)	0	1816	0	0	0	0	0	0	1593	0	0	1593
Link Speed (k/h)		50			50			48			48	
Link Distance (m)		29.0			106.9			182.6			76.0	
Travel Time (s)		2.1			7.7			13.7			5.7	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	843	0	0	0	0	0	0	17	0	0	462
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 51.0%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	609	5	320	454	20	5	100	10	10	100	5
Future Volume (vph)	5	609	5	320	454	20	5	100	10	10	100	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1650	0	0	1709	0	0	1837	0	0	1846	0
Flt Permitted					0.980			0.998			0.996	
Satd. Flow (perm)	0	1650	0	0	1709	0	0	1837	0	0	1846	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		85.0			119.5			122.1			70.9	
Travel Time (s)		6.4			9.0			9.2			5.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	14%	0%	0%	13%	0%	0%	1%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	672	0	0	863	0	0	125	0	0	125	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	94.8%
	ICU Level of Service F
Analysis Period (min)	15

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	418	125	15	130	31	23	61	35	25	16	13
Future Volume (vph)	15	418	125	15	130	31	23	61	35	25	16	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1664	0	0	1653	0	0	1741	0	0	1712	0
Flt Permitted		0.999			0.996			0.990			0.977	
Satd. Flow (perm)	0	1664	0	0	1653	0	0	1741	0	0	1712	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		354.9			95.1			212.9			63.8	
Travel Time (s)		26.6			7.1			16.0			4.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	13%	10%	7%	7%	12%	6%	4%	0%	6%	0%	6%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	606	0	0	191	0	0	129	0	0	58	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 46.8%	ICU Level of Service A
Analysis Period (min) 15	
Description: 2041 Background Volumes	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	740	37	0	0	415	0	508	26	0	601	0
Future Volume (vph)	0	740	37	0	0	415	0	508	26	0	601	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.4	3.4	3.4	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		24.2	40.0		40.0	0.0		0.0	0.0		16.9
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	0.0			0.0			0.0			0.0		
Satd. Flow (prot)	0	1592	0	0	0	1340	0	1604	0	0	1642	0
Flt Permitted												
Satd. Flow (perm)	0	1592	0	0	0	1181	0	1604	0	0	1642	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				87		4				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		106.9			362.3			239.3			74.0	
Travel Time (s)		7.7			26.1			17.2			5.3	
Confl. Peds. (#/hr)	48		45	45		48	83		75	75		83
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	4%	0%	0%	3%	3%	0%	4%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	844	0	0	0	451	0	580	0	0	653	0
Turn Type		NA				Perm		NA			NA	
Protected Phases		2						4			8	
Permitted Phases						6						
Detector Phase		2				6		4			8	
Switch Phase												
Minimum Initial (s)		8.0				8.0		8.0			8.0	
Minimum Split (s)		24.0				24.5		24.5			24.5	
Total Split (s)		45.0				45.0		35.0			35.0	
Total Split (%)		56.3%				56.3%		43.8%			43.8%	
Yellow Time (s)		3.3				3.3		3.3			3.3	
All-Red Time (s)		2.2				2.2		2.2			2.2	
Lost Time Adjust (s)		0.0				0.0		0.0			0.0	
Total Lost Time (s)		5.5				5.5		5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		Max				C-Max		None			None	
Act Effct Green (s)		39.5				39.5		29.5			29.5	
Actuated g/C Ratio		0.49				0.49		0.37			0.37	
v/c Ratio		1.07				0.72		0.98			1.08	
Control Delay		75.5				20.6		58.8			89.3	
Queue Delay		0.0				0.0		0.0			0.0	
Total Delay		75.5				20.6		58.8			89.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		E				C		E			F	
Approach Delay		75.5			20.6			58.8			89.3	
Approach LOS		E			C			E			F	
Queue Length 50th (m)		~133.2				37.8		78.0			~106.9	
Queue Length 95th (m)		#195.4				72.4		#138.1			#165.1	
Internal Link Dist (m)		82.9			338.3			215.3			50.0	
Turn Bay Length (m)						40.0						
Base Capacity (vph)		788				627		594			605	
Starvation Cap Reductn		0				0		0			0	
Spillback Cap Reductn		0				0		0			0	
Storage Cap Reductn		0				0		0			0	
Reduced v/c Ratio		1.07				0.72		0.98			1.08	

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 6:WBR, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.08
Intersection Signal Delay: 65.4 Intersection LOS: E
Intersection Capacity Utilization 90.3% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 89: BROCK ST S & DUNDAS ST

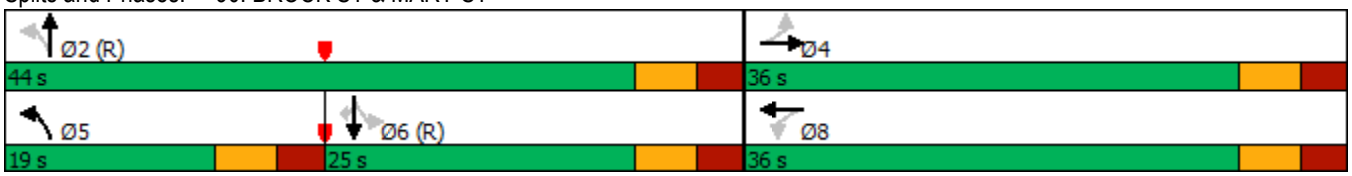
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	239	353	37	33	91	178	329	523	36	83	239	374
Future Volume (vph)	239	353	37	33	91	178	329	523	36	83	239	374
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	40.0		0.0	40.0		60.0	34.0		0.0	45.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	25.0			25.0			29.3			25.0		
Satd. Flow (prot)	1474	1540	0	1516	1326	0	1460	1506	0	1422	1510	1295
Flt Permitted	0.507			0.340			0.365			0.435		
Satd. Flow (perm)	787	1540	0	542	1326	0	561	1506	0	651	1510	1295
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			139			6				407
Link Speed (k/h)		48			48			50			48	
Link Distance (m)		119.5			354.9			133.4			69.9	
Travel Time (s)		9.0			26.6			9.6			5.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	9%	8%	11%	6%	7%	19%	10%	11%	14%	13%	12%	11%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	260	424	0	36	292	0	358	607	0	90	260	407
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	22.5	22.5		22.5	22.5		10.5	22.5		22.5	22.5	22.5
Total Split (s)	36.0	36.0		36.0	36.0		19.0	44.0		25.0	25.0	25.0
Total Split (%)	45.0%	45.0%		45.0%	45.0%		23.8%	55.0%		31.3%	31.3%	31.3%
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7		3.7	3.7	3.7
All-Red Time (s)	2.8	2.8		2.8	2.8		2.8	2.8		2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5		6.5	6.5		6.5	6.5		6.5	6.5	6.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	28.0	28.0		28.0	28.0		39.0	39.0		19.6	19.6	19.6
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.49	0.49		0.24	0.24	0.24
v/c Ratio	0.95	0.78		0.19	0.53		0.86	0.82		0.57	0.70	0.65
Control Delay	69.9	34.1		20.3	13.9		27.0	22.7		44.0	40.4	8.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	69.9	34.1		20.3	13.9		27.0	22.7		44.0	40.4	8.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	C		C	B		C	C		D	D	A
Approach Delay		47.7			14.6			24.3			23.7	
Approach LOS		D			B			C			C	
Queue Length 50th (m)	33.6	49.7		3.4	15.0		24.0	69.2		11.3	33.9	0.0
Queue Length 95th (m)	#73.6	#84.4		9.6	35.4		m#42.0	m103.6		#29.8	#64.9	22.4
Internal Link Dist (m)		95.5			330.9			109.4			45.9	
Turn Bay Length (m)	40.0			40.0			34.0			45.0		
Base Capacity (vph)	290	572		199	576		418	737		159	370	624
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.90	0.74		0.18	0.51		0.86	0.82		0.57	0.70	0.65

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 28.8 Intersection LOS: C
Intersection Capacity Utilization 92.0% ICU Level of Service F
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 90: BROCK ST & MARY ST



Lanes, Volumes, Timings
4: DUNDAS ST & HICKORY

03/24/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	526	1	35	346	105	3	14	31	63	17	9
Future Volume (vph)	114	526	1	35	346	105	3	14	31	63	17	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	80.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	1785	1708	0	1580	1635	0	0	1445	0	0	1621	0
Flt Permitted	0.950			0.950				0.983			0.800	
Satd. Flow (perm)	1753	1708	0	1538	1635	0	0	1423	0	0	1326	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					18			34			4	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		340.4			151.6			109.3			200.9	
Travel Time (s)		24.5			10.9			7.9			14.5	
Confl. Peds. (#/hr)	11		18	18		11	9		6	6		9
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	10%	0%	13%	9%	11%	8%	8%	19%	6%	22%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	124	573	0	38	490	0	0	52	0	0	96	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Detector Phase	1	6		5	2		8	8		4	4	
Switch Phase												
Minimum Initial (s)	4.0	20.0		4.0	20.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	10.8	25.9		10.8	25.9		25.4	25.4		25.4	25.4	
Total Split (s)	26.0	86.0		16.0	76.0		28.0	28.0		28.0	28.0	
Total Split (%)	20.0%	66.2%		12.3%	58.5%		21.5%	21.5%		21.5%	21.5%	
Yellow Time (s)	3.7	3.8		3.7	3.8		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.7	1.7		1.7	1.7		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.4	5.5		5.4	5.5			5.4			5.4	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?		Yes		Yes	Yes							
Recall Mode	Max	C-Max		Max	C-Max		None	None		None	None	
Act Effct Green (s)	28.8	80.5		18.8	70.5			14.4			14.4	
Actuated g/C Ratio	0.22	0.62		0.14	0.54			0.11			0.11	
v/c Ratio	0.31	0.54		0.17	0.55			0.28			0.64	
Control Delay	46.7	16.6		53.8	21.4			27.0			71.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	46.7	16.6		53.8	21.4			27.0			71.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	B		D	C			C			E	
Approach Delay		21.9			23.8			27.0			71.0	
Approach LOS		C			C			C			E	
Queue Length 50th (m)	24.7	72.9		8.0	69.9			3.9			21.1	
Queue Length 95th (m)	44.0	100.8		18.8	99.0			14.6			36.4	
Internal Link Dist (m)		316.4			127.6			85.3			176.9	
Turn Bay Length (m)	30.0			80.0								
Base Capacity (vph)	395	1057		228	894			275			233	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.31	0.54		0.17	0.55			0.19			0.41	

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 26.3 Intersection LOS: C
Intersection Capacity Utilization 57.7% ICU Level of Service B
Analysis Period (min) 15
Description: 2041 IBI BRT Volumes

Splits and Phases: 4: DUNDAS ST & HICKORY

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	564	13	0	0	0	0	0	12	0	0	425
Future Volume (vph)	0	564	13	0	0	0	0	0	12	0	0	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.4	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1816	0	0	0	0	0	0	1593	0	0	1593
Flt Permitted												
Satd. Flow (perm)	0	1816	0	0	0	0	0	0	1593	0	0	1593
Link Speed (k/h)		50			50			48			48	
Link Distance (m)		29.0			106.9			182.6			76.0	
Travel Time (s)		2.1			7.7			13.7			5.7	
Confl. Peds. (#/hr)						21						
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	627	0	0	0	0	0	0	13	0	0	462
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 40.5%	ICU Level of Service A
Analysis Period (min) 15	

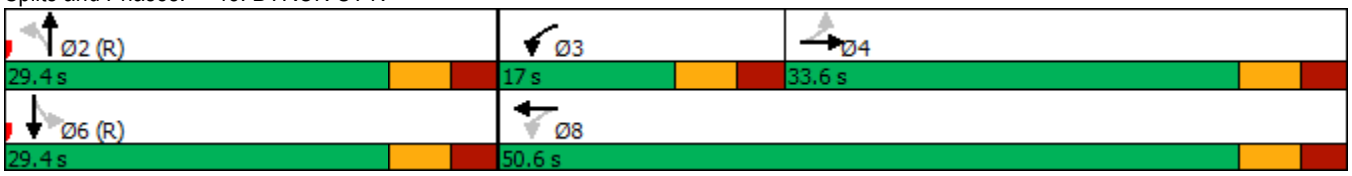
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	231	5	320	601	20	5	100	10	10	100	5
Future Volume (vph)	5	231	5	320	601	20	5	100	10	10	100	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	50.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1649	0	1785	1661	0	0	1837	0	0	1846	0
Flt Permitted		0.986		0.444				0.989			0.972	
Satd. Flow (perm)	0	1628	0	834	1661	0	0	1820	0	0	1801	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			3			6			3	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		85.0			119.5			122.1			70.9	
Travel Time (s)		6.4			9.0			9.2			5.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	14%	0%	0%	13%	0%	0%	1%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	261	0	348	675	0	0	125	0	0	125	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	33.5	33.5		10.5	33.5		28.5	28.5		28.5	28.5	
Total Split (s)	33.6	33.6		17.0	50.6		29.4	29.4		29.4	29.4	
Total Split (%)	42.0%	42.0%		21.3%	63.3%		36.8%	36.8%		36.8%	36.8%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7		3.7	3.7	
All-Red Time (s)	2.8	2.8		2.8	2.8		2.8	2.8		2.8	2.8	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)		6.5		6.5	6.5			6.5			6.5	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Act Effct Green (s)		27.1		44.1	44.1			22.9			22.9	
Actuated g/C Ratio		0.34		0.55	0.55			0.29			0.29	
v/c Ratio		0.47		0.60	0.74			0.24			0.24	
Control Delay		24.2		15.1	18.9			22.3			22.9	
Queue Delay		0.0		0.0	3.0			0.0			0.0	
Total Delay		24.2		15.1	21.9			22.3			22.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C		B	C			C			C	
Approach Delay		24.2			19.6			22.3			22.9	
Approach LOS		C			B			C			C	
Queue Length 50th (m)		28.2		28.7	61.4			12.7			13.0	
Queue Length 95th (m)		47.5		m43.2	m89.0			24.5			24.9	
Internal Link Dist (m)		61.0			95.5			98.1			46.9	
Turn Bay Length (m)				50.0								
Base Capacity (vph)		552		584	916			525			517	
Starvation Cap Reductn		0		0	147			0			0	
Spillback Cap Reductn		0		0	0			0			0	
Storage Cap Reductn		0		0	0			0			0	
Reduced v/c Ratio		0.47		0.60	0.88			0.24			0.24	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Pretimed
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 20.9 Intersection LOS: C
Intersection Capacity Utilization 71.2% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 45: BYRON ST N



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	170	75	14	196	15	109	92	6	27	16	26
Future Volume (vph)	16	170	75	14	196	15	109	92	6	27	16	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1602	0	0	1714	0	0	1525	0	0	1608	0
Flt Permitted		0.997			0.997			0.974			0.981	
Satd. Flow (perm)	0	1602	0	0	1714	0	0	1525	0	0	1608	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		335.1			107.5			200.9			119.3	
Travel Time (s)		25.1			8.1			15.1			8.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	14%	10%	7%	9%	0%	22%	18%	0%	7%	13%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	284	0	0	244	0	0	225	0	0	74	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 41.7%	ICU Level of Service A
Analysis Period (min) 15	
Description: 2041 Background Volumes	

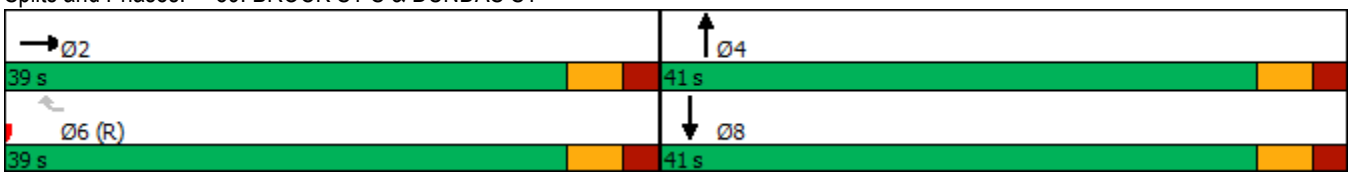
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	525	51	0	0	339	0	491	20	0	609	0
Future Volume (vph)	0	525	51	0	0	339	0	491	20	0	609	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.4	3.4	3.4	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (m)	0.0			0.0			0.0			0.0		
Satd. Flow (prot)	0	1605	0	0	0	1340	0	1624	0	0	1658	0
Flt Permitted												
Satd. Flow (perm)	0	1605	0	0	0	1181	0	1624	0	0	1658	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				143		3				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		106.9			340.4			239.3			74.0	
Travel Time (s)		7.7			24.5			17.2			5.3	
Confl. Peds. (#/hr)	48		45	45		48	83		75	75		83
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	0%	0%	2%	3%	0%	3%	0%	0%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	626	0	0	0	368	0	556	0	0	662	0
Turn Type		NA				Perm		NA			NA	
Protected Phases		2						4			8	
Permitted Phases						6						
Detector Phase		2				6		4			8	
Switch Phase												
Minimum Initial (s)		8.0				8.0		8.0			8.0	
Minimum Split (s)		24.0				24.5		24.5			24.5	
Total Split (s)		39.0				39.0		41.0			41.0	
Total Split (%)		48.8%				48.8%		51.3%			51.3%	
Yellow Time (s)		3.3				3.3		3.3			3.3	
All-Red Time (s)		2.2				2.2		2.2			2.2	
Lost Time Adjust (s)		0.0				0.0		0.0			0.0	
Total Lost Time (s)		5.5				5.5		5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		Max				C-Max		None			None	
Act Effct Green (s)		34.8				34.8		34.2			34.2	
Actuated g/C Ratio		0.44				0.44		0.43			0.43	
v/c Ratio		0.89				0.62		0.80			0.94	
Control Delay		39.2				16.2		29.9			42.2	
Queue Delay		0.0				0.0		0.0			0.0	
Total Delay		39.2				16.2		29.9			42.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		D				B		C			D	
Approach Delay		39.2			16.2			29.9			42.2	
Approach LOS		D			B			C			D	
Queue Length 50th (m)		79.9				23.3		62.9			99.3	
Queue Length 95th (m)		#140.6				50.6		#103.3			m109.6	
Internal Link Dist (m)		82.9			316.4			215.3			50.0	
Turn Bay Length (m)												
Base Capacity (vph)		702				594		722			735	
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		0.89				0.62		0.77			0.90	

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 6:WBR, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 33.9 Intersection LOS: C
Intersection Capacity Utilization 79.2% 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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 89: BROCK ST S & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	165	12	39	275	173	240	367	16	53	451	426
Future Volume (vph)	74	165	12	39	275	173	240	367	16	53	451	426
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	40.0		25.0	80.0		0.0	45.0		0.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	25.0			25.0			29.3			25.0		
Satd. Flow (prot)	1434	1478	0	1422	1580	1331	1306	1436	0	1447	1523	1319
Flt Permitted	0.254			0.637			0.140			0.519		
Satd. Flow (perm)	383	1478	0	953	1580	1331	192	1436	0	791	1523	1319
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				179		4				323
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		119.5			335.1			133.4			69.9	
Travel Time (s)		8.6			24.1			9.6			5.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	12%	13%	17%	13%	7%	8%	23%	17%	19%	11%	11%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	80	192	0	42	299	188	261	416	0	58	490	463
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm
Protected Phases	8	4			7		5	2			6	
Permitted Phases	4			7		7	2			6		6
Detector Phase	8	4		7	7	7	5	2		6	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.8	29.5		25.8	25.8	25.8	8.8	29.5		29.5	29.5	29.5
Total Split (s)	8.8	34.6		25.8	25.8	25.8	15.0	45.4		30.4	30.4	30.4
Total Split (%)	11.0%	43.3%		32.3%	32.3%	32.3%	18.8%	56.8%		38.0%	38.0%	38.0%
Yellow Time (s)	2.0	3.7		2.0	2.0	2.0	2.0	3.7		2.0	2.0	2.0
All-Red Time (s)	2.8	2.8		2.8	2.8	2.8	2.8	2.8		2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.8	6.5		4.8	4.8	4.8	4.8	6.5		4.8	4.8	4.8
Lead/Lag	Lead			Lag	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes			Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	25.7	24.0		18.7	18.7	18.7	44.7	43.0		26.4	26.4	26.4
Actuated g/C Ratio	0.32	0.30		0.23	0.23	0.23	0.56	0.54		0.33	0.33	0.33
v/c Ratio	0.46	0.43		0.19	0.81	0.42	0.88	0.54		0.22	0.98	0.71
Control Delay	44.0	42.7		25.7	46.9	7.8	43.3	13.1		22.9	64.6	14.5
Queue Delay	0.0	0.0		0.0	3.6	0.0	0.0	0.0		0.0	0.0	0.2
Total Delay	44.0	42.7		25.7	50.5	7.8	43.3	13.1		22.9	64.6	14.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	D		C	D	A	D	B		C	E	B
Approach Delay		43.1			33.3			24.7			39.3	
Approach LOS		D			C			C			D	
Queue Length 50th (m)	8.9	23.0		4.6	38.4	1.0	~27.6	40.8		5.9	~68.6	14.8
Queue Length 95th (m)	21.0	40.1		11.9	#69.1	14.4	m#60.2	m66.3		14.4	#123.4	48.1
Internal Link Dist (m)		95.5			311.1			109.4			45.9	
Turn Bay Length (m)	30.0			40.0		25.0	80.0			45.0		
Base Capacity (vph)	175	522		250	414	481	295	773		260	501	651
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	55	0	0	0		0	0	11
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.46	0.37		0.17	0.83	0.39	0.88	0.54		0.22	0.98	0.72

Intersection Summary

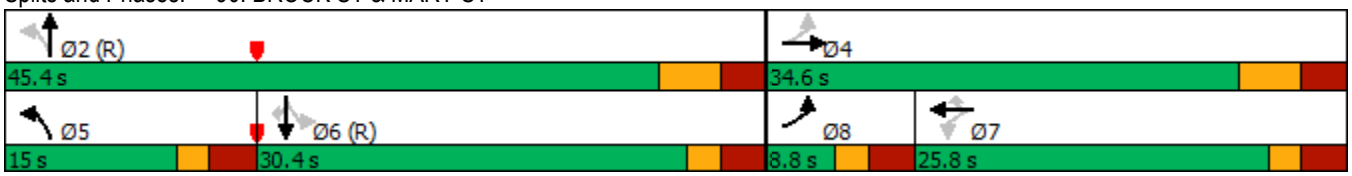
Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.98
Intersection Signal Delay: 34.5 Intersection LOS: C
Intersection Capacity Utilization 77.8% ICU Level of Service D
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

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

Splits and Phases: 90: BROCK ST & MARY ST'



Lanes, Volumes, Timings
4: DUNDAS ST & HICKORY

03/24/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	526	1	35	396	55	3	14	31	63	17	9
Future Volume (vph)	114	526	1	35	396	55	3	14	31	63	17	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	80.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	1785	1708	0	1580	1678	0	0	1445	0	0	1621	0
Flt Permitted	0.950			0.950				0.983			0.800	
Satd. Flow (perm)	1753	1708	0	1538	1678	0	0	1423	0	0	1326	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					8			34			4	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		340.4			151.6			109.3			200.9	
Travel Time (s)		24.5			10.9			7.9			14.5	
Confl. Peds. (#/hr)	11		18	18		11	9		6	6		9
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	10%	0%	13%	9%	11%	8%	8%	19%	6%	22%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	124	573	0	38	490	0	0	52	0	0	96	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Detector Phase	1	6		5	2		8	8		4	4	
Switch Phase												
Minimum Initial (s)	4.0	20.0		4.0	20.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	9.4	25.4		9.4	25.5		25.4	25.4		25.4	25.4	
Total Split (s)	26.0	86.0		16.0	76.0		28.0	28.0		28.0	28.0	
Total Split (%)	20.0%	66.2%		12.3%	58.5%		21.5%	21.5%		21.5%	21.5%	
Yellow Time (s)	3.7	3.7		3.7	3.8		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.7	1.7		1.7	1.7		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.4	5.4		5.4	5.5			5.4			5.4	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?		Yes		Yes	Yes							
Recall Mode	Max	C-Max		Max	C-Max		None	None		None	None	
Act Effct Green (s)	28.8	80.6		18.8	70.5			14.4			14.4	
Actuated g/C Ratio	0.22	0.62		0.14	0.54			0.11			0.11	
v/c Ratio	0.31	0.54		0.17	0.54			0.28			0.64	
Control Delay	46.7	16.5		53.8	21.6			27.0			71.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	46.7	16.5		53.8	21.6			27.0			71.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	B		D	C			C			E	
Approach Delay		21.9			23.9			27.0			71.0	
Approach LOS		C			C			C			E	
Queue Length 50th (m)	24.7	72.8		8.0	70.8			3.9			21.1	
Queue Length 95th (m)	44.0	100.5		18.8	99.2			14.6			36.4	
Internal Link Dist (m)		316.4			127.6			85.3			176.9	
Turn Bay Length (m)	30.0			80.0								
Base Capacity (vph)	395	1058		228	913			275			233	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.31	0.54		0.17	0.54			0.19			0.41	

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 26.3 Intersection LOS: C
Intersection Capacity Utilization 57.6% ICU Level of Service B
Analysis Period (min) 15
Description: 2041 IBI BRT Volumes

Splits and Phases: 4: DUNDAS ST & HICKORY

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	564	13	0	0	0	0	0	12	0	0	425
Future Volume (vph)	0	564	13	0	0	0	0	0	12	0	0	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.4	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1816	0	0	0	0	0	0	1593	0	0	1593
Flt Permitted												
Satd. Flow (perm)	0	1816	0	0	0	0	0	0	1593	0	0	1593
Link Speed (k/h)		50			50			48			48	
Link Distance (m)		29.0			106.9			182.6			76.0	
Travel Time (s)		2.1			7.7			13.7			5.7	
Confl. Peds. (#/hr)						21						
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	627	0	0	0	0	0	0	13	0	0	462
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 40.5%	ICU Level of Service A
Analysis Period (min) 15	

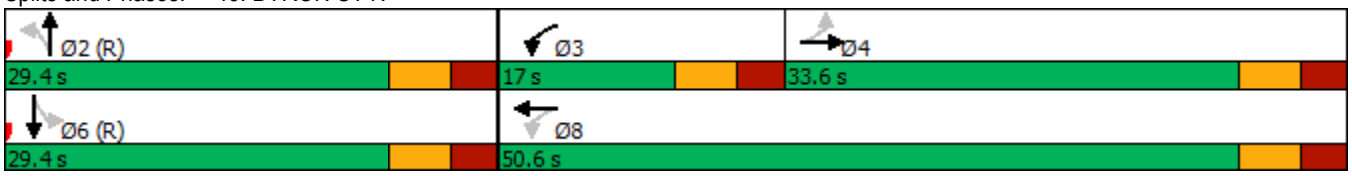
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	231	5	320	601	20	5	100	10	10	100	5
Future Volume (vph)	5	231	5	320	601	20	5	100	10	10	100	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	50.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1649	0	1785	1661	0	0	1837	0	0	1846	0
Flt Permitted		0.986		0.444				0.989			0.972	
Satd. Flow (perm)	0	1628	0	834	1661	0	0	1820	0	0	1801	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			3			6			3	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		85.0			119.5			122.1			70.9	
Travel Time (s)		6.4			9.0			9.2			5.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	14%	0%	0%	13%	0%	0%	1%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	261	0	348	675	0	0	125	0	0	125	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	33.5	33.5		10.5	33.5		28.5	28.5		28.5	28.5	
Total Split (s)	33.6	33.6		17.0	50.6		29.4	29.4		29.4	29.4	
Total Split (%)	42.0%	42.0%		21.3%	63.3%		36.8%	36.8%		36.8%	36.8%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7		3.7	3.7	
All-Red Time (s)	2.8	2.8		2.8	2.8		2.8	2.8		2.8	2.8	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)		6.5		6.5	6.5			6.5			6.5	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Act Effct Green (s)		27.1		44.1	44.1			22.9			22.9	
Actuated g/C Ratio		0.34		0.55	0.55			0.29			0.29	
v/c Ratio		0.47		0.60	0.74			0.24			0.24	
Control Delay		24.2		16.3	20.2			22.3			22.9	
Queue Delay		0.0		0.0	3.1			0.0			0.0	
Total Delay		24.2		16.3	23.3			22.3			22.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C		B	C			C			C	
Approach Delay		24.2			20.9			22.3			22.9	
Approach LOS		C			C			C			C	
Queue Length 50th (m)		28.2		28.1	60.3			12.7			13.0	
Queue Length 95th (m)		47.5		m46.4	m98.6			24.5			24.9	
Internal Link Dist (m)		61.0			95.5			98.1			46.9	
Turn Bay Length (m)				50.0								
Base Capacity (vph)		552		584	916			525			517	
Starvation Cap Reductn		0		0	149			0			0	
Spillback Cap Reductn		0		0	0			0			0	
Storage Cap Reductn		0		0	0			0			0	
Reduced v/c Ratio		0.47		0.60	0.88			0.24			0.24	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Pretimed
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 21.8 Intersection LOS: C
Intersection Capacity Utilization 71.2% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 45: BYRON ST N



