Barton Street and Fifty Road Class EA Study Transportation and Traffic Analysis Report

Paradigm Transportation Solutions Limited

August 2018

Project Summary

Project Number
161250

August 2018

Client
City of Hamilton
c/o Wood Group PLC
3450 Harvester Road
Suite 100
Burlington, ON L7N 3W5

Client Contact
David Sinke, B.Eng. Mgt., P.Eng.
Maria King, P.Eng.

Consultant Project Team
Gene Chartier, M.A.Sc., P.Eng.
Andrew Evans, M.Sc.

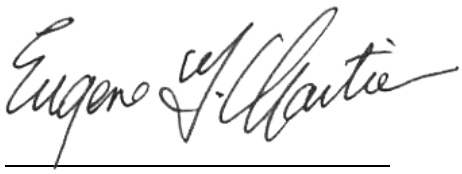
Paradigm Transportation Solutions Limited
22 King Street South Suite 300
Waterloo ON N2J 1N8
p: 519.896.3163
www.ptsl.com

Barton Street and Fifty Road Class EA Study Transportation and Traffic Analysis Report

List of Revisions

Version	Date	Description
1	4 May 2017	Draft to Client
2	22 March 2018	Revised Draft to Client
3	4 April 2018	Final to Client

Signatures



Signature

Disclaimer

Executive Summary

Study Overview

The City of Hamilton has initiated a Municipal Class Environmental Assessment (EA) (Phases 3 and 4) for Barton Street and Fifty Road Improvements in the community of Stoney Creek. This **Transportation and Traffic Analysis Report** has been prepared to address short and long-term transportation needs related to planned growth within these corridors to the year 2031. Opportunities to better facilitate the movement of vehicles, transit, goods movement, walking and cycling were reviewed. The Study Area for the transportation assessment comprised Barton Street from Fruitland Road to Fifty Road, and Fifty Road from South Service Road to Highway 8.

Planning Context

Numerous studies, projects and initiatives previously completed or currently underway by the City of Hamilton and other public agencies provide the planning context for the Barton Street and Fifty Road Class EA. These include the Official Plan and Transportation Plans for the City of Hamilton, and other on-going Class EA studies near the Study Area. Of note, the 2008 Stoney Creek Urban Boundary Expansion Study (SCUBE) Transportation Master Plan established the need and justification for the widening of Barton Street to three (3) lanes through the Study Area and served as the foundation for the Problem and Opportunity Statement for this Class EA study.

Traffic Operations Analysis Approach

Traffic analyses were completed for both existing (2016) and future (2031) conditions during the weekday morning (AM) and afternoon (PM) peak hours at midblock and intersection locations within the Study Area. The methodologies applied for the analyses are described as follows:

- For midblock sections, operational performance was characterized based on volume-to-capacity (v/c) ratio. A v/c ratio of 0.90 or less was deemed acceptable operation.
- The operational performance of the signalized and stop controlled intersections was assessed based on Level of Service (LOS) and v/c ratio estimates provided by Synchro Version 9.1. A v/c ratio of 0.90 or less was considered acceptable operation.

Existing Transportation Conditions

Sufficient capacity exists to serve existing midblock traffic volumes on Barton Street and Fifty Road within the Study Area.

All intersections within the Study Area currently operate with overall acceptable levels of service and within capacity during the AM and PM peak hours, except for Fifty Road and South Service Road. During both peak hours, this intersection operates with overall LOS F. In the AM peak hour, the southbound shared left-through-right turn movement operates at LOS F with a v/c ratio exceeding 1.0. In the PM peak hour, the eastbound shared left-through-right turn movement operates at LOS F with a v/c ratio of 0.97, and the southbound shared left-through-right turn movement operates at LOS F with a v/c ratio exceeding 1.

Future Transportation Conditions

Sufficient capacity would exist to serve forecasted year 2031 midblock traffic volumes on Barton Street and Fifty Road within the Study Area, assuming the proposed three (3)-lane cross-section is provided on Barton Street.

Several intersections within the Study Area are expected to operate with poor levels of service and over capacity by the year 2031 if not improved. Specific locations where LOS F and/or v/c ratios greater than 0.90 are anticipated include:

- Barton Street at Fruitland Road – In the AM peak hour, the eastbound, northbound and southbound left turn movements. In the PM peak hour, the eastbound left turn movement;
- Barton Street at Sunnyhurst Avenue/Gordon Dean Avenue – In the AM peak hour, the northbound left-through-right turn movement.
- Barton Street at Jones Road – In the AM peak hour the northbound left-through-right turn movement. In the PM peak hour, the northbound and southbound left-through-right turn movements.
- Barton Street at Glover Road – In the AM peak hour, the westbound through-right turn movement. In the PM peak hour, the eastbound and westbound through-right turn movements;
- Barton Street at McNeilly Road – In the AM peak hour, the westbound through-right turn movement. In the PM peak hour, the eastbound through-right turn movement;
- Barton Street at Lewis Road – In the PM peak hour, the eastbound through-right turn movement;
- Barton Street at Winona Road – In the PM peak hour, the eastbound and westbound through-right turn movement;
- Barton Street at Fifty Road – During both peak hours, the overall intersection and the eastbound left turn movement;
- Fifty Road at Highway 8 – In the PM peak hour, the overall intersection and the southbound left-through-right turn movement; and

- Fifty Road at South Service Road – In the PM peak hour, the eastbound left turn movement.

Potential Road Improvements

The following modifications were considered to improve intersection operations for 2031 future traffic conditions:

- Barton Street at Fruitland Road – Signal timing optimization and addition of westbound, northbound and southbound right turn lanes;
- Barton Street at Sunnyhurst Avenue/Gordon Dean Avenue – Installation of traffic control signals or a roundabout (plus eastbound and westbound left turn lanes with three (3) cross-section);
- Barton Street at Jones Road – Installation of traffic control signals or a roundabout (plus eastbound and westbound left turn lanes with three (3) lane cross-section);
- Barton Street at Glover Road – Installation of traffic control signals or a roundabout (plus eastbound and westbound left turn lanes with three (3) lane cross-section);
- Barton Street at McNeilly Road – Installation of traffic control signals or a roundabout (plus eastbound and westbound left turn lanes with three (3) lane cross-section);
- Barton Street at Lewis Road – Installation of traffic control signals or a roundabout (plus eastbound and westbound left turn lanes with three (3) lane cross-section);
- Barton Street at Winona Road – Installation of traffic control signals or a roundabout (plus eastbound and westbound left turn lanes with three (3) lane cross-section);
- Barton Street at Fifty Road – Installation of traffic control signals or a roundabout and addition of southbound right turn lane (plus eastbound left turn lane with three (3) lane cross-section);
- Fifty Road at Highway 8 – Addition of left turn lanes on all approaches; and
- Fifty Road at South Service Road – Signal timing optimization and addition of second southbound through and westbound right turn lanes.

All intersections are forecasted to operate with acceptable levels of service during the AM and PM peak hours with these improvements implemented. The intersections analyzed would likely operate better with roundabout control than traffic control signals.

The analyses confirmed the need and justification to improve Barton Street to three (3) lanes as recommended in the SCUBE Transportation Master Plan.

Fifty Road and Canadian National Railway Crossing

The need for enhanced protection at the Fifty Road and Canadian National Railway (CNR) crossing was assessed based on the "road exposure index", which is calculated as the cross-product of the daily number of trains and the Annual Average Daily Traffic (AADT). An index value exceeding 200,000 is a primary indicator that grade separation should be considered as there is currently no nationally recognized approach for assessing merit.

Between 13 and 20 trains cross Fifty Road on the CNR tracks daily under existing conditions, with 13 to 24 trains forecasted by the 2031 horizon year. Based on existing and forecasted traffic volumes, grade separation is not required under existing conditions, but should be considered by the 2031 horizon year subject to a more detailed safety assessment, especially if GO Transit rail service is extended to Niagara Region as planned. The need for grade separation should be examined further through the forthcoming addenda to the 2011 Niagara Rail Service Expansion GO Transit Class Environmental Assessment Study.

Recommendations

It is recommended that:

- Barton Street be widened to three (3) lanes from Fruitland Road to Fifty Road, consistent with the recommendations contained in the SCUBE Transportation Master Plan;
- The Barton Street at Fruitland Road, Barton Street at Fifty Road and Fifty Road at Highway 8 intersections be further improved as recommended in this study;
- Traffic control signals or a roundabout be installed at the following intersections:
  - Barton Street at Sunnyhurst Avenue/Gordon Dean Avenue;
  - Barton Street at Jones Road;
  - Barton Street at Glover Road;
  - Barton Street at McNeilly Road;
  - Barton Street at Lewis Road;
  - Barton Street at Winona Road; and
  - Barton Street at Fifty Road;
- A grade separation be considered for the Fifty Road and CNR crossing by 2031, especially if GO Transit rail service is extended to Niagara Region as planned.

Contents

Appendices

Figures

Tables

1 Introduction

1.1 Overview

The City of Hamilton has initiated a Municipal Class Environmental Assessment (EA) Phases 3 and 4 for Barton Street and Fifty Road Improvements in the community of Stoney Creek. This **Transportation and Traffic Analysis Report** has been prepared to address short and long-term transportation needs related to planned growth within these corridors to the year 2031. Opportunities to better facilitate the movement of vehicles, transit, goods movement, walking and cycling were reviewed.

Figure 1.1 illustrates the Study Area for this report, which comprises Barton Street from Fruitland Road to Fifty Road, and Fifty Road from South Service Road to Highway 8.

1.2 Traffic Operations Analysis Approach

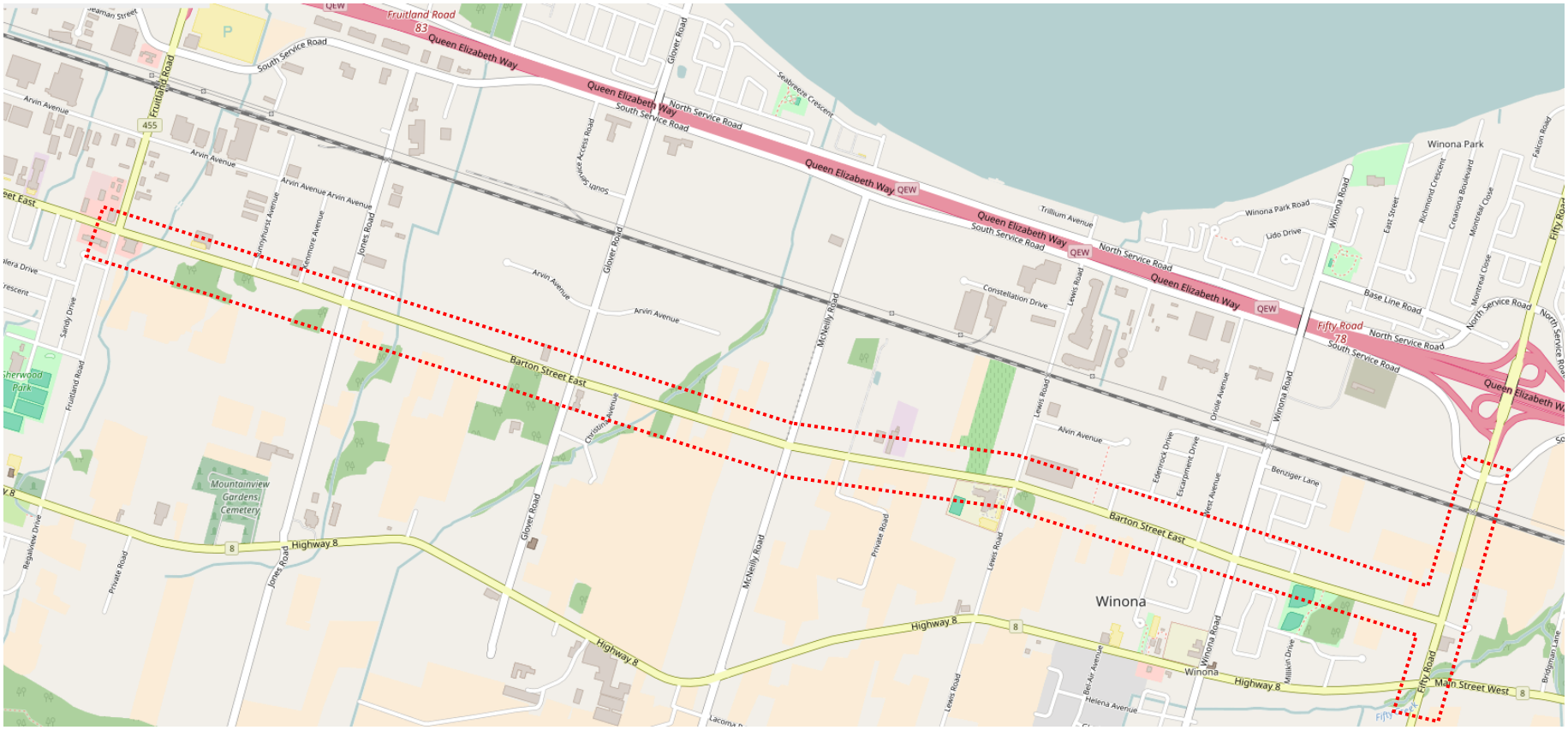
The transportation need and justification assessment was based on traffic operations analysis conducted for the midblock sections and intersections within the Study Area. The analyses were completed for both existing (2016) and future (2031) conditions during the weekday morning (AM) and afternoon (PM) peak hours to characterize operating conditions and identify locations requiring attention. The methodologies applied for the analyses are described as follows.

1.2.1 Midblock Analysis

For midblock sections, operational performance was characterized based on the volume-to-capacity (v/c) ratio for the link. The v/c ratio provides a measure of traffic volume demand to available capacity, with an at-capacity condition represented by a v/c ratio of 1.00 (i.e. volume demand equals theoretical capacity). A v/c ratio of 0.90 or less was deemed acceptable operation for midblock locations, as road segments with volumes exceeding this threshold would typically be candidates for widening.

The midblock v/c ratios were calculated by dividing the traffic link volume (existing or forecasted) by the theoretical capacity for the subject link (i.e. the maximum hourly rate at which vehicles can be expected reasonably to traverse the section of roadway within a given time, under prevailing roadway, traffic and control conditions). A theoretical capacity of 900 vehicles per hour per lane was assumed for Barton Street and Fifty Road per the City of Hamilton travel demand forecasting model.

This value reflects the intended function of the road, and accounts for factors such as: the type and number of local streets and private accesses provided; the presence of pedestrians and crossing locations; and typical driving characteristics for this type of facility.



NTS
Image Source: OpenStreet Map

paradigm TRANSPORTATION SOLUTIONS LIMITED

Study Area

Barton Street / Fifty Road Class EA, Hamilton
161250

Figure 1.1

1.2.2 Intersection Analysis

Intersection Level of Service (LOS) is estimated based on average delay per vehicle and includes deceleration delay, queue move-up time, stopped delay, and final acceleration delay. LOS is a qualitative measure that describes the operating conditions within an intersection, and the perception of those conditions by road users. There are six levels of service defined. Each level has a letter identification from A to F with LOS A representing the best operating conditions and LOS F the worst. **Table 1.1** summarizes the LOS criteria for signalized, stop controlled, and roundabout intersections according to the 2000 and 2010 Highway Capacity Manual (HCM 2000 and HCM 2010).

The operational analysis for the signalized and stop controlled intersections was conducted using Synchro Version 9.1, which implements the methods contained in HCM 2000 and HCM 2010. A Synchro network was developed specifically for this study and further refined through the analyses.

TABLE 1.1: INTERSECTION LEVEL OF SERVICE CRITERIA

Level of Service	Average Control Delay per Vehicle (sec/veh)	
	Signalized Intersections[1]	Stop Controlled[2] and Roundabouts[3]
A	<= 10	<= 10
B	>10 and <= 20	>10 and <= 15
C	> 20 and <= 35	> 15 and <= 25
D	> 35 and <= 55	> 25 and <= 35
E	> 55 and <= 80	> 35 and <= 50
F	> 80	> 50

Source: 1. Highway Capacity Manual, 4th Edition (HCM 2000), Transportation Research Board, Chapter 16: Signalized Intersections, Exhibit 16-2
2. HCM 2000, Chapter 17: Unsignalized Intersection, Exhibit 17-2
3. HCM 2000, Chapter 21: Roundabouts, Exhibit 21-1

The operational performance of the signalized and stop controlled intersections within the Study Area was also assessed based on the v/c ratio. For this study, v/c ratios were calculated at each intersection for individual movements and the entire intersection, with a v/c ratio of 0.90 or less considered acceptable operation.

1.3 Report Organization

The remainder of the Transportation and Traffic Analysis Report is organized as follows:

- Section 2 provides the **Planning Context**, summarizing the findings of other studies, projects, and initiatives to be considered in completing the report;
- Section 3 presents the analysis of **Existing Transportation Conditions** for the 2016 base year;
- Section 4 summarizes the analysis of the **Future Transportation Conditions** for the 2031 horizon year; and
- Section 5 provides the **Conclusions and Recommendations** of this report.

2 Planning Context

2.1 Provincial and Inter-Regional

2.1.1 Provincial Growth Plan for the Greater Golden Horseshoe

The Growth Plan for the Greater Golden Horseshoe – Places to Grow was adopted in June 2006 under the provisions of the *Places to Grow Act, 2005.* The plan provides the framework for implementing the Provincial government's vision for building stronger, prosperous communities by better managing growth to the year 2041 in the burgeoning Greater Toronto and Hamilton Area (GTHA). Since implementation, the plan has been amended to address growth in the County of Simcoe (including the cities of Barrie and Orillia), and provide population and employment forecasts to the year 2041.

The Growth Plan contains specific policies and directives regarding transportation, infrastructure, land use planning, urban form, housing, natural heritage and resource protection to be considered by municipalities in their planning activities. Of interest, the Growth Plan provides direction around where growth can occur, the form of future development, and future population and employment forecasts. The plan, as amended, forecasts the population of the City of Hamilton to grow to 680,000 by 2031, 730,000 by 2036, and 780,000 by 2041, for an annual average growth rate of 1.54 per cent. For employment, *Places to Grow* forecasts the number of jobs in the City to reach 310,000 by 2031, 330,000 by 2036, and 350,000 by 2041, for an annual average growth rate of 1.36 per cent.

The plan also offers guidance regarding transportation system development, envisioning an "integrated transportation network that will allow people choices for easy travel both within and between urban centers." While travel by automobile will remain a significant means of transport, other travel modes, including efficient, convenient and affordable public transit, and walking and cycling, will become more important elements of the urban transportation system.