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	170	75	14	196	15	59	92	6	27	16	26
Future Volume (vph)	16	170	75	14	196	15	59	92	6	27	16	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1602	0	0	1714	0	0	1544	0	0	1608	0
Flt Permitted		0.997			0.997			0.982			0.981	
Satd. Flow (perm)	0	1602	0	0	1714	0	0	1544	0	0	1608	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		335.1			107.5			200.9			119.3	
Travel Time (s)		25.1			8.1			15.1			8.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	14%	10%	7%	9%	0%	22%	18%	0%	7%	13%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	284	0	0	244	0	0	171	0	0	74	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 35.9%	ICU Level of Service A
Analysis Period (min) 15	
Description: 2041 Background Volumes	

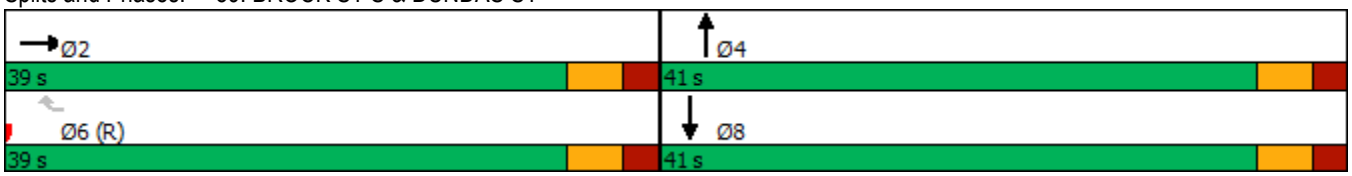
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	525	51	0	0	389	0	491	20	0	609	0
Future Volume (vph)	0	525	51	0	0	389	0	491	20	0	609	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.4	3.4	3.4	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		24.2	40.0		40.0	0.0		0.0	0.0		16.9
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	0.0			0.0			0.0			0.0		
Satd. Flow (prot)	0	1605	0	0	0	1340	0	1624	0	0	1658	0
Flt Permitted												
Satd. Flow (perm)	0	1605	0	0	0	1181	0	1624	0	0	1658	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				143		3				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		106.9			340.4			239.3			74.0	
Travel Time (s)		7.7			24.5			17.2			5.3	
Confl. Peds. (#/hr)	48		45	45		48	83		75	75		83
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	0%	0%	2%	3%	0%	3%	0%	0%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	626	0	0	0	423	0	556	0	0	662	0
Turn Type		NA				Perm		NA			NA	
Protected Phases		2						4			8	
Permitted Phases						6						
Detector Phase		2				6		4			8	
Switch Phase												
Minimum Initial (s)		8.0				8.0		8.0			8.0	
Minimum Split (s)		24.0				24.5		24.5			24.5	
Total Split (s)		39.0				39.0		41.0			41.0	
Total Split (%)		48.8%				48.8%		51.3%			51.3%	
Yellow Time (s)		3.3				3.3		3.3			3.3	
All-Red Time (s)		2.2				2.2		2.2			2.2	
Lost Time Adjust (s)		0.0				0.0		0.0			0.0	
Total Lost Time (s)		5.5				5.5		5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		Max				C-Max		None			None	
Act Effct Green (s)		34.8				34.8		34.2			34.2	
Actuated g/C Ratio		0.44				0.44		0.43			0.43	
v/c Ratio		0.89				0.71		0.80			0.94	
Control Delay		39.2				20.5		29.9			41.4	
Queue Delay		0.0				0.0		0.0			0.0	
Total Delay		39.2				20.5		29.9			41.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		D				C		C			D	
Approach Delay		39.2			20.5			29.9			41.4	
Approach LOS		D			C			C			D	
Queue Length 50th (m)		79.9				31.8		62.9			100.0	
Queue Length 95th (m)		#140.6				#68.0		#103.3			m107.0	
Internal Link Dist (m)		82.9			316.4			215.3			50.0	
Turn Bay Length (m)						40.0						
Base Capacity (vph)		702				594		722			735	
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		0.89				0.71		0.77			0.90	

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 6:WBR, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 34.1 Intersection LOS: C
Intersection Capacity Utilization 79.2% 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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 89: BROCK ST S & DUNDAS ST



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	165	12	39	225	173	290	367	16	53	451	426
Future Volume (vph)	74	165	12	39	225	173	290	367	16	53	451	426
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	40.0		25.0	80.0		0.0	45.0		0.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	25.0			25.0			29.3			25.0		
Satd. Flow (prot)	1434	1478	0	1422	1580	1331	1306	1436	0	1447	1523	1319
Flt Permitted	0.305			0.637			0.144			0.519		
Satd. Flow (perm)	460	1478	0	953	1580	1331	198	1436	0	791	1523	1319
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				188		4				352
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		119.5			335.1			133.4			69.9	
Travel Time (s)		8.6			24.1			9.6			5.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	12%	13%	17%	13%	7%	8%	23%	17%	19%	11%	11%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	80	192	0	42	245	188	315	416	0	58	490	463
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm
Protected Phases	8	4			7		5	2			6	
Permitted Phases	4			7		7	2			6		6
Detector Phase	8	4		7	7	7	5	2		6	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.8	29.5		25.8	25.8	25.8	8.8	29.5		29.5	29.5	29.5
Total Split (s)	8.8	34.6		25.8	25.8	25.8	15.0	45.4		30.4	30.4	30.4
Total Split (%)	11.0%	43.3%		32.3%	32.3%	32.3%	18.8%	56.8%		38.0%	38.0%	38.0%
Yellow Time (s)	2.0	3.7		2.0	2.0	2.0	2.0	3.7		2.0	2.0	2.0
All-Red Time (s)	2.8	2.8		2.8	2.8	2.8	2.8	2.8		2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.8	6.5		4.8	4.8	4.8	4.8	6.5		4.8	4.8	4.8
Lead/Lag	Lead			Lag	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes			Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	23.9	22.2		16.9	16.9	16.9	46.5	44.8		25.6	25.6	25.6
Actuated g/C Ratio	0.30	0.28		0.21	0.21	0.21	0.58	0.56		0.32	0.32	0.32
v/c Ratio	0.43	0.46		0.21	0.74	0.44	0.93	0.52		0.23	1.01	0.70
Control Delay	44.9	47.0		27.0	42.6	7.5	48.5	13.0		23.0	72.2	12.6
Queue Delay	0.0	0.0		0.0	1.5	0.0	0.0	0.0		0.0	0.0	0.4
Total Delay	44.9	47.0		27.0	44.1	7.5	48.5	13.0		23.0	72.2	13.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	D		C	D	A	D	B		C	E	B
Approach Delay		46.4			28.1			28.3			42.3	
Approach LOS		D			C			C			D	
Queue Length 50th (m)	10.9	29.4		4.8	31.9	0.0	~35.6	34.7		5.9	~68.6	11.4
Queue Length 95th (m)	20.3	40.1		11.9	50.9	13.2	m#78.2	m68.0		14.4	#123.4	42.2
Internal Link Dist (m)		95.5			311.1			109.4			45.9	
Turn Bay Length (m)	30.0			40.0		25.0	80.0			45.0		
Base Capacity (vph)	186	522		250	414	488	337	805		253	487	661
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	61	0	0	0		0	0	28
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.43	0.37		0.17	0.69	0.39	0.93	0.52		0.23	1.01	0.73

Intersection Summary

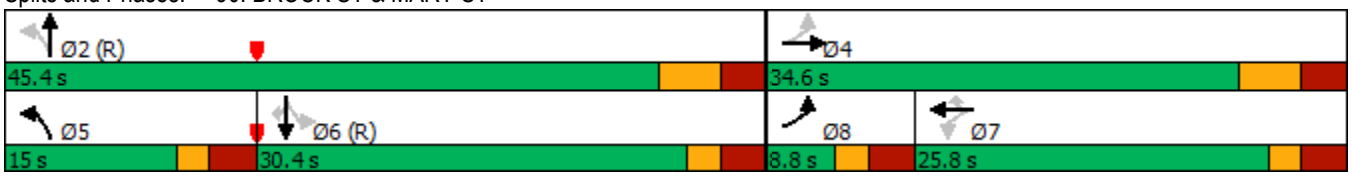
Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 35.9 Intersection LOS: D
Intersection Capacity Utilization 77.9% ICU Level of Service D
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

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

Splits and Phases: 90: BROCK ST & MARY ST'



Lanes, Volumes, Timings
4: DUNDAS ST & HICKORY ST

03/24/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	526	1	35	446	5	3	14	31	63	17	9
Future Volume (vph)	114	526	1	35	446	5	3	14	31	63	17	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	80.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	1785	1708	0	1580	1719	0	0	1445	0	0	1621	0
Flt Permitted	0.950			0.950				0.983			0.800	
Satd. Flow (perm)	1753	1708	0	1538	1719	0	0	1423	0	0	1326	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					1			34			4	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		340.4			151.6			109.3			200.9	
Travel Time (s)		24.5			10.9			7.9			14.5	
Confl. Peds. (#/hr)	11		18	18		11	9		6	6		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%	10%	0%	13%	9%	11%	8%	8%	19%	6%	22%	14%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	124	573	0	38	490	0	0	52	0	0	96	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Detector Phase	1	6		5	2		8	8		4	4	
Switch Phase												
Minimum Initial (s)	4.0	20.0		4.0	20.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	9.4	25.9		9.4	25.9		25.4	25.4		25.4	25.4	
Total Split (s)	27.0	85.0		16.0	74.0		29.0	29.0		29.0	29.0	
Total Split (%)	20.8%	65.4%		12.3%	56.9%		22.3%	22.3%		22.3%	22.3%	
Yellow Time (s)	3.7	3.8		3.7	3.8		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.7	1.7		1.7	1.7		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.4	5.5		5.4	5.5			5.4			5.4	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?		Yes		Yes	Yes							
Recall Mode	Max	C-Max		Max	C-Max		None	None		None	None	
Act Effct Green (s)	30.7	79.5		19.7	68.5			14.5			14.5	
Actuated g/C Ratio	0.24	0.61		0.15	0.53			0.11			0.11	
v/c Ratio	0.29	0.55		0.16	0.54			0.28			0.64	
Control Delay	44.7	17.2		52.8	23.1			27.0			70.8	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	44.7	17.2		52.8	23.1			27.0			70.8	
LOS	D	B		D	C			C			E	
Approach Delay		22.1			25.2			27.0			70.8	
Approach LOS		C			C			C			E	
Queue Length 50th (m)	24.2	74.6		7.9	73.8			3.9			21.1	
Queue Length 95th (m)	43.2	103.1		18.6	103.0			14.6			36.3	
Internal Link Dist (m)		316.4			127.6			85.3			176.9	
Turn Bay Length (m)	30.0			80.0								

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	421	1044		239	906			286			243	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.29	0.55		0.16	0.54			0.18			0.40	

Intersection Summary	
Area Type:	Other
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBT, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.64	
Intersection Signal Delay: 26.9	Intersection LOS: C
Intersection Capacity Utilization 57.6%	ICU Level of Service B
Analysis Period (min) 15	
Description: 2041 IBI BRT Volumes	

Splits and Phases: 4: DUNDAS ST & HICKORY ST

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	564	13	0	0	0	0	0	12	0	0	425
Future Volume (vph)	0	564	13	0	0	0	0	0	12	0	0	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.4	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Satd. Flow (prot)	0	1816	0	0	0	0	0	0	1593	0	0	1593
Flt Permitted												
Satd. Flow (perm)	0	1816	0	0	0	0	0	0	1593	0	0	1593
Link Speed (k/h)		50			50			48			48	
Link Distance (m)		29.0			106.9			182.6			76.0	
Travel Time (s)		2.1			7.7			13.7			5.7	
Confl. Peds. (#/hr)						21						
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	627	0	0	0	0	0	0	13	0	0	462
Sign Control		Free			Free			Stop			Stop	

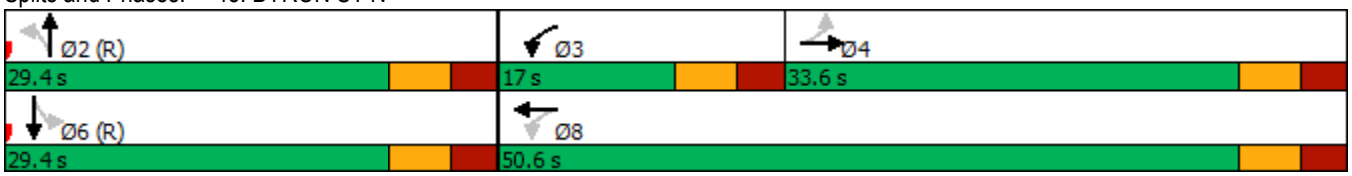
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 40.5%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	231	5	320	601	20	5	100	10	10	100	5
Future Volume (vph)	5	231	5	320	601	20	5	100	10	10	100	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	50.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1649	0	1785	1661	0	0	1837	0	0	1846	0
Flt Permitted		0.986		0.444				0.989			0.972	
Satd. Flow (perm)	0	1628	0	834	1661	0	0	1820	0	0	1801	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			3			6			3	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		85.0			119.5			122.1			70.9	
Travel Time (s)		6.4			9.0			9.2			5.3	
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%	14%	0%	0%	13%	0%	0%	1%	0%	0%	1%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	261	0	348	675	0	0	125	0	0	125	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	33.5	33.5		10.5	33.5		28.5	28.5		28.5	28.5	
Total Split (s)	33.6	33.6		17.0	50.6		29.4	29.4		29.4	29.4	
Total Split (%)	42.0%	42.0%		21.3%	63.3%		36.8%	36.8%		36.8%	36.8%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7		3.7	3.7	
All-Red Time (s)	2.8	2.8		2.8	2.8		2.8	2.8		2.8	2.8	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)		6.5		6.5	6.5			6.5			6.5	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Act Effct Green (s)		27.1		44.1	44.1			22.9			22.9	
Actuated g/C Ratio		0.34		0.55	0.55			0.29			0.29	
v/c Ratio		0.47		0.60	0.74			0.24			0.24	
Control Delay		24.2		16.9	20.7			22.3			22.9	
Queue Delay		0.0		0.0	3.3			0.0			0.0	
Total Delay		24.2		16.9	24.0			22.3			22.9	
LOS		C		B	C			C			C	
Approach Delay		24.2			21.6			22.3			22.9	
Approach LOS		C			C			C			C	
Queue Length 50th (m)		28.2		27.0	58.6			12.7			13.0	
Queue Length 95th (m)		47.5		m47.5	m103.3			24.5			24.9	
Internal Link Dist (m)		61.0			95.5			98.1			46.9	
Turn Bay Length (m)				50.0								
Base Capacity (vph)		552		584	916			525			517	
Starvation Cap Reductn		0		0	153			0			0	
Spillback Cap Reductn		0		0	0			0			0	
Storage Cap Reductn		0		0	0			0			0	
Reduced v/c Ratio		0.47		0.60	0.88			0.24			0.24	

Intersection Summary	
Area Type: Other	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 75	
Control Type: Pretimed	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 22.2	Intersection LOS: C
Intersection Capacity Utilization 71.2%	ICU Level of Service C
Analysis Period (min) 15	

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

Splits and Phases: 45: BYRON ST N



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	170	75	14	196	15	9	92	6	27	16	26
Future Volume (vph)	16	170	75	14	196	15	9	92	6	27	16	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1602	0	0	1714	0	0	1583	0	0	1608	0
Flt Permitted		0.997			0.997			0.996			0.981	
Satd. Flow (perm)	0	1602	0	0	1714	0	0	1583	0	0	1608	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		335.1			107.5			200.9			119.3	
Travel Time (s)		25.1			8.1			15.1			8.9	
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 (%)	6%	14%	10%	7%	9%	0%	22%	18%	0%	7%	13%	8%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	284	0	0	244	0	0	117	0	0	74	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 35.7%	ICU Level of Service A
Analysis Period (min) 15	
Description: 2041 Background Volumes	

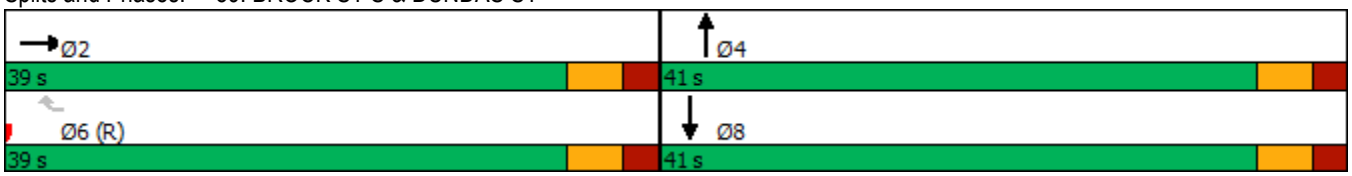
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	525	51	0	0	439	0	491	20	0	609	0
Future Volume (vph)	0	525	51	0	0	439	0	491	20	0	609	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.4	3.4	3.4	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0		24.2	40.0		40.0	0.0		0.0	0.0		16.9
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	0.0			0.0			0.0			0.0		
Satd. Flow (prot)	0	1605	0	0	0	1340	0	1624	0	0	1658	0
Flt Permitted												
Satd. Flow (perm)	0	1605	0	0	0	1181	0	1624	0	0	1658	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				143		3				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		106.9			340.4			239.3			74.0	
Travel Time (s)		7.7			24.5			17.2			5.3	
Confl. Peds. (#/hr)	48		45	45		48	83		75	75		83
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	0%	2%	3%	0%	3%	0%	0%	2%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	626	0	0	0	477	0	556	0	0	662	0
Turn Type		NA				Perm		NA			NA	
Protected Phases		2						4			8	
Permitted Phases						6						
Detector Phase		2				6		4			8	
Switch Phase												
Minimum Initial (s)		8.0				8.0		8.0			8.0	
Minimum Split (s)		24.0				24.5		24.5			24.5	
Total Split (s)		39.0				39.0		41.0			41.0	
Total Split (%)		48.8%				48.8%		51.3%			51.3%	
Yellow Time (s)		3.3				3.3		3.3			3.3	
All-Red Time (s)		2.2				2.2		2.2			2.2	
Lost Time Adjust (s)		0.0				0.0		0.0			0.0	
Total Lost Time (s)		5.5				5.5		5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		Max				C-Max		None			None	
Act Effct Green (s)		34.8				34.8		34.2			34.2	
Actuated g/C Ratio		0.44				0.44		0.43			0.43	
v/c Ratio		0.89				0.80		0.80			0.94	
Control Delay		39.2				26.7		29.9			41.5	
Queue Delay		0.0				0.0		0.0			0.0	
Total Delay		39.2				26.7		29.9			41.5	
LOS		D				C		C			D	
Approach Delay		39.2			26.7			29.9			41.5	
Approach LOS		D			C			C			D	
Queue Length 50th (m)		79.9				41.4		62.9			100.4	
Queue Length 95th (m)		#140.6				#93.2		#103.3			m107.0	
Internal Link Dist (m)		82.9			316.4			215.3			50.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)						40.0						
Base Capacity (vph)		702				594		722			735	
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		0.89				0.80		0.77			0.90	

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 6:WBR, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 35.0 Intersection LOS: D
Intersection Capacity Utilization 79.2% 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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 89: BROCK ST S & DUNDAS ST



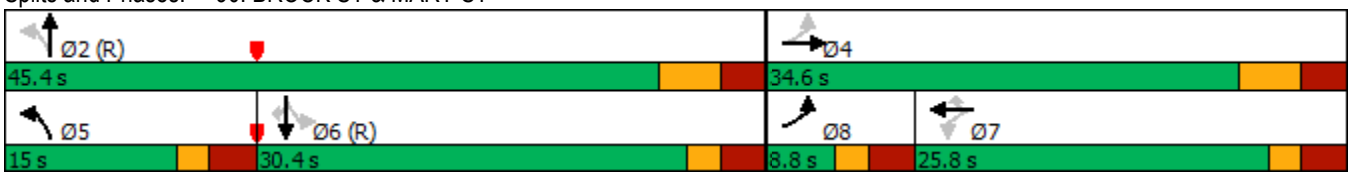
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	165	12	39	175	173	340	367	16	53	451	426
Future Volume (vph)	74	165	12	39	175	173	340	367	16	53	451	426
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	40.0		25.0	80.0		0.0	45.0		0.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	25.0			25.0			29.3			25.0		
Satd. Flow (prot)	1434	1478	0	1422	1580	1331	1306	1436	0	1447	1523	1319
Flt Permitted	0.371			0.637			0.144			0.519		
Satd. Flow (perm)	560	1478	0	953	1580	1331	198	1436	0	791	1523	1319
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				188		4				400
Link Speed (k/h)		48			48			50			48	
Link Distance (m)		119.5			335.1			133.4			69.9	
Travel Time (s)		9.0			25.1			9.6			5.2	
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 (%)	12%	13%	17%	13%	7%	8%	23%	17%	19%	11%	11%	9%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	80	192	0	42	190	188	370	416	0	58	490	463
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm
Protected Phases	8	4			7		5	2			6	
Permitted Phases	4			7		7	2			6		6
Detector Phase	8	4		7	7	7	5	2		6	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.8	29.5		25.8	25.8	25.8	8.8	29.5		29.5	29.5	29.5
Total Split (s)	8.8	34.6		25.8	25.8	25.8	15.0	45.4		30.4	30.4	30.4
Total Split (%)	11.0%	43.3%		32.3%	32.3%	32.3%	18.8%	56.8%		38.0%	38.0%	38.0%
Yellow Time (s)	2.0	3.7		2.0	2.0	2.0	2.0	3.7		2.0	2.0	2.0
All-Red Time (s)	2.8	2.8		2.8	2.8	2.8	2.8	2.8		2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.8	6.5		4.8	4.8	4.8	4.8	6.5		4.8	4.8	4.8
Lead/Lag	Lead			Lag	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes			Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	22.3	20.6		15.2	15.2	15.2	48.1	46.4		25.6	25.6	25.6
Actuated g/C Ratio	0.28	0.26		0.19	0.19	0.19	0.60	0.58		0.32	0.32	0.32
v/c Ratio	0.40	0.50		0.23	0.63	0.46	1.02	0.50		0.23	1.01	0.67
Control Delay	46.9	50.3		28.9	38.9	8.1	64.1	12.5		23.0	72.2	9.6
Queue Delay	0.0	0.0		0.0	0.7	0.0	1.6	0.0		0.0	0.0	0.6
Total Delay	46.9	50.3		28.9	39.5	8.1	65.7	12.5		23.0	72.2	10.2
LOS	D	D		C	D	A	E	B		C	E	B
Approach Delay		49.3			24.4			37.5			41.0	
Approach LOS		D			C			D			D	
Queue Length 50th (m)	12.4	29.4		5.1	24.9	0.0	~45.3	30.6		5.9	~68.6	6.2
Queue Length 95th (m)	19.7	41.0		11.9	39.4	13.2	m#93.0	m61.2		14.4	#123.4	32.6
Internal Link Dist (m)		95.5			311.1			109.4			45.9	
Turn Bay Length (m)	30.0			40.0		25.0	80.0			45.0		
Base Capacity (vph)	199	522		250	414	488	364	835		253	487	694

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	61	0	2	0		0	0	54
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.40	0.37		0.17	0.54	0.39	1.02	0.50		0.23	1.01	0.72

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 38.0 Intersection LOS: D
Intersection Capacity Utilization 78.5% ICU Level of Service D
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 90: BROCK ST & MARY ST'



Lanes, Volumes, Timings
4: DUNDAS ST & HICKORY ST

03/24/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	722	3	101	273	119	13	39	74	114	18	7
Future Volume (vph)	84	722	3	101	273	119	13	39	74	114	18	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	80.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	1526	1662	0	1700	1549	0	0	1488	0	0	1619	0
Flt Permitted	0.950			0.950				0.962			0.579	
Satd. Flow (perm)	1504	1662	0	1694	1549	0	0	1435	0	0	970	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					26			49			2	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		368.3			157.7			139.9			207.5	
Travel Time (s)		26.5			11.4			10.1			14.9	
Confl. Peds. (#/hr)	8		3	3		8	11		3	3		11
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	17%	13%	0%	5%	13%	17%	0%	33%	6%	11%	0%	27%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	788	0	110	426	0	0	136	0	0	152	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Detector Phase	1	6		5	2		8	8		4	4	
Switch Phase												
Minimum Initial (s)	4.0	20.0		4.0	20.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	10.5	26.5		10.5	26.5		26.5	26.5		26.5	26.5	
Total Split (s)	21.6	79.0		19.0	76.4		32.0	32.0		32.0	32.0	
Total Split (%)	16.6%	60.8%		14.6%	58.8%		24.6%	24.6%		24.6%	24.6%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7		3.7	3.7	
All-Red Time (s)	2.8	2.8		2.8	2.8		2.8	2.8		2.8	2.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.5	6.5		6.5	6.5			6.5			6.5	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Recall Mode	Max	C-Max		Max	C-Max		None	None		None	None	
Act Effct Green (s)	18.0	72.5		15.4	69.9			22.6			22.6	
Actuated g/C Ratio	0.14	0.56		0.12	0.54			0.17			0.17	
v/c Ratio	0.43	0.85		0.55	0.50			0.47			0.89	
Control Delay	60.1	34.9		66.5	20.3			35.2			97.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	60.1	34.9		66.5	20.3			35.2			97.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	C		E	C			D			F	
Approach Delay		37.5			29.8			35.2			97.3	
Approach LOS		D			C			D			F	
Queue Length 50th (m)	20.5	150.1		25.5	57.6			17.8			34.0	
Queue Length 95th (m)	37.1	#211.1		#48.7	83.8			36.2			#67.1	
Internal Link Dist (m)		344.3			133.7			115.9			183.5	
Turn Bay Length (m)	30.0			80.0								
Base Capacity (vph)	211	926		201	844			320			191	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.43	0.85		0.55	0.50			0.42			0.80	

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 40.2 Intersection LOS: D
Intersection Capacity Utilization 75.1% ICU Level of Service D
Analysis Period (min) 15
Description: 2041 IBI BRT Volumes
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: DUNDAS ST & HICKORY ST