2.1.2 Metrolinx "The Big Move" – Regional Transportation Plan for the GTHA

Pursuant to the *Metrolinx Act, 2006*, the Province created Metrolinx to develop, fund, coordinate and promote transportation within the GTHA municipalities. In 2008, Metrolinx released its Regional Transportation Plan (RTP) for the GTHA, entitled "The Big Move: Transforming Transportation in the Greater Toronto and Hamilton Area". The plan outlines a 25-year vision for sustainable transportation in the GTHA, and the policies, programs and infrastructure investments required to achieve this vision of a seamless, integrated transportation network.

The Big Move is primarily focused on enhancing and expanding public transit. Near the Study Area, the RTP identifies a Niagara GO Rail line the provision of Higher Order Transit (either Bus Rapid Transit (BRT) or Light Rail

Rapid Transit (LRT)) on King Street from McMaster University to Eastgate Square Transit terminal. The plan also includes policies related to goods movement, active transportation (AT) and transit to be considered in developing and improving infrastructure.

2.2 City of Hamilton

2.2.1 Urban Hamilton Official Plan

The Urban Hamilton Official Plan (UHOP) guides City Council in managing growth and development through interpretation of the intent of Provincial legislation and policies and providing a long term strategic policy framework. The UHOP includes a transportation network and related polices to serve planned growth, including TDM policies and programs to foster travel options and reduce traffic congestion in the City.

Schedule C (Functional Road Network) of the UHOP identifies Barton Street as Minor Arterial and Fifty Road as Major Arterial. A minor arterial road is designed to:

- Carry moderate volumes of intra-municipal traffic and inter-regional traffic through the City in association with other types of roads;
- Permit land access with some controls;
- Provide a basic minimum right-of-way width of 36.576 metres, unless otherwise specified;
- Be organized in a grid pattern with collectors, major and minor arterials, parkways, and Provincial highways;
- Include sidewalks on both sides of the street and provide bicycle lanes, where appropriate;
- Permit gateway features where required; and
- Prohibit, or at least restrict, on-street parking and loading in the peak hours.

A major arterial road is designed to:

- Carry relatively high volumes of intra-municipal and inter-regional traffic through the City in association with other types of roads;
- Permit controlled/restricted land access;
- Provide a basic maximum right-of-way width of 45.720 metres, unless otherwise specified;
- Include sufficient right-of-way widths for left turn lanes and right turn lanes at major intersections;
- Be organized in a grid pattern with collectors, other major and minor arterials, parkways, and Provincial highways;

- Include sidewalks on both sides of the street and provide bicycle lanes, where appropriate;
- Prohibit, or at least restrict, on-street parking and loading in the peak hours.

Schedule C2 (Future Road Widenings of the UHOP) identifies Barton Street from Nash Road to Fifty Road to have a right-of-way width of 36.576 metres and Fifty Road from Falcon Road to Ridge Road at 26.213 metres.

2.2.2 Stoney Creek Urban Boundary Expansion Area – Transportation Master Plan (Phases 1 and 2) Study Report

The 2008 Stoney Creek Urban Boundary Expansion Area (SCUBE) – Transportation Master Plan (Phases 1 and 2) Study Report provides a transportation strategy to accommodate planned growth in the Stoney Creek urban boundary expansion area resulting from Official Plan Amendments and the Provincial Places to Grow plan.

The SCUBE Transportation Master Plan concluded that no significant through lane capacity was required on Barton Street by 2021, but the road should be widened to a basic three-lane cross-section for operational reasons and to provide access to the adjacent low density, strip residential, commercial and industrial developments. The study recommended a centre two-way left turn lane at midblock driveways and local intersections and left-turn lanes at major intersections to increase capacity and improve road safety.

The SCUBE Transportation Master Plan recommended no improvements to Fifty Road by the 2021 horizon year. However, the study did identify a need to improve Fifty Road between Highway 8 and the QEW due to the possibly of higher order transit being extended east into Stoney Creek to a proposed transit terminal at Fifty Road and South Service Road. This recommendation is consistent with the 2007 Hamilton Transportation Master Plan which proposed widening this section of Fifty Road beyond 2021.

Three new collector roads were identified in the SCUBE Transportation Master Plan to connect with Barton Street: between Jones Road and Glover Road; between McNeilly Road and Lewis Road; and between Lewis Road and Winona Road. The study recommends a minimum right-of-way of 26 metres for the collector roads to provide wider lanes or separate facilities to accommodate cyclists and sidewalks on both sides of the street.

A local transit bus route on Barton Street was recommended to provide two-way service between the future transit terminal at Fifty Road and South Service Road and other parts of Hamilton. The SCUBE Transportation Master Plan sets a 12 percent transit modal split target, which would be achievable through implementation of transit priority infrastructure, transit supportive land uses, and system improvements elsewhere in the City intended to ensure an attractive level of transit service for the entire trip.

2.2.3 Gordon Dean Avenue Municipal Class Environmental Assessment (Phase 3 and 4)

In 2011, the City of Hamilton completed Phases 1 and 2 of a Class EA for Fruitland Road. The study recommended a new north-south road, east of the existing Fruitland Road between Highway 8 and Barton Street, to serve trucks travelling through the area. The new road, Gordon Dean Avenue, is proposed to connect with Barton Street opposite Sunnyhurst Avenue and intersect with Highway 8 at one of two locations.

The study has since resumed, with Phases 3 and 4 currently being conducted to establish the preferred design for Gordon Dean Avenue. The following configuration was presented to the public as the preliminary preferred design at an April 2017 open house:

- Two-lane cross-section with sidewalks and multi-use path;
- Curved horizontal alignment to reduce the impact to existing property; and
- Traffic signals or roundabout for traffic control at the intersection of Barton Street and Sunnyhurst Avenue/Gordon Dean Avenue.

3 Existing Transportation Conditions

3.1 Road Network

The main roadways within the Study Area include:

- **Barton Street** is an east-west minor arterial road identified in the City of Hamilton Urban Official Plan that extends from Locke Street North in the Harbour/Downtown Area in the west to Fifty Road in the east. Within the Study Area (from Fruitland Road to Fifty Road), Barton Street has posted speed limits of 50 km/h to 60 km/h, and features a rural cross-section, with one (1) travel lane per direction; and
- **Fifty Road** is a two lane, north-south major arterial road identified in the City of Hamilton Urban Official Plan that extends from the Lake Ontario shore south up the Niagara Escarpment to Ridge Road. There is a full interchange with the QEW at Fifty Road. Within the Study Area, Fifty Road has a rural cross-section and a posted speed limit of 60 km/h. Approximately 130 m south of its intersection with South Service Road, there is an at-grade rail crossing of the Canadian National Railway (CNR).

There are also several local roads and driveways that intersect with Barton Street and Fifty Road within the Study Area, including:

- **Fruitland Road** is a north-south minor arterial road that intersects Barton Street at a signalized intersection;
- **Jones Road** is a north-south collector road that intersects Barton Street with stop-control from the north-south movements;
- **Glover Road** is a north-south minor arterial that intersects Barton Street at an all-way stop control intersection;
- **McNeilly Road** is a north-collector road that intersects Barton Street at an all-way stop control intersection;
- **Lewis Road** is a north-collector road that intersects Barton Street at an all-way stop control intersection;
- **Winona Road** is a north-collector road that intersects Barton Street at an all-way stop control intersection;
- **South Service Road** is an east-west minor arterial road that intersects Fifty Road at an all-way stop control intersection; and
- **Highway 8 (Queenston Road)** is an east-west major arterial road that intersects with Fifty Road at a signalized intersection.

Figure 3.1 illustrates the existing lane configuration and traffic control at the nine (9) primary intersections within the Study Area. As noted above, the intersections of Barton Street at Fruitland Road and Fifty Road at Highway 8 are signalized. The intersections of Barton Street at Jones Road and Barton

Street at Fifty Road feature two-way stop control, while the remaining intersections are all-way stop control.

3.2 Transit and Active Transportation Network

3.2.1 Transit Network

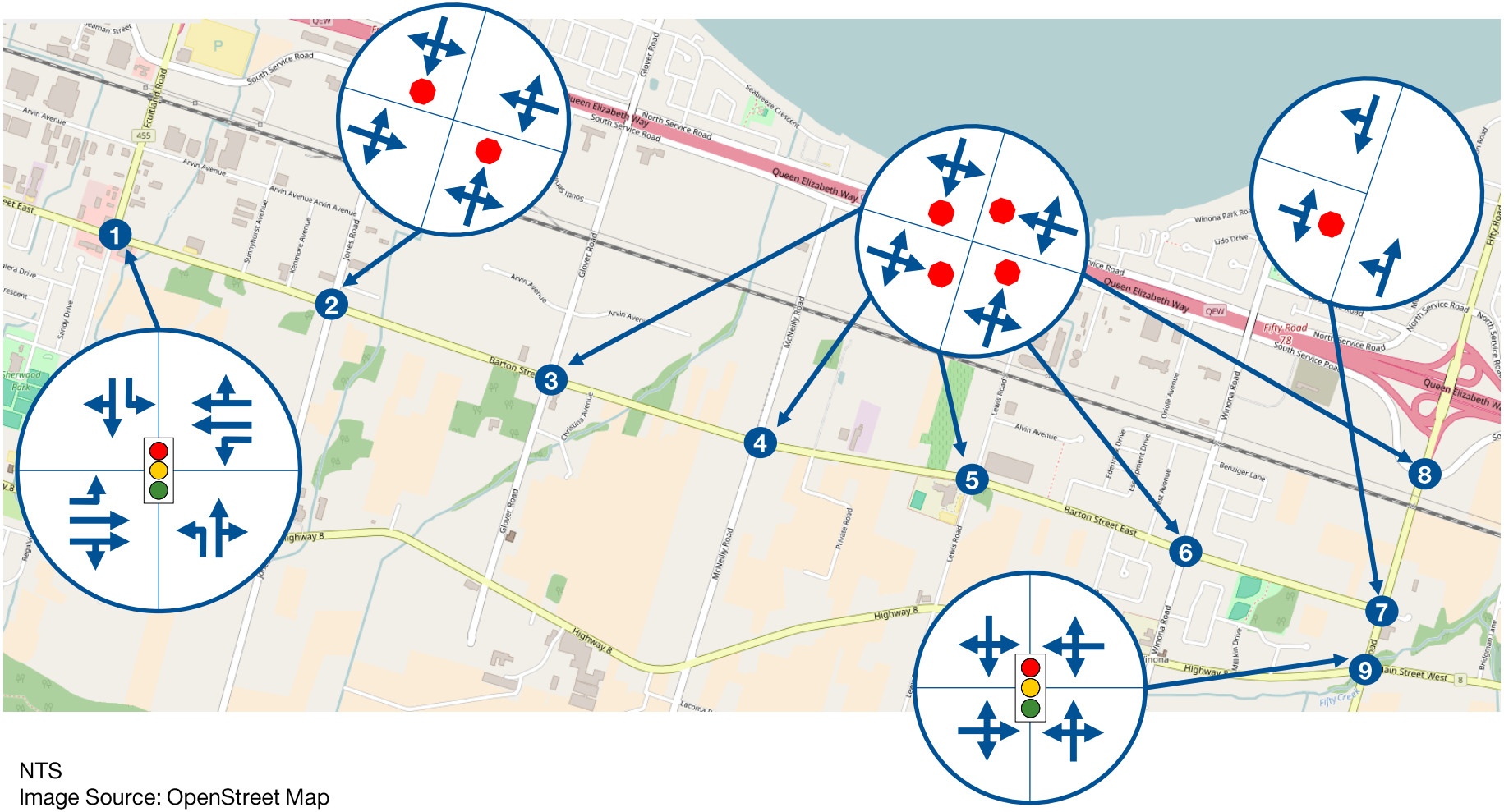
Hamilton Street Railway (HSR) currently operates one (1) bus route within the Study Area, Route 55 Stoney Creek Central. Route 55 travels east-west from the Eastgate Square Transit Terminal to Jones Road and Highway 8. There is limited service for eastbound buses from Jones Road at Barton Street and Barton Street and Fruitland Road. Service is provided 7 days a week from the early morning until after midnight. More specifically:

- Weekday service operates from approximately 5:00 AM to 1:30 AM with headways of generally 20 minutes;
- Saturday service operates from approximately 5:00 AM to 01:30 AM with headways of generally 20 minutes; and
- Sunday service operates from approximately 8:00 AM to 6:00 PM with headway of generally 20 minutes.

3.2.2 Active Transportation Network

Active transportation infrastructure within the Study Area consists of either asphalt or concrete sidewalks on either one side of Barton Street or both sides depending on location. Between Fruitland Road and Jones Road, an asphalt sidewalk runs along the south side of Barton Street. It switches to the north side between Jones Road and Glover Road. Between Glover Road and McNeilly Road, the sidewalk is on the south side of Barton Street, and again on the north side between McNeilly Road and Lewis Road. Just west of Lewis Road, there is a sidewalk on the south side of Barton Street that runs the length of the Winona Elementary School property. The asphalt sidewalk runs along the south side of Barton Street east of Lewis Road. It transitions to a concrete sidewalk at Tuscani Drive to Winona Road. East of Winona Road, the asphalt sidewalk continues along the south side of Barton Street to Fifty Road. On the north side, a concrete sidewalk is provided (with a few small sections of asphalt sidewalks) to the eastern property line of the St. Gabriel Catholic Elementary School.

There are no sidewalks on Fifty Road within the Study Area. There are no on-street bike lanes on Barton Street or Fifty Road within the Study Area.



NTS
Image Source: OpenStreet Map

paradigm TRANSPORTATION SOLUTIONS LIMITED

Existing Lane Configuration & Traffic Control

3.3 Traffic Volumes

3.3.1 Count Information

The City of Hamilton provided historic and their latest midblock and intersection traffic volumes for the Study Area intersections and roads. **Table 3.1** lists the dates of the turning movement counts at the nine (9) primary intersections. **Appendix A** provides the most recent traffic count data.

TABLE 3.1: STUDY AREA TURNING MOVEMENT COUNTS

Intersection	Latest Turning Movement Count
Barton Street at Fifty Road	March 8, 2016
Barton Street at Winona Road	February 19, 2016
Barton Street at Lewis Road	March 3. 2016
Barton Street at McNeilly Road	November 28, 2014
Barton Street at Glover Road	July 22, 2015
Barton Street at Jones Road	July 21, 2015
Barton Street at Fruitland Road	January 21, 2014
Fifty Road at Highway 8 (Queenston Road)	December 3, 2014
Fifty Road at South Service Road	October 15, 2015

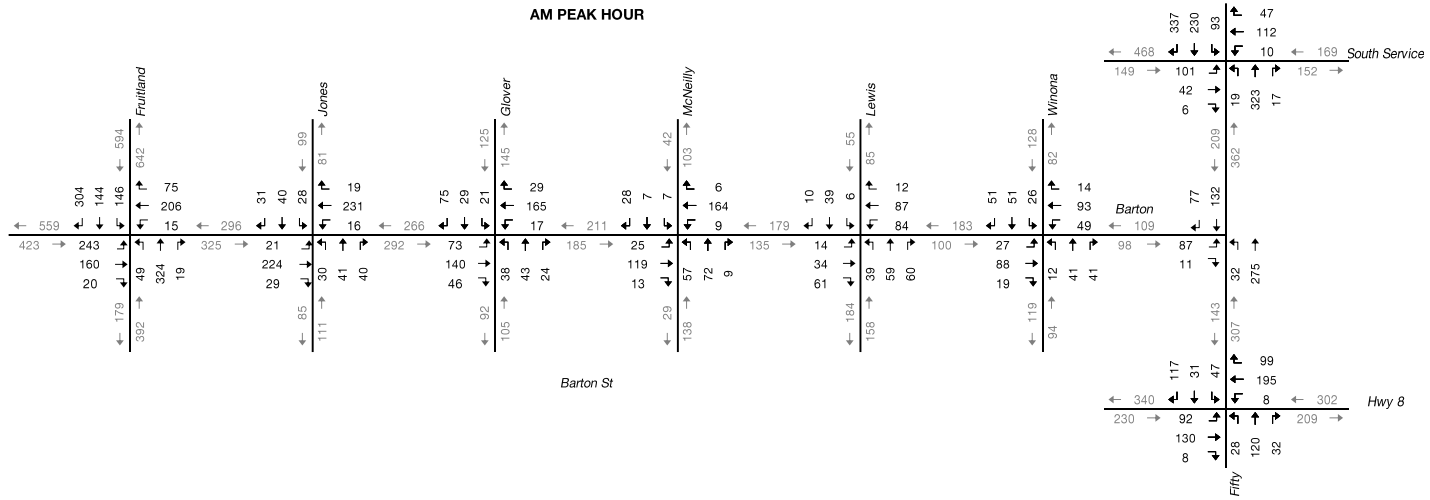
As shown in **Table 3.1,** the original data was collected over different years and times. As a result, observed traffic volumes were found to be inconsistent between intersections within the corridor. Recognizing this situation could adversely affect the analyses, the historic turning movement counts were utilized to determine a growth rate to obtain 2016 baseline traffic volumes.

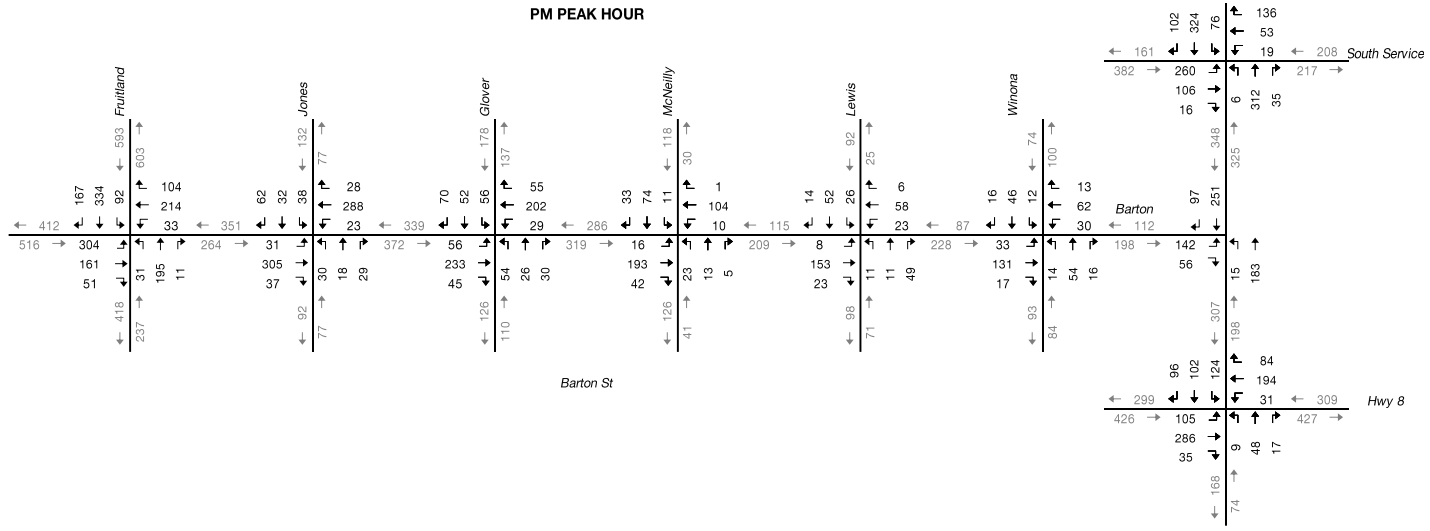
3.3.2 Intersection Traffic Volumes

Figure 3.2 shows the existing weekday AM and PM peak hour traffic volumes. Note that these volumes are not balanced due to the nature of the Study Area, which features numerous local roads and driveways intersecting the main roadways. Vehicles could be arriving and departing at widely different times during the peak hours, contributing to the inconsistencies between intersection volumes.

3.3.3 Midblock Traffic Volumes

Table 3.2 shows the midblock daily traffic volumes on Barton Street and Fifty Road. The daily volumes were derived from the base year PM peak hour traffic volumes shown in **Figure 3.2**. PM peak hour volumes were assumed to be 10 per cent of total daily traffic.





paradigm TRANSPORTATION SOLUTIONS LIMITED

Existing 2016 Traffic Volumes

Barton Street / Fifty Road Class EA, Hamilton
161250

Figure 3.2

TABLE 3.2: MIDBLOCK DAILY TRAFFIC VOLUMES

Road Section		Vehicles Per Day		
From	To	NB / EB	SB / WB	Two-Way AADT
Barton Street				
Fruitland Road	Jones Road	373	380	7,530
Jones Road	Glover Road	372	339	7,110
Glover Road	McNeilly Road	319	286	6,050
McNeilly Road	Lewis Road	209	115	3,240
Lewis Road	Winona Road	228	92	3,200
Winona Road	Fifty Road	198	112	3,100
Fifty Road				
South Service Road	Barton Street	353	359	7,120
Barton Street	Highway 8	237	322	5,590

3.4 Traffic Operations

3.4.1 Midblock Analysis

Table 3.3 and **Table 3.4** show the existing 2016 peak direction midblock volume to capacity (v/c) ratios for Barton Street and Fifty Road respectively, based on the traffic volumes shown in **Figure 3.2**.

During the weekday AM peak hour, the highest v/c ratios on Barton Street occur between Fruitland Road and Jones Road in the eastbound direction with a v/c ratio of 0.36. The highest v/c ratios on Fifty Road occur between Barton Street and South Service Road in the northbound direction with a v/c ratio of 0.40.

In the weekday PM peak hour, the highest v/c ratios on Barton Street occur between Fruitland Road and Jones Road in the westbound direction with a v/c ratio of 0.42. The highest v/c ratios on Fifty Road occur between Barton Street and South Service Road in the southbound direction with a v/c ratio of 0.40.

TABLE 3.3: EXISTING (2016) MIDBLOCK CAPACITY ANALYSIS – BARTON STREET

Road Section		AM Peak Hour		PM Peak Hour	
From	To	Volume	v/c Ratio	Volume	v/c Ratio
Eastbound					
Fruitland	Jones	325	0.36	373	0.41
Jones	Glover	292	0.32	372	0.41
Glover	McNeilly	185	0.21	319	0.35
McNeilly	Lewis	135	0.15	209	0.23
Lewis	Winona	134	0.15	228	0.25
Winona	Fifty	155	0.17	198	0.22
Westbound					
Fruitland	Jones	335	0.37	380	0.42
Jones	Glover	278	0.31	339	0.38
Glover	McNeilly	249	0.28	286	0.32
McNeilly	Lewis	179	0.20	115	0.13
Lewis	Winona	183	0.20	92	0.10
Winona	Fifty	156	0.17	112	0.12

TABLE 3.4: EXISTING (2016) MIDBLOCK CAPACITY ANALYSIS – FIFTY ROAD

Road Section		AM Peak Hour		PM Peak Hour	
From	To	Volume	v/c Ratio	Volume	v/c Ratio
Southbound					
South Service	Barton	246	0.27	359	0.40
Barton	Highway 8	195	0.22	322	0.36
Northbound					
South Service	Barton	362	0.40	353	0.39
Barton	Highway 8	311	0.35	237	0.26

3.4.2 Intersection Analysis

Table 3.5 shows the existing intersection operations based on the traffic volumes provided in **Figure 3.2**. The table denotes the existing level of service (LOS), v/c ratios, and 95th percentile queue lengths experienced on roads within the Study Area for the AM and PM peak hours.

TABLE 3.5A: EXISTING (2016) INTERSECTION OPERATIONS SUMMARY (AM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Barton Street at Fruitland Road	TCS	LOS Delay V/C Q Ex Avail.	B 15 0.62 55 40 -15	B 10 0.13 14		**B 13**	A 10 0.04 5 35 30	B 11 0.20 19		**B 11**	B 13 0.26 13 35 -22	B 15 0.54 26		**B 15**	B 16 0.51 11 40 29	B 17 0.64 23		**B 17**	**B 14**
	Fifty Road at Highway 8	TCS	LOS Delay V/C Q		A 10 0.50 25		**A 10**		A 9 0.47 26		**A 9**		A 10 0.36 22		**A 10**		A 10 0.31 17		**A 10**	**A 9**
	Barton Street at Jones Road	TWSC	LOS Delay V/C Q		A 1 0.02 1		**A 1**		A 1 0.01 0		**A 1**		C 17 0.28 9		**C 17**		C 17 0.25 8		**C 17**	**5**
	Barton Street at Glover Road	AWSC	LOS Delay V/C Q		B 11 0.39		**B 11**		B 11 0.33		**B 11**		A 10 0.17		**A 10**		A 10 0.20		**A 10**	**B 11**
	Barton Street at McNeilly Road	AWSC	LOS Delay V/C Q		A 9 0.23		**A 9**		A 9 0.26		**A 9**		A 9 0.21		**A 9**		A 8 0.06		**A 8**	**A 9**
	Barton Street at Lewis Road	AWSC	LOS Delay V/C Q		A 9 0.15		**A 9**		A 10 0.26		**A 10**		A 9 0.22		**A 9**		A 8 0.08		**A 8**	**A 9**
	Barton Street at Winona Road	AWSC	LOS Delay V/C Q		A 9 0.19		**A 9**		A 9 0.23		**A 9**		A 9 0.14		**A 9**		A 9 0.18		**A 9**	**A 9**
	Barton Street at Fifty Road	TWSC	LOS Delay V/C Q	B 14 0.22 6			**B 14**						A 1 0.03 1		**A 1**		A 0 0.13 0		**A 0**	**3**
	Fifty Road at South Service Road	AWSC	LOS Delay V/C Q		C 15 0.36		**C 15**		B 15 0.38		**C 16**		C 24 0.71		**C 24**		F 123 1.19		**F 123**	**F 71**

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
Ex. - Existing Available Storage
Avail. - Available Storage

TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control

RBT - Roundabout

TABLE 3.5B: EXISTING (2016) INTERSECTION OPERATIONS SUMMARY (PM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
PM Peak Hour	Barton Street at Fruitland Road	TCS	LOS Delay V/C Q Ex Avail.	C 24 0.78 82 40 -42	B 12 0.14 14		**B** **19**	B 11 0.08 8 35 27	B 12 0.20 19		**B** **12**	B 13 0.17 9 35 -26	B 14 0.31 36		**B** **14**	B 13 0.22 19 40 21	C 21 0.75 95		**C** **20**	**B** **17**
	Fifty Road at Highway 8	TCS	LOS Delay V/C Q		B 14 0.70 54		**B** **14**		A 10 0.45 31		**A** **10**		B 11 0.12 13		**B** **11**		B 17 0.67 68		**B** **17**	**B** **14**
	Barton Street at Jones Road	TWSC	LOS Delay V/C Q		A 1 0.03 1		**A** **7**		A 1 0.02 1		**A** **1**		C 21 0.28 9		**C** **22**		C 21 0.38 13		**C** **21**	**5**
	Barton Street at Glover Road	AWSC	LOS Delay V/C Q		C 15 0.56		**C** **15**		B 14 0.49		**B** **14**		B 11 0.21		**B** **11**		B 12 0.33		**B** **12**	**B** **14**
	Barton Street at McNeilly Road	AWSC	LOS Delay V/C Q		A 10 0.34		**A** **10**		A 9 0.16		**A** **9**		A 9 0.06		**A** **9**		A 9 0.17		**A** **9**	**A** **9**
	Barton Street at Lewis Road	AWSC	LOS Delay V/C Q		A 9 0.25		**A** **9**		A 8 0.12		**A** **8**		A 8 0.09		**A** **8**		A 8 0.13		**A** **8**	**A** **9**
	Barton Street at Winona Road	AWSC	LOS Delay V/C Q		A 9 0.24		**A** **9**		A 8 0.15		**A** **8**		A 8 0.12		**A** **8**		A 8 0.10		**A** **8**	**A** **9**
	Barton Street at Fifty Road	TWSC	LOS Delay V/C Q	C 16 0.40 15			**C** **16**						A 1 0.01 0		**A** **1**		A 0 0.22 0		**A** **0**	**5**
	Fifty Road at South Service Road	AWSC	LOS Delay V/C Q		F 64 0.97		**F** **64**		C 23 0.56		**C** **23**		E 50 0.89		**E** **50**		F 159 1.26		**F** **159**	**F** **88**

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
Ex. - Existing Available Storage
Avail. - Available Storage

TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control

RBT - Roundabout

All intersections within the Study Area currently operate with overall acceptable levels of service during the AM and PM peak hours, except for the intersection of Fifty Road and South Service Road. During the AM and PM peak hours, this intersection operates with overall LOS F. In the AM peak hour, the southbound shared left-through-right turn movement operates with LOS F and v/c ratio exceeding 1.0. In the PM peak hour: the eastbound shared left-through-right turn movement operates with LOS F and v/c ratio of 0.97; the southbound shared left-through-right turn movement operates with LOS F and v/c ratio exceeding 1.0; and the northbound shared left-through-right turn movement operates with LOS E and v/c ratio of 0.89.

3.4.3 Traffic Control Signal Justification

The unsignalized intersection of Fifty Road and South Service Road was analyzed to determine if traffic signal control is justified under existing conditions due to the congestion experienced by the eastbound and southbound movements during the AM and PM peak hours. The warrant analysis is based on the methodologies contained in Book 12 of the Ontario Traffic Manual – Traffic Signals (OTM Book 12)[1]. For an existing intersection with existing traffic volumes, a traffic signal is warranted if Justification 1 (both 1A and 1B) or Justification 2 (both 2A and 2B) is 100 per cent satisfied. If 100 per cent satisfaction is not achieved, but the justifications are at least 80 per cent satisfied, then the lesser value of both justifications (A or B) can be used in Justification 3, a combination of volume and delay.

According to OTM Book 12, each of the eight (8) highest hourly volumes in the warrant analysis must meet the compliance threshold values for traffic control signals to be fully justified at either 100 per cent for Justification 1 and 2, or 80 per cent satisfaction for Justification 3. For this analysis, the traffic count data for the two (2) intersections found in **Appendix A** were used.

Appendix C provides the detailed traffic signal warrant analyses completed for the intersection, which indicate that warrants are met for existing conditions at the intersection of Fifty Road and South Service Road:

- Justification 1 (Minimum Vehicle Volume) – Justification 1A is 100 per cent satisfied, while Justification 1B is 100 per cent satisfied.
- Justification 2 (Delay to Cross Traffic) – Justification 2A is 100 per cent satisfied, while Justification 2B is 100 per cent satisfied.

It should be noted that traffic signals are recommended for the intersection of Fifty Road and South Service Road with the development of the Winona Crossing commercial centre. In addition to traffic signal installation, the QEW

[1] Ontario Traffic Manual Book 12, Ministry of Transportation of Ontario, July 2001

at Fifty Road Multi-Use Centre Traffic Impact Study[2], recommended the following geometric improvements:

- Southbound exclusive channelized right turn lane;
- Second eastbound left turn lane, creating an eastbound double left on South Service Road,
- An additional northbound receiving lane to accommodate traffic from the eastbound double left; and
- An additional northbound auxiliary lane on the south leg to maintain lane balance through the intersection. The lane configuration in the northbound direction will become left turn lane, through lane, and through-right turn lane.

The improvements noted in the TIS for the Winona Centre development were assumed in place for the future traffic analysis presented in **Section 4**.

3.5 Road Safety

The analysis summarized in this section is based on midblock and intersection collision data provided by the City of Hamilton for the years 2006 to 2015 for Barton Street and Fifty Road.

3.5.1 Midblock Analysis

Table 3.6 summarizes the collisions by impact type and direction for each midblock segment of the two roads. As some segments experienced very few collisions, all 37 midblock collisions were analyzed together for the Study Area.

Figure 3.3 shows a summary of the midblock collisions. Most collisions occurred in clear environment conditions (70%) and on dry roads (65%). Only 19% of the collisions occurred while it was raining, and 22% occurred on a wet roadway. Additionally, 11% of the collisions occurred during the winter under the following environment and road surface conditions:

- Environment: Snowing: 11%
- Road surface: Loose snow: 5%, Ice: 3%, Slush: 3%

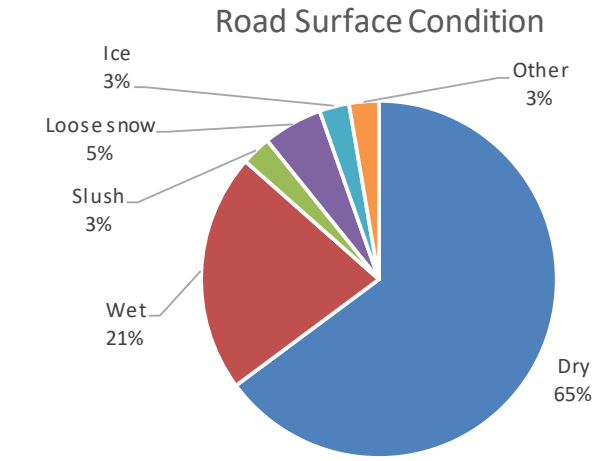
Most collisions were classified as non-fatal injuries (59%). A few (38%) caused property damage only, and one (1) collision (3%) was coded as fatal injury. The most common collision types were single motor vehicle (51%), rear end (11%), and approaching (11%).

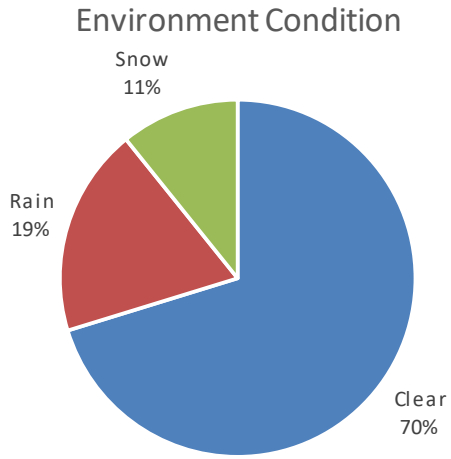
[2] QEW at Fifty Road Multi-Use Centre Traffic Impact Study, Delcan Corporation, July 2012

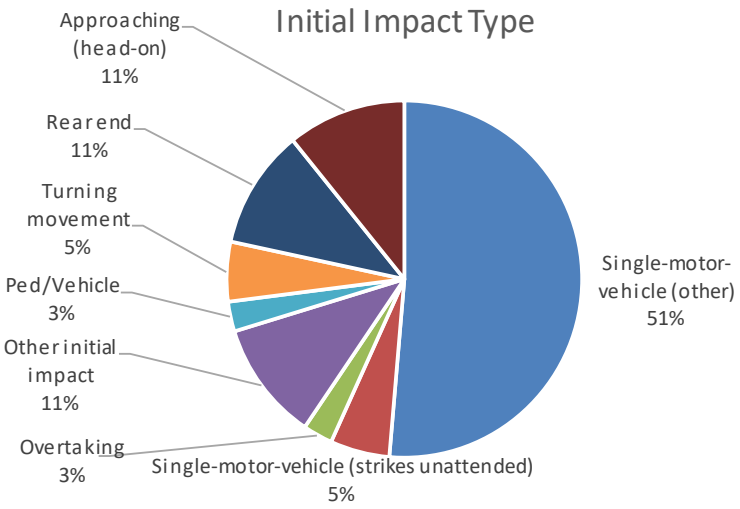
TABLE 3.6: MIDBLOCK COLLISIONS (2006 – 2015)

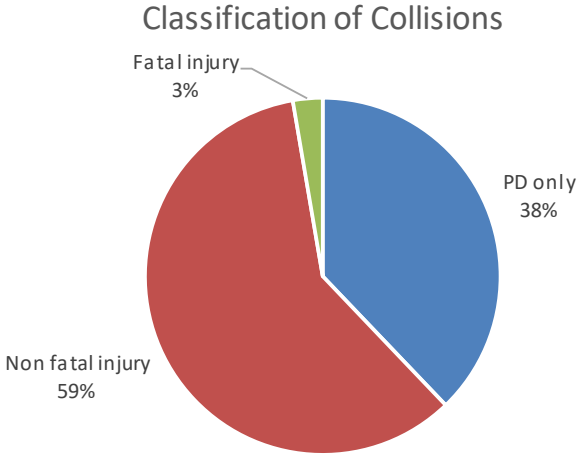
Section Limits	Impact Type	Number of Collisions
Barton Street		
East of Fruitland Road to Jones Road	Single motor vehicle (other)	6
	Single motor vehicle (strikes unattended)	2
	Overtaking	1
	Other initial impact	2
	Pedestrian	1
	Total	**12**
Jones Road to Glover Road	Single motor vehicle (other)	2
	Turning movement	1
	Other initial impact	1
	Total	**4**
Glover Road to McNeilly Road	Single motor vehicle (other)	6
	Turning movement	1
	Total	**7**
McNeilly Road to Lewis Road	Single motor vehicle (other)	1
	Approaching (head-on)	1
	Total	**2**
Lewis Road to Winona Road	Single motor vehicle (other)	1
	Approaching (head-on)	1
	Total	**2**
Winona Road to west of Fifty Road	Single motor vehicle (other)	1
	Approaching (head-on)	2
	Rear-end	3
	Other initial impact	1
	Total	**7**
Fifty Road		
South of South Service Road to Barton Street	Single motor vehicle (other)	2
	Rear-end	1
	Total	**3**
Barton Street to north of Highway 8	No collision information provided	

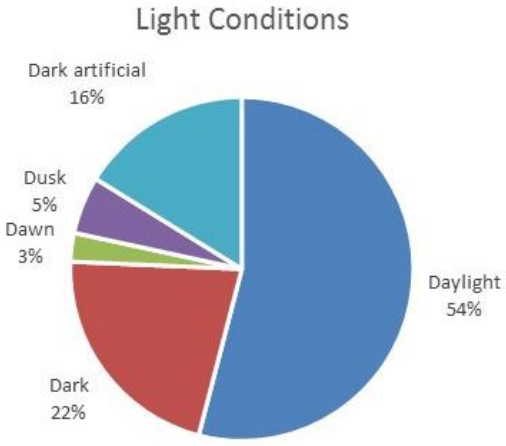
Most collisions occurred during daylight (54%), with other collisions occurring in dark conditions (22%), with or without artificial lighting (16%), and at dawn (3%) or dusk (5%). Most collisions occurred over night (32% between 19:00 and 06:00) and during the PM peak period (30% between 15:00 and 19:00). The other collisions occurred mostly during the off-peak daytime period (22% between 09:00 and 15:00), while a few collisions occurred during the AM peak period (16% between 06:00 and 09:00).