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	761	15	0	0	0	0	0	16	0	0	425
Future Volume (vph)	0	761	15	0	0	0	0	0	16	0	0	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.4	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1816	0	0	0	0	0	0	1593	0	0	1593
Flt Permitted												
Satd. Flow (perm)	0	1816	0	0	0	0	0	0	1593	0	0	1593
Link Speed (k/h)		50			50			48			48	
Link Distance (m)		29.0			106.9			182.6			76.0	
Travel Time (s)		2.1			7.7			13.7			5.7	
Confl. Peds. (#/hr)						48						
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	843	0	0	0	0	0	0	17	0	0	462
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 51.0%	ICU Level of Service A
Analysis Period (min) 15	

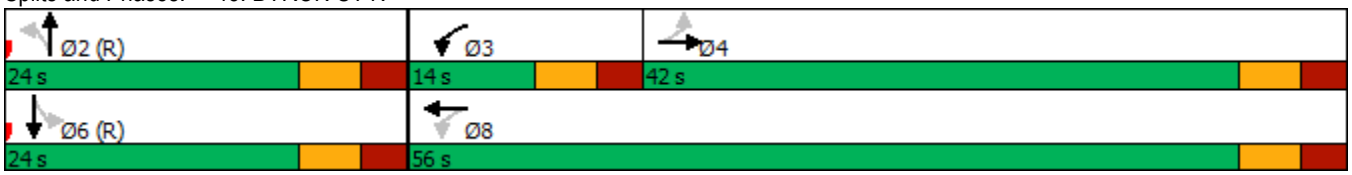
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	609	5	320	454	20	5	100	10	10	100	5
Future Volume (vph)	5	609	5	320	454	20	5	100	10	10	100	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	50.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1650	0	1785	1661	0	0	1837	0	0	1846	0
Flt Permitted		0.996		0.256				0.987			0.968	
Satd. Flow (perm)	0	1643	0	481	1661	0	0	1816	0	0	1794	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			5			6			2	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		85.0			119.5			122.1			70.9	
Travel Time (s)		6.4			9.0			9.2			5.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	14%	0%	0%	13%	0%	0%	1%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	672	0	348	515	0	0	125	0	0	125	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	27.5	27.5		10.5	27.5		22.5	22.5		22.5	22.5	
Total Split (s)	42.0	42.0		14.0	56.0		24.0	24.0		24.0	24.0	
Total Split (%)	52.5%	52.5%		17.5%	70.0%		30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7		3.7	3.7	
All-Red Time (s)	2.8	2.8		2.8	2.8		2.8	2.8		2.8	2.8	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)		6.5		6.5	6.5			6.5			6.5	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Act Effct Green (s)		35.5		49.5	49.5			17.5			17.5	
Actuated g/C Ratio		0.44		0.62	0.62			0.22			0.22	
v/c Ratio		0.92		0.83	0.50			0.31			0.32	
Control Delay		41.9		28.4	11.7			27.4			28.5	
Queue Delay		0.0		0.0	0.5			0.0			0.0	
Total Delay		41.9		28.4	12.2			27.4			28.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		D		C	B			C			C	
Approach Delay		41.9			18.8			27.4			28.5	
Approach LOS		D			B			C			C	
Queue Length 50th (m)		85.0		22.7	34.7			14.0			14.5	
Queue Length 95th (m)		#148.0		#59.0	65.7			27.1			27.7	
Internal Link Dist (m)		61.0			95.5			98.1			46.9	
Turn Bay Length (m)				50.0								
Base Capacity (vph)		729		419	1029			401			394	
Starvation Cap Reductn		0		0	182			0			0	
Spillback Cap Reductn		0		0	0			0			0	
Storage Cap Reductn		0		0	0			0			0	
Reduced v/c Ratio		0.92		0.83	0.61			0.31			0.32	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Pretimed
Maximum v/c Ratio: 0.92
Intersection Signal Delay: 28.7 Intersection LOS: C
Intersection Capacity Utilization 83.4% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 45: BYRON ST N



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	418	125	15	130	31	123	61	35	25	16	13
Future Volume (vph)	15	418	125	15	130	31	123	61	35	25	16	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1664	0	0	1653	0	0	1732	0	0	1712	0
Flt Permitted		0.999			0.996			0.973			0.977	
Satd. Flow (perm)	0	1664	0	0	1653	0	0	1732	0	0	1712	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		361.3			115.9			207.5			90.1	
Travel Time (s)		27.1			8.7			15.6			6.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	13%	10%	7%	7%	12%	6%	4%	0%	6%	0%	6%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	606	0	0	191	0	0	238	0	0	58	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 56.5%	ICU Level of Service B
Analysis Period (min) 15	
Description: 2041Background Volumes	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	740	37	0	0	315	0	508	26	0	601	0
Future Volume (vph)	0	740	37	0	0	315	0	508	26	0	601	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.4	3.4	3.4	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		24.2	40.0		40.0	0.0		0.0	0.0		16.9
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	0.0			0.0			0.0			0.0		
Satd. Flow (prot)	0	1589	0	0	0	1340	0	1604	0	0	1642	0
Flt Permitted												
Satd. Flow (perm)	0	1589	0	0	0	1181	0	1604	0	0	1642	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				87		4				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		106.9			368.3			239.3			74.0	
Travel Time (s)		7.7			26.5			17.2			5.3	
Confl. Peds. (#/hr)	48		45	45		48	83		75	75		83
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	4%	4%	0%	3%	3%	0%	4%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	844	0	0	0	342	0	580	0	0	653	0
Turn Type		NA				Perm		NA			NA	
Protected Phases		2						4			8	
Permitted Phases						6						
Detector Phase		2				6		4			8	
Switch Phase												
Minimum Initial (s)		8.0				8.0		8.0			8.0	
Minimum Split (s)		24.0				24.5		24.5			24.5	
Total Split (s)		45.0				45.0		35.0			35.0	
Total Split (%)		56.3%				56.3%		43.8%			43.8%	
Yellow Time (s)		3.3				3.3		3.3			3.3	
All-Red Time (s)		2.2				2.2		2.2			2.2	
Lost Time Adjust (s)		0.0				0.0		0.0			0.0	
Total Lost Time (s)		5.5				5.5		5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		Max				C-Max		None			None	
Act Effct Green (s)		39.5				39.5		29.5			29.5	
Actuated g/C Ratio		0.49				0.49		0.37			0.37	
v/c Ratio		1.07				0.55		0.98			1.08	
Control Delay		76.5				14.1		58.8			89.1	
Queue Delay		0.0				0.0		0.0			0.0	
Total Delay		76.5				14.1		58.8			89.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		E				B		E			F	
Approach Delay		76.5			14.1			58.8			89.1	
Approach LOS		E			B			E			F	
Queue Length 50th (m)		~133.4				22.7		78.0			~106.8	
Queue Length 95th (m)		#195.6				44.8		#138.1			#163.8	
Internal Link Dist (m)		82.9			344.3			215.3			50.0	
Turn Bay Length (m)						40.0						
Base Capacity (vph)		786				627		594			605	
Starvation Cap Reductn		0				0		0			0	
Spillback Cap Reductn		0				0		0			0	
Storage Cap Reductn		0				0		0			0	
Reduced v/c Ratio		1.07				0.55		0.98			1.08	

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 6:WBR, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.08
Intersection Signal Delay: 66.8 Intersection LOS: E
Intersection Capacity Utilization 90.3% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 89: BROCK ST S & DUNDAS ST

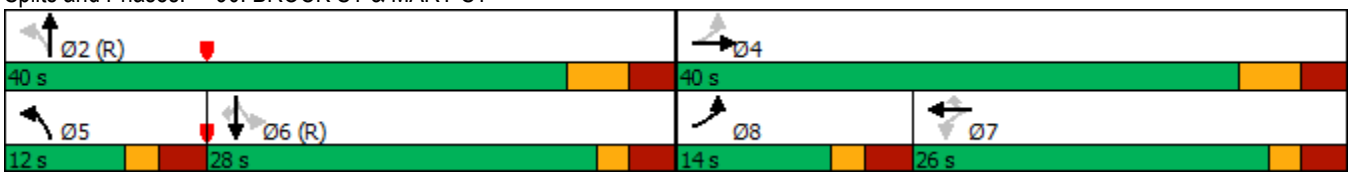
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	239	353	37	33	191	178	229	523	36	83	239	374
Future Volume (vph)	239	353	37	33	191	178	229	523	36	83	239	374
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	40.0		25.0	80.0		0.0	45.0		0.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	25.0			25.0			29.3			25.0		
Satd. Flow (prot)	1474	1540	0	1516	1580	1208	1460	1506	0	1422	1510	1295
Flt Permitted	0.345			0.515			0.409			0.435		
Satd. Flow (perm)	535	1540	0	822	1580	1208	629	1506	0	651	1510	1295
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8				193		5				407
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		119.5			361.3			133.4			69.9	
Travel Time (s)		8.6			26.0			9.6			5.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	9%	8%	11%	6%	7%	19%	10%	11%	14%	13%	12%	11%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	260	424	0	36	208	193	249	607	0	90	260	407
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm
Protected Phases	8	4			7		5	2			6	
Permitted Phases	4			7		7	2			6		6
Detector Phase	8	4		7	7	7	5	2		6	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.8	27.5		25.8	25.8	25.8	8.8	27.5		25.8	25.8	25.8
Total Split (s)	14.0	40.0		26.0	26.0	26.0	12.0	40.0		28.0	28.0	28.0
Total Split (%)	17.5%	50.0%		32.5%	32.5%	32.5%	15.0%	50.0%		35.0%	35.0%	35.0%
Yellow Time (s)	2.0	3.7		2.0	2.0	2.0	2.0	3.7		2.0	2.0	2.0
All-Red Time (s)	2.8	2.8		2.8	2.8	2.8	2.8	2.8		2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.8	6.5		4.8	4.8	4.8	4.8	6.5		4.8	4.8	4.8
Lead/Lag	Lead			Lag	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes			Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	29.6	27.9		15.6	15.6	15.6	40.8	39.1		25.8	25.8	25.8
Actuated g/C Ratio	0.37	0.35		0.20	0.20	0.20	0.51	0.49		0.32	0.32	0.32
v/c Ratio	0.85	0.78		0.23	0.68	0.49	0.58	0.82		0.43	0.53	0.59
Control Delay	45.2	36.9		28.7	40.5	8.7	13.5	21.1		31.0	28.2	6.5
Queue Delay	0.0	0.1		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	45.2	37.0		28.7	40.5	8.7	13.5	21.1		31.0	28.2	6.5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	D		C	D	A	B	C		C	C	A
Approach Delay		40.1			25.5			18.9			16.9	
Approach LOS		D			C			B			B	
Queue Length 50th (m)	28.8	46.8		4.3	27.2	0.0	8.0	53.4		10.3	31.1	0.0
Queue Length 95th (m)	m27.1	m42.2		10.6	42.8	13.4	m22.8	m#110.0		23.8	52.7	19.7
Internal Link Dist (m)		95.5			337.3			109.4			45.9	
Turn Bay Length (m)	30.0			40.0		25.0	80.0			45.0		
Base Capacity (vph)	305	649		217	418	461	426	738		210	487	693
Starvation Cap Reductn	0	6		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	0.85	0.66		0.17	0.50	0.42	0.58	0.82		0.43	0.53	0.59

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 24.7 Intersection LOS: C
Intersection Capacity Utilization 83.4% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 90: BROCK ST & MARY ST'



Lanes, Volumes, Timings
4: DUNDAS ST & HICKORY ST

03/24/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	722	3	101	323	69	13	39	74	114	18	7
Future Volume (vph)	84	722	3	101	323	69	13	39	74	114	18	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	80.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	1526	1662	0	1700	1597	0	0	1488	0	0	1619	0
Flt Permitted	0.950			0.950				0.962			0.579	
Satd. Flow (perm)	1504	1662	0	1694	1597	0	0	1435	0	0	970	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					13			49			2	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		368.3			157.7			139.9			207.5	
Travel Time (s)		26.5			11.4			10.1			14.9	
Confl. Peds. (#/hr)	8		3	3		8	11		3	3		11
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	17%	13%	0%	5%	13%	17%	0%	33%	6%	11%	0%	27%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	788	0	110	426	0	0	136	0	0	152	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Detector Phase	1	6		5	2		8	8		4	4	
Switch Phase												
Minimum Initial (s)	4.0	20.0		4.0	20.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	10.8	26.5		10.8	26.5		26.5	26.5		26.5	26.5	
Total Split (s)	22.0	79.0		19.0	76.0		32.0	32.0		32.0	32.0	
Total Split (%)	16.9%	60.8%		14.6%	58.5%		24.6%	24.6%		24.6%	24.6%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7		3.7	3.7	
All-Red Time (s)	2.8	2.8		2.8	2.8		2.8	2.8		2.8	2.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.5	6.5		6.5	6.5			6.5			6.5	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?		Yes		Yes	Yes							
Recall Mode	Max	C-Max		Max	C-Max		None	None		None	None	
Act Effct Green (s)	18.4	72.5		15.4	69.5			22.6			22.6	
Actuated g/C Ratio	0.14	0.56		0.12	0.53			0.17			0.17	
v/c Ratio	0.42	0.85		0.55	0.50			0.47			0.89	
Control Delay	59.4	34.9		66.5	21.0			35.2			97.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	59.4	34.9		66.5	21.0			35.2			97.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	C		E	C			D			F	
Approach Delay		37.4			30.3			35.2			97.3	
Approach LOS		D			C			D			F	
Queue Length 50th (m)	20.4	150.1		25.5	59.5			17.8			34.0	
Queue Length 95th (m)	36.9	#211.1		#48.7	85.3			36.2			#67.1	
Internal Link Dist (m)		344.3			133.7			115.9			183.5	
Turn Bay Length (m)	30.0			80.0								
Base Capacity (vph)	215	926		201	859			320			191	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.42	0.85		0.55	0.50			0.42			0.80	

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 48.6 (37%), Referenced to phase 2:WBT and 6:EBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 40.4 Intersection LOS: D
Intersection Capacity Utilization 75.1% ICU Level of Service D
Analysis Period (min) 15
Description: 2041 IBI BRT Volumes
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: DUNDAS ST & HICKORY ST

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	761	15	0	0	0	0	0	16	0	0	425
Future Volume (vph)	0	761	15	0	0	0	0	0	16	0	0	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.4	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1816	0	0	0	0	0	0	1593	0	0	1593
Flt Permitted												
Satd. Flow (perm)	0	1816	0	0	0	0	0	0	1593	0	0	1593
Link Speed (k/h)		50			50			48			48	
Link Distance (m)		29.0			106.9			182.6			76.0	
Travel Time (s)		2.1			7.7			13.7			5.7	
Confl. Peds. (#/hr)						48						
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	843	0	0	0	0	0	0	17	0	0	462
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 51.0%	ICU Level of Service A
Analysis Period (min) 15	

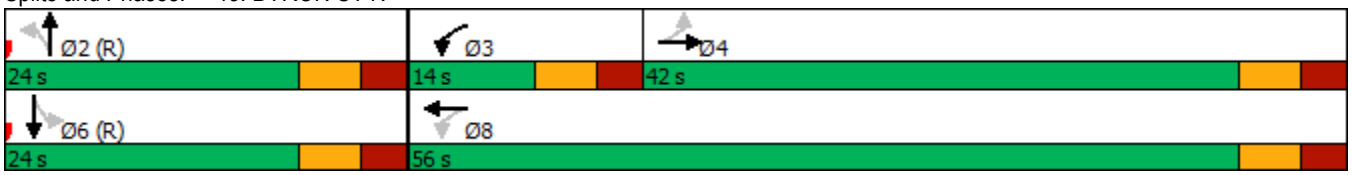
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	609	5	320	454	20	5	100	10	10	100	5
Future Volume (vph)	5	609	5	320	454	20	5	100	10	10	100	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	50.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1650	0	1785	1661	0	0	1837	0	0	1846	0
Flt Permitted		0.996		0.256				0.987			0.968	
Satd. Flow (perm)	0	1643	0	481	1661	0	0	1816	0	0	1794	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			5			6			2	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		85.0			119.5			122.1			70.9	
Travel Time (s)		6.4			9.0			9.2			5.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	14%	0%	0%	13%	0%	0%	1%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	672	0	348	515	0	0	125	0	0	125	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	27.5	27.5		10.5	27.5		22.5	22.5		22.5	22.5	
Total Split (s)	42.0	42.0		14.0	56.0		24.0	24.0		24.0	24.0	
Total Split (%)	52.5%	52.5%		17.5%	70.0%		30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7		3.7	3.7	
All-Red Time (s)	2.8	2.8		2.8	2.8		2.8	2.8		2.8	2.8	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)		6.5		6.5	6.5			6.5			6.5	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Act Effct Green (s)		35.5		49.5	49.5			17.5			17.5	
Actuated g/C Ratio		0.44		0.62	0.62			0.22			0.22	
v/c Ratio		0.92		0.83	0.50			0.31			0.32	
Control Delay		41.9		29.7	13.4			27.4			28.5	
Queue Delay		0.0		0.0	0.7			0.0			0.0	
Total Delay		41.9		29.7	14.1			27.4			28.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		D		C	B			C			C	
Approach Delay		41.9			20.4			27.4			28.5	
Approach LOS		D			C			C			C	
Queue Length 50th (m)		85.0		25.4	39.4			14.0			14.5	
Queue Length 95th (m)		#148.0		#64.2	73.5			27.1			27.7	
Internal Link Dist (m)		61.0			95.5			98.1			46.9	
Turn Bay Length (m)				50.0								
Base Capacity (vph)		729		419	1029			401			394	
Starvation Cap Reductn		0		0	224			0			0	
Spillback Cap Reductn		0		0	0			0			0	
Storage Cap Reductn		0		0	0			0			0	
Reduced v/c Ratio		0.92		0.83	0.64			0.31			0.32	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Pretimed
Maximum v/c Ratio: 0.92
Intersection Signal Delay: 29.5 Intersection LOS: C
Intersection Capacity Utilization 83.4% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 45: BYRON ST N



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	418	125	15	130	31	73	61	35	25	16	13
Future Volume (vph)	15	418	125	15	130	31	73	61	35	25	16	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1664	0	0	1653	0	0	1736	0	0	1712	0
Flt Permitted		0.999			0.996			0.979			0.977	
Satd. Flow (perm)	0	1664	0	0	1653	0	0	1736	0	0	1712	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		361.3			115.9			207.5			90.1	
Travel Time (s)		27.1			8.7			15.6			6.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	13%	10%	7%	7%	12%	6%	4%	0%	6%	0%	6%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	606	0	0	191	0	0	183	0	0	58	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 51.4%	ICU Level of Service A
Analysis Period (min) 15	
Description: 2041Background Volumes	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	740	37	0	0	365	0	508	26	0	601	0
Future Volume (vph)	0	740	37	0	0	365	0	508	26	0	601	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.4	3.4	3.4	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		24.2	40.0		40.0	0.0		0.0	0.0		16.9
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	0.0			0.0			0.0			0.0		
Satd. Flow (prot)	0	1589	0	0	0	1340	0	1604	0	0	1642	0
Flt Permitted												
Satd. Flow (perm)	0	1589	0	0	0	1181	0	1604	0	0	1642	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				87		4				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		106.9			368.3			239.3			74.0	
Travel Time (s)		7.7			26.5			17.2			5.3	
Confl. Peds. (#/hr)	48		45	45		48	83		75	75		83
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	4%	4%	0%	3%	3%	0%	4%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	844	0	0	0	397	0	580	0	0	653	0
Turn Type		NA				Perm		NA			NA	
Protected Phases		2						4			8	
Permitted Phases						6						
Detector Phase		2				6		4			8	
Switch Phase												
Minimum Initial (s)		8.0				8.0		8.0			8.0	
Minimum Split (s)		24.0				24.5		24.5			24.5	
Total Split (s)		45.0				45.0		35.0			35.0	
Total Split (%)		56.3%				56.3%		43.8%			43.8%	
Yellow Time (s)		3.3				3.3		3.3			3.3	
All-Red Time (s)		2.2				2.2		2.2			2.2	
Lost Time Adjust (s)		0.0				0.0		0.0			0.0	
Total Lost Time (s)		5.5				5.5		5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		Max				C-Max		None			None	
Act Effct Green (s)		39.5				39.5		29.5			29.5	
Actuated g/C Ratio		0.49				0.49		0.37			0.37	
v/c Ratio		1.07				0.63		0.98			1.08	
Control Delay		76.5				16.9		58.8			89.3	
Queue Delay		0.0				0.0		0.0			0.0	
Total Delay		76.5				16.9		58.8			89.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		E				B		E			F	
Approach Delay		76.5			16.9			58.8			89.3	
Approach LOS		E			B			E			F	
Queue Length 50th (m)		~133.4				29.9		78.0			~107.0	
Queue Length 95th (m)		#195.6				57.4		#138.1			#163.8	
Internal Link Dist (m)		82.9			344.3			215.3			50.0	
Turn Bay Length (m)						40.0						
Base Capacity (vph)		786				627		594			605	
Starvation Cap Reductn		0				0		0			0	
Spillback Cap Reductn		0				0		0			0	
Storage Cap Reductn		0				0		0			0	
Reduced v/c Ratio		1.07				0.63		0.98			1.08	

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 6:WBR, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.08
Intersection Signal Delay: 66.1 Intersection LOS: E
Intersection Capacity Utilization 90.3% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 89: BROCK ST S & DUNDAS ST

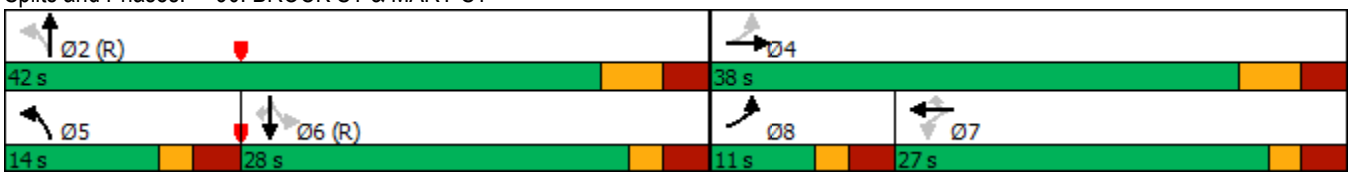
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	239	353	37	33	141	178	279	523	36	83	239	374
Future Volume (vph)	239	353	37	33	141	178	279	523	36	83	239	374
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	40.0		25.0	80.0		0.0	45.0		0.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	25.0			25.0			29.3			25.0		
Satd. Flow (prot)	1474	1540	0	1516	1580	1208	1460	1506	0	1422	1510	1295
Flt Permitted	0.464			0.515			0.415			0.435		
Satd. Flow (perm)	720	1540	0	822	1580	1208	638	1506	0	651	1510	1295
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8				193		6				407
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		119.5			361.3			133.4			69.9	
Travel Time (s)		8.6			26.0			9.6			5.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	9%	8%	11%	6%	7%	19%	10%	11%	14%	13%	12%	11%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	260	424	0	36	153	193	303	607	0	90	260	407
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm
Protected Phases	8	4			7		5	2			6	
Permitted Phases	4			7		7	2			6		6
Detector Phase	8	4		7	7	7	5	2		6	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.8	27.5		25.8	25.8	25.8	8.8	27.5		25.8	25.8	25.8
Total Split (s)	11.0	38.0		27.0	27.0	27.0	14.0	42.0		28.0	28.0	28.0
Total Split (%)	13.8%	47.5%		33.8%	33.8%	33.8%	17.5%	52.5%		35.0%	35.0%	35.0%
Yellow Time (s)	2.0	3.7		2.0	2.0	2.0	2.0	3.7		2.0	2.0	2.0
All-Red Time (s)	2.8	2.8		2.8	2.8	2.8	2.8	2.8		2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.8	6.5		4.8	4.8	4.8	4.8	6.5		4.8	4.8	4.8
Lead/Lag	Lead			Lag	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes			Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	27.7	26.0		16.7	16.7	16.7	42.7	41.0		26.4	26.4	26.4
Actuated g/C Ratio	0.35	0.32		0.21	0.21	0.21	0.53	0.51		0.33	0.33	0.33
v/c Ratio	0.85	0.84		0.21	0.47	0.48	0.66	0.78		0.42	0.52	0.58
Control Delay	44.0	42.8		26.8	31.1	8.1	15.7	19.6		30.6	27.8	6.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	44.0	42.8		26.8	31.1	8.1	15.7	19.6		30.6	27.8	6.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	D		C	C	A	B	B		C	C	A
Approach Delay		43.3			19.0			18.3			16.6	
Approach LOS		D			B			B			B	
Queue Length 50th (m)	28.2	48.6		4.1	18.5	0.0	11.8	54.6		10.3	31.1	0.0
Queue Length 95th (m)	m26.7	m46.1		10.4	31.3	13.2	m29.5	m#106.1		23.8	52.7	19.7
Internal Link Dist (m)		95.5			337.3			109.4			45.9	
Turn Bay Length (m)	30.0			40.0		25.0	80.0			45.0		
Base Capacity (vph)	307	611		228	438	474	458	775		214	498	700
Starvation Cap Reductn	0	2		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	0.85	0.70		0.16	0.35	0.41	0.66	0.78		0.42	0.52	0.58

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 24.2 Intersection LOS: C
Intersection Capacity Utilization 83.4% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 90: BROCK ST & MARY ST'



Lanes, Volumes, Timings
4: DUNDAS ST & HICKORY ST

03/24/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	722	3	101	373	19	13	39	74	114	18	7
Future Volume (vph)	84	722	3	101	373	19	13	39	74	114	18	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	80.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	1526	1662	0	1700	1645	0	0	1488	0	0	1619	0
Flt Permitted	0.950			0.950				0.962			0.579	
Satd. Flow (perm)	1504	1662	0	1694	1645	0	0	1435	0	0	970	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					3			49			2	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		368.3			157.7			139.9			207.5	
Travel Time (s)		26.5			11.4			10.1			14.9	
Confl. Peds. (#/hr)	8		3	3		8	11		3	3		11
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	17%	13%	0%	5%	13%	17%	0%	33%	6%	11%	0%	27%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	788	0	110	426	0	0	136	0	0	152	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Detector Phase	1	6		5	2		8	8		4	4	
Switch Phase												
Minimum Initial (s)	4.0	20.0		4.0	20.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	10.5	26.5		10.5	26.5		26.5	26.5		26.5	26.5	
Total Split (s)	21.6	79.0		19.0	76.4		32.0	32.0		32.0	32.0	
Total Split (%)	16.6%	60.8%		14.6%	58.8%		24.6%	24.6%		24.6%	24.6%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7		3.7	3.7	
All-Red Time (s)	2.8	2.8		2.8	2.8		2.8	2.8		2.8	2.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.5	6.5		6.5	6.5			6.5			6.5	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Recall Mode	Max	C-Max		Max	C-Max		None	None		None	None	
Act Effct Green (s)	18.0	72.5		15.4	69.9			22.6			22.6	
Actuated g/C Ratio	0.14	0.56		0.12	0.54			0.17			0.17	
v/c Ratio	0.43	0.85		0.55	0.48			0.47			0.89	
Control Delay	60.1	34.9		66.5	20.9			35.2			97.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	60.1	34.9		66.5	20.9			35.2			97.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	C		E	C			D			F	
Approach Delay		37.5			30.2			35.2			97.3	
Approach LOS		D			C			D			F	
Queue Length 50th (m)	20.5	150.1		25.5	60.0			17.8			34.0	
Queue Length 95th (m)	37.1	#211.1		#48.7	85.3			36.2			#67.1	
Internal Link Dist (m)		344.3			133.7			115.9			183.5	
Turn Bay Length (m)	30.0			80.0								
Base Capacity (vph)	211	926		201	885			320			191	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.43	0.85		0.55	0.48			0.42			0.80	