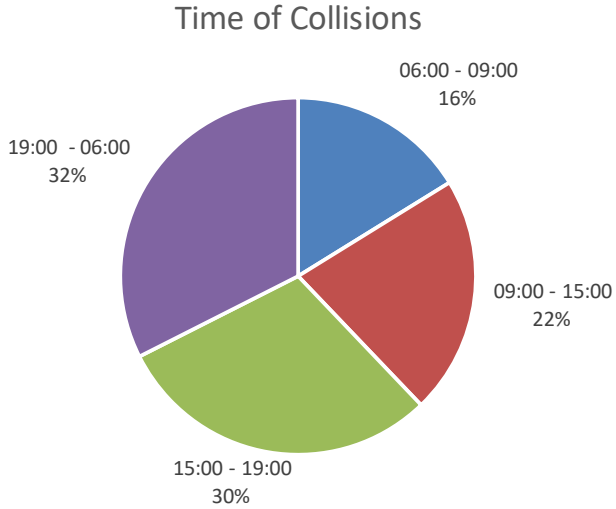












paradigm TRANSPORTATION SOLUTIONS LIMITED

Midblock Collision Analysis Summary

Barton Street / Fifty Road Class EA, Hamilton
161250

Figure 3.3

3.5.2 Intersection Analysis

Table 3.7 summarizes the collisions by impact type and direction for each intersection in the Study Area. Of note:

Barton Street and Fruitland Road

Most collisions occurred in clear conditions (91%) and on dry roads (77%). Only 23% occurred in raining conditions or on wet roadways. Winter conditions were present in only one (1) of the collisions (5%) with wet road surface.

Most collisions were classified as property damage only (55%). The remainder (45%) caused non-fatal injuries. The most common impact types were turning movement (36%), rear-end (18%), angled (18%), and single motor vehicle (18%).

Most collisions occurred during daylight conditions (68%). The remaining collisions occurred in dark conditions (18%), and with or without artificial lighting (14%). Most collisions occurred during the off-peak daytime period (55%, 09:00-15:00) and were then equally divided between the PM peak period (23%, 15:00-19:00) and evening/night (23%, (19:00-06:00). No collisions were reported for the AM peak period (06:00-09:00).

Barton Street and Jones Road

A total of four (4) collisions were recorded at the intersection of Barton Street and Jones Road for the study period. All four (4) collisions (100%) occurred in clear conditions with three (3) on dry roads (75%), and one (1) on a wet road (25%).

All four (4) collisions were classified as non-fatal injury. The impact type was turning movement for two (2) collisions and angled for two (2) collisions.

Three (3) collisions occurred during daylight conditions (75%) and the remaining collision occurred under dusk with or without artificial lighting. Two (2) collisions occurred during the AM peak period (50%, 06:00-09:00), one (1) collision occurred during the off-peak daytime period (25%, 09:00-15:00), and one (1) collision occurred during the PM peak period (25%, 15:00-19:00).

TABLE 3.7: INTERSECTION COLLISIONS (2006 – 2015)

Intersecting Roadway	Impact Type	Number of Collisions
Barton Street		
Fruitland Road	Pedestrian	2
	Turning movement	8
	Single motor vehicle (other)	4
	Angled	4
	Rear-end	4
	Total	**22**
Jones Road	Turning movement	2
	Angled	2
	Total	**4**
Glover Road	Angled	9
	Turning movement	1
	Single motor vehicle (other)	1
	Overtaking	1
	Total	**12**
McNeilly Road	Angled	1
	Single motor vehicle (other)	1
	Other	1
	Total	**3**
Lewis Road	Turning movement	5
	Other	1
	Total	**6**
Winona Road	Turning movement	1
	Angled	2
	Single motor vehicle (strikes unattended)	1
	Total	**4**
Fifty Road		
South Service Road	Angled	15
	Single motor vehicle (other)	1
	Rear-end	1
	Side swipe (same direction)	1
	Turning movement	1
	Total	**19**
Highway 8	Single motor vehicle (other)	1
	Turning movement	2
	Angled	1
	Total	**4**

Barton Street and Glover Road

Most collisions occurred in clear conditions (92%) and on dry roads (92%). Only 8% occurred in raining conditions or on wet roadways.

Most collisions were classified as non-fatal injuries (67%). The remainder (33%) caused property damage only. The most common impact types were angled (75%), turning movement (8%), single motor vehicle (8%), and overtaking (8%).

Most collisions occurred during daylight conditions (58%). The remaining collisions occurred in dark conditions (17%), dusk (8%), dark with or without artificial lighting (8%), and dusk with or without artificial lighting (8%). Most collisions occurred during the off-peak daytime period (42%, 09:00-15:00), then the PM peak period (25%, 15:00-19:00). The AM peak period (06:00-09:00) and evening/night period (19:00-06:00) both reported two (2) collisions (17%).

Barton Street and McNeilly Road

A total of three (3) collisions were recorded at the intersection of Barton Street and McNeilly Road for the study period. All three (3) collisions (100%) occurred in clear conditions with three (2) on dry roads (67%), and one (1) on a wet road (33%).

Two (2) collisions were classified as personal damage only and one (1) collision was classified as non-fatal injury. The impact type reported was angled for one (1) collision, single motor vehicle for one (1) collision, and other for one (1) collision.

Two (2) collisions occurred during daylight conditions (67%) and the remaining collision occurred under dusk conditions. Two (2) collisions occurred during the PM peak period (67%, 15:00-19:00), and one (1) collision occurred during the off-peak daytime period (33%, 09:00-15:00).

Barton Street and Lewis Road

A total of six (6) collisions were recorded at the intersection of Barton Street and Lewis Road for the study period. Five (4) collisions occurred in clear (83%) conditions with four (4) on dry roads (67%), one (1) on a wet road (17%), and one (1) on loose snow (17%).

Two (2) collisions were classified as personal damage only and four (4) collisions were classified as non-fatal injury. The impact type reported were turning movement for five (5) collisions, and other for one (1) collision.

Three (3) collisions occurred during daylight conditions (50%), two (2) collisions occurred under dark (33%) conditions, and the remaining collision occurred under dark with or without artificial lighting conditions. Two (2) collisions occurred during the PM peak period (33%, 15:00-19:00), two (2) collisions occurred during the off-peak daytime period (33%, 09:00-15:00),

and two collisions occurred during the evening/night period (33%, 19:00-06:00).

Barton Street and Winona Road

A total of four (4) collisions were recorded at the intersection of Barton Street and Winona Road for the study period. All four (4) collisions (100%) occurred in clear conditions with all four (4) on dry roads.

Two (2) collisions were classified as non-fatal injury and two (2) collisions classified as property damage only. The impact type was angled for two (2) collisions, angled for one (1) collision, and single motor vehicle for one (1) collision.

All four (4) collisions occurred during daylight conditions and during the PM peak period (15:00-19:00).

Barton Street and Fifty Road

A total of three (3) collisions were recorded at the intersection of Barton Street and Fifty Road for the study period. All three (3) collisions (100%) occurred in clear conditions and on dry roads.

All three (3) collisions were classified as non-fatal injury. Three (3) different impact types were reported, rear end, angled, and single motor vehicle.

Three (3) collisions occurred during daylight conditions and one (1) collision occurred under dark conditions. One (1) collision was reported in each of the AM peak period (06:00-09:00), PM peak period (15:00-19:00) and evening/night period (19:00-06:00).

Fifty Road and South Service Road

Most collisions occurred in clear conditions (65%) and on dry roads (74%). Only 26% occurred in raining conditions or on wet/icy roadways. Fog, mist, smoke, or dust accounted for only one (1) of the collisions (5%).

Most collisions were classified as non-fatal injuries (53%). The remainder (47%) were property damage only. The most common impact types were angled (80%), rear-end (5%), turning movement (5%), side-swipe (5%), and single motor vehicle (5%).

Most collisions occurred during daylight conditions (79%). The remaining collisions occurred at dawn (11%), dusk (5%), and dark with or without artificial lighting (5%). Most collisions occurred during the off-peak daytime period (37%, 09:00-15:00), then PM Peak period (32%, 15:00-19:00), AM peak period (26%, 06:00-09:00), and evening/night (5%, 19:00-06:00).

Fifty Road and Highway 8

A total of four (4) collisions were recorded at the intersection of Fifty Road and Highway 8 for the study period. All four (4) collisions (100%) occurred in clear conditions with three (3) on a dry road and one (1) on wet road.

Three (3) collisions were classified as non-fatal injury and one (1) collision classified as property damage only. Two (2) collisions were reported as turning movement, one (1) collision reported as angled, and one (1) collision reported as single motor vehicle impact types.

Three (3) collisions occurred during daylight conditions and one (1) collision occurred under dusk conditions. Two (2) collisions were reported in the PM peak period (15:00-19:00) and one (1) collision each in the AM peak period (06:00-09:00) and evening/night period (19:00-06:00).

3.5.3 Trends and Proposed Countermeasures

The collision analysis presented above identified the following:

Midblock

Single motor vehicle was the most common collision type observed midblock. This trend is consistent with the current two-lane rural road configuration for Barton Street and Fifty Road. The provision of the centre left-turn lane and streetlighting will help to address this collision trend.

Intersection

Turning movement and angled were the most common collision types observed at intersections. The provision of the centre left-turn lane and auxiliary turn lanes at intersections will help to address this collision trend.

4 Future Transportation Conditions

4.1 Network Assumptions

The analysis of future transportation conditions assumed the existing road network configuration with the following changes:

- Installation of traffic control signals and construction of geometric improvements at the intersection of Fifty Road and South Service Road, as recommended in the QEW and Fifty Road Multi-Use Centre Traffic Impact Study, July 2012 prepared by Delcan Corporation; and
- Construction of the proposed north-south collector road east of Fruitland Road, known as Gordon Dean Avenue.

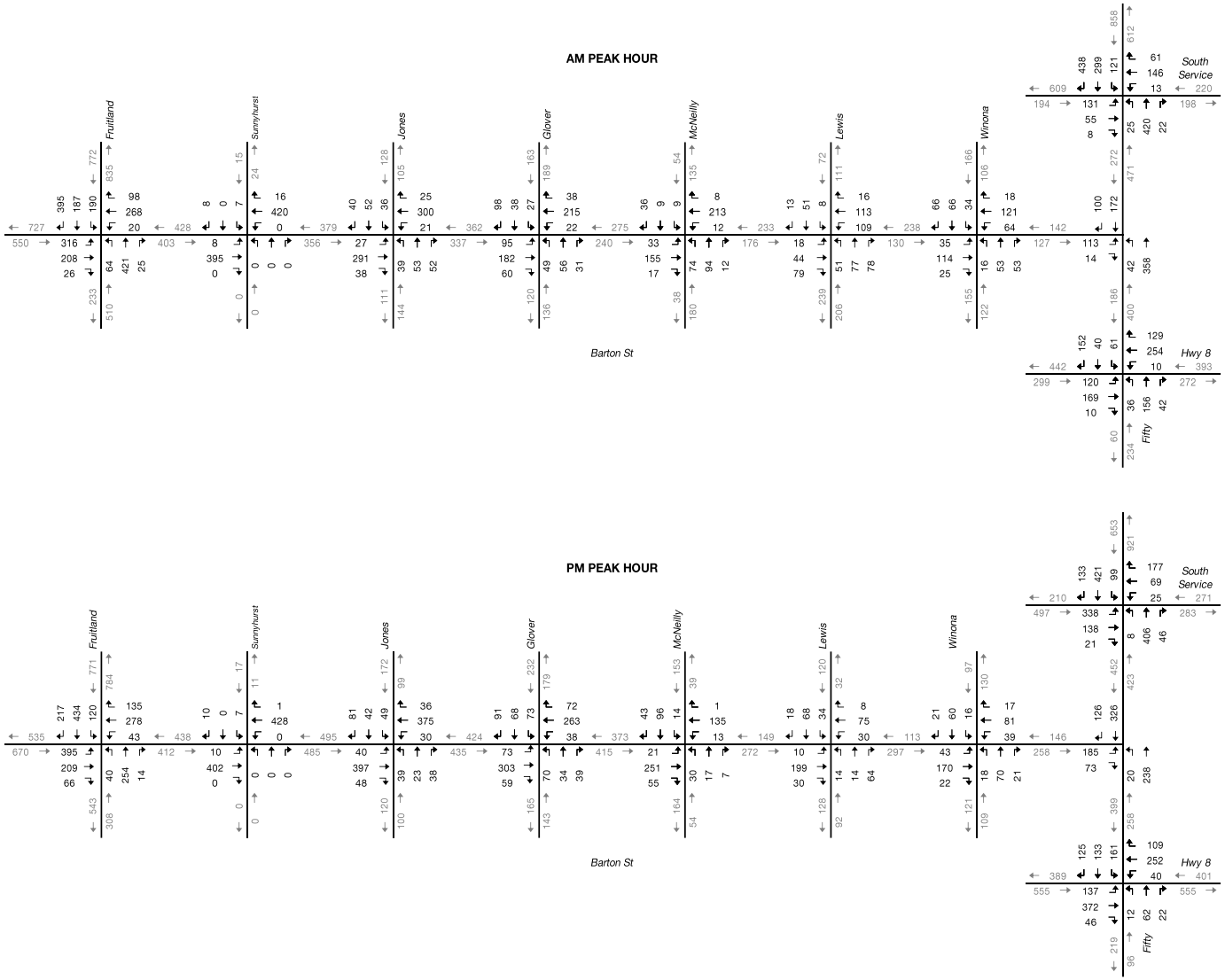
4.2 Traffic Forecasts

The analysis of future midblock and intersection traffic conditions for the 2031 horizon year is dependent upon forecasted traffic volumes for intersections and roads within the Study Area. Future traffic volumes were determined by applying a background growth factor to existing counts, adding traffic generated by proposed development near the Study Area, and subtracting future trips potentially diverted to other modes. The methodology is described in further detail in the sections that follow.

4.2.1 Background Traffic Growth

A background growth rate of 1.77 per cent per annum was used to forecast future volumes on Study Area roads. This growth rate was derived principally from the GRID Population and Employments forecasts for Stoney Creek, and verified based on the City's travel demand forecasting model, historic traffic counts, and anticipated development patterns. The factor accounts for general increases in background traffic on the Study Area road network due to planned development outside the immediate area. Traffic generation attributed to development within the Study Area is captured in Section 4.2.2 below.

Figure 4.1 shows the 2031 AM and PM peak hour forecast traffic volumes based on the background growth rate.



Future (2031) Background Growth Traffic Volumes

Figure 4.1

4.2.2 Development Traffic

Traffic generated by the following four (4) planned developments in or near the Study Area have been included in the future traffic forecast:

- Fruitland Secondary Plan Traffic Impact Study, GHD, 21 October 2016;
- QEW and Fifty Road Multi-Use Centre Traffic Impact Study, Delcan Corporation, July 2012 (now known as the Winona Crossing commercial development), which was an update to a previous 2009 study;
- Commercial Development Winona Road Traffic Impact Study, C.F. Crozier and Associates Inc., August 2014; and
- Block 1 Fruitland-Winona Secondary Plan Area, Transportation Phasing Assessment, Paradigm Transportation Solutions Limited, February 2-18, which was an update to a previous September 2017 study.

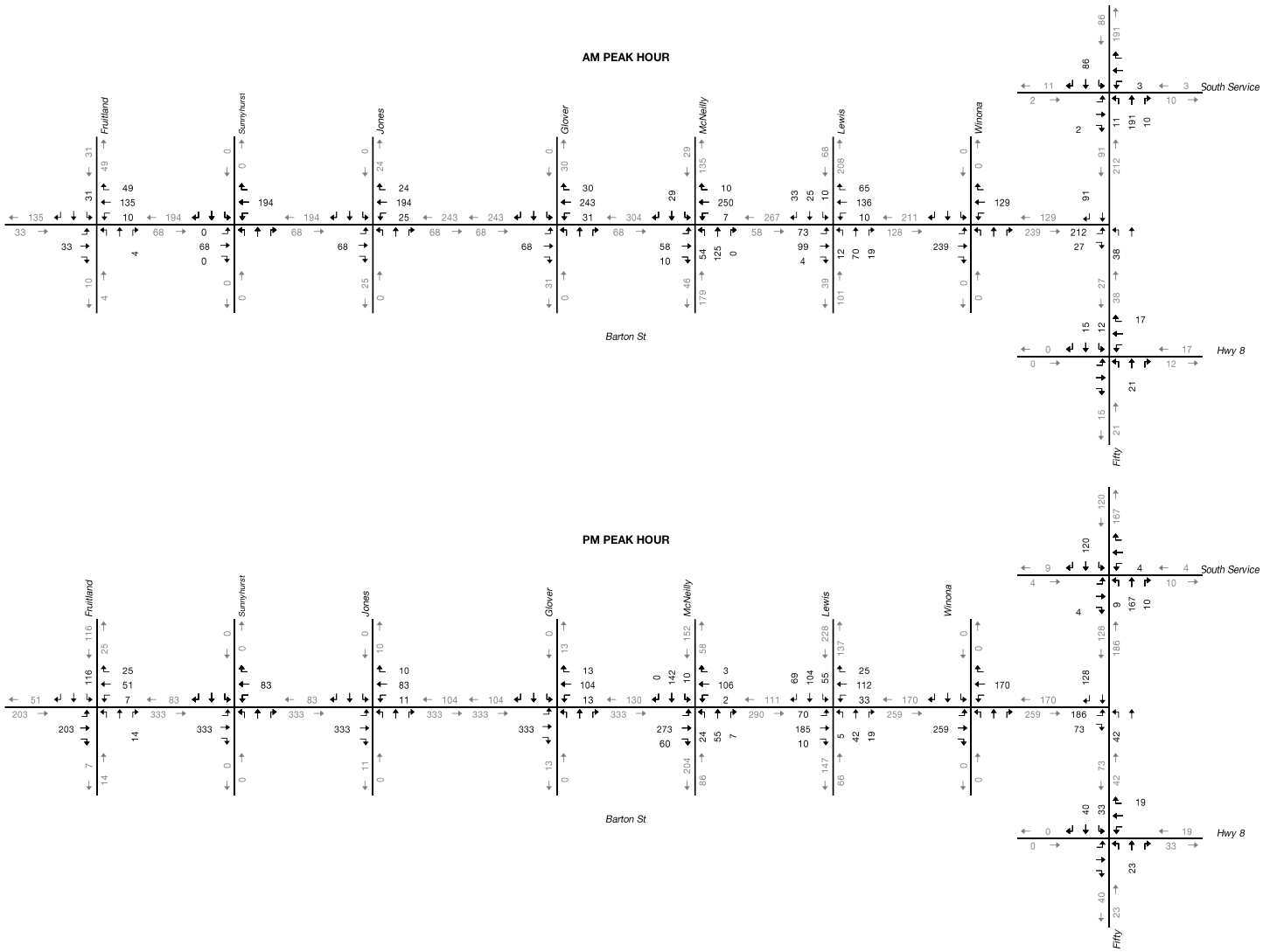
Figure 4.2 to **Figure 4.5** show the AM and PM peak hour traffic volumes generated by the Fruitland Secondary Plan, the Winona Crossing development, the Winona Road commercial development and the Block 1 Fruitland-Winona Secondary Plan Area, respectively, that utilize the roads in the Study Area.

4.2.3 Trip Reductions

Trip reductions were applied to account for increased future use of transit and active transportation modes for travel in the Study Area. The City of Hamilton Transportation Master Plan sets overall modal share targets of 12 per cent for public transit for the year 2031. Although these trip reductions may be overly optimistic, a less ambitious non-auto mode share assumption of 6% was used in the traffic volumes forecast for the Study Area to provide a conservative future traffic demand forecast.

4.3.4 Forecasted 2031 Traffic Volumes

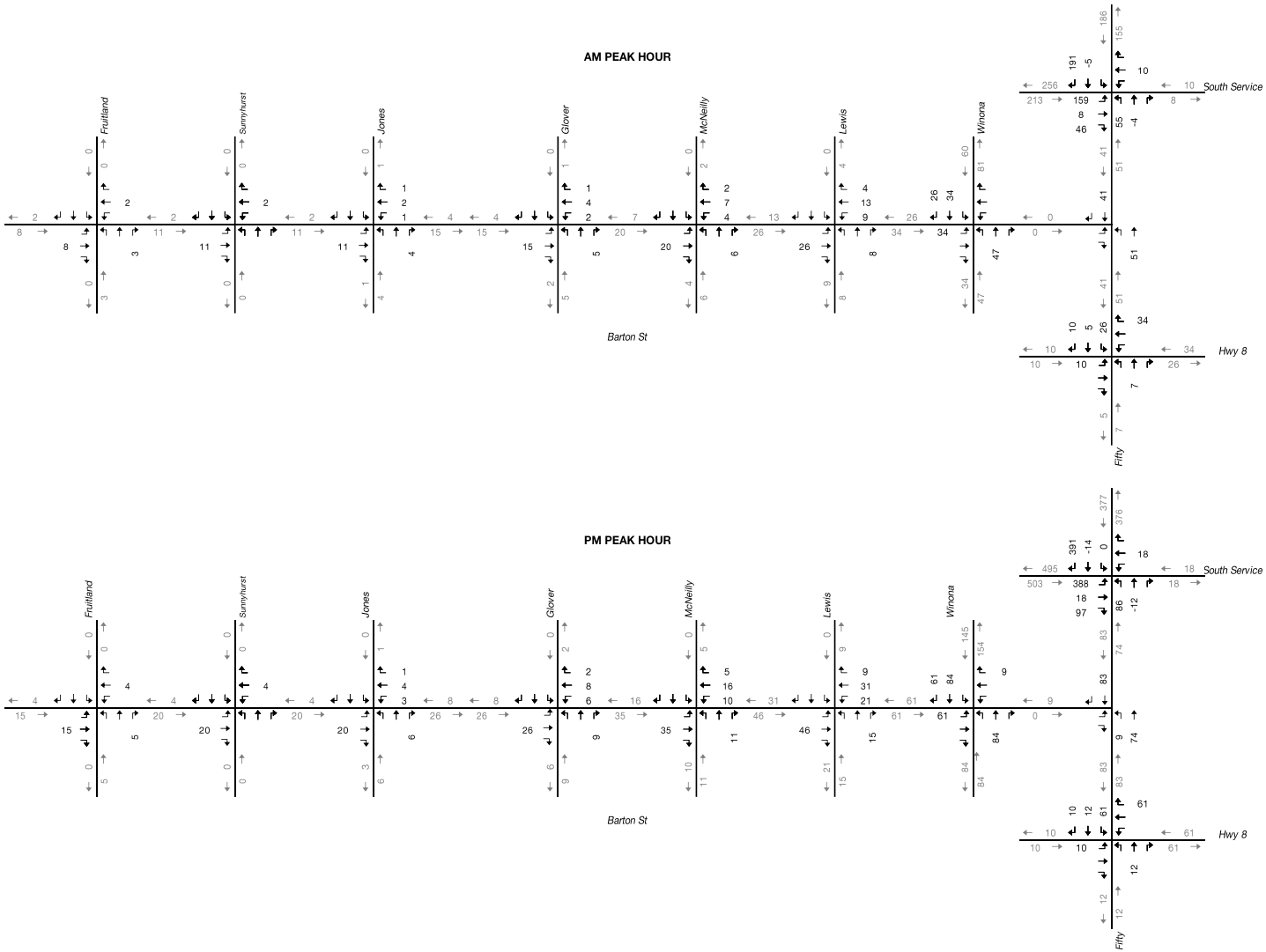
Figure 4.6 shows the forecasted 2031 AM and PM peak hour traffic volumes for the Study Area, comprised of background growth, new development-generated travel and trip reductions. These volumes provided the basis for the future operations analyses.



Fruitland Secondary Plan Traffic Volumes

Barton Street / Fifty Road Class EA, Hamilton
161250

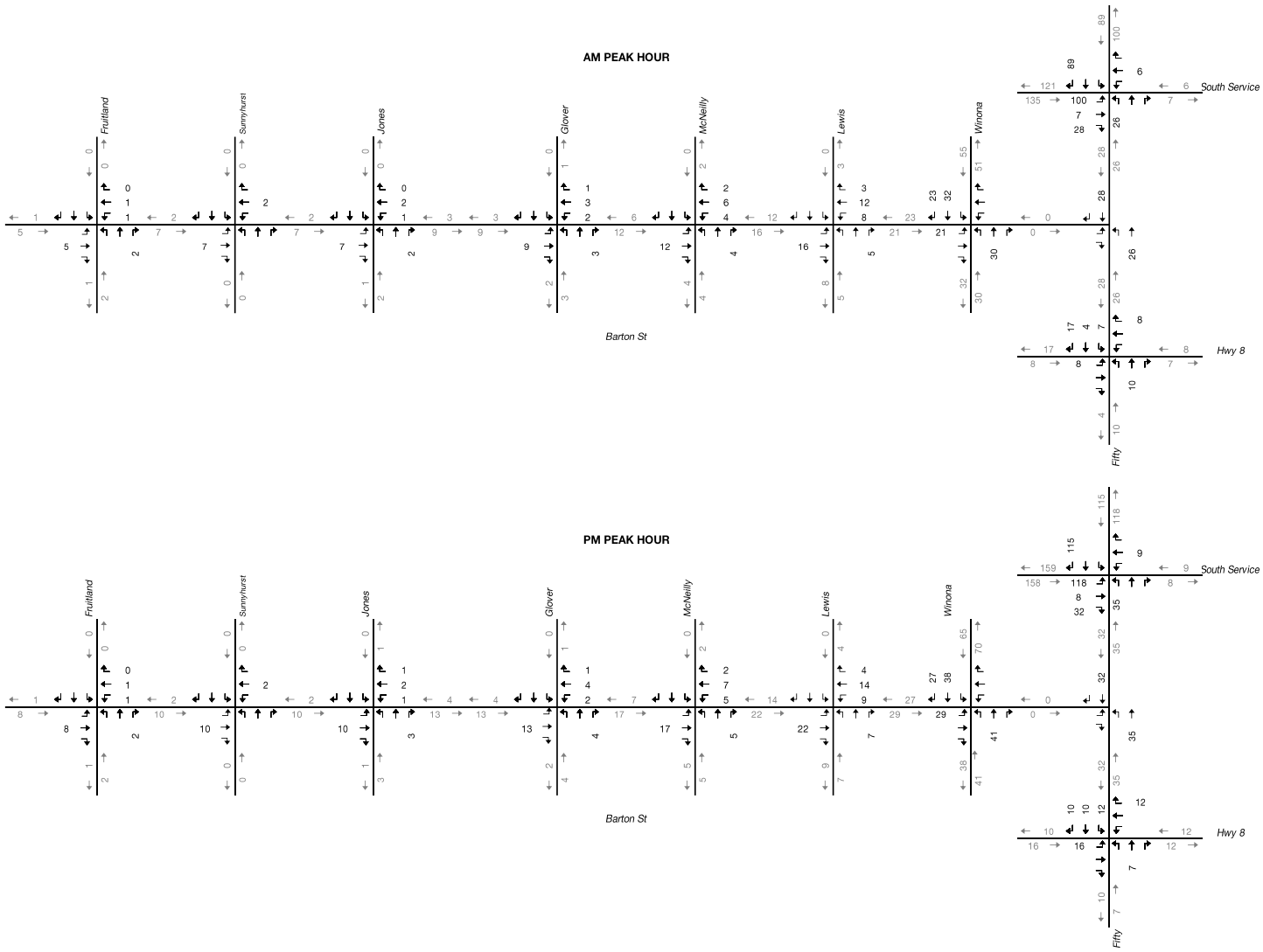
Figure 4.2



Winona Crossing Traffic Volumes

Barton Street / Fifty Road Class EA, Hamilton
161250

Figure 4.3

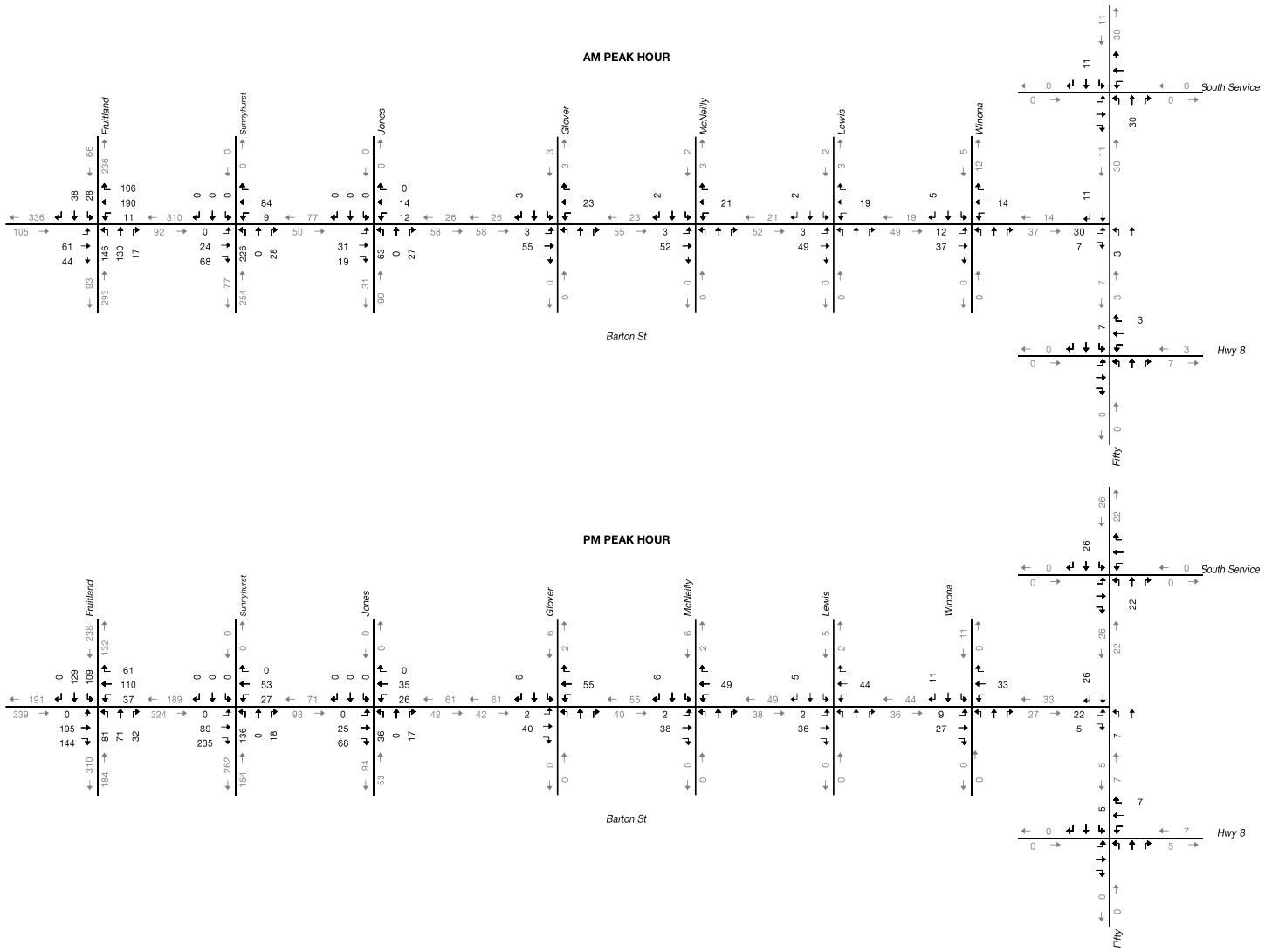


Winona Road Commercial Development

Traffic Volumes

Barton Street / Fifty Road Class EA, Hamilton
161250

Figure 4.4

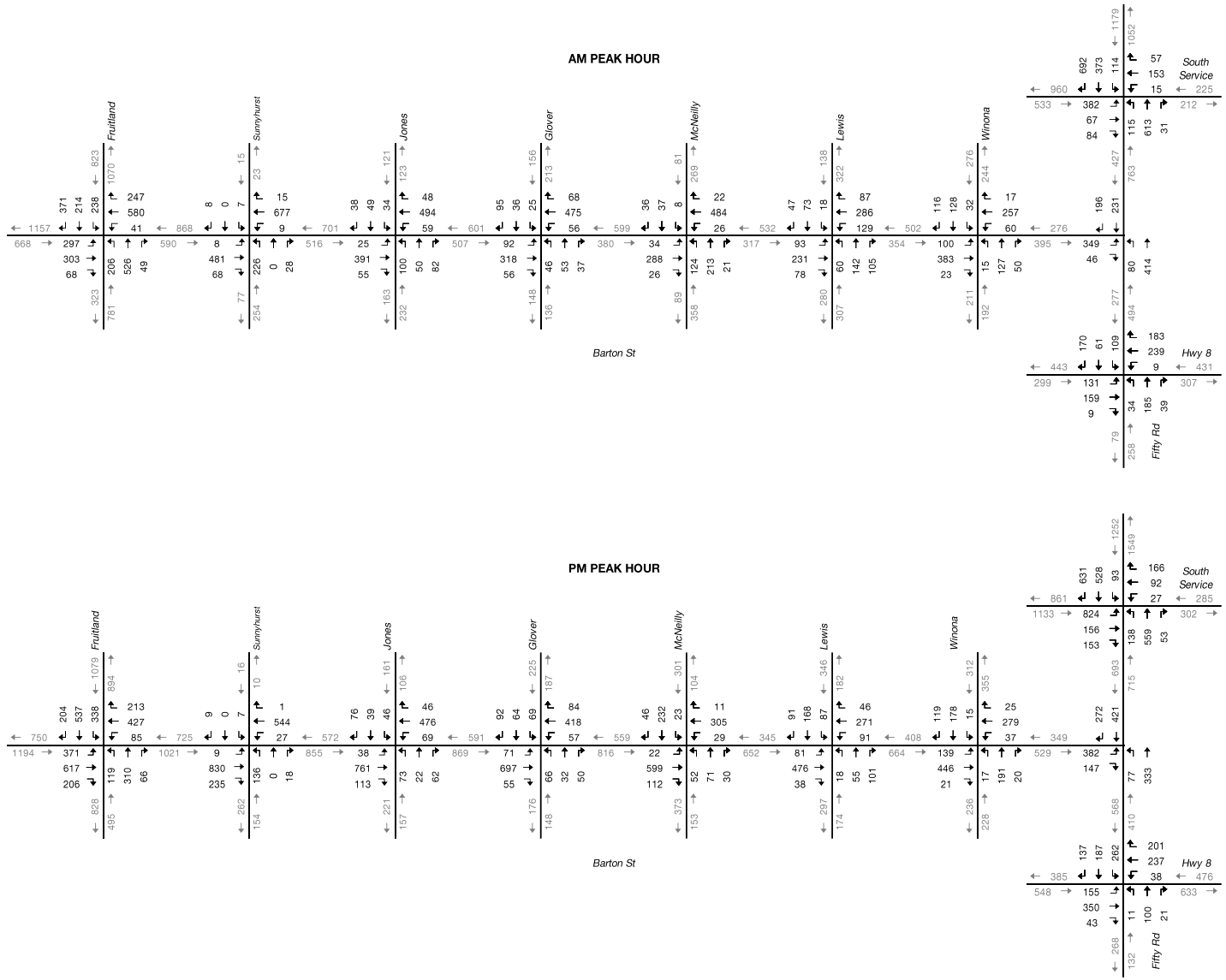


Block 1 Fruitland-Winona Secondary Plan

Traffic Volumes

Barton Street / Fifty Road Class EA, Hamilton
161250

Figure 4.5



Future (2031) Traffic Volumes

Barton Street / Fifty Road Class EA, Hamilton
161250

Figure 4.6

4.3 Traffic Operations

4.3.1 Midblock Analysis

The forecasted midblock traffic volumes for Barton Street and Fifty Road shown in **Figure 4.6** were compared to the 2031 volumes produced by the City of Hamilton Long Range Traffic Model to assess consistency with the forecasts. **Table 4.1** summarizes the comparison of the volumes. Only the westbound volumes were assessed on Barton Street since the model forecasts AM peak hour conditions and westbound is the peak direction of travel in the morning.