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 40.4 Intersection LOS: D
Intersection Capacity Utilization 75.1% ICU Level of Service D
Analysis Period (min) 15
Description: 2041 IBI BRT Volumes
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: DUNDAS ST & HICKORY ST

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	761	15	0	0	0	0	0	16	0	0	425
Future Volume (vph)	0	761	15	0	0	0	0	0	16	0	0	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.4	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1816	0	0	0	0	0	0	1593	0	0	1593
Flt Permitted												
Satd. Flow (perm)	0	1816	0	0	0	0	0	0	1593	0	0	1593
Link Speed (k/h)		50			50			48			48	
Link Distance (m)		29.0			106.9			182.6			76.0	
Travel Time (s)		2.1			7.7			13.7			5.7	
Confl. Peds. (#/hr)						48						
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	843	0	0	0	0	0	0	17	0	0	462
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 51.0%	ICU Level of Service A
Analysis Period (min) 15	

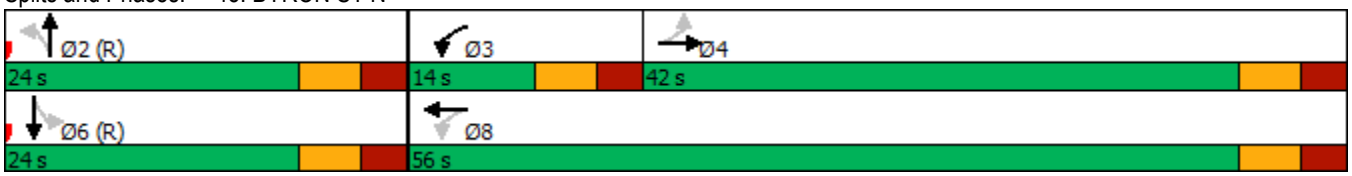
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	609	5	320	454	20	5	100	10	10	100	5
Future Volume (vph)	5	609	5	320	454	20	5	100	10	10	100	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	50.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1650	0	1785	1661	0	0	1837	0	0	1846	0
Flt Permitted		0.996		0.256				0.987			0.968	
Satd. Flow (perm)	0	1643	0	481	1661	0	0	1816	0	0	1794	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			5			6			2	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		85.0			119.5			122.1			70.9	
Travel Time (s)		6.4			9.0			9.2			5.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	14%	0%	0%	13%	0%	0%	1%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	672	0	348	515	0	0	125	0	0	125	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	27.5	27.5		10.5	27.5		22.5	22.5		22.5	22.5	
Total Split (s)	42.0	42.0		14.0	56.0		24.0	24.0		24.0	24.0	
Total Split (%)	52.5%	52.5%		17.5%	70.0%		30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7		3.7	3.7	
All-Red Time (s)	2.8	2.8		2.8	2.8		2.8	2.8		2.8	2.8	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)		6.5		6.5	6.5			6.5			6.5	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Act Effct Green (s)		35.5		49.5	49.5			17.5			17.5	
Actuated g/C Ratio		0.44		0.62	0.62			0.22			0.22	
v/c Ratio		0.92		0.83	0.50			0.31			0.32	
Control Delay		41.9		31.1	15.0			27.4			28.5	
Queue Delay		0.0		0.0	1.0			0.0			0.0	
Total Delay		41.9		31.1	16.0			27.4			28.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		D		C	B			C			C	
Approach Delay		41.9			22.1			27.4			28.5	
Approach LOS		D			C			C			C	
Queue Length 50th (m)		85.0		29.3	46.6			14.0			14.5	
Queue Length 95th (m)		#148.0		m#64.1	m79.7			27.1			27.7	
Internal Link Dist (m)		61.0			95.5			98.1			46.9	
Turn Bay Length (m)				50.0								
Base Capacity (vph)		729		419	1029			401			394	
Starvation Cap Reductn		0		0	280			0			0	
Spillback Cap Reductn		0		0	0			0			0	
Storage Cap Reductn		0		0	0			0			0	
Reduced v/c Ratio		0.92		0.83	0.69			0.31			0.32	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Pretimed
Maximum v/c Ratio: 0.92
Intersection Signal Delay: 30.4 Intersection LOS: C
Intersection Capacity Utilization 83.4% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 45: BYRON ST N



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	418	125	15	130	31	23	61	35	25	16	13
Future Volume (vph)	15	418	125	15	130	31	23	61	35	25	16	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Satd. Flow (prot)	0	1664	0	0	1653	0	0	1741	0	0	1712	0
Flt Permitted		0.999			0.996			0.990			0.977	
Satd. Flow (perm)	0	1664	0	0	1653	0	0	1741	0	0	1712	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		361.3			115.9			207.5			90.1	
Travel Time (s)		27.1			8.7			15.6			6.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	13%	10%	7%	7%	12%	6%	4%	0%	6%	0%	6%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	606	0	0	191	0	0	129	0	0	58	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 46.8%	ICU Level of Service A
Analysis Period (min) 15	
Description: 2041Background Volumes	

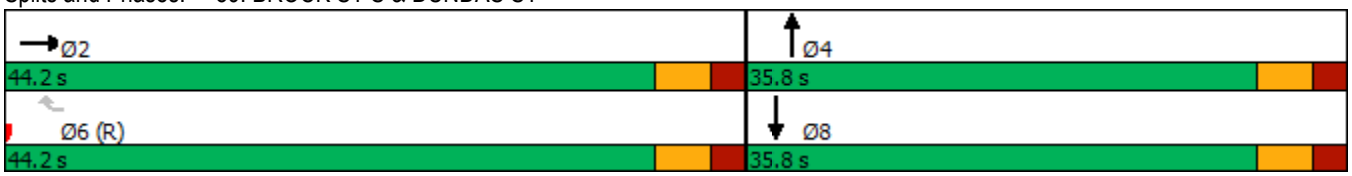
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	740	37	0	0	415	0	508	26	0	601	0
Future Volume (vph)	0	740	37	0	0	415	0	508	26	0	601	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.4	3.4	3.4	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		24.2	40.0		40.0	0.0		0.0	0.0		16.9
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	0.0			0.0			0.0			0.0		
Satd. Flow (prot)	0	1592	0	0	0	1340	0	1604	0	0	1642	0
Flt Permitted												
Satd. Flow (perm)	0	1592	0	0	0	1181	0	1604	0	0	1642	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				93		4				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		106.9			368.3			239.3			74.0	
Travel Time (s)		7.7			26.5			17.2			5.3	
Confl. Peds. (#/hr)	48		45	45		48	83		75	75		83
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	4%	0%	0%	3%	3%	0%	4%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	844	0	0	0	451	0	580	0	0	653	0
Turn Type		NA				Perm		NA			NA	
Protected Phases		2						4			8	
Permitted Phases						6						
Detector Phase		2				6		4			8	
Switch Phase												
Minimum Initial (s)		8.0				8.0		8.0			8.0	
Minimum Split (s)		24.0				24.5		24.5			24.5	
Total Split (s)		44.2				44.2		35.8			35.8	
Total Split (%)		55.3%				55.3%		44.8%			44.8%	
Yellow Time (s)		3.3				3.3		3.3			3.3	
All-Red Time (s)		2.2				2.2		2.2			2.2	
Lost Time Adjust (s)		0.0				0.0		0.0			0.0	
Total Lost Time (s)		5.5				5.5		5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		Max				C-Max		None			None	
Act Effct Green (s)		38.7				38.7		30.3			30.3	
Actuated g/C Ratio		0.48				0.48		0.38			0.38	
v/c Ratio		1.09				0.73		0.95			1.05	
Control Delay		83.9				21.3		52.4			79.4	
Queue Delay		0.0				0.0		0.0			0.0	
Total Delay		83.9				21.3		52.4			79.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		F				C		D			E	
Approach Delay		83.9			21.3			52.4			79.4	
Approach LOS		F			C			D			E	
Queue Length 50th (m)		~135.7				38.0		76.6			~104.4	
Queue Length 95th (m)		#197.9				73.1		#135.6			#161.7	
Internal Link Dist (m)		82.9			344.3			215.3			50.0	
Turn Bay Length (m)						40.0						
Base Capacity (vph)		772				619		610			621	
Starvation Cap Reductn		0				0		0			0	
Spillback Cap Reductn		0				0		0			0	
Storage Cap Reductn		0				0		0			0	
Reduced v/c Ratio		1.09				0.73		0.95			1.05	

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 6:WBR, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.09
Intersection Signal Delay: 64.3 Intersection LOS: E
Intersection Capacity Utilization 90.3% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 89: BROCK ST S & DUNDAS ST



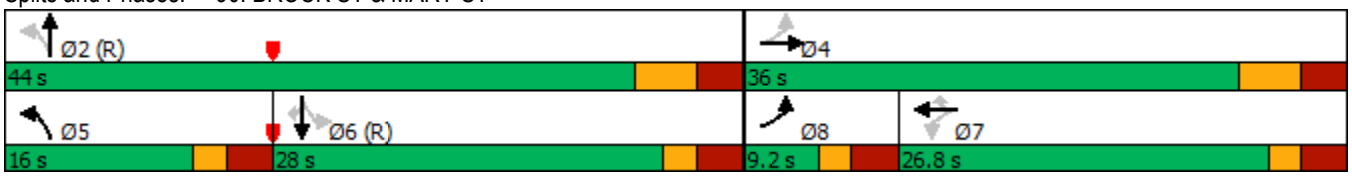
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	239	353	37	33	91	178	329	523	36	83	239	374
Future Volume (vph)	239	353	37	33	91	178	329	523	36	83	239	374
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	40.0		25.0	80.0		0.0	45.0		0.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	25.0			25.0			29.3			25.0		
Satd. Flow (prot)	1474	1540	0	1516	1580	1208	1460	1506	0	1422	1510	1295
Flt Permitted	0.536			0.485			0.402			0.435		
Satd. Flow (perm)	832	1540	0	774	1580	1208	618	1506	0	651	1510	1295
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				193		6				407
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		119.5			361.3			133.4			69.9	
Travel Time (s)		8.6			26.0			9.6			5.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	9%	8%	11%	6%	7%	19%	10%	11%	14%	13%	12%	11%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	260	424	0	36	99	193	358	607	0	90	260	407
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm
Protected Phases	8	4			7		5	2			6	
Permitted Phases	4			7		7	2			6		6
Detector Phase	8	4		7	7	7	5	2		6	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.8	27.5		25.8	25.8	25.8	8.8	27.5		25.8	25.8	25.8
Total Split (s)	9.2	36.0		26.8	26.8	26.8	16.0	44.0		28.0	28.0	28.0
Total Split (%)	11.5%	45.0%		33.5%	33.5%	33.5%	20.0%	55.0%		35.0%	35.0%	35.0%
Yellow Time (s)	2.0	3.7		2.0	2.0	2.0	2.0	3.7		2.0	2.0	2.0
All-Red Time (s)	2.8	2.8		2.8	2.8	2.8	2.8	2.8		2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.8	6.5		4.8	4.8	4.8	4.8	6.5		4.8	4.8	4.8
Lead/Lag	Lead			Lag	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes			Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	27.3	25.6		18.1	18.1	18.1	43.1	41.4		25.1	25.1	25.1
Actuated g/C Ratio	0.34	0.32		0.23	0.23	0.23	0.54	0.52		0.31	0.31	0.31
v/c Ratio	0.82	0.85		0.21	0.28	0.46	0.76	0.78		0.44	0.55	0.59
Control Delay	42.6	45.1		26.3	26.1	7.6	19.4	19.8		31.8	29.1	6.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	42.6	45.2		26.3	26.1	7.6	19.4	19.8		31.8	29.1	6.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	D		C	C	A	B	B		C	C	A
Approach Delay		44.2			15.2			19.7			17.4	
Approach LOS		D			B			B			B	
Queue Length 50th (m)	28.0	48.5		4.0	11.2	0.0	20.2	64.8		10.3	31.1	0.0
Queue Length 95th (m)	m29.1	m50.1		10.6	21.6	13.2	m#39.6	m101.6		23.8	52.7	19.7
Internal Link Dist (m)		95.5			337.3			109.4			45.9	
Turn Bay Length (m)	30.0			40.0		25.0	80.0			45.0		
Base Capacity (vph)	319	572		212	434	472	471	782		204	473	685
Starvation Cap Reductn	0	1		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	13	0	0	0		0	0	3
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.82	0.74		0.17	0.24	0.41	0.76	0.78		0.44	0.55	0.60

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 24.6 Intersection LOS: C
Intersection Capacity Utilization 82.0% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 90: BROCK ST & MARY ST'



Lanes, Volumes, Timings
89: BROCK ST S & DUNDAS ST

11/10/2021

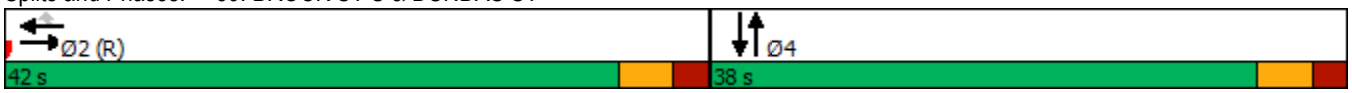
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	650	0	0	660	148	0	491	0	0	609	0
Future Volume (vph)	0	650	0	0	660	148	0	491	0	0	609	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		24.2	0.0		40.0	0.0		0.0	0.0		16.9
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (m)	0.0			0.0			0.0			0.0		
Satd. Flow (prot)	0	1658	0	0	1658	1395	0	1642	0	0	1658	0
Flt Permitted												
Satd. Flow (perm)	0	1658	0	0	1658	1213	0	1642	0	0	1658	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						118						
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		102.6			205.3			239.3			85.4	
Travel Time (s)		7.4			14.8			17.2			6.1	
Confl. Peds. (#/hr)	48		45	45		48	83		75	75		83
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	0%	0%	2%	3%	0%	3%	0%	0%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	707	0	0	717	161	0	534	0	0	662	0
Turn Type		NA			NA	Perm		NA			NA	
Protected Phases		2			2			4			4	
Permitted Phases						2						
Detector Phase		2			2	2		4			4	
Switch Phase												
Minimum Initial (s)		8.0			8.0	8.0		8.0			8.0	
Minimum Split (s)		24.0			24.0	24.0		24.5			24.5	
Total Split (s)		42.0			42.0	42.0		38.0			38.0	
Total Split (%)		52.5%			52.5%	52.5%		47.5%			47.5%	
Yellow Time (s)		3.3			3.3	3.3		3.3			3.3	
All-Red Time (s)		2.2			2.2	2.2		2.2			2.2	
Lost Time Adjust (s)		0.0			0.0	0.0		0.0			0.0	
Total Lost Time (s)		5.5			5.5	5.5		5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		Max			Max	Max		Max			Max	
Act Effct Green (s)		36.5			36.5	36.5		32.5			32.5	
Actuated g/C Ratio		0.46			0.46	0.46		0.41			0.41	
v/c Ratio		0.94			0.95	0.26		0.80			0.98	
Control Delay		43.0			45.3	5.7		32.1			56.8	
Queue Delay		0.0			0.0	0.0		0.0			0.0	
Total Delay		43.0			45.3	5.7		32.1			56.8	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		D			D	A		C			E	
Approach Delay		43.0			38.1			32.1			56.8	
Approach LOS		D			D			C			E	
Queue Length 50th (m)		90.0			92.2	3.3		63.8			89.0	
Queue Length 95th (m)		#154.3			#157.6	12.8		#111.3			#152.1	
Internal Link Dist (m)		78.6			181.3			215.3			61.4	
Turn Bay Length (m)						40.0						
Base Capacity (vph)		756			756	617		667			673	
Starvation Cap Reductn		0			0	0		0			0	
Spillback Cap Reductn		0			0	0		0			0	
Storage Cap Reductn		0			0	0		0			0	
Reduced v/c Ratio		0.94			0.95	0.26		0.80			0.98	

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0.9 (1%), Referenced to phase 2:EBWB, Start of Green
Natural Cycle: 90
Control Type: Pretimed
Maximum v/c Ratio: 0.98
Intersection Signal Delay: 42.6 Intersection LOS: D
Intersection Capacity Utilization 83.4% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 89: BROCK ST S & DUNDAS ST



Lanes, Volumes, Timings
89: BROCK ST S & DUNDAS ST

11/10/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1198	0	0	739	138	0	508	0	0	601	0
Future Volume (vph)	0	1198	0	0	739	138	0	508	0	0	601	0
Ideal Flow (vphpl)	1900	2005	1900	1900	2005	1900	1900	1900	1900	1900	2005	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		24.2	0.0		40.0	0.0		0.0	0.0		16.9
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (m)	0.0			0.0			0.0			0.0		
Satd. Flow (prot)	0	1716	0	0	1732	1395	0	1626	0	0	1732	0
Flt Permitted												
Satd. Flow (perm)	0	1716	0	0	1732	1300	0	1626	0	0	1732	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						73						
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		102.6			205.3			239.3			85.4	
Travel Time (s)		7.4			14.8			17.2			6.1	
Confl. Peds. (#/hr)	21		15	15		21	5		34	34		5
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	4%	4%	0%	3%	3%	0%	4%	0%	0%	3%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1302	0	0	803	150	0	552	0	0	653	0
Turn Type		NA			NA	Perm		NA			NA	
Protected Phases		2			2			4			4	
Permitted Phases						2						
Detector Phase		2			2	2		4			4	
Switch Phase												
Minimum Initial (s)		8.0			8.0	8.0		8.0			8.0	
Minimum Split (s)		25.0			25.0	25.0		26.0			26.0	
Total Split (s)		50.0			50.0	50.0		30.0			30.0	
Total Split (%)		62.5%			62.5%	62.5%		37.5%			37.5%	
Yellow Time (s)		3.3			3.3	3.3		3.3			3.3	
All-Red Time (s)		2.2			2.2	2.2		2.2			2.2	
Lost Time Adjust (s)		0.0			0.0	0.0		0.0			0.0	
Total Lost Time (s)		5.5			5.5	5.5		5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		Max			Max	Max		Max			Max	
Act Effct Green (s)		44.5			44.5	44.5		24.5			24.5	
Actuated g/C Ratio		0.56			0.56	0.56		0.31			0.31	
v/c Ratio		1.36			0.83	0.20		1.11			1.23	
Control Delay		192.2			24.5	5.4		103.4			148.1	
Queue Delay		0.0			0.0	0.0		0.0			0.0	
Total Delay		192.2			24.5	5.4		103.4			148.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		F			C	A		F			F	
Approach Delay		192.2			21.5			103.4			148.1	
Approach LOS		F			C			F			F	
Queue Length 50th (m)		~243.9			86.0	4.7		~89.6			~114.7	
Queue Length 95th (m)		#311.4			#154.5	12.3		#142.3			#170.6	
Internal Link Dist (m)		78.6			181.3			215.3			61.4	
Turn Bay Length (m)						40.0						
Base Capacity (vph)		954			963	755		497			530	
Starvation Cap Reductn		0			0	0		0			0	
Spillback Cap Reductn		0			0	0		0			0	
Storage Cap Reductn		0			0	0		0			0	
Reduced v/c Ratio		1.36			0.83	0.20		1.11			1.23	

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0.8 (1%), Referenced to phase 2:EBWB, Start of Green
Natural Cycle: 150
Control Type: Pretimed
Maximum v/c Ratio: 1.36
Intersection Signal Delay: 122.7 Intersection LOS: F
Intersection Capacity Utilization 108.9% ICU Level of Service G
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 89: BROCK ST S & DUNDAS ST

Lanes, Volumes, Timings
89: BROCK ST S & DUNDAS ST

11/10/2021

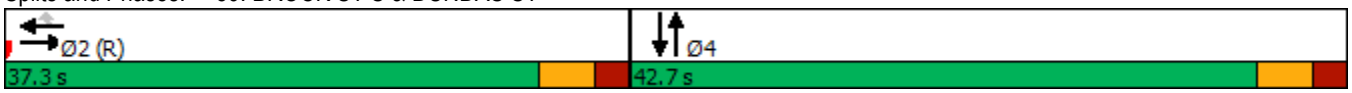
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	520	0	0	528	148	0	491	0	0	609	0
Future Volume (vph)	0	520	0	0	528	148	0	491	0	0	609	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		24.2	0.0		40.0	0.0		0.0	0.0		16.9
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (m)	0.0			0.0			0.0			0.0		
Satd. Flow (prot)	0	1496	0	0	1483	1261	0	1458	0	0	1510	0
Flt Permitted												
Satd. Flow (perm)	0	1496	0	0	1483	1177	0	1458	0	0	1510	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						141						
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		102.6			375.6			239.3			85.4	
Travel Time (s)		7.4			27.0			17.2			6.1	
Confl. Peds. (#/hr)	20		25	25		20	20		27	27		20
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	13%	8%	0%	14%	14%	0%	16%	25%	0%	12%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	565	0	0	574	161	0	534	0	0	662	0
Turn Type		NA			NA	Perm		NA			NA	
Protected Phases		2			2			4			4	
Permitted Phases						2						
Detector Phase		2			2	2		4			4	
Switch Phase												
Minimum Initial (s)		8.0			8.0	8.0		8.0			8.0	
Minimum Split (s)		24.0			24.0	24.0		24.5			24.5	
Total Split (s)		37.3			37.3	37.3		42.7			42.7	
Total Split (%)		46.6%			46.6%	46.6%		53.4%			53.4%	
Yellow Time (s)		3.3			3.3	3.3		3.3			3.3	
All-Red Time (s)		2.2			2.2	2.2		2.2			2.2	
Lost Time Adjust (s)		0.0			0.0	0.0		0.0			0.0	
Total Lost Time (s)		5.5			5.5	5.5		5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		Max			Max	Max		Max			Max	
Act Effct Green (s)		31.8			31.8	31.8		37.2			37.2	
Actuated g/C Ratio		0.40			0.40	0.40		0.46			0.46	
v/c Ratio		0.95			0.97	0.29		0.79			0.94	
Control Delay		50.4			50.3	8.5		29.2			32.1	
Queue Delay		0.0			0.0	0.0		0.0			0.0	
Total Delay		50.4			50.3	8.5		29.2			32.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		D			D	A		C			C	
Approach Delay		50.4			41.2			29.2			32.1	
Approach LOS		D			D			C			C	
Queue Length 50th (m)		78.1			59.1	0.8		57.8			23.5	
Queue Length 95th (m)		m75.2			#132.4	m15.8		#93.4			#145.5	
Internal Link Dist (m)		78.6			351.6			215.3			61.4	
Turn Bay Length (m)						40.0						
Base Capacity (vph)		594			589	552		677			702	
Starvation Cap Reductn		0			0	0		0			0	
Spillback Cap Reductn		0			0	0		0			0	
Storage Cap Reductn		0			0	0		0			0	
Reduced v/c Ratio		0.95			0.97	0.29		0.79			0.94	

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0.8 (1%), Referenced to phase 2:EBWB, Start of Green
Natural Cycle: 90
Control Type: Pretimed
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 38.3 Intersection LOS: D
Intersection Capacity Utilization 75.7% ICU Level of Service D
Analysis Period (min) 15
Description: TMC June 26/19
Updated Sept 17/20
No Left Turns allowed for any movement
Street parking on North, West and South legs;
Assumed to handle 0 volume - lanes ignored
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 89: BROCK ST S & DUNDAS ST



Lanes, Volumes, Timings
89: BROCK ST S & DUNDAS ST

11/10/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	700	0	0	591	138	0	508	0	0	601	0
Future Volume (vph)	0	700	0	0	591	138	0	508	0	0	601	0
Ideal Flow (vphpl)	1900	2005	1900	1900	2005	1900	1900	1900	1900	1900	2005	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		24.2	0.0		40.0	0.0		0.0	0.0		16.9
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (m)	0.0			0.0			0.0			0.0		
Satd. Flow (prot)	0	1716	0	0	1732	1395	0	1626	0	0	1732	0
Flt Permitted												
Satd. Flow (perm)	0	1716	0	0	1732	1300	0	1626	0	0	1732	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						133						
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		102.6			205.3			239.3			85.4	
Travel Time (s)		7.4			14.8			17.2			6.1	
Confl. Peds. (#/hr)	21		15	15		21	5		34	34		5
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	4%	4%	0%	3%	3%	0%	4%	0%	0%	3%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	761	0	0	642	150	0	552	0	0	653	0
Turn Type		NA			NA	Perm		NA			NA	
Protected Phases		2			2			4			4	
Permitted Phases						2						
Detector Phase		2			2	2		4			4	
Switch Phase												
Minimum Initial (s)		8.0			8.0	8.0		8.0			8.0	
Minimum Split (s)		25.0			25.0	25.0		26.0			26.0	
Total Split (s)		43.0			43.0	43.0		37.0			37.0	
Total Split (%)		53.8%			53.8%	53.8%		46.3%			46.3%	
Yellow Time (s)		3.3			3.3	3.3		3.3			3.3	
All-Red Time (s)		2.2			2.2	2.2		2.2			2.2	
Lost Time Adjust (s)		0.0			0.0	0.0		0.0			0.0	
Total Lost Time (s)		5.5			5.5	5.5		5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		Max			Max	Max		Max			Max	
Act Effct Green (s)		37.5			37.5	37.5		31.5			31.5	
Actuated g/C Ratio		0.47			0.47	0.47		0.39			0.39	
v/c Ratio		0.95			0.79	0.22		0.86			0.96	
Control Delay		43.5			26.9	4.0		38.3			51.6	
Queue Delay		0.0			0.0	0.0		0.0			0.0	
Total Delay		43.5			26.9	4.0		38.3			51.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		D			C	A		D			D	
Approach Delay		43.5			22.6			38.3			51.6	
Approach LOS		D			C			D			D	
Queue Length 50th (m)		97.2			72.5	1.2		69.2			86.7	
Queue Length 95th (m)		#164.7			#118.2	9.7		#121.2			#148.2	
Internal Link Dist (m)		78.6			181.3			215.3			61.4	
Turn Bay Length (m)						40.0						
Base Capacity (vph)		804			811	680		640			681	
Starvation Cap Reductn		0			0	0		0			0	
Spillback Cap Reductn		0			0	0		0			0	
Storage Cap Reductn		0			0	0		0			0	
Reduced v/c Ratio		0.95			0.79	0.22		0.86			0.96	

Intersection Summary

Area Type: CBD
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0.8 (1%), Referenced to phase 2:EBWB, Start of Green
Natural Cycle: 90
Control Type: Pretimed
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 38.4 Intersection LOS: D
Intersection Capacity Utilization 81.3% 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: 89: BROCK ST S & DUNDAS ST