The table illustrates that the modelled (from City's traffic model) and forecasted (derived through this study) volumes are somewhat consistent but do vary by as much as 42% for certain sections

Table 4.2 and **Table 4.3** show the forecasted 2031 peak hour midblock traffic volumes and v/c ratios for Barton Street and Fifty Road, respectively. In estimating the v/c ratios, a slightly higher per lane capacity was assumed than for the existing conditions analysis to reflect the three (3) lane cross-section.

Table 4.2 indicates that Barton Street is not expected to exceed capacity during the 2031 AM and PM peak hours with the midblock volumes and the three (3) lane cross-section. The short section between Fruitland Road and Sunnyhurst Avenue/Gordon Dean Avenue (bolded in **Table 4.2**) is forecasted to exceed a v/c ratio of 1.02 in the PM peak hour, peak (eastbound) direction, suggesting this link will be over capacity by 2031. **Table 4.3** shows that Fifty Road will also be under capacity during these periods.

TABLE 4.1: COMPARISON OF MODELLED AND FORECASTED FUTURE (2031) AM PEAK HOUR MIDBLOCK VOLUMES

Road Section (Direction)	Modelled Volumes[1]	Forecasted Volumes[2]	Ratio of Forecasted to Modelled	Diff (Model – Adj)	Diff %
Barton Street – Fruitland Road to Jones Road (WB)	718	868	1.21	-150	-20.9%
Barton Street – Jones Road to Glover Road (WB)	718	601	0.84	117	16.3%
Barton Street – Glover Road to McNeilly Road (WB)	684	599	0.88	85	12.4%
Barton Street – McNeilly Road to Lewis Road (WB)	476	532	1.12	-56	-11.8%
Barton Street – Lewis Road to Winona Road (WB)	476	502	1.05	-26	-5.5%
Barton Street – Winona Road to Fifty Road (WB)	476	276	0.58	200	42.0%
Fifty Road – South Service Road to Barton Street (NB)	559	763	1.36	-204	-36.5%
Fifty Road – South Service Road to Barton Street (SB)	335	427	1.27	-92	-27.5%

Notes: 1. Volumes derived from City of Hamilton Long Range Traffic Model
2. Volumes obtained from Figure 4.6

TABLE 4.2: FUTURE (2031) MIDBLOCK CAPACITY ANALYSIS– BARTON STREET

Road Section		AM Peak Hour		PM Peak Hour	
From	To	Volume (Adj.*)	v/c Ratio	Volume (Adj.*)	v/c Ratio
Eastbound					
Fruitland	Sunnyhurst	590	0.59	**1,021**	**1.02**
Sunnyhurst	Jones	516	0.52	855	0.86
Jones	Glover	507	0.51	869	0.87
Glover	McNeilly	380	0.38	816	0.82
McNeilly	Lewis	317	0.32	652	0.65
Lewis	Winona	354	0.35	664	0.66
Winona	Fifty	395	0.40	529	0.53
Westbound					
Fruitland	Sunnyhurst	868	0.87	725	0.73
Sunnyhurst	Jones	701	0.70	572	0.57
Jones	Glover	601	0.60	591	0.59
Glover	McNeilly	599	0.60	559	0.56
McNeilly	Lewis	532	0.53	345	0.35
Lewis	Winona	502	0.50	408	0.41
Winona	Fifty	276	0.28	349	0.35

TABLE 4.3: FUTURE (2031) MIDBLOCK CAPACITY ANALYSIS – FIFTY ROAD

Road Section		AM Peak Hour		PM Peak Hour	
From	To	Volume (Adj)	v/c Ratio	Volume (Adj)	v/c Ratio
Southbound					
South Service	Barton	427	0.43	693	0.69
Barton	Highway 8	277	0.28	568	0.57
Northbound					
South Service	Barton	763	0.76	715	0.72
Barton	Highway 8	494	0.49	410	0.41

4.3.2 Intersection Analysis

Table 4.4 summarizes the forecasted 2031 intersection traffic operations based on the volumes provided in **Figure 4.6**. The table denotes the expected LOS, v/c ratios, and 95th percentile queues for the intersections in the Study Area for the AM and PM peak hours. **Appendix D** provides the detailed Synchro analysis reports. It is noted that the intersection operations analyses are also intended to assist in determining the lane configuration of the approach roads to satisfactory accommodate forecasted future traffic demand. Findings from the analyses include:

- **Barton Street at Fruitland Road** – During the AM peak hour, the intersection is forecasted to operate with overall LOS F and LOS D in the PM peak hour. In the AM peak hour, the eastbound, northbound, and southbound left turn movements are forecasted to operate with LOS F and v/c ratios greater that 1. All remaining individual turning movements are forecasted to operate with LOS C or better and v/c ratios 0.83 or lower. In the PM peak hour, the eastbound left turn is forecasted to operate with LOS F with v/c ratio greater than 1. All remaining individual turning movement are forecasted to operate with LOS D or better and v/c ratios of 0.96 or lower;
- **Barton Street at Sunnyhurst Avenue/Gordon Dean Avenue** – During the AM peak hour, the intersection is forecasted to operate with overall LOS A with the northbound left-through-right turn movement operating with LOS F and v/c ratio of 0.84. All remaining individual turning movements are forecasted to operate with LOS C or better and v/c ratios of 0.44 or lower. During the PM peak hour, the intersection is forecasted to operate with overall LOS A with all individual turning movements operating at LOS D or better and v/c ratios of 0.51 or lower;
- **Barton Street at Jones Road** – During the AM peak hour, the intersection is forecasted to operate with overall LOS B with the northbound left-through-right turn movement operating with LOS F and v/c ratio of 0.89. All remaining individual turning movements are forecasted to operate with LOS D or better and v/c ratios of 0.51 or lower. In the PM peak hour, intersection is forecasted to operate with overall LOS B with the northbound and southbound left-through-right turn movements operating LOS F and v/c ratios of 0.78 and 0.77 respectively. All remaining individual turning movements are forecasted to operate with LOS B or better and v/c ratio 0.56 or lower;

TABLE 4.4A: FUTURE (2031) INTERSECTION OPERATIONS SUMMARY (AM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																	Overall
				Eastbound				Westbound				Northbound				Southbound					
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		
AM Peak Hour	Barton Street at Fruitland Road	TCS	LOS Delay V/C Q Ex Avail.	F 406 1.80 39 40 1	B 14 0.26 428		**F** **189**	B 14 0.13 27 35 8	B 18 0.62 66		**B** **18**	F 458 1.90 41 35 6	C 29 0.82 777		**F** **142**	F 457 1.90 54 40 -14	C 30 0.83 1866		**F** **154**	**F** **121**
	Fifty Road at Highway 8	TCS	LOS Delay V/C Q		C 22 0.79 55		**C** **22**		B 14 0.65 53		**B** **14**		B 11 0.44 45		**B** **11**		B 15 0.65 82		**B** **15**	**B** **16**
	Barton Street at Sunnyhurst Avenue / Gordon Dean Avenue	TWSC	LOS Delay V/C Q	A 9 0.01 5	A 0 0.35 0		**A** **0**	A 9 0.01 4	A 0 0.44 0		**A** **0**		F 54 0.84 60		**F** **54**		C 16 0.05 11		**C** **15.5**	**9**
	Barton Street at Jones Road	TWSC	LOS Delay V/C Q	A 9 0.04 11	A 0 0.32 4		**A** **1**	A 9 0.07 13	A 0 0.37 5		**A** **1**		F 66 0.89 41		**F** **66**		D 30 0.51 29		**D** **30**	**14**
	Barton Street at Glover Road	AWSC	LOS Delay V/C Q	B 11 0.20 22	D 27 0.76 34		**C** **24**	A 10 0.12 27	F 96 1.11 59		**F** **88**		B 14 0.31 23		**B** **14**		B 14 0.34 29		**B** **14**	**E** **50**
	Barton Street at McNeilly Road	AWSC	LOS Delay V/C Q	B 11 0.08 15	D 26 0.72 31		**C** **25**	B 10 0.06 24	F 104 1.12 60		**F** **99**		D 30 0.77 37		**D** **30**		B 13 0.20 16		**B** **13**	**F** **56**
	Barton Street at Lewis Road	AWSC	LOS Delay V/C Q	B 13 0.23 24	D 27 0.72 43		**C** **23**	B 14 0.31 28	E 35 0.83 44		**D** **30**		C 23 0.67 39		**C** **23**		C 15 0.34 26		**C** **15**	**C** **25**
	Barton Street at Winona Road	AWSC	LOS Delay V/C Q	B 13 0.25 28	E 48 0.91 45		**E** **41**	B 12 0.15 23	C 23 0.65 36		**C** **21**		C 17 0.45 31		**C** **17**		C 21 0.61 38		**C** **21**	**D** **28**
	Barton Street at Fifty Road	TWSC	LOS Delay V/C Q	F 287 1.51 30		B 11 0.08 335	**F** **255**						A 2 0.08 33		**A** **2**		A 0 0.27 8		**A** **0**	**77**
	Fifty Road at South Service Road	TCS	LOS Delay V/C Q	D 39 0.80 79	B 14 0.18 39		**C** **32**	C 25 0.07 14	C 35 0.68 60		**C** **34**	B 15 0.41 26	B 15 0.46 49		**B** **15**	C 22 0.53 46	C 24 0.66 78	C 23 0.62	**C** **23**	**C** **23**

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
Q - 95th Percentile Queue Length
Ex. - Existing Available Storage
Avail. - Available Storage
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control
RBT - Roundabout

TABLE 4.4B: FUTURE (2031) INTERSECTION OPERATIONS SUMMARY (PM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																	Overall
				Eastbound				Westbound				Northbound				Southbound					
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		
PM Peak Hour	Barton Street at Fruitland Road	TCS	LOS Delay V/C Q Ex Avail.	F 210 1.38 38 40 2	B 15 0.36 441		**F** **103**	B 14 0.17 22 35 13	B 15 0.34 43		**B** **15**	B 20 0.46 25 35 -10	B 17 0.43 59		**B** **17**	C 23 0.67 67 40 -27	D 46 0.96 712		**D** **40**	**D** **53**
	Fifty Road at Highway 8	TCS	LOS Delay V/C Q		C 28 0.90 118		**C** **28**		B 11 0.59 59		**B** **11**		B 15 0.25 24		**B** **15**		F 221 1.42 248		**F** **221**	**F** **87**
	Barton Street at Sunnyhurst Avenue / Gordon Dean Avenue	TWSC	LOS Delay V/C Q	A 9 0.01 5	A 0 0.48 3		**A** **0**	A 10 0.04 13	A 0 0.00 0		**A** **1**		D 27 0.51 124		**D** **27**		B 14 0.05 13		**B** **14**	**3**
	Barton Street at Jones Road	TWSC	LOS Delay V/C Q	A 9 0.04 12	A 0 0.56 10		**A** **0**	B 11 0.11 19	A 0 0.33 10		**A** **1**		F 62 0.78 86		**F** **62**		F 59 0.77 97		**F** **59**	**11**
	Barton Street at Glover Road	AWSC	LOS Delay V/C Q	B 12 0.20 38	F 335 1.82 294		**F** **307**	B 11 0.15 31	F 107 1.25 78		**F** **97**		C 16 0.42 26		**C** **17**		C 20 0.59 35		**C** **20**	**F** **179**
	Barton Street at McNeilly Road	AWSC	LOS Delay V/C Q	B 10 0.05 25	F 288 1.58 65		**F** **280**	B 11 0.07 13	D 28 0.73 32		**D** **26**		C 16 0.38 23		**C** **16**		C 24 0.67 34		**C** **24**	**F** **146**
	Barton Street at Lewis Road	AWSC	LOS Delay V/C Q	B 13 0.22 31	F 148 1.24 47		**F** **130**	B 13 0.24 21	D 32 0.77 32		**D** **28**		C 18 0.44 27		**C** **18**		D 35 0.80 39		**D** **35**	**F** **68**
	Barton Street at Winona Road	AWSC	LOS Delay V/C Q	B 15 0.36 29	F 107 1.12 144		**F** **86**	B 12 0.10 20	D 31 0.76 36		**D** **29**		C 22 0.57 33		**C** **22**		D 28 0.72 43		**D** **28**	**F** **51**
	Barton Street at Fifty Road	TWSC	LOS Delay V/C Q	F 529 2.05 814		C 16 0.32 30	**F** **386**						A 3 0.10 35		**A** **3**		A 0 0.44 430		**A** **0**	**126**
	Fifty Road at South Service Road	TCS	LOS Delay V/C Q	F 108 1.12 110	B 18 0.39 255		**F** **83**	C 26 0.17 24	E 55 0.80 73		**D** **53**	F 101 1.00 56	C 30 0.62 68		**D** **43**	C 20 0.37 117	E 59 0.96 310	C 27 0.48 260	**D** **40**	**E** **56**

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
Q - 95th Percentile Queue Length
Ex. - Existing Available Storage
Avail. - Available Storage
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control
RBT - Roundabout

- **Barton Street at Glover Road** – During the AM and PM peak hours, the intersection is forecasted to operate with overall LOS E and LOS F respectively. During the AM peak hour, the westbound through-right turn movement is forecasted to operate with LOS F and v/c ratio greater than 1. The westbound through-right turn movement is forecasted to operate with LOS F and v/c ratio of 1.11. All remaining individual turning movements are forecasted to operate with LOS D or better and v/c ratios of 0.76 or lower. In the PM peak hour, the eastbound and westbound through-right turn movements are forecasted to operate with LOS F and v/c ratios greater than 1. All remaining individual turning movements are forecasted to operate with LOS C or better and v/c ratio of 0.59 or lower;
- **Barton Street at McNeilly Road** – During the AM and PM peak hours, the intersection is forecasted to operate with overall LOS F. During the AM peak hour, the westbound through-right turn movement is forecasted to operate with LOS F and v/c ratio greater than 1. All remaining individual turning movements are forecasted to operate with LOS D or better and v/c ratios of 0.77 or lower. In the PM peak hour, the eastbound through-right turn movement is forecasted to operate with LOS F and v/c ratio greater than 1. All remaining individual turning movements are forecasted to operate with LOS D or better and v/c ratio of 0.73 or lower;
- **Barton Street at Lewis Road** – During the AM peak hour, the intersection is forecasted to operate with overall LOS C with the westbound through-right turn movement operating with LOS E and v/c ratio of 0.83. All remaining individual turning movements operating with LOS D or better and v/c ratio of 0.72 or lower. In the PM peak hour, the intersection is forecasted to operate with overall LOS F. The eastbound through-right turn movement is forecasted to operate with LOS F and v/c ratio greater than 1. All remaining individual turning movements are forecasted to operate with LOS D or better and v/c ratios of 0.80 or lower;
- **Barton Street at Winona Road** – During the AM peak hour, the intersection is forecasted to operate with overall LOS D with the eastbound through-right turn movement operating with LOS E and v/c ratio of 0.91. All remaining individual turning movements are forecasted with LOS C or better and v/c ratio of 0.65 or lower. In the PM peak hour, the intersection is forecasted to operate with overall LOS F. The eastbound through-right turn movement is forecasted to operate with LOS F and v/c ratio greater than 1. The eastbound through-right turn movement is forecasted with LOS F and v/c ratio greater than 1.. All remaining individual turning movements are forecasted to operate with LOS D or better and v/c ratios of 0.76 or lower;
- **Barton Street at Fifty Road** – During the AM and PM peak hours, the intersection operates with overall LOS F. In the AM peak hour, the eastbound left turn movement is forecasted to operate with LOS F and v/c ratio greater than 1. All remaining individual turning

movements are forecasted to operate with LOS B or better and v/c ratios of 0.27 or lower. In the PM peak hour, the eastbound left turn movement is forecasted to operate with LOS F and v/c ratio greater than 1. All remaining individual turning movements are forecasted to operate with LOS C or better and v/c ratios of 0.44 or lower;

- **Fifty Road at Highway 8** - During the AM peak hour, the intersection is forecasted to operate with overall LOS B and individual turning movements operating with LOS C or better and v/c ratio of 0.82 or lower. In the PM peak hour, the intersection is forecasted to operate with overall LOS F. The southbound left-through-right turn movement is forecasted to operate with LOS F and v/c ratio greater than 1. All remaining individual turning movements are forecasted to operate with LOS C or better and v/c ratios of 0.94 or lower; and
- **Fifty Road at South Service Road** – During the AM peak hour, the intersection is forecasted to operate with overall LOS C and individual turning movements operating with LOS D or better and v/c ratio of 0.80 or lower. In the PM peak hour, the intersection is forecasted to operate with overall LOS E. The eastbound left turn movement is forecasted to operate with LOS F and v/c ratio greater than 1. The westbound through-right turn movement is forecasted to operate with LOS E and v/c ratio of 0.80. The southbound through movement is forecasted to operate with LOS E and v/c ratio of 0.96. All remaining individual turning movements are forecasted to operate with LOS C or better and v/c ratios of 0.62 or lower.

4.3.3 Traffic Control Signal Justification

The following unsignalized intersections were analyzed to determine if traffic signal control is justified under future conditions:

- Barton Street at Sunnyhurst Avenue/Gordon Dean Avenue;
- Barton Street at Jones Road;
- Barton Street at Glover Road;
- Barton Street at McNeilly Road;
- Barton Street at Lewis Road;
- Barton Street at Winona Road; and
- Barton Street at Fifty Road.

The warrant analysis is based on the methodologies contained in OTM Book 12. For an existing intersection with future traffic volumes, a traffic signal is warranted if Justification 1 (both 1A and 1B) or Justification 2 (both 2A and 2B) is 120 per cent satisfied.

Table 4.5 summarizes the results of traffic signal warrant analyses for the above noted intersections. Traffic control signals are warranted for all locations.

TABLE 4.5: TRAFFIC SIGNAL JUSTIFICATION SUMMARY

Barton Street Intersection	Warrant 1 – Minimum Vehicular Volume		Warrant 2 – Delay to Cross Traffic		120% Satisfied
	1A	1B	2A	2B	
Sunnyhurst Avenue	177%	103%	151%	188%	YES
Jones Road	178%	140%	143%	171%	YES
Glover Road	162%	139%	127%	162%	YES
McNeilly Road	148%	186%	102%	326%	YES
Lewis Road	150%	201%	99%	247%	YES
Winona Road	146%	210%	93%	199%	YES
Fifty Road	154%	281%	48%	496%	YES

Appendix C provides the detailed traffic signal warrant analyses completed for the intersections.

4.3.4 Intersection Analysis with Improvements

The following modifications were considered to improve intersection operations for 2031 future traffic conditions:

- Barton Street at Fruitland Road – Signal timing optimization and addition of westbound, northbound and southbound right turn lanes;
- Barton Street at Sunnyhurst Avenue/Gordon Dean Avenue – Installation of traffic control signals (plus eastbound and westbound left turn lanes with four (4) lane cross-section from Fruitland Road);
- Barton Street at Jones Road – Installation of traffic control signals (plus eastbound and westbound left turn lanes with three (3) lane cross-section);
- Barton Street at Glover Road – Installation of traffic control signals (plus eastbound and westbound left turn lanes with three (3) lane cross-section);
- Barton Street at McNeilly Road – Installation of traffic control signals (plus eastbound and westbound left turn lanes with three (3) lane cross-section);
- Barton Street at Lewis Road – Installation of traffic control signals (plus eastbound and westbound left turn lanes with three (3) lane cross-section);
- Barton Street at Winona Road – Installation of traffic control signals (plus eastbound and westbound left turn lanes with three (3) lane cross-section);

- Barton Street at Fifty Road – Installation of traffic control signals and addition of southbound right turn lane (plus eastbound left turn lane with three (3) lane cross-section);
- Fifty Road at Highway 8 – Addition of left turn lanes on all approaches; and
- Fifty Road at South Service Road – Signal timing optimization and addition of second southbound through and westbound right turn lanes.

Table 4.6 summarizes the resultant traffic operations for Study Area intersections with these potential road improvements. **Appendix E** provides the detailed Synchro analysis reports. The analyses indicate that all intersections are forecasted to operate with acceptable levels of service during the AM and PM peak hours with the improvements implemented.

TABLE 4.6A: FUTURE (2031) INTERSECTION OPERATIONS SUMMARY WITH IMPROVEMENTS (AM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Barton Street at Fruitland Road	TCS	LOS	E	C		D	C	D	C	D	C	E	C	D	F	C	C	D	D
			Delay	70	27		46	30	48	33	43	21	63	26	50	82	30	29	45	46
			V/C	0.98	0.35			0.18	0.84	0.19		0.48	0.96	0.03		0.99	0.42	0.32		
			Q	85	151			33	101	64		79	521	57		78	174	85		
			Ex	40				35				35				40				
			Avail.	-45				2				44				-38				
	Fifty Road at Highway 8	TCS	LOS	B	A		A	A	B		B	A	B		B	B	B		B	B
			Delay	10	8		9	7	11		11	10	11		11	11	10		10	10
			V/C	0.48	0.26			0.02	0.62			0.11	0.41			0.39	0.25			
			Q	39	27			5	57			12	34			33	35			
	Barton Street at Sunnyhurst Avenue / Gordon Dean Avenue	TCS	LOS	A	A	A	A	A	B		B		B		B		B		B	B
			Delay	7	10	7	9	7	17		17		20		20		13		13	14
			V/C	0.05	0.57	0.05		0.03	0.82				0.64				0.01			
			Q	9	54	15		7	84				44				7			
	Barton Street at Jones Road	TCS	LOS	A	B		B	A	B		B		B		B		B		B	B
			Delay	7	11		11	8	14		14		16		16		13		13	13
			V/C	0.12	0.63			0.19	0.75				0.57				0.27			
			Q	19	66			30	66				43				30			
	Barton Street at Glover Road	TCS	LOS	A	A		A	A	B		B		B		B		B		B	B
			Delay	7	8		8	6	12		11		14		14		14		14	11
			V/C	0.35	0.47			0.13	0.73				0.37				0.29			
			Q	31	49			21	70				31				37			
	Barton Street at McNeilly Road	TCS	LOS	A	B		B	A	B		B		B		B		B		B	B
			Delay	10	11		11	9	17		17		18		18		11		11	15
			V/C	0.16	0.48			0.07	0.76				0.71				0.11			
			Q	21	53			18	60				50				21			
	Barton Street at Lewis Road	TCS	LOS	A	B		B	A	B		B		B		B		A		A	B
			Delay	10	11		11	10	12		11		12		12		10		10	11
			V/C	0.35	0.56			0.40	0.61				0.58				0.25			
			Q	32	89			39	53				42				33			
	Barton Street at Winona Road	TCS	LOS	A	B		B	A	A		A		B		B		B		B	B
			Delay	9	11		11	8	9		9		11		11		13		13	11
			V/C	0.29	0.62			0.20	0.43				0.37				0.53			
			Q	34	51			21	44				41				48			
	Barton Street at Fifty Road	TCS	LOS	B		B	B						B		B		A	A	A	B
			Delay	19		12	18						15		15		9	8	9	14
			V/C	0.71		0.04							0.74				0.32	0.14		
			Q	54		39							71				38	26		
	Fifty Road at South Service Road	TCS	LOS	D	B		C	C	D	C	D	B	C		C	B	C	C	C	C
			Delay	36	16		30	31	37	31	35	19	29		28	18	23	26	24	27
			V/C	0.70	0.20			0.08	0.60	0.04		0.29	0.70			0.42	0.38	0.55		
			Q	80	43			13	60	36		40	69			44	63	51		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
Ex. - Existing Available Storage
Avail. - Available Storage

TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control

RBT - Roundabout

TABLE 4.6B: FUTURE (2031) INTERSECTION OPERATIONS SUMMARY WITH IMPROVEMENTS (PM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
PM Peak Hour	Barton Street at Fruitland Road	TCS	LOS	D	B		C	C	C	C	C	C	C	C	C	C	C	B	C	C
			Delay	40	13		25	22	22	21	22	23	28	21	27	33	22	16	23	24
			V/C	0.98	0.76			0.52	0.64	0.26		0.86	0.72	0.05		0.95	0.91	0.25		
			Q	40	304			24	41	34		32	70	32		61	110	44		
			Ex	40				35				35				40				
			Avail.	0				11				-3				-21				
	Fifty Road at Highway 8	TCS	LOS	B	B		B	B	B		B	B	B		B	B	B		B	B
			Delay	16	13		14	10	15		14	10	11		11	16	13		14	14
			V/C	0.61	0.57			0.14	0.63			0.03	0.17			0.61	0.48			
			Q	44	58			22	69			9	23			55	65			
	Barton Street at Sunnyhurst Avenue / Gordon Dean	TCS	LOS	A	B	A	B	A	A		A		C		C		B		B	B
			Delay	5	14	5	12	6	7		7		22		22		19		19	11
			V/C	0.02	0.81	0.16		0.16	0.53				0.50				0.01			
			Q	11	71	21		16	56				36				12			
	Barton Street at Jones Road	TCS	LOS	A	B		B	A	A		A		C		C		C		C	B
			Delay	5	17		17	9	7		7		26		26		24		24	15
			V/C	0.10	0.87			0.47	0.54				0.57				0.46			
			Q	23	174			30	90				41				41			
	Barton Street at Glover Road	TCS	LOS	A	B		B	A	A		A		C		C		C		C	B
			Delay	7	17		16	8	10		9		20		20		23		23	15
			V/C	0.22	0.84			0.34	0.59				0.46				0.61			
			Q	27	105			28	85				43				55			
	Barton Street at McNeilly Road	TCS	LOS	A	B		B	A	A		A		B		B		C		C	B
			Delay	7	17		17	8	9		8		17		17		21		21	16
			V/C	0.05	0.82			0.18	0.37				0.42				0.66			
			Q	18	89			19	47				38				58			
	Barton Street at Lewis Road	TCS	LOS	A	B		B	B	B		B		B		B		B		B	B
			Delay	10	16		16	12	11		11		11		11		17		17	14
			V/C	0.27	0.75			0.43	0.45				0.22				0.68			
			Q	33	83			29	51				31				58			
	Barton Street at Winona Road	TCS	LOS	A	B		B	A	A		A		B		B		B		B	B
			Delay	9	12		11	8	9		9		13		13		14		14	12
			V/C	0.34	0.65			0.14	0.43				0.46				0.56			
			Q	32	71			21	46				42				52			
	Barton Street at Fifty Road	TCS	LOS	B		B	B						B		B		B	A	B	B
			Delay	17		11	15						17		17		12	9	11	14
			V/C	0.69		0.10							0.76				0.61	0.19		
			Q	31		78							106				87	34		
	Fifty Road at South Service Road	TCS	LOS	D	C		D	D	D	D	D	E	C		D	C	D	C	D	D
			Delay	53	22		44	48	51	41	45	62	32		38	23	52	33	40	42
			V/C	0.92	0.41			0.27	0.54	0.31		0.88	0.58			0.38	0.91	0.62		
			Q	114	225			34	86	40		61	83			78	172	125		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
Ex. - Existing Available Storage
Avail. - Available Storage

TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control

RBT - Roundabout

4.3.5 Auxiliary Turn Lane Storage Requirements

Table 4.7 summarizes the required storage lengths for the auxiliary turning lanes in the Study Area based on the operational analysis summarized in Section 4.3.4.

TABLE 4.7: AUXILIARY TURN LANE STORAGE REQUIREMENTS

Intersection	Auxiliary Lane	95th Percentile Queue (m)		Required Storage Length (m)
		AM Peak Hour	PM Peak Hour	
Barton Street at Fruitland Road	SB Right	85	44	90
	WB Right	64	34	70
	NB Right	57	32	60
Barton Street at Sunnyhurst Avenue/ Gordon Dean Avenue	EB Left	9	11	20
	WB Left	7	16	20
Barton Street at Jones Road	EB Left	19	23	30
	WB Left	30	30	30
Barton Street at Glover Road	EB Left	31	27	40
	WB Left	21	28	30
Barton Street at McNeilly Road	EB Left	21	18	30
	WB Left	18	19	20
Barton Street at Lewis Road	EB Left	32	33	40
	WB Left	39	29	40
Barton Street at Winona Road	EB Left	34	32	40
	WB Left	39	21	40
Barton Street at Fifty Road	EB Left	54	31	60
	SB Right	26	34	40
Fifty Road at Highway 8	EB Left	39	44	50
	WB Left	5	22	30
	NB Left	12	9	20
	SB Left	33	55	60
Fifty Road at South Service Road	WB Right	36	40	40

4.3.6 Roundabout Feasibility for Barton Street Intersections

The following intersections on Barton Street were analyzed using RODEL to determine the operational impacts of roundabouts as an alternative to traffic control signals:

- Barton Street at Sunnyhurst Avenue/Gordon Dean Avenue;
- Barton Street at Jones Road;
- Barton Street at Glover Road;
- Barton Street at McNeilly Road;
- Barton Street at Lewis Road;
- Barton Street at Winona Road; and
- Barton Street at Fifty Road.

The following geometric parameters were utilized in the analysis:

- Entry width: 4.5m
- Effective flare length: 30m
- Half width: 3.5m
- Entry radius: 20m
- Entry angle: 25°
- Inscribed Diameter: 40m

Table 4.8 summarizes the resultant roundabout operations for the seven intersections. **Appendix F** provides the detailed RODEL analysis outputs.

The analyses indicate that with single lane roundabouts, all seven intersections are forecasted to operate with acceptable levels of service during the AM and PM peak hours. In the PM peak hour, the eastbound leg at Sunnyhust Avenue/Gordon Dean Avenue is forecasted to operate with LOS C and v/c ratio of 0.84 in the PM peak hour, while the eastbound leg at Jones Road is forecasted to operate with LOS C and v/c ratio of 0.78.

TABLE 4.8: FUTURE (2031) INTERSECTION OPERATIONS SUMMARY WITH ROUNDABOUTS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Barton Street at Sunnyhurst Avenue / Gordon Dean Avenue	RBT	LOS Delay V/C Q		A 5 0.44 7		A 5		A 8 0.60 14		A 8		A 5 0.25 0		A 5		A 5 0.02 0		A 5	A 6
	Barton Street at Jones Road	RBT	LOS Delay V/C Q		A 5 0.42 7		A 5		A 7 0.53 7		A 7		A 5 0.23 0		A 5		A 5 0.15 0		A 5	A 6
	Barton Street at Glover Road	RBT	LOS Delay V/C Q		A 5 0.38 7		A 5		A 7 0.56 7		A 7		A 4 0.11 0		A 4		A 5 0.19 0		A 5	A 6
	Barton Street at McNeilly Road	RBT	LOS Delay V/C Q		A 4 0.29 0		A 4		A 4 0.52 7		A 4		A 5 0.32 0		A 5		A 4 0.09 0		A 4	A 6
	Barton Street at Lewis Road	RBT	LOS Delay V/C Q		A 5 0.39 7		A 5		A 6 0.45 7		A 6		A 5 0.29 0		A 5		A 4 0.15 0		A 4	A 5
	Barton Street at Winona Road	RBT	LOS Delay V/C Q		A 5 0.44 7		A 5		A 5 0.30 0		A 5		A 5 0.20 0		A 5		A 4 0.26 0		A 4	A 5
	Barton Street at Fifty Road	RBT	LOS Delay V/C Q		A 5 0.35 7		A 5						A 6 0.45 7		A 6		A 4 0.35 7		A 4	A 5
PM Peak Hour	Barton Street at Sunnyhurst Avenue / Gordon Dean Avenue	RBT	LOS Delay V/C Q		C 20 0.84 42		C 20		A 5 0.47 7		A 5		A 5 0.19 0		A 5		A 4 0.02 0		A 4	B 14
	Barton Street at Jones Road	RBT	LOS Delay V/C Q		C 16 0.78 28		C 16		A 7 0.52 7		A 7		A 6 0.21 0		A 6		A 5 0.18 0		A 5	B 11
	Barton Street at Glover Road	RBT	LOS Delay V/C Q		B 10 0.68 14		B 10		A 6 0.49 7		A 6		A 5 0.19 0		A 5		A 5 0.24 0		A 5	A 8
	Barton Street at McNeilly Road	RBT	LOS Delay V/C Q		A 8 0.63 14		A 8		A 4 0.28 0		A 4		A 5 0.16 0		A 5		A 5 0.28 0		A 5	A 6
	Barton Street at Lewis Road	RBT	LOS Delay V/C Q		A 8 0.55 7		A 8		A 4 0.33 0		A 4		A 5 0.19 0		A 5		A 5 0.32 0		A 5	A 6
	Barton Street at Winona Road	RBT	LOS Delay V/C Q		A 6 0.50 7		A 6		A 5 0.31 0		A 5		A 5 0.25 0		A 5		A 4 0.27 0		A 4	A 5
	Barton Street at Fifty Road	RBT	LOS Delay V/C Q		A 7 0.49 7		A 7						A 5 0.36 7		A 5		A 6 0.54 7		A 6	A 6

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
Ex. - Existing Available Storage
Avail. - Available Storage

TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control

RBT - Roundabout

5 Fifty Road and CNR Crossing

The need for enhanced protection at the Fifty Road and Canadian National Railway (CNR) crossing was assessed based on the "road exposure index", which is calculated as the cross-product of the number of trains and the Annual Average Daily Traffic (AADT). An index value exceeding 200,000 is a primary indicator that grade separation should be considered as there is currently no nationally recognized approach for assessing merit.

From the Fifty Road and Canadian National Railway (CNR) Grade Separation Needs Assessment Study[3], between 13 and 20 trains cross Fifty Road on the CNR tracks daily under existing conditions. By the 2031 horizon year, the number of train movements is forecasted to increase to between 13 and 24 daily.

Table 5.1 shows the road exposure index values for the Fifty Road and CNR crossing based on the existing and forecasted traffic volumes provided in Sections 2 and 4 of this report, respectively. Grade separation is not required under existing conditions but should be considered by the 2031 horizon year, as the 200,000 cross-product threshold is exceeded for both the minimum and maximum number of forecasted train movements during the PM peak hour. Further study is recommended based on updated train forecasts with the proposed GO Transit rail service extension to Niagara Region.