HCM 2000 Reports

For reference

HCM Signalized Intersection Capacity Analysis
90: BROCK ST N & MARY ST W

11/09/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	72	12	39	175	76	40	367	16	53	637	240
Future Volume (vph)	74	72	12	39	175	76	40	367	16	53	637	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8		5.8	5.8		5.3	5.3		5.3	5.3	5.3
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		0.99	1.00	1.00
Frt	1.00	0.97		1.00	0.95		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1425	1426		1414	1484		1302	1428		1435	1523	1278
Flt Permitted	0.31	1.00		0.68	1.00		0.28	1.00		0.43	1.00	1.00
Satd. Flow (perm)	462	1426		1008	1484		383	1428		653	1523	1278
Peak-hour factor, PHF	0.84	0.75	0.43	0.81	0.71	0.66	0.71	0.83	0.57	0.74	0.92	0.85
Adj. Flow (vph)	88	96	28	48	246	115	56	442	28	72	692	282
RTOR Reduction (vph)	0	13	0	0	21	0	0	3	0	0	0	112
Lane Group Flow (vph)	88	111	0	48	340	0	56	467	0	72	692	170
Confl. Peds. (#/hr)	7		3	3		7	6		10	10		6
Heavy Vehicles (%)	12%	13%	17%	13%	7%	8%	23%	17%	19%	11%	11%	9%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	20.8	20.8		20.8	20.8		48.1	48.1		48.1	48.1	48.1
Effective Green, g (s)	20.8	20.8		20.8	20.8		48.1	48.1		48.1	48.1	48.1
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.60	0.60		0.60	0.60	0.60
Clearance Time (s)	5.8	5.8		5.8	5.8		5.3	5.3		5.3	5.3	5.3
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	120	370		262	385		230	858		392	915	768
v/s Ratio Prot		0.08			c0.23			0.33			c0.45	
v/s Ratio Perm	0.19			0.05			0.15			0.11		0.13
v/c Ratio	0.73	0.30		0.18	0.88		0.24	0.54		0.18	0.76	0.22
Uniform Delay, d1	27.1	23.8		23.0	28.4		7.5	9.5		7.1	11.7	7.3
Progression Factor	1.00	1.00		1.00	1.00		1.48	1.32		0.42	0.66	0.38
Incremental Delay, d2	20.5	0.5		0.3	20.4		1.9	1.9		0.9	5.1	0.6
Delay (s)	47.6	24.2		23.3	48.8		13.0	14.4		3.9	12.8	3.3
Level of Service	D	C		C	D		B	B		A	B	A
Approach Delay (s)		33.9			45.8			14.3			9.7	
Approach LOS		C			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.1
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		

Description: TMC Sep 26/19
Updated Sept 17/20

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	70	61	43	105	16	6	432	57	0	572	29
Future Volume (vph)	18	70	61	43	105	16	6	432	57	0	572	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.2	6.2		6.2	6.2		5.7	5.7	5.7		5.7	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00	0.91		0.99	
Flpb, ped/bikes	0.96	1.00		0.97	1.00		0.98	1.00	1.00		1.00	
Frt	1.00	0.93		1.00	0.97		1.00	1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00		1.00	
Satd. Flow (prot)	1457	1536		1557	1541		1576	1595	1281		1600	
Flt Permitted	0.64	1.00		0.57	1.00		0.32	1.00	1.00		1.00	
Satd. Flow (perm)	980	1536		938	1541		527	1595	1281		1600	
Peak-hour factor, PHF	0.64	0.67	0.76	0.72	0.82	0.50	0.50	0.78	0.75	0.25	0.86	0.60
Adj. Flow (vph)	28	104	80	60	128	32	12	554	76	0	665	48
RTOR Reduction (vph)	0	38	0	0	13	0	0	0	24	0	3	0
Lane Group Flow (vph)	28	146	0	60	147	0	12	554	52	0	711	0
Confl. Peds. (#/hr)	22		31	31		22	31		29	29		31
Heavy Vehicles (%)	6%	1%	0%	0%	3%	13%	0%	6%	2%	0%	4%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	13.1	13.1		13.1	13.1		55.0	55.0	55.0		55.0	
Effective Green, g (s)	13.1	13.1		13.1	13.1		55.0	55.0	55.0		55.0	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.69	0.69	0.69		0.69	
Clearance Time (s)	6.2	6.2		6.2	6.2		5.7	5.7	5.7		5.7	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	160	251		153	252		362	1096	880		1100	
v/s Ratio Prot		0.09			c0.10			0.35			c0.44	
v/s Ratio Perm	0.03			0.06			0.02		0.04			
v/c Ratio	0.17	0.58		0.39	0.59		0.03	0.51	0.06		0.65	
Uniform Delay, d1	28.8	30.9		29.9	30.9		4.0	6.0	4.1		7.0	
Progression Factor	1.00	1.00		1.00	1.00		0.87	0.79	0.65		0.25	
Incremental Delay, d2	0.5	3.2		1.7	3.4		0.2	1.6	0.1		0.3	
Delay (s)	29.3	34.1		31.6	34.4		3.6	6.4	2.8		2.1	
Level of Service	C	C		C	C		A	A	A		A	
Approach Delay (s)		33.5			33.6			5.9			2.1	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.9
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		
Description: TMC Oct 4/18			
Updated Sept 17/20			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	504	98	11	1037	36	135	99	21	86	227	275
Future Volume (vph)	56	504	98	11	1037	36	135	99	21	86	227	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	2000	1900	1900	1900	2000	1900
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5	3.5	6.5	6.5	6.5	6.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1543	2966		1357	3150	1291	1642	1626	1238	1582	1604	
Flt Permitted	0.15	1.00		0.35	1.00	1.00	0.13	1.00	1.00	0.68	1.00	
Satd. Flow (perm)	240	2966		501	3150	1291	218	1626	1238	1136	1604	
Peak-hour factor, PHF	0.82	0.89	0.82	0.69	0.89	0.75	0.66	0.85	0.58	0.74	0.75	0.80
Adj. Flow (vph)	68	566	120	16	1165	48	205	116	36	116	303	344
RTOR Reduction (vph)	0	22	0	0	0	25	0	0	23	0	26	0
Lane Group Flow (vph)	68	664	0	16	1165	23	205	116	13	116	621	0
Confl. Peds. (#/hr)	5		4	4		5	1		6	6		1
Heavy Vehicles (%)	4%	6%	0%	18%	2%	8%	3%	4%	14%	1%	3%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		
Actuated Green, G (s)	38.3	38.3		38.3	38.3	38.3	28.7	28.7	28.7	28.7	28.7	
Effective Green, g (s)	38.3	38.3		38.3	38.3	38.3	31.7	28.7	28.7	28.7	28.7	
Actuated g/C Ratio	0.48	0.48		0.48	0.48	0.48	0.40	0.36	0.36	0.36	0.36	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	
Lane Grp Cap (vph)	114	1419		239	1508	618	86	583	444	407	575	
v/s Ratio Prot		0.22			c0.37			0.07			0.39	
v/s Ratio Perm	0.28			0.03		0.02	c0.94		0.01	0.10		
v/c Ratio	0.60	0.47		0.07	0.77	0.04	2.38	0.20	0.03	0.29	1.08	
Uniform Delay, d1	15.2	14.0		11.2	17.2	11.1	24.1	17.7	16.6	18.3	25.7	
Progression Factor	1.00	1.00		0.85	0.73	0.69	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	20.9	1.1		0.5	3.6	0.1	656.9	0.8	0.1	1.8	61.2	
Delay (s)	36.1	15.1		10.1	16.3	7.7	681.0	18.5	16.7	20.1	86.8	
Level of Service	D	B		B	B	A	F	B	B	C	F	
Approach Delay (s)		17.0			15.8			398.7			76.7	
Approach LOS		B			B			F			E	

Intersection Summary			
HCM 2000 Control Delay	75.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.56		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	104.2%	ICU Level of Service	G
Analysis Period (min)	15		
Description: TMC Oct 24/17			
Updated Sept 23/20			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	502	85	31	646	14	126	120	42	31	201	98
Future Volume (vph)	41	502	85	31	646	14	126	120	42	31	201	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.3	6.3		6.1	6.1	6.1	6.1	6.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00	1.00	0.99	1.00	
Frt	1.00	0.97		1.00	1.00		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1566	2969		1600	3106		1543	1691	1404	1592	1590	
Flt Permitted	0.33	1.00		0.33	1.00		0.34	1.00	1.00	0.65	1.00	
Satd. Flow (perm)	541	2969		557	3106		555	1691	1404	1095	1590	
Peak-hour factor, PHF	0.73	0.81	0.66	0.78	0.88	0.70	0.93	0.73	0.81	0.70	0.75	0.82
Adj. Flow (vph)	56	620	129	40	734	20	135	164	52	44	268	120
RTOR Reduction (vph)	0	22	0	0	2	0	0	0	36	0	20	0
Lane Group Flow (vph)	56	727	0	40	752	0	135	164	16	44	368	0
Confl. Peds. (#/hr)	10		7	7		10	22		11	11		22
Heavy Vehicles (%)	2%	5%	4%	0%	3%	0%	3%	0%	0%	0%	0%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	42.5	42.5		42.5	42.5		25.1	25.1	25.1	25.1	25.1	
Effective Green, g (s)	42.5	42.5		42.5	42.5		25.1	25.1	25.1	25.1	25.1	
Actuated g/C Ratio	0.53	0.53		0.53	0.53		0.31	0.31	0.31	0.31	0.31	
Clearance Time (s)	6.3	6.3		6.3	6.3		6.1	6.1	6.1	6.1	6.1	
Lane Grp Cap (vph)	287	1577		295	1650		174	530	440	343	498	
v/s Ratio Prot		c0.24			0.24			0.10			0.23	
v/s Ratio Perm	0.10			0.07			c0.24		0.01	0.04		
v/c Ratio	0.20	0.46		0.14	0.46		0.78	0.31	0.04	0.13	0.74	
Uniform Delay, d1	9.8	11.6		9.5	11.6		24.9	20.9	19.1	19.6	24.5	
Progression Factor	1.27	1.36		0.20	0.16		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.4	0.9		0.1	0.1		28.0	1.5	0.2	0.8	9.5	
Delay (s)	13.9	16.8		2.0	2.0		52.9	22.4	19.2	20.4	34.0	
Level of Service	B	B		A	A		D	C	B	C	C	
Approach Delay (s)		16.6			2.0			33.7			32.6	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		
Description: TMC May 30 2017			
Updated Sept 23/20			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	496	17	90	899	138	38	403	50	190	522	88
Future Volume (vph)	53	496	17	90	899	138	38	403	50	190	522	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.6		6.6	6.6		5.9	5.9		3.0	5.9	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1545	3028		1527	3013		1433	3058		1499	3067	
Flt Permitted	0.09	1.00		0.42	1.00		0.36	1.00		0.27	1.00	
Satd. Flow (perm)	153	3028		677	3013		544	3058		434	3067	
Peak-hour factor, PHF	0.74	0.86	0.53	0.73	0.84	0.88	0.63	0.82	0.89	0.83	0.85	0.88
Adj. Flow (vph)	72	577	32	123	1070	157	60	491	56	229	614	100
RTOR Reduction (vph)	0	4	0	0	10	0	0	8	0	0	12	0
Lane Group Flow (vph)	72	605	0	123	1217	0	60	539	0	229	702	0
Confl. Peds. (#/hr)	13		26	26		13	23		17	17		23
Heavy Vehicles (%)	4%	5%	6%	4%	4%	6%	11%	3%	4%	7%	2%	2%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	57.2	57.2		48.9	48.9		29.3	29.3		40.3	40.3	
Effective Green, g (s)	57.2	57.2		48.9	48.9		29.3	29.3		40.3	40.3	
Actuated g/C Ratio	0.52	0.52		0.44	0.44		0.27	0.27		0.37	0.37	
Clearance Time (s)	3.0	6.6		6.6	6.6		5.9	5.9		3.0	5.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	146	1574		300	1339		144	814		236	1123	
v/s Ratio Prot	c0.02	0.20			c0.40			0.18		c0.07	0.23	
v/s Ratio Perm	0.23			0.18			0.11			c0.28		
v/c Ratio	0.49	0.38		0.41	0.91		0.42	0.66		0.97	0.63	
Uniform Delay, d1	18.6	15.8		20.8	28.5		33.3	35.9		32.2	28.6	
Progression Factor	1.00	1.00		0.88	0.90		1.17	1.12		0.83	0.87	
Incremental Delay, d2	2.6	0.7		3.6	9.6		8.6	4.2		46.4	2.3	
Delay (s)	21.2	16.6		21.9	35.2		47.4	44.3		73.3	27.2	
Level of Service	C	B		C	D		D	D		E	C	
Approach Delay (s)		17.0			34.0			44.6			38.4	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	33.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	97.6%	ICU Level of Service	F
Analysis Period (min)	15		

Description: TMC Oct 19/16
Updated Sept 23/20

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	78	0	117	13	6	26	66	540	3	19	727	171
Future Volume (vph)	78	0	117	13	6	26	66	540	3	19	727	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.3	6.3		5.9	5.9		5.9	5.9	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.88		1.00	1.00		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1414	1243		1394	1458		1364	2917		1443	2835	
Flt Permitted	0.73	1.00		0.67	1.00		0.25	1.00		0.44	1.00	
Satd. Flow (perm)	1080	1243		988	1458		356	2917		661	2835	
Peak-hour factor, PHF	0.65	0.25	0.89	0.65	0.75	0.65	0.75	0.95	0.38	0.59	0.91	0.76
Adj. Flow (vph)	120	0	131	20	8	40	88	568	8	32	799	225
RTOR Reduction (vph)	0	47	0	0	33	0	0	1	0	0	31	0
Lane Group Flow (vph)	120	84	0	20	15	0	88	575	0	32	993	0
Confl. Peds. (#/hr)	7		3	3		7	21		5	5		21
Heavy Vehicles (%)	13%	0%	14%	15%	0%	0%	17%	10%	0%	11%	8%	10%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	10.3	10.3		10.3	10.3		32.5	32.5		32.5	32.5	
Effective Green, g (s)	10.3	10.3		10.3	10.3		32.5	32.5		32.5	32.5	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.59	0.59		0.59	0.59	
Clearance Time (s)	6.3	6.3		6.3	6.3		5.9	5.9		5.9	5.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	202	232		185	273		210	1723		390	1675	
v/s Ratio Prot		0.07			0.01			0.20			c0.35	
v/s Ratio Perm	c0.11			0.02			0.25			0.05		
v/c Ratio	0.59	0.36		0.11	0.06		0.42	0.33		0.08	0.59	
Uniform Delay, d1	20.4	19.5		18.5	18.4		6.1	5.7		4.8	7.1	
Progression Factor	1.00	1.00		1.00	1.00		2.38	2.00		1.00	1.00	
Incremental Delay, d2	4.6	1.0		0.3	0.1		4.3	0.4		0.4	1.6	
Delay (s)	25.1	20.4		18.8	18.4		18.9	11.9		5.2	8.6	
Level of Service	C	C		B	B		B	B		A	A	
Approach Delay (s)		22.7			18.6			12.8			8.5	
Approach LOS		C			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		

Description: TMC Nov 27/19
Updated Sept 17/20

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	514	1	42	901	6	4	22	31	18	25	11
Future Volume (vph)	6	514	1	42	901	6	4	22	31	18	25	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5			5.4			5.4	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		1.00			1.00			0.93			0.97	
Flt Protected		1.00			1.00			1.00			0.98	
Satd. Flow (prot)		2837			2839			1337			1430	
Flt Permitted		0.93			0.86			0.97			0.78	
Satd. Flow (perm)		2643			2442			1300			1138	
Peak-hour factor, PHF	0.50	0.90	0.25	0.55	0.94	0.50	0.33	0.43	0.52	0.45	0.75	0.46
Adj. Flow (vph)	12	571	4	76	959	12	12	51	60	40	33	24
RTOR Reduction (vph)	0	0	0	0	1	0	0	51	0	0	18	0
Lane Group Flow (vph)	0	587	0	0	1046	0	0	72	0	0	79	0
Confl. Peds. (#/hr)	5		8	8		5	10		3	3		10
Heavy Vehicles (%)	17%	13%	0%	5%	13%	17%	0%	33%	6%	11%	0%	27%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		59.7			59.7			9.4			9.4	
Effective Green, g (s)		59.7			59.7			9.4			9.4	
Actuated g/C Ratio		0.75			0.75			0.12			0.12	
Clearance Time (s)		5.5			5.5			5.4			5.4	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1972			1822			152			133	
v/s Ratio Prot												
v/s Ratio Perm		0.22			c0.43			0.06			c0.07	
v/c Ratio		0.30			0.57			0.47			0.60	
Uniform Delay, d1		3.3			4.5			33.0			33.5	
Progression Factor		0.30			1.00			0.94			1.03	
Incremental Delay, d2		0.3			1.3			2.3			7.0	
Delay (s)		1.3			5.8			33.1			41.6	
Level of Service		A			A			C			D	
Approach Delay (s)		1.3			5.8			33.1			41.6	
Approach LOS		A			A			C			D	

Intersection Summary			
HCM 2000 Control Delay	8.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.9
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		

Description: TMC Jun 26/19
Updated Sept 28/20

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
656: MARY ST W & HICKORY ST

11/09/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	125	30	14	196	15	9	17	6	27	16	26
Future Volume (Veh/h)	16	125	30	14	196	15	9	17	6	27	16	26
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.36	0.84	0.68	0.70	0.80	0.75	0.56	0.47	0.50	0.54	0.50	0.50
Hourly flow rate (vph)	44	149	44	20	245	20	16	36	12	50	32	52
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		360										
pX, platoon unblocked												
vC, conflicting volume	265			193			622	564	171	584	576	255
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	265			193			622	564	171	584	576	255
tC, single (s)	4.2			4.2			7.3	6.7	6.2	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.7	4.2	3.3	3.6	4.1	3.4
p0 queue free %	97			99			95	91	99	86	92	93
cM capacity (veh/h)	1276			1351			313	393	878	367	393	769

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	237	285	64	134
Volume Left	44	20	16	50
Volume Right	44	20	12	52
cSH	1276	1351	410	470
Volume to Capacity	0.03	0.01	0.16	0.29
Queue Length 95th (m)	0.7	0.3	3.8	8.1
Control Delay (s)	1.7	0.7	15.4	15.7
Lane LOS	A	A	C	C
Approach Delay (s)	1.7	0.7	15.4	15.7
Approach LOS			C	C

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	27.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	34	26	45	12	11	67
Future Volume (Veh/h)	34	26	45	12	11	67
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	37	28	49	13	12	73
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		378				
pX, platoon unblocked						
vC, conflicting volume	62				158	56
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	62				158	56
tC, single (s)	4.1				6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	98				98	93
cM capacity (veh/h)	1535				798	1006

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	65	62	85
Volume Left	37	0	12
Volume Right	0	13	73
cSH	1535	1700	970
Volume to Capacity	0.02	0.04	0.09
Queue Length 95th (m)	0.5	0.0	2.0
Control Delay (s)	4.3	0.0	9.1
Lane LOS	A		A
Approach Delay (s)	4.3	0.0	9.1
Approach LOS			A

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	21.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	24	139	12	13	90	53	24	114	19	25	174	55
Future Volume (vph)	24	139	12	13	90	53	24	114	19	25	174	55
Peak Hour Factor	0.75	0.85	0.60	0.54	0.90	0.78	0.50	0.84	0.68	0.65	0.91	0.78
Hourly flow rate (vph)	32	164	20	24	100	68	48	136	28	38	191	71

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	216	192	212	300
Volume Left (vph)	32	24	48	38
Volume Right (vph)	20	68	28	71
Hadj (s)	-0.01	-0.13	0.03	-0.02
Departure Headway (s)	5.7	5.6	5.6	5.4
Degree Utilization, x	0.34	0.30	0.33	0.45
Capacity (veh/h)	572	573	578	617
Control Delay (s)	11.6	11.0	11.4	12.9
Approach Delay (s)	11.6	11.0	11.4	12.9
Approach LOS	B	B	B	B

Intersection Summary			
Delay	11.9		
Level of Service	B		
Intersection Capacity Utilization	37.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	22	4	215	104	13	3	85	63	16	110	1
Future Volume (vph)	3	22	4	215	104	13	3	85	63	16	110	1
Peak Hour Factor	0.38	0.61	0.50	0.96	0.74	0.81	0.38	0.79	0.83	0.67	0.79	0.25
Hourly flow rate (vph)	8	36	8	224	141	16	8	108	76	24	139	4

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	52	381	192	167
Volume Left (vph)	8	224	8	24
Volume Right (vph)	8	16	76	4
Hadj (s)	0.00	0.10	-0.19	0.07
Departure Headway (s)	5.5	5.1	5.2	5.4
Degree Utilization, x	0.08	0.54	0.27	0.25
Capacity (veh/h)	584	680	644	606
Control Delay (s)	8.9	13.7	10.1	10.3
Approach Delay (s)	8.9	13.7	10.1	10.3
Approach LOS	A	B	B	B

Intersection Summary			
Delay	11.8		
Level of Service	B		
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	21	76	11	66	68	29	10	157	38	70	239	47
Future Volume (vph)	21	76	11	66	68	29	10	157	38	70	239	47
Peak Hour Factor	0.88	0.79	0.69	0.66	0.71	0.72	0.63	0.69	0.86	0.73	0.80	0.73
Hourly flow rate (vph)	24	96	16	100	96	40	16	228	44	96	299	64

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	136	236	288	459
Volume Left (vph)	24	100	16	96
Volume Right (vph)	16	40	44	64
Hadj (s)	0.01	0.04	0.04	0.09
Departure Headway (s)	6.8	6.5	6.1	5.8
Degree Utilization, x	0.26	0.43	0.49	0.74
Capacity (veh/h)	455	485	545	598
Control Delay (s)	12.1	14.3	14.8	23.8
Approach Delay (s)	12.1	14.3	14.8	23.8
Approach LOS	B	B	B	C

Intersection Summary			
Delay	18.0		
Level of Service	C		
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
90: BROCK ST & MARY ST

11/09/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	239	189	37	33	91	73	29	523	36	83	440	173
Future Volume (vph)	239	189	37	33	91	73	29	523	36	83	440	173
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8		5.8	5.8		3.0	5.3		5.3	5.3	5.3
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.98		1.00	0.99		1.00	1.00	0.94
Flpb, ped/bikes	0.98	1.00		0.99	1.00		1.00	1.00		0.97	1.00	1.00
Frt	1.00	0.96		1.00	0.93		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1450	1483		1495	1371		1455	1478		1384	1510	1213
Flt Permitted	0.59	1.00		0.47	1.00		0.31	1.00		0.27	1.00	1.00
Satd. Flow (perm)	893	1483		734	1371		469	1478		388	1510	1213
Peak-hour factor, PHF	0.85	0.83	0.51	0.75	0.78	0.73	0.73	0.83	0.50	0.74	0.89	0.79
Adj. Flow (vph)	281	228	73	44	117	100	40	630	72	112	494	219
RTOR Reduction (vph)	0	14	0	0	38	0	0	5	0	0	0	120
Lane Group Flow (vph)	281	287	0	44	179	0	40	697	0	112	494	99
Confl. Peds. (#/hr)	11		11	11		11	23		51	51		23
Heavy Vehicles (%)	9%	8%	11%	6%	7%	19%	10%	11%	14%	13%	12%	11%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	26.2	26.2		26.2	26.2		42.7	42.7		36.1	36.1	36.1
Effective Green, g (s)	26.2	26.2		26.2	26.2		42.7	42.7		36.1	36.1	36.1
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.53	0.53		0.45	0.45	0.45
Clearance Time (s)	5.8	5.8		5.8	5.8		3.0	5.3		5.3	5.3	5.3
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	292	485		240	449		294	788		175	681	547
v/s Ratio Prot		0.19			0.13		0.01	c0.47			0.33	
v/s Ratio Perm	c0.31			0.06			0.07			0.29		0.08
v/c Ratio	0.96	0.59		0.18	0.40		0.14	0.88		0.64	0.73	0.18
Uniform Delay, d1	26.4	22.4		19.2	20.8		10.3	16.5		16.9	17.9	13.1
Progression Factor	1.00	1.00		1.00	1.00		0.16	0.49		0.67	0.67	0.15
Incremental Delay, d2	42.2	1.9		0.4	0.6		0.1	7.7		15.6	6.2	0.7
Delay (s)	68.6	24.4		19.6	21.4		1.8	15.8		26.9	18.2	2.6
Level of Service	E	C		B	C		A	B		C	B	A
Approach Delay (s)		45.7			21.1			15.1			15.2	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	23.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.1
Intersection Capacity Utilization	95.5%	ICU Level of Service	F
Analysis Period (min)	15		

Description: TMC Sep 26/19
Updated Sept 17/20

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	138	95	65	108	21	3	520	104	5	554	19
Future Volume (vph)	34	138	95	65	108	21	3	520	104	5	554	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.2	6.2		6.2	6.2		3.0	5.7	5.7	5.7	5.7	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00	0.86	1.00	0.99	
Flpb, ped/bikes	0.95	1.00		0.97	1.00		0.99	1.00	1.00	0.95	1.00	
Frt	1.00	0.93		1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1526	1538		1534	1597		1592	1658	1236	1521	1625	
Flt Permitted	0.65	1.00		0.41	1.00		0.32	1.00	1.00	0.44	1.00	
Satd. Flow (perm)	1051	1538		663	1597		528	1658	1236	703	1625	
Peak-hour factor, PHF	0.85	0.93	0.79	0.65	0.82	0.75	0.38	0.96	0.74	0.42	0.94	0.79
Adj. Flow (vph)	40	148	120	100	132	28	8	542	141	12	589	24
RTOR Reduction (vph)	0	39	0	0	10	0	0	0	49	0	2	0
Lane Group Flow (vph)	40	229	0	100	150	0	8	542	92	12	611	0
Confl. Peds. (#/hr)	28		33	33		28	52		49	49		52
Heavy Vehicles (%)	0%	0%	0%	2%	2%	0%	0%	2%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	16.1	16.1		16.1	16.1		52.0	52.0	52.0	48.0	48.0	
Effective Green, g (s)	16.1	16.1		16.1	16.1		52.0	52.0	52.0	48.0	48.0	
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.65	0.65	0.65	0.60	0.60	
Clearance Time (s)	6.2	6.2		6.2	6.2		3.0	5.7	5.7	5.7	5.7	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	211	309		133	321		356	1077	803	421	975	
v/s Ratio Prot		0.15			0.09		0.00	c0.33			c0.38	
v/s Ratio Perm	0.04			c0.15			0.01		0.07	0.02		
v/c Ratio	0.19	0.74		0.75	0.47		0.02	0.50	0.11	0.03	0.63	
Uniform Delay, d1	26.5	30.0		30.1	28.2		6.1	7.3	5.3	6.5	10.3	
Progression Factor	1.00	1.00		1.00	1.00		0.76	0.48	0.42	1.39	1.20	
Incremental Delay, d2	0.4	9.2		21.0	1.1		0.0	1.6	0.3	0.0	0.3	
Delay (s)	27.0	39.2		51.1	29.2		4.7	5.1	2.5	9.0	12.6	
Level of Service	C	D		D	C		A	A	A	A	B	
Approach Delay (s)		37.6			37.7			4.6			12.5	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.9
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

Description: TMC Oct 4/18
Updated Sept 17/20
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	1324	142	17	622	86	105	159	13	62	132	76
Future Volume (vph)	156	1324	142	17	622	86	105	159	13	62	132	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1551	3113		1606	3150	1361	1601	1691	1414	1586	1575	
Flt Permitted	0.37	1.00		0.09	1.00	1.00	0.49	1.00	1.00	0.57	1.00	
Satd. Flow (perm)	612	3113		157	3150	1361	832	1691	1414	953	1575	
Peak-hour factor, PHF	0.80	0.98	0.85	0.85	0.93	0.86	0.85	0.69	0.54	0.78	0.77	0.70
Adj. Flow (vph)	195	1351	167	20	669	100	124	230	24	79	171	109
RTOR Reduction (vph)	0	12	0	0	0	46	0	0	17	0	29	0
Lane Group Flow (vph)	195	1506	0	20	669	54	124	230	7	79	251	0
Confl. Peds. (#/hr)	7		17	17		7	5		4	4		5
Heavy Vehicles (%)	3%	1%	0%	0%	2%	2%	0%	0%	0%	1%	0%	1%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		
Actuated Green, G (s)	43.1	43.1		43.1	43.1	43.1	23.9	23.9	23.9	23.9	23.9	
Effective Green, g (s)	43.1	43.1		43.1	43.1	43.1	23.9	23.9	23.9	23.9	23.9	
Actuated g/C Ratio	0.54	0.54		0.54	0.54	0.54	0.30	0.30	0.30	0.30	0.30	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	
Lane Grp Cap (vph)	329	1677		84	1697	733	248	505	422	284	470	
v/s Ratio Prot		c0.48			0.21			0.14			c0.16	
v/s Ratio Perm	0.32			0.13		0.04	0.15		0.01	0.08		
v/c Ratio	0.59	0.90		0.24	0.39	0.07	0.50	0.46	0.02	0.28	0.53	
Uniform Delay, d1	12.5	16.5		9.8	10.8	8.9	23.1	22.8	19.8	21.5	23.4	
Progression Factor	1.00	1.00		1.44	1.40	3.01	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.6	8.0		6.0	0.6	0.2	7.0	2.9	0.1	2.4	4.3	
Delay (s)	20.1	24.5		20.0	15.8	26.8	30.2	25.7	19.8	23.9	27.7	
Level of Service	C	C		C	B	C	C	C	B	C	C	
Approach Delay (s)		24.0			17.3			26.8			26.9	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	109.2%	ICU Level of Service	H
Analysis Period (min)	15		
Description: TMC Oct 24/17			
Updated Sept 23/20			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	103	1125	111	52	510	21	138	361	87	29	182	73
Future Volume (vph)	103	1125	111	52	510	21	138	361	87	29	182	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.3	6.3		6.1	6.1	6.1	6.1	6.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.95	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00	1.00	0.98	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1600	3116		1602	3122		1581	1691	1363	1532	1586	
Flt Permitted	0.42	1.00		0.11	1.00		0.47	1.00	1.00	0.32	1.00	
Satd. Flow (perm)	705	3116		180	3122		780	1691	1363	518	1586	
Peak-hour factor, PHF	0.83	0.93	0.79	0.65	0.94	0.66	0.78	0.86	0.81	0.66	0.88	0.73
Adj. Flow (vph)	124	1210	141	80	543	32	177	420	107	44	207	100
RTOR Reduction (vph)	0	11	0	0	5	0	0	0	30	0	22	0
Lane Group Flow (vph)	124	1340	0	80	570	0	177	420	77	44	285	0
Confl. Peds. (#/hr)	5		19	19		5	10		39	39		10
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	1%	0%	0%	3%	1%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	40.9	40.9		40.9	40.9		26.7	26.7	26.7	26.7	26.7	
Effective Green, g (s)	40.9	40.9		40.9	40.9		26.7	26.7	26.7	26.7	26.7	
Actuated g/C Ratio	0.51	0.51		0.51	0.51		0.33	0.33	0.33	0.33	0.33	
Clearance Time (s)	6.3	6.3		6.3	6.3		6.1	6.1	6.1	6.1	6.1	
Lane Grp Cap (vph)	360	1593		92	1596		260	564	454	172	529	
v/s Ratio Prot		0.43			0.18			c0.25			0.18	
v/s Ratio Perm	0.18			c0.44			0.23		0.06	0.09		
v/c Ratio	0.34	0.84		0.87	0.36		0.68	0.74	0.17	0.26	0.54	
Uniform Delay, d1	11.6	16.8		17.2	11.7		23.0	23.6	18.8	19.4	21.6	
Progression Factor	0.30	0.26		1.54	1.49		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.3	3.0		37.2	0.3		13.5	8.7	0.8	3.6	3.9	
Delay (s)	4.9	7.3		63.8	17.8		36.5	32.3	19.6	23.0	25.5	
Level of Service	A	A		E	B		D	C	B	C	C	
Approach Delay (s)		7.1			23.4			31.4			25.2	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	17.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	93.8%	ICU Level of Service	F
Analysis Period (min)	15		
Description: TMC May 30 2017			
Updated Sept 23/20			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	143	1125	23	68	726	199	32	625	78	278	410	73
Future Volume (vph)	143	1125	23	68	726	199	32	625	78	278	410	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.6		3.0	6.6		5.9	5.9		0.0	5.9	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1590	3164		1591	3029		1604	3141		1606	3127	
Flt Permitted	0.11	1.00		0.10	1.00		0.45	1.00		0.12	1.00	
Satd. Flow (perm)	187	3164		169	3029		758	3141		209	3127	
Peak-hour factor, PHF	0.85	0.90	0.52	0.77	0.94	0.80	0.73	0.82	0.78	0.93	0.90	0.83
Adj. Flow (vph)	168	1250	44	88	772	249	44	762	100	299	456	88
RTOR Reduction (vph)	0	3	0	0	28	0	0	10	0	0	14	0
Lane Group Flow (vph)	168	1291	0	88	993	0	44	852	0	299	530	0
Confl. Peds. (#/hr)	6		5	5		6	3		19	19		3
Heavy Vehicles (%)	1%	1%	0%	1%	2%	1%	0%	0%	1%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	48.7	40.7		46.5	39.6		29.3	29.3		46.9	46.9	
Effective Green, g (s)	48.7	40.7		46.5	39.6		29.3	29.3		49.9	46.9	
Actuated g/C Ratio	0.44	0.37		0.42	0.36		0.27	0.27		0.45	0.43	
Clearance Time (s)	3.0	6.6		3.0	6.6		5.9	5.9		3.0	5.9	
Lane Grp Cap (vph)	184	1170		160	1090		201	836		318	1333	
v/s Ratio Prot	c0.07	c0.41		0.03	0.33			c0.27		c0.15	0.17	
v/s Ratio Perm	0.34			0.20			0.06			0.28		
v/c Ratio	0.91	1.10		0.55	0.91		0.22	1.02		0.94	0.40	
Uniform Delay, d1	23.3	34.6		25.2	33.5		31.4	40.4		30.4	21.8	
Progression Factor	1.00	1.00		1.45	0.48		1.19	1.16		1.02	0.71	
Incremental Delay, d2	46.8	59.6		12.1	12.1		2.3	35.2		34.7	0.8	
Delay (s)	70.1	94.2		48.6	28.2		39.8	81.9		65.7	16.2	
Level of Service	E	F		D	C		D	F		E	B	
Approach Delay (s)		91.4			29.8			79.9			33.7	
Approach LOS		F			C			E			C	

Intersection Summary			
HCM 2000 Control Delay	61.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	97.1%	ICU Level of Service	F
Analysis Period (min)	15		
Description: TMC Oct 19/16			
Updated Sept 23/20			
Phase 1 minimum timing error due to 2 second COMM delay			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	183	4	210	10	2	8	71	796	21	12	605	92
Future Volume (vph)	183	4	210	10	2	8	71	796	21	12	605	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.3	6.3		5.9	5.9		5.9	5.9	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.88		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1469	1265		1603	1331		1499	3045		1604	2928	
Flt Permitted	0.74	1.00		0.45	1.00		0.27	1.00		0.29	1.00	
Satd. Flow (perm)	1151	1265		757	1331		432	3045		494	2928	
Peak-hour factor, PHF	0.76	0.50	0.85	0.50	0.50	0.50	0.74	0.96	0.66	0.60	0.79	0.64
Adj. Flow (vph)	241	8	247	20	4	16	96	829	32	20	766	144
RTOR Reduction (vph)	0	127	0	0	12	0	0	2	0	0	11	0
Lane Group Flow (vph)	241	128	0	20	8	0	96	859	0	20	899	0
Confl. Peds. (#/hr)	2		2	2		2	3		2	2		3
Heavy Vehicles (%)	9%	0%	13%	0%	0%	13%	7%	5%	0%	0%	6%	10%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	28.3	28.3		28.3	28.3		69.5	69.5		69.5	69.5	
Effective Green, g (s)	28.3	28.3		28.3	28.3		69.5	69.5		69.5	69.5	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.63	0.63		0.63	0.63	
Clearance Time (s)	6.3	6.3		6.3	6.3		5.9	5.9		5.9	5.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	296	325		194	342		272	1923		312	1849	
v/s Ratio Prot		0.10			0.01			0.28			c0.31	
v/s Ratio Perm	c0.21			0.03			0.22			0.04		
v/c Ratio	0.81	0.39		0.10	0.02		0.35	0.45		0.06	0.49	
Uniform Delay, d1	38.4	33.8		31.2	30.5		9.6	10.4		7.8	10.8	
Progression Factor	1.00	1.00		1.00	1.00		1.57	1.61		1.00	1.00	
Incremental Delay, d2	15.6	0.8		0.2	0.0		1.0	0.2		0.4	0.9	
Delay (s)	54.0	34.6		31.4	30.6		16.0	16.9		8.2	11.7	
Level of Service	D	C		C	C		B	B		A	B	
Approach Delay (s)		44.0			31.0			16.8			11.6	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		
Description: TMC Nov 27/19			
Updated Sept 17/20			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	1309	6	23	794	19	13	38	83	36	18	7
Future Volume (vph)	13	1309	6	23	794	19	13	38	83	36	18	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5			5.4			5.4	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			0.98			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		1.00			0.99			0.91			0.98	
Flt Protected		1.00			1.00			0.99			0.97	
Satd. Flow (prot)		2919			2914			1385			1433	
Flt Permitted		0.92			0.86			0.96			0.60	
Satd. Flow (perm)		2690			2503			1335			887	
Peak-hour factor, PHF	0.46	0.91	0.38	0.72	0.87	0.48	0.54	0.63	0.58	0.64	0.56	0.58
Adj. Flow (vph)	28	1438	16	32	913	40	24	60	143	56	32	12
RTOR Reduction (vph)	0	1	0	0	3	0	0	30	0	0	6	0
Lane Group Flow (vph)	0	1481	0	0	982	0	0	197	0	0	94	0
Confl. Peds. (#/hr)	10		19	19		10	13		11	11		13
Heavy Vehicles (%)	0%	10%	0%	13%	9%	11%	8%	8%	10%	6%	22%	14%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		52.9			52.9			16.2			16.2	
Effective Green, g (s)		52.9			52.9			16.2			16.2	
Actuated g/C Ratio		0.66			0.66			0.20			0.20	
Clearance Time (s)		5.5			5.5			5.4			5.4	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1778			1655			270			179	
v/s Ratio Prot												
v/s Ratio Perm		c0.55			0.39			c0.15			0.11	
v/c Ratio		0.83			0.59			0.73			0.52	
Uniform Delay, d1		10.2			7.6			29.8			28.5	
Progression Factor		0.28			1.00			1.00			1.00	
Incremental Delay, d2		3.3			1.6			9.3			2.7	
Delay (s)		6.1			9.1			39.3			31.0	
Level of Service		A			A			D			C	
Approach Delay (s)		6.1			9.1			39.3			31.0	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.9
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		

Description: TMC June 26/19
Updated Sept 28/20

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
656: HICKORY ST & MARY ST

11/09/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	336	42	15	130	29	23	11	35	25	16	12
Future Volume (Veh/h)	15	336	42	15	130	29	23	11	35	25	16	12
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.63	0.81	0.75	0.94	0.96	0.91	0.79	0.92	0.73	0.69	0.40	0.50
Hourly flow rate (vph)	24	415	56	16	135	32	29	12	48	36	40	24
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		361										
pX, platoon unblocked												
vC, conflicting volume	167			471			718	690	443	728	702	151
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	167			471			718	690	443	728	702	151
tC, single (s)	4.2			4.2			7.1	6.5	6.3	7.1	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.5	4.0	3.4	3.5	4.1	3.4
p0 queue free %	98			98			90	97	92	88	88	97
cM capacity (veh/h)	1347			1065			295	359	606	299	346	880

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	495	183	89	100
Volume Left	24	16	29	36
Volume Right	56	32	48	24
cSH	1347	1065	422	380
Volume to Capacity	0.02	0.02	0.21	0.26
Queue Length 95th (m)	0.4	0.3	5.5	7.3
Control Delay (s)	0.6	0.9	15.8	17.8
Lane LOS	A	A	C	C
Approach Delay (s)	0.6	0.9	15.8	17.8
Approach LOS			C	C

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	35.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	27	169	13	10	175	80	25	114	12	39	122	14
Future Volume (vph)	27	169	13	10	175	80	25	114	12	39	122	14
Peak Hour Factor	0.75	0.75	0.81	0.63	0.84	0.77	0.63	0.89	0.75	0.70	0.87	0.88
Hourly flow rate (vph)	36	225	16	16	208	104	40	128	16	56	140	16

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	277	328	184	212
Volume Left (vph)	36	16	40	56
Volume Right (vph)	16	104	16	16
Hadj (s)	-0.01	-0.15	0.03	0.02
Departure Headway (s)	5.7	5.5	6.1	6.0
Degree Utilization, x	0.44	0.50	0.31	0.35
Capacity (veh/h)	581	613	519	534
Control Delay (s)	13.1	13.8	11.8	12.3
Approach Delay (s)	13.1	13.8	11.8	12.3
Approach LOS	B	B	B	B

Intersection Summary			
Delay	12.9		
Level of Service	B		
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	26	101	12	33	62	92	7	140	40	49	222	55
Future Volume (vph)	26	101	12	33	62	92	7	140	40	49	222	55
Peak Hour Factor	0.81	0.87	0.75	0.75	0.86	0.74	0.58	0.90	0.83	0.77	0.88	0.69
Hourly flow rate (vph)	32	116	16	44	72	124	12	156	48	64	252	80

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	164	240	216	396
Volume Left (vph)	32	44	12	64
Volume Right (vph)	16	124	48	80
Hadj (s)	-0.02	-0.26	-0.09	-0.06
Departure Headway (s)	6.1	5.7	5.7	5.4
Degree Utilization, x	0.28	0.38	0.34	0.60
Capacity (veh/h)	508	566	564	627
Control Delay (s)	11.4	12.1	11.7	16.2
Approach Delay (s)	11.4	12.1	11.7	16.2
Approach LOS	B	B	B	C

Intersection Summary			
Delay	13.5		
Level of Service	B		
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	2	64	7	203	40	17	7	160	297	18	77	1
Future Volume (vph)	2	64	7	203	40	17	7	160	297	18	77	1
Peak Hour Factor	0.25	0.73	0.58	0.75	0.83	0.53	0.88	0.83	0.95	0.90	0.80	0.25
Hourly flow rate (vph)	8	88	12	271	48	32	8	193	313	20	96	4

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	108	351	514	120
Volume Left (vph)	8	271	8	20
Volume Right (vph)	12	32	313	4
Hadj (s)	-0.05	0.10	-0.36	0.01
Departure Headway (s)	6.4	6.0	5.2	6.3
Degree Utilization, x	0.19	0.59	0.75	0.21
Capacity (veh/h)	486	564	665	491
Control Delay (s)	10.9	17.2	22.0	11.0
Approach Delay (s)	10.9	17.2	22.0	11.0
Approach LOS	B	C	C	B

Intersection Summary			
Delay	18.1		
Level of Service	C		
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	112	82	31	9	9	43
Future Volume (Veh/h)	112	82	31	9	9	43
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	122	89	34	10	10	47
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		376				
pX, platoon unblocked						
vC, conflicting volume	44				372	39
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	44				372	39
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				98	95
cM capacity (veh/h)	1577				584	1033

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	211	44	57
Volume Left	122	0	10
Volume Right	0	10	47
cSH	1577	1700	910
Volume to Capacity	0.08	0.03	0.06
Queue Length 95th (m)	1.8	0.0	1.4
Control Delay (s)	4.6	0.0	9.2
Lane LOS	A		A
Approach Delay (s)	4.6	0.0	9.2
Approach LOS			A

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	27.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
90: BROCK ST N & MARY ST W/MARY ST E

11/09/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	72	12	39	175	76	40	367	16	53	637	240
Future Volume (vph)	74	72	12	39	175	76	40	367	16	53	637	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8		5.8	5.8		5.3	5.3		5.3	5.3	5.3
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		0.99	1.00	1.00
Frt	1.00	0.98		1.00	0.95		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1422	1452		1414	1488		1302	1433		1433	1523	1278
Flt Permitted	0.42	1.00		0.70	1.00		0.30	1.00		0.48	1.00	1.00
Satd. Flow (perm)	625	1452		1039	1488		412	1433		730	1523	1278
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	80	78	13	42	190	83	43	399	17	58	692	261
RTOR Reduction (vph)	0	9	0	0	22	0	0	1	0	0	0	95
Lane Group Flow (vph)	80	82	0	42	251	0	43	415	0	58	692	166
Confl. Peds. (#/hr)	7		3	3		7	6		10	10		6
Heavy Vehicles (%)	12%	13%	17%	13%	7%	8%	23%	17%	19%	11%	11%	9%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	18.0	18.0		18.0	18.0		50.9	50.9		50.9	50.9	50.9
Effective Green, g (s)	18.0	18.0		18.0	18.0		50.9	50.9		50.9	50.9	50.9
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.64	0.64		0.64	0.64	0.64
Clearance Time (s)	5.8	5.8		5.8	5.8		5.3	5.3		5.3	5.3	5.3
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	140	326		233	334		262	911		464	969	813
v/s Ratio Prot		0.06			c0.17			0.29			c0.45	
v/s Ratio Perm	0.13			0.04			0.10			0.08		0.13
v/c Ratio	0.57	0.25		0.18	0.75		0.16	0.46		0.12	0.71	0.20
Uniform Delay, d1	27.6	25.5		25.0	28.9		5.9	7.4		5.7	9.7	6.1
Progression Factor	1.00	1.00		1.00	1.00		1.58	1.43		0.42	0.61	0.08
Incremental Delay, d2	5.5	0.4		0.4	9.2		1.0	1.2		0.5	4.0	0.5
Delay (s)	33.1	25.9		25.4	38.1		10.3	11.8		2.9	9.9	1.0
Level of Service	C	C		C	D		B	B		A	A	A
Approach Delay (s)		29.3			36.4			11.7			7.2	
Approach LOS		C			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.1
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		

Description: TMC Sep 26/19
Updated Sept 17/20

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	70	61	43	105	16	6	432	57	0	572	29
Future Volume (vph)	18	70	61	43	105	16	6	432	57	0	572	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.2	6.2		6.2	6.2		5.7	5.7	5.7		5.7	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00	0.91		1.00	
Flpb, ped/bikes	0.96	1.00		0.97	1.00		0.98	1.00	1.00		1.00	
Frt	1.00	0.93		1.00	0.98		1.00	1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00		1.00	
Satd. Flow (prot)	1454	1527		1552	1576		1569	1595	1281		1607	
Flt Permitted	0.67	1.00		0.67	1.00		0.36	1.00	1.00		1.00	
Satd. Flow (perm)	1030	1527		1089	1576		592	1595	1281		1607	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	20	76	66	47	114	17	7	470	62	0	622	32
RTOR Reduction (vph)	0	43	0	0	8	0	0	0	18	0	2	0
Lane Group Flow (vph)	20	99	0	47	123	0	7	470	44	0	652	0
Confl. Peds. (#/hr)	22		31	31		22	31		29	29		31
Heavy Vehicles (%)	6%	1%	0%	0%	3%	13%	0%	6%	2%	0%	4%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	11.8	11.8		11.8	11.8		56.3	56.3	56.3		56.3	
Effective Green, g (s)	11.8	11.8		11.8	11.8		56.3	56.3	56.3		56.3	
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.70	0.70	0.70		0.70	
Clearance Time (s)	6.2	6.2		6.2	6.2		5.7	5.7	5.7		5.7	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	151	225		160	232		416	1122	901		1130	
v/s Ratio Prot		0.06			c0.08			0.29			c0.41	
v/s Ratio Perm	0.02			0.04			0.01		0.03			
v/c Ratio	0.13	0.44		0.29	0.53		0.02	0.42	0.05		0.58	
Uniform Delay, d1	29.6	31.1		30.4	31.5		3.6	5.0	3.6		5.9	
Progression Factor	1.00	1.00		1.00	1.00		0.87	0.79	0.62		0.12	
Incremental Delay, d2	0.4	1.4		1.0	2.3		0.1	1.1	0.1		0.6	
Delay (s)	30.0	32.4		31.4	33.9		3.2	5.1	2.3		1.3	
Level of Service	C	C		C	C		A	A	A		A	
Approach Delay (s)		32.1			33.2			4.7			1.3	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.9
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		
Description: TMC Oct 4/18			
Updated Sept 17/20			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	560	134	12	1036	40	151	114	28	118	239	310
Future Volume (vph)	77	560	134	12	1036	40	151	114	28	118	239	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	6.5	6.5	5.0	6.5	6.5	0.7	6.5	6.5	6.5	6.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1545	3031	1397	1361	3150	1291	1560	1626	1238	1582	1517	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.14	1.00	1.00	0.68	1.00	
Satd. Flow (perm)	1545	3031	1397	1361	3150	1291	233	1626	1238	1128	1517	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	84	609	146	13	1126	43	164	124	30	128	260	337
RTOR Reduction (vph)	0	0	96	0	0	28	0	0	19	0	58	0
Lane Group Flow (vph)	84	609	50	13	1126	15	164	124	11	128	539	0
Confl. Peds. (#/hr)	5		4	4		5	1		6	6		1
Heavy Vehicles (%)	4%	6%	0%	18%	2%	8%	3%	4%	14%	1%	3%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases			2			6	8		8	4		
Actuated Green, G (s)	5.0	27.5	27.5	5.0	27.5	27.5	29.5	29.5	29.5	24.5	24.5	
Effective Green, g (s)	8.0	27.5	27.5	5.0	27.5	27.5	32.5	29.5	29.5	24.5	24.5	
Actuated g/C Ratio	0.10	0.34	0.34	0.06	0.34	0.34	0.41	0.37	0.37	0.31	0.31	
Clearance Time (s)	5.0	6.5	6.5	5.0	6.5	6.5	3.7	6.5	6.5	6.5	6.5	
Lane Grp Cap (vph)	154	1041	480	85	1082	443	165	599	456	345	464	
v/s Ratio Prot	c0.05	0.20		0.01	c0.36		c0.05	0.08			c0.36	
v/s Ratio Perm			0.04			0.01	0.35		0.01	0.11		
v/c Ratio	0.55	0.59	0.10	0.15	1.04	0.03	0.99	0.21	0.02	0.37	1.16	
Uniform Delay, d1	34.3	21.6	17.9	35.5	26.2	17.4	22.9	17.3	16.1	21.7	27.8	
Progression Factor	1.00	1.00	1.00	1.01	1.45	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	13.2	2.4	0.4	3.6	37.7	0.1	68.5	0.8	0.1	3.0	94.0	
Delay (s)	47.4	24.0	18.3	39.4	75.9	17.6	91.4	18.0	16.2	24.8	121.8	
Level of Service	D	C	B	D	E	B	F	B	B	C	F	
Approach Delay (s)		25.3			73.3			55.7			104.6	
Approach LOS		C			E			E			F	

Intersection Summary			
HCM 2000 Control Delay	65.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.7
Intersection Capacity Utilization	98.5%	ICU Level of Service	F
Analysis Period (min)	15		
Description: TMC Oct 24/17			
Updated Sept 23/20			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	413	18	91	789	141	39	323	55	208	560	89
Future Volume (vph)	58	413	18	91	789	141	39	323	55	208	560	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	6.6		5.5	6.6	6.6	5.9	5.9		0.0	5.9	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1545	3035		1545	1626	1325	1427	3034		1495	3061	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.38	1.00		0.47	1.00	
Satd. Flow (perm)	1545	3035		1545	1626	1325	567	3034		734	3061	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	63	449	20	99	858	153	42	351	60	226	609	97
RTOR Reduction (vph)	0	3	0	0	0	89	0	15	0	0	14	0
Lane Group Flow (vph)	63	466	0	99	858	64	42	396	0	226	692	0
Confl. Peds. (#/hr)	13		26	26		13	23		17	17		23
Heavy Vehicles (%)	4%	5%	6%	4%	4%	6%	11%	3%	4%	7%	2%	2%
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases						6	8			4		
Actuated Green, G (s)	5.0	32.0		5.0	32.0	32.0	28.0	28.0		36.0	36.0	
Effective Green, g (s)	5.0	32.0		5.0	32.0	32.0	28.0	28.0		39.0	36.0	
Actuated g/C Ratio	0.05	0.35		0.05	0.35	0.35	0.31	0.31		0.43	0.40	
Clearance Time (s)	5.5	6.6		5.5	6.6	6.6	5.9	5.9		3.0	5.9	
Lane Grp Cap (vph)	84	1067		84	571	465	174	933		381	1210	
v/s Ratio Prot	0.04	0.15		c0.06	c0.53			0.13		c0.05	c0.23	
v/s Ratio Perm						0.05	0.07			0.20		
v/c Ratio	0.75	0.44		1.18	1.50	0.14	0.24	0.42		0.59	0.57	
Uniform Delay, d1	42.4	22.6		43.0	29.5	20.1	23.6	25.1		17.9	21.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	45.7	1.3		154.1	235.2	0.6	3.3	1.4		6.6	2.0	
Delay (s)	88.1	23.9		197.1	264.7	20.7	26.8	26.5		24.6	23.4	
Level of Service	F	C		F	F	C	C	C		C	C	
Approach Delay (s)		31.5			225.1			26.5			23.7	
Approach LOS		C			F			C			C	

Intersection Summary			
HCM 2000 Control Delay	99.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	104.8%	ICU Level of Service	G
Analysis Period (min)	15		
Description: TMC Oct 19/16			
Updated Sept 23/20			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	78	0	117	13	6	26	66	540	3	19	727	171
Future Volume (vph)	78	0	117	13	6	26	66	540	3	19	727	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.3	6.3		5.9	5.9		5.9	5.9	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.88		1.00	1.00		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1413	1242		1394	1467		1363	2920		1443	2852	
Flt Permitted	0.73	1.00		0.68	1.00		0.27	1.00		0.43	1.00	
Satd. Flow (perm)	1092	1242		991	1467		393	2920		652	2852	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	85	0	127	14	7	28	72	587	3	21	790	186
RTOR Reduction (vph)	0	81	0	0	24	0	0	0	0	0	23	0
Lane Group Flow (vph)	85	46	0	14	11	0	72	590	0	21	953	0
Confl. Peds. (#/hr)	7		3	3		7	21		5	5		21
Heavy Vehicles (%)	13%	0%	14%	15%	0%	0%	17%	10%	0%	11%	8%	10%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	8.9	8.9		8.9	8.9		37.7	37.7		37.7	37.7	
Effective Green, g (s)	8.9	8.9		8.9	8.9		37.7	37.7		37.7	37.7	
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.64	0.64		0.64	0.64	
Clearance Time (s)	6.3	6.3		6.3	6.3		5.9	5.9		5.9	5.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	165	187		149	222		251	1872		418	1828	
v/s Ratio Prot		0.04			0.01			0.20			c0.33	
v/s Ratio Perm	c0.08			0.01			0.18			0.03		
v/c Ratio	0.52	0.25		0.09	0.05		0.29	0.31		0.05	0.52	
Uniform Delay, d1	23.0	22.0		21.5	21.3		4.6	4.7		3.9	5.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.7	0.7		0.3	0.1		2.9	0.4		0.2	1.1	
Delay (s)	25.7	22.7		21.8	21.4		7.5	5.2		4.1	6.8	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		23.9			21.5			5.4			6.7	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	58.8	Sum of lost time (s)	12.2
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		

Description: TMC Nov 27/19
Updated Sept 17/20

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	511	1	42	778	6	4	14	38	22	17	11
Future Volume (vph)	7	511	1	42	778	6	4	14	38	22	17	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.5		5.0	5.5			5.4			5.4	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.91			0.97	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.98	
Satd. Flow (prot)	1373	1496		1530	1494			1346			1437	
Flt Permitted	0.95	1.00		0.95	1.00			0.97			0.86	
Satd. Flow (perm)	1373	1496		1530	1494			1311			1271	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	555	1	46	846	7	4	15	41	24	18	12
RTOR Reduction (vph)	0	0	0	0	0	0	0	38	0	0	11	0
Lane Group Flow (vph)	8	556	0	46	853	0	0	22	0	0	43	0
Confl. Peds. (#/hr)	5		8	8		5	10		3	3		10
Heavy Vehicles (%)	17%	13%	0%	5%	13%	17%	0%	33%	6%	11%	0%	27%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	1.2	53.3		4.9	57.0			5.9			5.9	
Effective Green, g (s)	1.2	53.3		4.9	57.0			5.9			5.9	
Actuated g/C Ratio	0.01	0.67		0.06	0.71			0.07			0.07	
Clearance Time (s)	5.0	5.5		5.0	5.5			5.4			5.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	20	996		93	1064			96			93	
v/s Ratio Prot	0.01	0.37		c0.03	c0.57							
v/s Ratio Perm								0.02			c0.03	
v/c Ratio	0.40	0.56		0.49	0.80			0.23			0.46	
Uniform Delay, d1	39.0	7.1		36.4	7.7			34.9			35.5	
Progression Factor	0.50	1.92		1.00	1.00			1.17			0.89	
Incremental Delay, d2	3.4	0.6		4.1	6.4			1.2			3.6	
Delay (s)	22.8	14.2		40.4	14.1			42.0			35.3	
Level of Service	C	B		D	B			D			D	
Approach Delay (s)		14.3			15.4			42.0			35.3	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	16.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	15.9
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		

Description: TMC Jun 26/19
Updated Sept 28/20

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
656: HICKORY ST & MARY ST E

11/09/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	125	30	14	196	15	9	17	6	27	16	26
Future Volume (Veh/h)	16	125	30	14	196	15	9	17	6	27	16	26
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	136	33	15	213	16	10	18	7	29	17	28
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		360										
pX, platoon unblocked												
vC, conflicting volume	229			169			474	446	152	454	454	221
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	229			169			474	446	152	454	454	221
tC, single (s)	4.2			4.2			7.3	6.7	6.2	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.7	4.2	3.3	3.6	4.1	3.4
p0 queue free %	99			99			98	96	99	94	96	97
cM capacity (veh/h)	1316			1379			432	473	899	481	474	804

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	186	244	35	74
Volume Left	17	15	10	29
Volume Right	33	16	7	28
cSH	1316	1379	507	565
Volume to Capacity	0.01	0.01	0.07	0.13
Queue Length 95th (m)	0.3	0.2	1.6	3.1
Control Delay (s)	0.8	0.6	12.6	12.3
Lane LOS	A	A	B	B
Approach Delay (s)	0.8	0.6	12.6	12.3
Approach LOS			B	B

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	27.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	34	26	45	7	11	67
Future Volume (Veh/h)	34	26	45	7	11	67
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	37	28	49	8	12	73
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		376				
pX, platoon unblocked						
vC, conflicting volume	57				155	53
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	57				155	53
tC, single (s)	4.1				6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	98				99	93
cM capacity (veh/h)	1541				801	1009

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	65	57	85
Volume Left	37	0	12
Volume Right	0	8	73
cSH	1541	1700	973
Volume to Capacity	0.02	0.03	0.09
Queue Length 95th (m)	0.5	0.0	2.0
Control Delay (s)	4.3	0.0	9.1
Lane LOS	A		A
Approach Delay (s)	4.3	0.0	9.1
Approach LOS			A

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	21.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	22	4	215	104	13	3	105	63	16	110	1
Future Volume (vph)	3	22	4	215	104	13	3	105	63	16	110	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
Hourly flow rate (vph)	3	24	4	234	113	14	3	114	68	17	120	1

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	31	361	185	138
Volume Left (vph)	3	234	3	17
Volume Right (vph)	4	14	68	1
Hadj (s)	0.01	0.11	-0.18	0.07
Departure Headway (s)	5.3	4.9	4.9	5.3
Degree Utilization, x	0.05	0.49	0.25	0.20
Capacity (veh/h)	608	700	672	627
Control Delay (s)	8.5	12.5	9.6	9.6
Approach Delay (s)	8.5	12.5	9.6	9.6
Approach LOS	A	B	A	A

Intersection Summary			
Delay	11.0		
Level of Service	B		
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	24	139	12	13	90	53	24	114	19	55	174	25
Future Volume (vph)	24	139	12	13	90	53	24	114	19	55	174	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	151	13	14	98	58	26	124	21	60	189	27

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	190	170	171	276
Volume Left (vph)	26	14	26	60
Volume Right (vph)	13	58	21	27
Hadj (s)	0.00	-0.13	0.03	0.08
Departure Headway (s)	5.4	5.3	5.4	5.3
Degree Utilization, x	0.29	0.25	0.26	0.40
Capacity (veh/h)	608	614	606	642
Control Delay (s)	10.5	10.1	10.2	11.8
Approach Delay (s)	10.5	10.1	10.2	11.8
Approach LOS	B	B	B	B

Intersection Summary			
Delay	10.8		
Level of Service	B		
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	21	76	11	29	68	66	10	157	38	47	239	70
Future Volume (vph)	21	76	11	29	68	66	10	157	38	47	239	70
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	83	12	32	74	72	11	171	41	51	260	76

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	118	178	223	387
Volume Left (vph)	23	32	11	51
Volume Right (vph)	12	72	41	76
Hadj (s)	0.03	-0.15	0.01	0.04
Departure Headway (s)	5.9	5.6	5.4	5.2
Degree Utilization, x	0.19	0.28	0.33	0.56
Capacity (veh/h)	524	572	613	665
Control Delay (s)	10.3	10.7	11.0	14.4
Approach Delay (s)	10.3	10.7	11.0	14.4
Approach LOS	B	B	B	B

Intersection Summary			
Delay	12.3		
Level of Service	B		
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
90: BROCK ST & MARY ST W/MARY ST E

11/09/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	239	189	37	33	91	73	29	523	36	83	440	173
Future Volume (vph)	239	189	37	33	91	73	29	523	36	83	440	173
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8		5.8	5.8		3.0	5.3		5.3	5.3	5.3
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.98		1.00	0.99		1.00	1.00	0.94
Flpb, ped/bikes	0.98	1.00		0.98	1.00		1.00	1.00		0.97	1.00	1.00
Frt	1.00	0.98		1.00	0.93		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1447	1510		1493	1379		1453	1495		1373	1510	1213
Flt Permitted	0.64	1.00		0.53	1.00		0.35	1.00		0.35	1.00	1.00
Satd. Flow (perm)	970	1510		835	1379		531	1495		511	1510	1213
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	260	205	40	36	99	79	32	568	39	90	478	188
RTOR Reduction (vph)	0	9	0	0	38	0	0	3	0	0	0	95
Lane Group Flow (vph)	260	236	0	36	140	0	32	604	0	90	478	93
Confl. Peds. (#/hr)	11		11	11		11	23		51	51		23
Heavy Vehicles (%)	9%	8%	11%	6%	7%	19%	10%	11%	14%	13%	12%	11%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	24.2	24.2		24.2	24.2		44.7	44.7		39.4	39.4	39.4
Effective Green, g (s)	24.2	24.2		24.2	24.2		44.7	44.7		39.4	39.4	39.4
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.56	0.56		0.49	0.49	0.49
Clearance Time (s)	5.8	5.8		5.8	5.8		3.0	5.3		5.3	5.3	5.3
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	293	456		252	417		323	835		251	743	597
v/s Ratio Prot		0.16			0.10		0.00	c0.40			0.32	
v/s Ratio Perm	c0.27			0.04			0.05			0.18		0.08
v/c Ratio	0.89	0.52		0.14	0.34		0.10	0.72		0.36	0.64	0.16
Uniform Delay, d1	26.6	23.1		20.3	21.7		9.0	13.1		12.5	15.1	11.2
Progression Factor	1.00	1.00		1.00	1.00		0.32	0.59		0.63	0.65	0.16
Incremental Delay, d2	25.9	1.0		0.3	0.5		0.1	2.1		3.7	4.0	0.5
Delay (s)	52.5	24.1		20.6	22.1		3.0	9.9		11.5	13.8	2.3
Level of Service	D	C		C	C		A	A		B	B	A
Approach Delay (s)		38.7			21.9			9.6			10.7	
Approach LOS		D			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.1
Intersection Capacity Utilization	95.5%	ICU Level of Service	F
Analysis Period (min)	15		

Description: TMC Sep 26/19
Updated Sept 17/20

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	138	95	65	108	21	3	520	104	5	554	19
Future Volume (vph)	34	138	95	65	108	21	3	520	104	5	554	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.2	6.2		6.2	6.2		3.0	5.7	5.7	5.7	5.7	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00	0.86	1.00	1.00	
Flpb, ped/bikes	0.95	1.00		0.97	1.00		0.99	1.00	1.00	0.95	1.00	
Frt	1.00	0.94		1.00	0.98		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1524	1552		1532	1601		1593	1658	1236	1525	1627	
Flt Permitted	0.67	1.00		0.44	1.00		0.31	1.00	1.00	0.43	1.00	
Satd. Flow (perm)	1071	1552		702	1601		524	1658	1236	683	1627	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	150	103	71	117	23	3	565	113	5	602	21
RTOR Reduction (vph)	0	33	0	0	10	0	0	0	39	0	1	0
Lane Group Flow (vph)	37	220	0	71	130	0	3	565	74	5	622	0
Confl. Peds. (#/hr)	28		33	33		28	52		49	49		52
Heavy Vehicles (%)	0%	0%	0%	2%	2%	0%	0%	2%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	15.6	15.6		15.6	15.6		52.5	52.5	52.5	48.5	48.5	
Effective Green, g (s)	15.6	15.6		15.6	15.6		52.5	52.5	52.5	48.5	48.5	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.66	0.66	0.66	0.61	0.61	
Clearance Time (s)	6.2	6.2		6.2	6.2		3.0	5.7	5.7	5.7	5.7	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	208	302		136	312		357	1088	811	414	986	
v/s Ratio Prot		c0.14			0.08		0.00	c0.34			c0.38	
v/s Ratio Perm	0.03			0.10			0.01		0.06	0.01		
v/c Ratio	0.18	0.73		0.52	0.42		0.01	0.52	0.09	0.01	0.63	
Uniform Delay, d1	26.9	30.2		28.9	28.2		6.0	7.2	5.0	6.2	10.0	
Progression Factor	1.00	1.00		1.00	1.00		0.80	0.50	0.43	1.32	1.17	
Incremental Delay, d2	0.4	8.5		3.6	0.9		0.0	1.7	0.2	0.0	0.3	
Delay (s)	27.3	38.7		32.4	29.1		4.8	5.2	2.4	8.3	12.1	
Level of Service	C	D		C	C		A	A	A	A	B	
Approach Delay (s)		37.2			30.2			4.8			12.0	
Approach LOS		D			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.9
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

Description: TMC Oct 4/18
Updated Sept 17/20

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	171	1450	155	21	798	110	134	201	14	68	157	97
Future Volume (vph)	171	1450	155	21	798	110	134	201	14	68	157	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5	3.5	6.5	6.5	6.5	6.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1554	3121		1606	3150	1361	1601	1691	1414	1586	1578	
Flt Permitted	0.28	1.00		0.09	1.00	1.00	0.51	1.00	1.00	0.59	1.00	
Satd. Flow (perm)	462	3121		155	3150	1361	854	1691	1414	981	1578	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	186	1576	168	23	867	120	146	218	15	74	171	105
RTOR Reduction (vph)	0	10	0	0	0	55	0	0	11	0	28	0
Lane Group Flow (vph)	186	1734	0	23	867	65	146	218	4	74	248	0
Confl. Peds. (#/hr)	7		17	17		7	5		4	4		5
Heavy Vehicles (%)	3%	1%	0%	0%	2%	2%	0%	0%	0%	1%	0%	1%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		
Actuated Green, G (s)	43.5	43.5		43.5	43.5	43.5	23.5	23.5	23.5	23.5	23.5	
Effective Green, g (s)	43.5	43.5		43.5	43.5	43.5	26.5	23.5	23.5	23.5	23.5	
Actuated g/C Ratio	0.54	0.54		0.54	0.54	0.54	0.33	0.29	0.29	0.29	0.29	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	
Lane Grp Cap (vph)	251	1697		84	1712	740	282	496	415	288	463	
v/s Ratio Prot		c0.56			0.28			0.13			0.16	
v/s Ratio Perm	0.40			0.15		0.05	c0.17		0.00	0.08		
v/c Ratio	0.74	1.02		0.27	0.51	0.09	0.52	0.44	0.01	0.26	0.54	
Uniform Delay, d1	13.9	18.2		9.8	11.5	8.7	21.6	22.9	20.0	21.6	23.7	
Progression Factor	1.00	1.00		1.41	1.41	2.87	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	17.8	27.5		7.1	1.0	0.2	6.6	2.8	0.0	2.1	4.4	
Delay (s)	31.7	45.8		20.9	17.2	25.4	28.2	25.7	20.1	23.7	28.1	
Level of Service	C	D		C	B	C	C	C	C	C	C	
Approach Delay (s)		44.4			18.2			26.5			27.2	
Approach LOS		D			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	33.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	113.5%	ICU Level of Service	H
Analysis Period (min)	15		
Description: TMC Oct 24/17			
Updated Sept 23/20			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	104	1145	112	62	617	24	163	405	88	29	207	87
Future Volume (vph)	104	1145	112	62	617	24	163	405	88	29	207	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5		6.5	6.5		6.5	6.5	6.5	6.5	6.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.95	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00	1.00	0.98	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1601	3126		1602	3131		1581	1691	1363	1534	1594	
Flt Permitted	0.36	1.00		0.11	1.00		0.45	1.00	1.00	0.28	1.00	
Satd. Flow (perm)	601	3126		184	3131		741	1691	1363	452	1594	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	113	1245	122	67	671	26	177	440	96	32	225	95
RTOR Reduction (vph)	0	9	0	0	3	0	0	0	33	0	19	0
Lane Group Flow (vph)	113	1358	0	67	694	0	177	440	63	32	301	0
Confl. Peds. (#/hr)	5		19	19		5	10		39	39		10
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	1%	0%	0%	3%	1%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	41.9	41.9		41.9	41.9		25.1	25.1	25.1	25.1	25.1	
Effective Green, g (s)	41.9	41.9		41.9	41.9		25.1	25.1	25.1	25.1	25.1	
Actuated g/C Ratio	0.52	0.52		0.52	0.52		0.31	0.31	0.31	0.31	0.31	
Clearance Time (s)	6.5	6.5		6.5	6.5		6.5	6.5	6.5	6.5	6.5	
Lane Grp Cap (vph)	314	1637		96	1639		232	530	427	141	500	
v/s Ratio Prot		c0.43			0.22			c0.26			0.19	
v/s Ratio Perm	0.19			0.36			0.24		0.05	0.07		
v/c Ratio	0.36	0.83		0.70	0.42		0.76	0.83	0.15	0.23	0.60	
Uniform Delay, d1	11.2	16.0		14.3	11.7		24.8	25.5	19.8	20.3	23.2	
Progression Factor	0.26	0.21		1.54	1.52		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	1.4		3.8	0.1		20.9	14.0	0.7	3.7	5.3	
Delay (s)	3.8	4.8		25.8	17.8		45.6	39.5	20.5	24.0	28.5	
Level of Service	A	A		C	B		D	D	C	C	C	
Approach Delay (s)		4.7			18.5			38.5			28.1	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	98.0%	ICU Level of Service	F
Analysis Period (min)	15		
Description: TMC May 30 2017			
Updated Sept 23/20			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	1149	23	73	789	216	34	650	79	283	424	79
Future Volume (vph)	145	1149	23	73	789	216	34	650	79	283	424	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	0.7	6.5		3.7	6.5		6.5	6.5		0.7	6.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.97		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1590	3171		1591	3043		1604	3146		1606	3130	
Flt Permitted	0.11	1.00		0.10	1.00		0.45	1.00		0.15	1.00	
Satd. Flow (perm)	185	3171		161	3043		756	3146		247	3130	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	158	1249	25	79	858	235	37	707	86	308	461	86
RTOR Reduction (vph)	0	1	0	0	22	0	0	8	0	0	14	0
Lane Group Flow (vph)	158	1273	0	79	1071	0	37	785	0	308	533	0
Confl. Peds. (#/hr)	6		5	5		6	3		19	19		3
Heavy Vehicles (%)	1%	1%	0%	1%	2%	1%	0%	0%	1%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	48.8	41.5		48.8	41.5		28.5	28.5		44.5	44.5	
Effective Green, g (s)	54.8	41.5		48.8	41.5		28.5	28.5		47.5	44.5	
Actuated g/C Ratio	0.50	0.38		0.44	0.38		0.26	0.26		0.43	0.40	
Clearance Time (s)	3.7	6.5		3.7	6.5		6.5	6.5		3.7	6.5	
Lane Grp Cap (vph)	223	1196		166	1148		195	815		295	1266	
v/s Ratio Prot	c0.07	c0.40		0.03	0.35			c0.25		c0.14	0.17	
v/s Ratio Perm	0.29			0.18			0.05			0.30		
v/c Ratio	0.71	1.06		0.48	0.93		0.19	0.96		1.04	0.42	
Uniform Delay, d1	20.1	34.2		23.7	32.9		31.8	40.2		28.5	23.5	
Progression Factor	1.00	1.00		1.41	0.52		1.19	1.16		0.86	0.75	
Incremental Delay, d2	17.3	44.9		8.8	13.9		2.0	22.7		62.8	1.0	
Delay (s)	37.4	79.2		42.4	31.1		39.7	69.3		87.3	18.5	
Level of Service	D	E		D	C		D	E		F	B	
Approach Delay (s)		74.6			31.9			68.0			43.3	
Approach LOS		E			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	55.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.4
Intersection Capacity Utilization	99.2%	ICU Level of Service	F
Analysis Period (min)	15		

Description: TMC Oct 19/16
Updated Sept 23/20
Phase 1 minimum timing error due to 2 second COMM delay
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	183	4	210	10	2	8	71	796	21	12	605	92
Future Volume (vph)	183	4	210	10	2	8	71	796	21	12	605	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.3	6.3		5.9	5.9		5.9	5.9	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.88		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1469	1259		1603	1324		1498	3050		1604	2945	
Flt Permitted	0.75	1.00		0.45	1.00		0.34	1.00		0.29	1.00	
Satd. Flow (perm)	1160	1259		768	1324		538	3050		489	2945	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	199	4	228	11	2	9	77	865	23	13	658	100
RTOR Reduction (vph)	0	169	0	0	7	0	0	1	0	0	8	0
Lane Group Flow (vph)	199	63	0	11	4	0	77	887	0	13	750	0
Confl. Peds. (#/hr)	2		2	2		2	3		2	2		3
Heavy Vehicles (%)	9%	0%	13%	0%	0%	13%	7%	5%	0%	0%	6%	10%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.5	24.5		24.5	24.5		73.3	73.3		73.3	73.3	
Effective Green, g (s)	24.5	24.5		24.5	24.5		73.3	73.3		73.3	73.3	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.67	0.67		0.67	0.67	
Clearance Time (s)	6.3	6.3		6.3	6.3		5.9	5.9		5.9	5.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	258	280		171	294		358	2032		325	1962	
v/s Ratio Prot		0.05			0.00			c0.29			0.25	
v/s Ratio Perm	c0.17			0.01			0.14			0.03		
v/c Ratio	0.77	0.23		0.06	0.01		0.22	0.44		0.04	0.38	
Uniform Delay, d1	40.1	35.0		33.7	33.3		7.1	8.6		6.3	8.2	
Progression Factor	1.00	1.00		1.00	1.00		1.73	1.71		1.00	1.00	
Incremental Delay, d2	13.3	0.4		0.2	0.0		0.5	0.3		0.2	0.6	
Delay (s)	53.4	35.4		33.9	33.3		12.9	15.0		6.5	8.8	
Level of Service	D	D		C	C		B	B		A	A	
Approach Delay (s)		43.7			33.6			14.8			8.7	
Approach LOS		D			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	18.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		

Description: TMC Nov 27/19
Updated Sept 17/20

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	1318	6	26	930	22	15	39	83	36	18	8
Future Volume (vph)	13	1318	6	26	930	22	15	39	83	36	18	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.5			6.5			6.5			6.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			0.98			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		1.00			1.00			0.92			0.98	
Flt Protected		1.00			1.00			0.99			0.97	
Satd. Flow (prot)		2920			2927			1343			1431	
Flt Permitted		0.94			0.88			0.96			0.73	
Satd. Flow (perm)		2747			2568			1292			1072	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	1433	7	28	1011	24	16	42	90	39	20	9
RTOR Reduction (vph)	0	0	0	0	2	0	0	31	0	0	8	0
Lane Group Flow (vph)	0	1454	0	0	1061	0	0	117	0	0	60	0
Confl. Peds. (#/hr)	10		19	19		10	13		11	11		13
Heavy Vehicles (%)	0%	10%	0%	13%	9%	11%	0%	33%	6%	6%	22%	14%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		54.3			54.3			12.7			12.7	
Effective Green, g (s)		54.3			54.3			12.7			12.7	
Actuated g/C Ratio		0.68			0.68			0.16			0.16	
Clearance Time (s)		6.5			6.5			6.5			6.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1864			1743			205			170	
v/s Ratio Prot												
v/s Ratio Perm		c0.53			0.41			c0.09			0.06	
v/c Ratio		0.78			0.61			0.57			0.36	
Uniform Delay, d1		8.8			7.0			31.1			30.0	
Progression Factor		1.46			1.00			0.63			1.06	
Incremental Delay, d2		1.3			1.6			3.6			1.3	
Delay (s)		14.1			8.6			23.2			33.2	
Level of Service		B			A			C			C	
Approach Delay (s)		14.1			8.6			23.2			33.2	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		

Description: TMC June 26/19
Updated Sept 28/20

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
656: MARY ST E & HICKORY ST

11/09/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	336	43	15	130	31	23	11	35	25	16	13
Future Volume (Veh/h)	15	336	43	15	130	31	23	11	35	25	16	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	365	47	16	141	34	25	12	38	27	17	14
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		361										
pX, platoon unblocked												
vC, conflicting volume	175			412			633	628	388	654	634	158
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	175			412			633	628	388	654	634	158
tC, single (s)	4.2			4.2			7.1	6.5	6.3	7.1	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.5	4.0	3.4	3.5	4.1	3.4
p0 queue free %	99			99			93	97	94	92	96	98
cM capacity (veh/h)	1338			1120			363	392	651	345	381	872

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	428	191	75	58
Volume Left	16	16	25	27
Volume Right	47	34	38	14
cSH	1338	1120	475	417
Volume to Capacity	0.01	0.01	0.16	0.14
Queue Length 95th (m)	0.3	0.3	3.9	3.4
Control Delay (s)	0.4	0.8	14.0	15.0
Lane LOS	A	A	B	C
Approach Delay (s)	0.4	0.8	14.0	15.0
Approach LOS			B	C

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	27	169	13	10	175	80	25	114	12	39	122	14
Future Volume (vph)	27	169	13	10	175	80	25	114	12	39	122	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	184	14	11	190	87	27	124	13	42	133	15

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	227	288	164	190
Volume Left (vph)	29	11	27	42
Volume Right (vph)	14	87	13	15
Hadj (s)	-0.01	-0.14	0.02	0.01
Departure Headway (s)	5.4	5.2	5.7	5.6
Degree Utilization, x	0.34	0.41	0.26	0.30
Capacity (veh/h)	618	652	567	583
Control Delay (s)	11.1	11.7	10.6	10.9
Approach Delay (s)	11.1	11.7	10.6	10.9
Approach LOS	B	B	B	B

Intersection Summary			
Delay	11.2		
Level of Service	B		
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	26	101	12	33	62	92	7	195	40	49	222	55
Future Volume (vph)	26	101	12	33	62	92	7	195	40	49	222	55
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	28	110	13	36	67	100	8	212	43	53	241	60

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	151	203	263	354
Volume Left (vph)	28	36	8	53
Volume Right (vph)	13	100	43	60
Hadj (s)	-0.01	-0.25	-0.06	-0.04
Departure Headway (s)	6.0	5.6	5.5	5.4
Degree Utilization, x	0.25	0.32	0.40	0.53
Capacity (veh/h)	516	566	603	634
Control Delay (s)	11.0	11.3	12.1	14.1
Approach Delay (s)	11.0	11.3	12.1	14.1
Approach LOS	B	B	B	B

Intersection Summary			
Delay	12.5		
Level of Service	B		
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	2	64	7	203	40	17	7	160	297	18	77	1
Future Volume (vph)	2	64	7	203	40	17	7	160	297	18	77	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
Hourly flow rate (vph)	2	70	8	221	43	18	8	174	323	20	84	1

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	80	282	505	105
Volume Left (vph)	2	221	8	20
Volume Right (vph)	8	18	323	1
Hadj (s)	-0.06	0.12	-0.38	0.03
Departure Headway (s)	6.0	5.7	4.8	5.8
Degree Utilization, x	0.13	0.45	0.67	0.17
Capacity (veh/h)	516	582	724	556
Control Delay (s)	9.9	13.3	17.0	9.9
Approach Delay (s)	9.9	13.3	17.0	9.9
Approach LOS	A	B	C	A

Intersection Summary			
Delay	14.6		
Level of Service	B		
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	112	82	31	9	9	43
Future Volume (Veh/h)	112	82	31	9	9	43
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	122	89	34	10	10	47
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		373				
pX, platoon unblocked						
vC, conflicting volume	44				372	39
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	44				372	39
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				98	95
cM capacity (veh/h)	1577				584	1033

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	211	44	57
Volume Left	122	0	10
Volume Right	0	10	47
cSH	1577	1700	910
Volume to Capacity	0.08	0.03	0.06
Queue Length 95th (m)	1.8	0.0	1.4
Control Delay (s)	4.6	0.0	9.2
Lane LOS	A		A
Approach Delay (s)	4.6	0.0	9.2
Approach LOS			A

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	27.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
89: BROCK ST S & DUNDAS ST

11/10/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	650	0	0	660	148	0	491	0	0	609	0
Future Volume (vph)	0	650	0	0	660	148	0	491	0	0	609	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5	5.5		5.5			5.5	
Lane Util. Factor		*1.00			1.00	1.00		1.00			1.00	
Frpb, ped/bikes		1.00			1.00	0.87		1.00			1.00	
Flpb, ped/bikes		1.00			1.00	1.00		1.00			1.00	
Frt		1.00			1.00	0.85		1.00			1.00	
Flt Protected		1.00			1.00	1.00		1.00			1.00	
Satd. Flow (prot)		1658			1658	1213		1642			1658	
Flt Permitted		1.00			1.00	1.00		1.00			1.00	
Satd. Flow (perm)		1658			1658	1213		1642			1658	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	707	0	0	717	161	0	534	0	0	662	0
RTOR Reduction (vph)	0	0	0	0	0	64	0	0	0	0	0	0
Lane Group Flow (vph)	0	707	0	0	717	97	0	534	0	0	662	0
Confl. Peds. (#/hr)	48		45	45		48	83		75	75		83
Heavy Vehicles (%)	0%	2%	0%	0%	2%	3%	0%	3%	0%	0%	2%	0%
Turn Type		NA			NA	Perm		NA			NA	
Protected Phases		2			2			4			4	
Permitted Phases						2						
Actuated Green, G (s)		36.5			36.5	36.5		32.5			32.5	
Effective Green, g (s)		36.5			36.5	36.5		32.5			32.5	
Actuated g/C Ratio		0.46			0.46	0.46		0.41			0.41	
Clearance Time (s)		5.5			5.5	5.5		5.5			5.5	
Lane Grp Cap (vph)		756			756	553		667			673	
v/s Ratio Prot		0.43			c0.43			0.33			c0.40	
v/s Ratio Perm						0.08						
v/c Ratio		0.94			0.95	0.18		0.80			0.98	
Uniform Delay, d1		20.6			20.8	12.9		20.9			23.5	
Progression Factor		1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2		20.3			22.3	0.7		9.8			30.9	
Delay (s)		40.9			43.2	13.5		30.7			54.4	
Level of Service		D			D	B		C			D	
Approach Delay (s)		40.9			37.7			30.7			54.4	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	41.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
89: BROCK ST S & DUNDAS ST

11/10/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1198	0	0	739	138	0	508	0	0	601	0
Future Volume (vph)	0	1198	0	0	739	138	0	508	0	0	601	0
Ideal Flow (vphpl)	1900	2005	1900	1900	2005	1900	1900	1900	1900	1900	2005	1900
Total Lost time (s)		5.5			5.5	5.5		5.5			5.5	
Lane Util. Factor		*1.00			1.00	1.00		1.00			1.00	
Frpb, ped/bikes		1.00			1.00	0.93		1.00			1.00	
Flpb, ped/bikes		1.00			1.00	1.00		1.00			1.00	
Frt		1.00			1.00	0.85		1.00			1.00	
Flt Protected		1.00			1.00	1.00		1.00			1.00	
Satd. Flow (prot)		1716			1732	1300		1626			1732	
Flt Permitted		1.00			1.00	1.00		1.00			1.00	
Satd. Flow (perm)		1716			1732	1300		1626			1732	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1302	0	0	803	150	0	552	0	0	653	0
RTOR Reduction (vph)	0	0	0	0	0	32	0	0	0	0	0	0
Lane Group Flow (vph)	0	1302	0	0	803	118	0	552	0	0	653	0
Confl. Peds. (#/hr)	21		15	15		21	5		34	34		5
Heavy Vehicles (%)	0%	4%	4%	0%	3%	3%	0%	4%	0%	0%	3%	1%
Turn Type		NA			NA	Perm		NA			NA	
Protected Phases		2			2			4			4	
Permitted Phases						2						
Actuated Green, G (s)		44.5			44.5	44.5		24.5			24.5	
Effective Green, g (s)		44.5			44.5	44.5		24.5			24.5	
Actuated g/C Ratio		0.56			0.56	0.56		0.31			0.31	
Clearance Time (s)		5.5			5.5	5.5		5.5			5.5	
Lane Grp Cap (vph)		954			963	723		497			530	
v/s Ratio Prot		c0.76			0.46			0.34			c0.38	
v/s Ratio Perm						0.09						
v/c Ratio		1.36			0.83	0.16		1.11			1.23	
Uniform Delay, d1		17.8			14.7	8.7		27.8			27.8	
Progression Factor		1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2		170.9			8.4	0.5		74.2			120.1	
Delay (s)		188.7			23.1	9.1		101.9			147.9	
Level of Service		F			C	A		F			F	
Approach Delay (s)		188.7			20.9			101.9			147.9	
Approach LOS		F			C			F			F	

Intersection Summary			
HCM 2000 Control Delay	120.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.32		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	108.9%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
89: BROCK ST S & DUNDAS ST

11/10/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	520	0	0	528	148	0	491	0	0	609	0
Future Volume (vph)	0	520	0	0	528	148	0	491	0	0	609	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5	5.5		5.5			5.5	
Lane Util. Factor		1.00			1.00	1.00		1.00			1.00	
Frpb, ped/bikes		1.00			1.00	0.93		1.00			1.00	
Flpb, ped/bikes		1.00			1.00	1.00		1.00			1.00	
Frt		1.00			1.00	0.85		1.00			1.00	
Flt Protected		1.00			1.00	1.00		1.00			1.00	
Satd. Flow (prot)		1496			1483	1177		1458			1510	
Flt Permitted		1.00			1.00	1.00		1.00			1.00	
Satd. Flow (perm)		1496			1483	1177		1458			1510	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	565	0	0	574	161	0	534	0	0	662	0
RTOR Reduction (vph)	0	0	0	0	0	85	0	0	0	0	0	0
Lane Group Flow (vph)	0	565	0	0	574	76	0	534	0	0	662	0
Confl. Peds. (#/hr)	20		25	25		20	20		27	27		20
Heavy Vehicles (%)	0%	13%	8%	0%	14%	14%	0%	16%	25%	0%	12%	8%
Turn Type		NA			NA	Perm		NA			NA	
Protected Phases		2			2			4			4	
Permitted Phases						2						
Actuated Green, G (s)		31.8			31.8	31.8		37.2			37.2	
Effective Green, g (s)		31.8			31.8	31.8		37.2			37.2	
Actuated g/C Ratio		0.40			0.40	0.40		0.47			0.47	
Clearance Time (s)		5.5			5.5	5.5		5.5			5.5	
Lane Grp Cap (vph)		594			589	467		677			702	
v/s Ratio Prot		0.38			c0.39			0.37			c0.44	
v/s Ratio Perm						0.06						
v/c Ratio		0.95			0.97	0.16		0.79			0.94	
Uniform Delay, d1		23.3			23.7	15.5		18.1			20.4	
Progression Factor		1.62			0.98	1.79		1.09			0.56	
Incremental Delay, d2		11.6			24.5	0.5		8.1			17.5	
Delay (s)		49.5			47.8	28.3		27.8			28.9	
Level of Service		D			D	C		C			C	
Approach Delay (s)		49.5			43.5			27.8			28.9	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	37.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		

Description: TMC June 26/19
Updated Sept 17/20
No Left Turns allowed for any movement
Street parking on North, West and South legs;
Assumed to handle 0 volume - lanes ignored

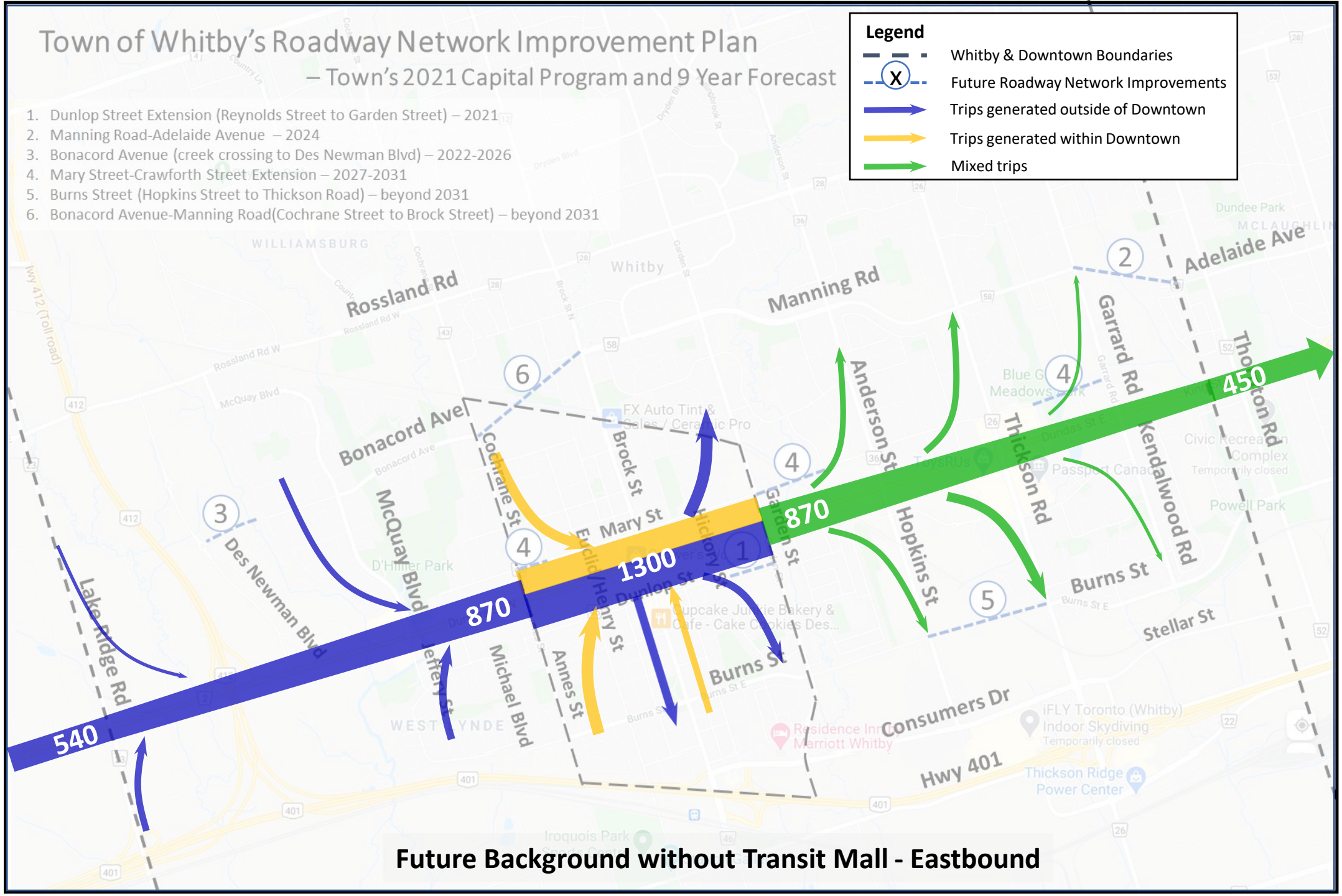
c Critical Lane Group

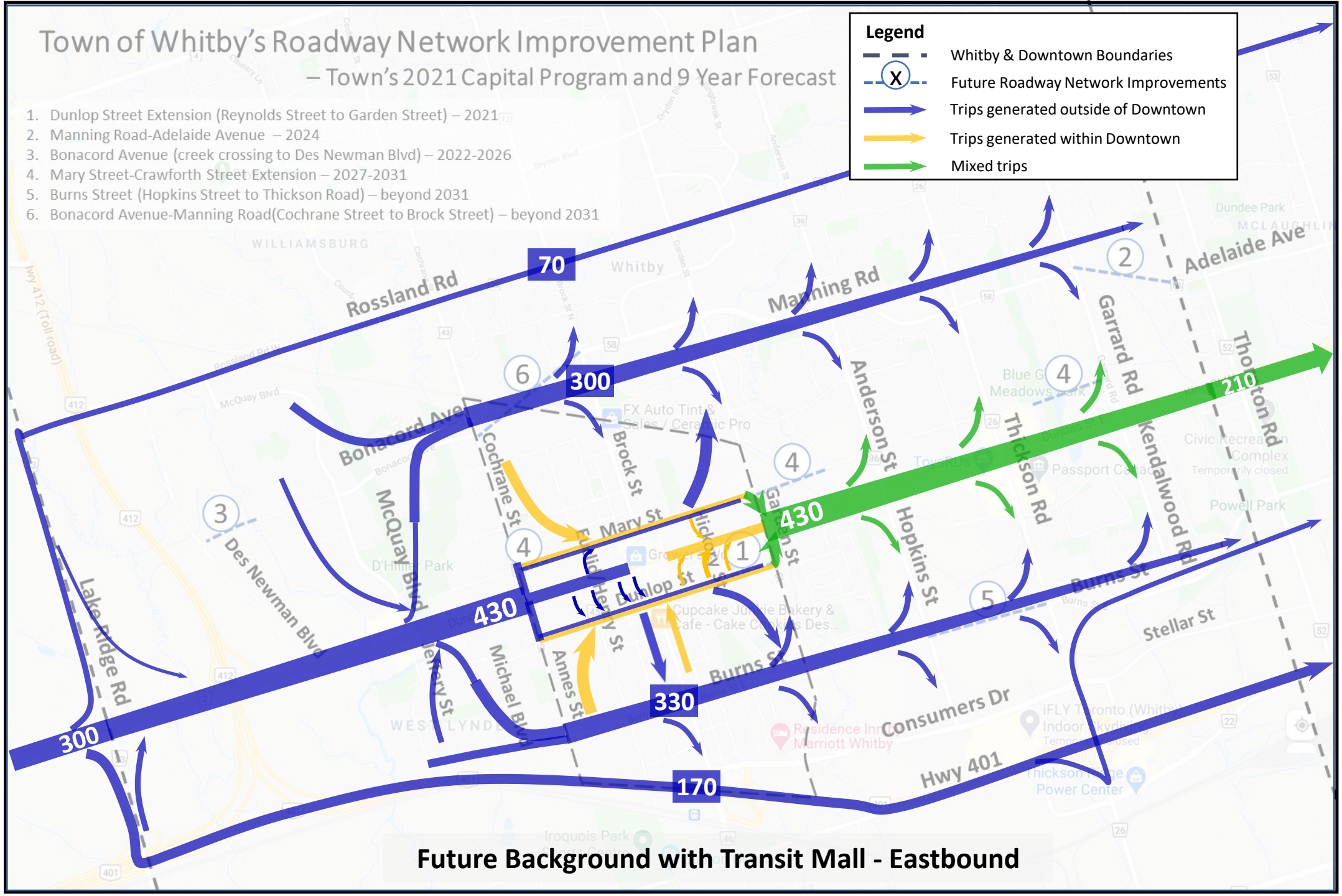
HCM Signalized Intersection Capacity Analysis
89: BROCK ST S & DUNDAS ST

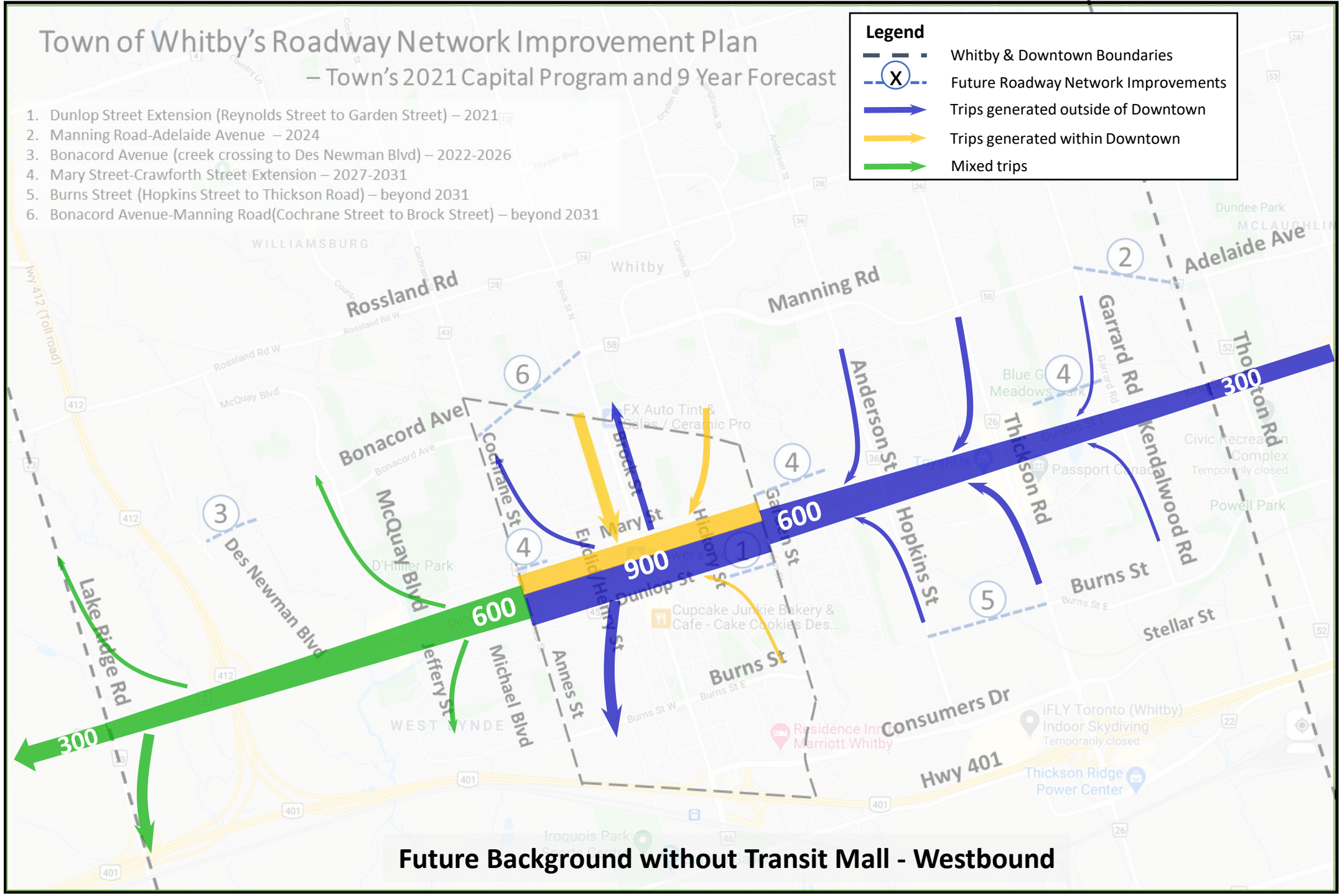
11/10/2021

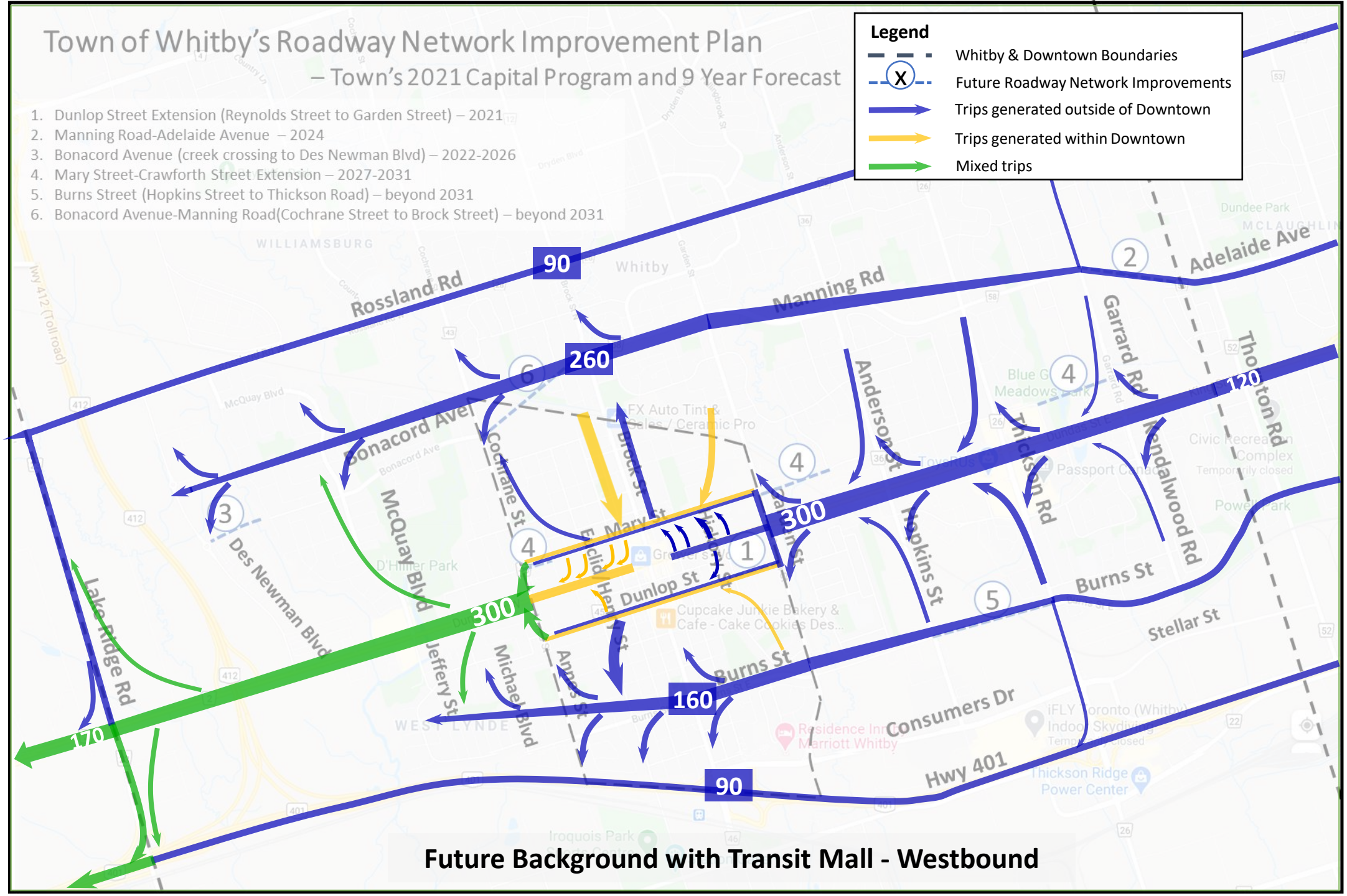
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	700	0	0	591	138	0	508	0	0	601	0
Future Volume (vph)	0	700	0	0	591	138	0	508	0	0	601	0
Ideal Flow (vphpl)	1900	2005	1900	1900	2005	1900	1900	1900	1900	1900	2005	1900
Total Lost time (s)		5.5			5.5	5.5		5.5			5.5	
Lane Util. Factor		*1.00			1.00	1.00		1.00			1.00	
Frpb, ped/bikes		1.00			1.00	0.93		1.00			1.00	
Flpb, ped/bikes		1.00			1.00	1.00		1.00			1.00	
Frt		1.00			1.00	0.85		1.00			1.00	
Flt Protected		1.00			1.00	1.00		1.00			1.00	
Satd. Flow (prot)		1716			1732	1300		1626			1732	
Flt Permitted		1.00			1.00	1.00		1.00			1.00	
Satd. Flow (perm)		1716			1732	1300		1626			1732	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	761	0	0	642	150	0	552	0	0	653	0
RTOR Reduction (vph)	0	0	0	0	0	71	0	0	0	0	0	0
Lane Group Flow (vph)	0	761	0	0	642	79	0	552	0	0	653	0
Confl. Peds. (#/hr)	21		15	15		21	5		34	34		5
Heavy Vehicles (%)	0%	4%	4%	0%	3%	3%	0%	4%	0%	0%	3%	1%
Turn Type		NA			NA	Perm		NA			NA	
Protected Phases		2			2			4			4	
Permitted Phases						2						
Actuated Green, G (s)		37.5			37.5	37.5		31.5			31.5	
Effective Green, g (s)		37.5			37.5	37.5		31.5			31.5	
Actuated g/C Ratio		0.47			0.47	0.47		0.39			0.39	
Clearance Time (s)		5.5			5.5	5.5		5.5			5.5	
Lane Grp Cap (vph)		804			811	609		640			681	
v/s Ratio Prot		c0.44			0.37			0.34			c0.38	
v/s Ratio Perm						0.06						
v/c Ratio		0.95			0.79	0.13		0.86			0.96	
Uniform Delay, d1		20.3			17.9	12.0		22.3			23.6	
Progression Factor		1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2		21.1			7.8	0.4		14.3			25.8	
Delay (s)		41.4			25.7	12.5		36.6			49.4	
Level of Service		D			C	B		D			D	
Approach Delay (s)		41.4			23.2			36.6			49.4	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	37.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	81.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			


Town of Whitby's Roadway Network Improvement Plan
– Town's 2021 Capital Program and 9 Year Forecast
1. Dunlop Street Extension (Reynolds Street to Garden Street) – 2021
2. Manning Road-Adelaide Avenue – 2024
3. Bonacord Avenue (creek crossing to Des Newman Blvd) – 2022-2026
4. Mary Street-Crawforth Street Extension – 2027-2031
5. Burns Street (Hopkins Street to Thickson Road) – beyond 2031
6. Bonacord Avenue-Manning Road(Cochrane Street to Brock Street) – beyond 2031
Legend
Whitby & Downtown Boundaries
Future Roadway Network Improvements
Trips generated outside of Downtown
Trips generated within Downtown
Mixed trips
540
870
1300
870
450
Rossland Rd
Manning Rd
Adelaide Ave
Garrard Rd
Thickson Rd
Kendalwood Rd
Anderson St
Hopkins St
Bonacord Ave
Cochrane St
Brock St
Mary St
Des Newman Blvd
McQuay Blvd
Lake Ridge Rd
Jeffery St
Michael Blvd
Annes St
Euclid/Henry St
Dunlop St
Hickory St
Garden St
Burns St
Stellar St
Consumers Dr
Hwy 401
Whitby
WILLIAMSBURG
WESTMYNDE
Dundee Park
Powell Park
Iroquois Park
Thickson Ridge Power Center
iFLY Toronto (Whitby) Indoor Skydiving
Temporarily closed
Civic Recreation Complex
Temporarily closed
Passport Canada
Blue Grass Meadows Park
D'Hillier Park
Cupcake Junkie Bakery & Cafe - Cake Cookies Des...
Residence Inn Marriott Whitby
FX Auto Tint & Sales / Ceramic Pro
Hwy 412 (Toll road)
Future Background without Transit Mall - Eastbound


Town of Whitby's Roadway Network Improvement Plan
– Town's 2021 Capital Program and 9 Year Forecast
1. Dunlop Street Extension (Reynolds Street to Garden Street) – 2021
2. Manning Road-Adelaide Avenue – 2024
3. Bonacord Avenue (creek crossing to Des Newman Blvd) – 2022-2026
4. Mary Street-Crawforth Street Extension – 2027-2031
5. Burns Street (Hopkins Street to Thickson Road) – beyond 2031
6. Bonacord Avenue-Manning Road(Cochrane Street to Brock Street) – beyond 2031
Legend
Whitby & Downtown Boundaries
Future Roadway Network Improvements
Trips generated outside of Downtown
Trips generated within Downtown
Mixed trips
70
300
430
330
170
210
Rossland Rd
Manning Rd
Adelaide Ave
Garrard Rd
Thickson Rd
Kendalwood Rd
Anderson St
Hopkins St
Bonacord Ave
Cochrane St
Brock St
Mary St
Dunlop St
Des Newman Blvd
McQuay Blvd
Lake Ridge Rd
Michael Blvd
Annes St
Burns St
Stellar St
Consumers Dr
Hwy 401
Whitby
Future Background with Transit Mall - Eastbound


Town of Whitby's Roadway Network Improvement Plan
– Town's 2021 Capital Program and 9 Year Forecast
1. Dunlop Street Extension (Reynolds Street to Garden Street) – 2021
2. Manning Road-Adelaide Avenue – 2024
3. Bonacord Avenue (creek crossing to Des Newman Blvd) – 2022-2026
4. Mary Street-Crawforth Street Extension – 2027-2031
5. Burns Street (Hopkins Street to Thickson Road) – beyond 2031
6. Bonacord Avenue-Manning Road(Cochrane Street to Brock Street) – beyond 2031
Legend
Whitby & Downtown Boundaries
Future Roadway Network Improvements
Trips generated outside of Downtown
Trips generated within Downtown
Mixed trips
300
600
900
600
300
Rossland Rd
Manning Rd
Adelaide Ave
Garrard Rd
Thickson Rd
Anderson St
Kendalwood Rd
Bonacord Ave
Cochrane St
Brock St
Mary St
Hickory St
Garden St
Hopkins St
Burns St
Stellar St
Des Newman Blvd
McQuay Blvd
Lake Ridge Rd
Jeffery St
Michael Blvd
Annes St
Dunlop St
Consumers Dr
Hwy 401
Whitby
WILLIAMSBURG
WEST LYNDE
Future Background without Transit Mall - Westbound



Future Background with Transit Mall - Westbound