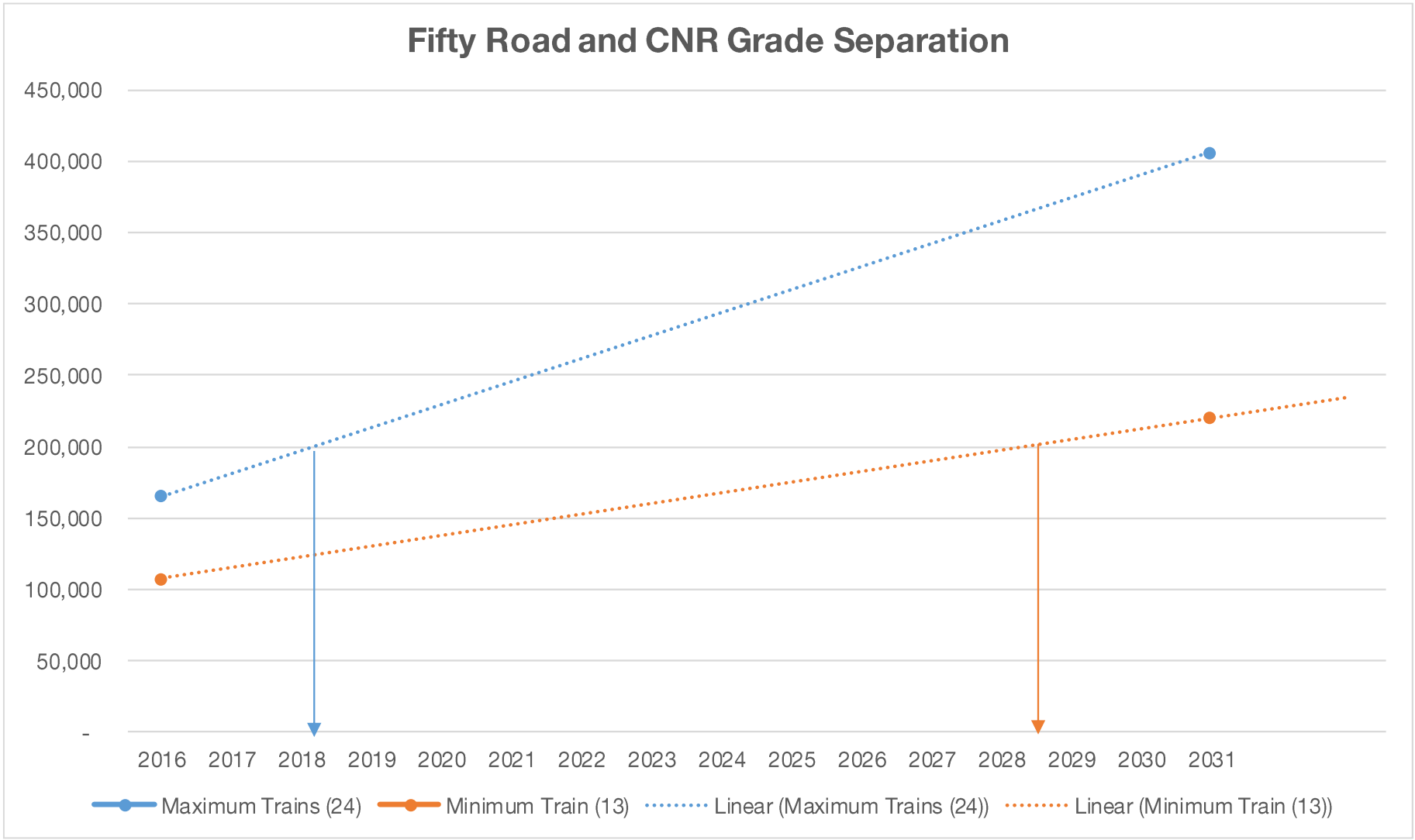
From the intersection operations detailed in Section 4, the longest 95th percentile queue for the northbound movement at the Fifty Road and South Service Road intersection is forecasted to reach 83 m during the 2031 PM peak hour. With the CNR crossing located approximately 115 m south of the intersection, the queue is not expected to extend to the at-grade rail crossing.

Figure 5.1 illustrates the change in the PM peak hour road exposure index value between the 2016 and 2031 for the minimum and maximum number of trains, assuming a linear relationship. Under the minimum train scenario, the 200,000 cross-product threshold is expected to be exceeded by about 2029. For the maximum train scenario, the threshold is reached sooner, likely 2019.

[3] Fifty Road and Canadian National Railway (CNR) Grade Separation Needs Assessment Study, MMM Group, December 6, 2013

TABLE 5.1: FIFTY ROAD AND CNR CROSSING ROAD EXPOSURE INDEX

Scenario	Peak Hour	Fifty Road Peak Hour Traffic Volumes			Heavy Traffic %	Heavy Traffic Equiv. (pcu)	AADT	Trains / Day	Road Exposure Index
		SB	NB	Total Link			(B)	(A)	(A x B)
Existing (2016)									
Minimum Trains	AM	246	362	608	8%	120	7,556	13	98,222
	PM	359	353	712	3%	53	8,264		107,435
Maximum Trains	AM	246	362	608	8%	120	7,556	20	151,111
	PM	359	353	712	3%	53	8,264		165,284
Future (2031)									
Minimum Trains	AM	472	763	1,235	8%	244	15,350	13	199,550
	PM	708	750	1,438	3%	109	16,928		220,067
Maximum Trains	AM	472	763	1,235	8%	244	15,350	24	368,400
	PM	708	750	1,458	3%	109	16,928		406,278



paradigm TRANSPORTATION SOLUTIONS LIMITED

Fifty Road and CNR Grade Separation Linear Growth

6 Conclusions and Recommendations

6.1 Conclusions

The following conclusions are drawn from the information and analyses presented in this report.

6.1.1 Existing Transportation Conditions

Sufficient capacity exists to serve existing midblock traffic volumes on Barton Street and Fifty Road within the Study Area.

All intersections within the Study Area currently operate with overall acceptable levels of service and within capacity during the AM and PM peak hours, except for Fifty Road and South Service Road. During both peak hours, the intersection operates with overall LOS F. In the AM peak hour, the southbound shared left-through-right turn movement operates at LOS F with a v/c ratio exceeding 1.0. In the PM peak hour, the eastbound shared left-through-right turn movement operates at LOS F with a v/c ratio of 0.97, and the southbound shared left-through-right turn movement operates at LOS F with a v/c ratio exceeding 1.

6.1.2 Future Transportation Conditions

Sufficient capacity would exist to serve forecasted year 2031 midblock traffic volumes on Barton Street and Fifty Road within the Study Area, assuming the proposed three (3)-lane cross-section is provided on Barton Street.

Several intersections within the Study Area are expected to operate with poor levels of service and over capacity by the year 2031 if not improved. Specific locations where LOS F and/or v/c ratios greater than 0.90 are anticipated include:

- Barton Street at Fruitland Road – In the AM peak hour, the eastbound, northbound and southbound left turn movements. In the PM peak hour, the eastbound left turn movement;
- Barton Street at Sunnyhurst Avenue/Gordon Dean Avenue – In the AM peak hour, the northbound left-through-right turn movement.
- Barton Street at Jones Road – In the AM peak hour the northbound left-through-right turn movement. In the PM peak hour, the northbound and southbound left-through-right turn movements.
- Barton Street at Glover Road – In the AM peak hour, the westbound through-right turn movement. In the PM peak hour, the eastbound and westbound through-right turn movements;
- Barton Street at McNeilly Road – In the AM peak hour, the westbound through-right turn movement. In the PM peak hour, the eastbound through-right turn movement;

- Barton Street at Lewis Road – In the PM peak hour, the eastbound through-right turn movement;
- Barton Street at Winona Road – In the PM peak hour, the eastbound and westbound through-right turn movement;
- Barton Street at Fifty Road – During both peak hours, the overall intersection and the eastbound left turn movement;
- Fifty Road at Highway 8 – In the PM peak hour, the overall intersection and the southbound left-through-right turn movement; and
- Fifty Road at South Service Road – In the PM peak hour, the eastbound left turn movement.

6.1.3 Potential Road Improvements

The following modifications were considered to improve intersection operations for 2031 future traffic conditions:

- Barton Street at Fruitland Road – Signal timing optimization and addition of westbound, northbound and southbound right turn lanes;
- Barton Street at Sunnyhurst Avenue/Gordon Dean Avenue – Installation of traffic control signals or a roundabout (plus eastbound and westbound left turn lanes with three (3) cross-section);
- Barton Street at Jones Road – Installation of traffic control signals or a roundabout (plus eastbound and westbound left turn lanes with three (3) lane cross-section);
- Barton Street at Glover Road – Installation of traffic control signals or a roundabout (plus eastbound and westbound left turn lanes with three (3) lane cross-section);
- Barton Street at McNeilly Road – Installation of traffic control signals or a roundabout (plus eastbound and westbound left turn lanes with three (3) lane cross-section);
- Barton Street at Lewis Road – Installation of traffic control signals or a roundabout (plus eastbound and westbound left turn lanes with three (3) lane cross-section);
- Barton Street at Winona Road – Installation of traffic control signals or a roundabout (plus eastbound and westbound left turn lanes with three (3) lane cross-section);
- Barton Street at Fifty Road – Installation of traffic control signals or a roundabout and addition of southbound right turn lane (plus eastbound left turn lane with three (3) lane cross-section);
- Fifty Road at Highway 8 – Addition of left turn lanes on all approaches; and

- Fifty Road at South Service Road – Signal timing optimization and addition of second southbound through and westbound right turn lanes.

All intersections are forecasted to operate with acceptable levels of service during the AM and PM peak hours with these improvements implemented. The intersections analyzed would likely operate better with roundabout control than traffic control signals.

The analyses confirmed the need and justification to improve Barton Street to three (3) lanes as recommended in the SCUBE Transportation Master Plan.

6.1.4 Fifty Road and CNR Crossing

The need for enhanced protection at the Fifty Road and Canadian National Railway (CNR) crossing was assessed based on the "road exposure index", which is calculated as the cross-product of the number of trains and the Annual Average Daily Traffic (AADT). An index value exceeding 200,000 is a primary indicator that grade separation should be considered as there is currently no nationally recognized approach for assessing merit.

Between 13 and 20 trains cross Fifty Road on the CNR tracks daily under existing conditions, with 13 to 24 trains forecasted by the 2031 horizon year. Based on existing and forecasted traffic volumes, grade separation is not required under existing conditions, but should be considered by the 2031 horizon year subject to a more detailed safety assessment, especially if GO Transit rail service is extended to Niagara Region as planned. The need for grade separation should be examined further through the forthcoming addenda to the 2011 Niagara Rail Service Expansion GO Transit Class Environmental Assessment Study.

6.2 Recommendations

It is recommended that:

- Barton Street be widened to three (3) lanes from Jones Road to Fifty Road, consistent with the recommendations contained in the SCUBE Transportation Master Plan;
- The Barton Street at Fruitland Road, Barton Street at Fifty Road and Fifty Road at Highway 8 intersections be further improved as recommended in this study;
- Traffic control signals or a roundabout be installed at the following intersections:
  - Barton Street at Sunnyhurst Avenue/Gordon Dean Avenue;
  - Barton Street at Jones Road;
  - Barton Street at Glover Road;

- Barton Street at McNeilly Road;
- Barton Street at Lewis Road;
- Barton Street at Winona Road; and
- Barton Street at Fifty Road;

- A grade separation be considered for the Fifty Road and CNR crossing by 2031, especially if GO Transit rail service is extended to Niagara Region as planned.

Appendix A

Existing Traffic Volumes

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 2

Intersection: **Fruitland Rd** **at** **Barton** Total Vehicles: 8,770 Date: Monday
Direction: (North/South) (East/West) M.V.E./Year: 7.007 Feb 2, 2009
Road Condition: Dry Weather: Clear AWDT Factor: 2.35 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	2	81	0	41	13	1	7	20	21	3	24	15	228	1	0	0	2
7:30	1	74	5	65	25	1	18	37	35	2	24	9	296	2	3	0	2
7:45 *	8	79	2	73	21	0	10	44	61	7	22	10	337	0	1	0	0
8:00 *	6	78	6	64	34	3	14	48	93	6	34	11	397	6	2	1	1
8:15 *	3	75	1	79	24	3	18	43	70	3	18	19	356	0	0	2	0
8:30 *	5	88	3	56	25	4	17	49	63	5	35	19	369	0	0	0	0
8:45	1	67	5	64	12	6	12	47	43	6	38	12	313	0	0	0	0
9:00	8	45	5	51	31	7	18	54	55	2	32	16	324	0	0	0	0
9:15	5	46	5	45	16	2	16	36	40	3	34	16	264	0	0	0	0
9:30	3	31	5	34	11	6	13	34	27	5	21	15	205	0	1	0	0
9:45	4	40	1	39	25	6	14	36	34	1	21	10	231	0	1	1	0
10:00	2	33	3	28	31	3	7	38	21	5	27	10	208	0	0	0	1
14:15 *	1	33	7	48	25	9	13	30	20	7	22	12	227	0	0	0	1
14:30 *	3	49	5	54	35	9	14	54	24	3	22	6	278	0	0	0	0
14:45 *	9	59	3	65	32	2	9	52	37	4	37	10	319	0	0	0	3
15:00 *	10	42	4	65	34	11	16	48	28	1	34	11	304	1	0	0	1
15:15	7	44	1	68	43	9	17	61	55	2	40	17	364	0	0	5	1
15:30	9	43	3	44	41	18	23	71	40	9	29	18	348	0	0	0	0
15:45	13	56	1	71	30	9	8	78	50	11	41	22	390	1	0	1	2
16:00	1	40	3	55	27	9	17	78	47	0	29	9	315	0	0	0	0
16:15	2	59	9	46	42	8	11	89	49	5	35	20	375	1	1	0	1
16:30	8	42	3	52	27	10	13	80	46	7	21	12	321	0	0	1	0
16:45 *	6	50	1	66	32	8	14	94	35	7	41	19	373	2	2	0	5
17:00 *	3	44	4	51	31	13	18	102	36	9	36	14	361	1	0	1	0
17:15 *	5	49	2	55	30	10	9	109	41	9	45	23	387	11	0	0	3
17:30 *	4	44	4	44	35	4	13	111	39	8	36	12	354	2	0	1	0
17:45	7	53	1	35	39	3	5	91	51	4	18	9	316	1	0	0	2
18:00	1	32	4	35	14	5	3	64	32	1	14	5	210	0	0	0	0
TOTAL	137	1,476	96	1,493	785	179	367	1,698	1,193	135	830	381		29	11	13	25
APPR.		1,709			2,457			3,258			1,346		8,770			78	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	3	0	1	3	0	0	2	0	0	2	1	12
7:30	0	3	0	4	1	0	7	7	2	1	5	1	31
7:45 *	1	5	1	4	3	0	0	5	3	2	4	1	29
8:00 *	1	5	0	1	4	1	1	4	6	2	9	0	34
8:15 *	2	4	0	5	4	0	2	4	3	0	5	3	32
8:30 *	0	3	0	6	3	1	4	1	4	1	3	1	27
8:45	0	2	2	4	0	2	1	6	1	3	8	1	30
9:00	1	1	0	2	1	0	1	6	4	0	4	1	21
9:15	1	2	1	7	1	0	3	4	7	0	5	2	33
9:30	0	2	1	2	3	2	3	2	3	0	1	2	21
9:45	1	3	0	5	8	0	4	5	5	0	2	3	36
10:00	0	2	0	1	3	1	1	7	3	1	4	3	26
14:15 *	0	3	1	1	2	0	2	2	1	2	2	2	18
14:30 *	1	6	2	3	3	0	3	4	0	0	2	1	25
14:45 *	1	10	0	3	4	0	1	7	2	0	1	3	32
15:00 *	2	5	0	4	4	1	0	5	1	0	3	1	26
15:15	0	5	1	4	3	0	3	7	6	0	4	3	36
15:30	1	1	2	7	2	2	2	6	9	1	7	1	41
15:45	0	5	0	5	4	0	0	7	4	1	2	0	28
16:00	0	5	1	2	2	0	3	2	4	0	4	0	23
16:15	0	5	2	0	1	0	2	5	5	1	1	1	23
16:30	0	1	0	0	3	0	0	4	2	0	2	1	13
16:45 *	0	5	0	0	0	0	2	7	4	0	2	1	21
17:00 *	0	2	1	1	1	1	1	7	0	0	2	1	17
17:15 *	0	1	0	3	1	0	0	4	2	0	5	1	17
17:30 *	0	1	0	3	3	0	0	4	0	0	2	0	13
17:45	2	2	0	4	3	0	1	6	4	0	2	0	24
18:00	0	3	1	0	0	1	0	3	2	0	0	0	10
TOTAL	14	95	16	82	70	12	47	133	87	15	93	35	
APPR.		125			164			267			143		699

TRUCKS

7:15	0	2	0	1	3	0	0	0	0	0	2	1	9
7:30	0	3	0	3	1	0	6	6	1	1	5	1	27
7:45 *	1	3	0	3	1	0	0	5	1	1	3	1	19
8:00 *	1	4	0	1	3	0	1	3	4	2	8	0	27
8:15 *	1	3	0	3	3	0	2	3	3	0	2	2	22
8:30 *	0	2	0	4	2	0	4	1	3	0	3	1	20
8:45	0	2	1	3	0	2	1	4	1	2	8	1	25
9:00	0	1	0	2	1	0	1	6	2	0	3	0	16
9:15	1	2	1	7	1	0	3	4	6	0	5	2	32
9:30	0	2	1	2	3	1	2	2	3	0	1	2	19
9:45	1	3	0	5	8	0	4	5	5	0	2	3	36
10:00	0	2	0	1	3	1	1	7	2	1	4	3	25
14:15 *	0	3	1	1	2	0	2	2	0	2	1	2	16
14:30 *	1	6	2	3	3	0	3	4	0	0	1	1	24
14:45 *	1	10	0	3	4	0	1	6	1	0	1	3	30
15:00 *	1	5	0	3	1	1	0	5	0	0	3	1	20
15:15	0	3	0	3	3	0	3	7	4	0	3	3	29
15:30	1	1	1	6	1	1	2	5	8	1	6	1	34
15:45	0	2	0	5	2	0	0	5	2	1	2	0	19
16:00	0	4	0	2	2	0	3	0	4	0	3	0	18
16:15	0	3	0	0	1	0	1	4	3	0	1	1	14
16:30	0	1	0	0	3	0	0	4	2	0	1	1	12
16:45 *	0	5	0	0	0	0	2	7	3	0	2	1	20
17:00 *	0	2	1	1	1	1	1	7	0	0	2	1	17
17:15 *	0	1	0	3	1	0	0	4	1	0	5	1	16
17:30 *	0	1	0	3	3	0	0	4	0	0	2	0	13
17:45	2	2	0	4	3	0	1	6	3	0	2	0	23
18:00	0	3	1	0	0	1	0	3	2	0	0	0	10
TOTAL	11	81	9	72	59	8	44	119	64	11	81	33	
APPR.		101			139			227			125		592

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 22

Intersection: **Fruitland Rd** **at** **Barton St** Total Vehicles: 9,719 Date: Tuesday
Direction: (North/South) (East/West) M.V.E./Year: 7.898 Jan 21, 2014
Road Condition: Wet Weather: Cloudy AWDT Factor: 2.39 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	6	59	0	48	29	6	10	16	20	3	33	17	247	0	0	0	0
7:30	6	89	1	46	25	0	12	16	29	1	25	16	266	1	0	2	0
7:45 *	8	88	1	72	33	2	21	35	74	0	50	18	402	0	0	0	0
8:00 *	14	71	8	58	50	3	38	28	78	3	62	8	421	0	0	0	0
8:15 *	7	74	5	63	40	7	38	28	57	2	41	22	384	0	0	0	0
8:30 *	18	77	4	39	30	7	43	47	82	9	44	24	424	0	0	3	1
8:45	9	59	1	51	35	6	30	41	70	5	37	23	367	0	0	0	0
9:00	7	53	5	58	42	4	51	54	59	1	36	20	390	0	0	0	0
9:15	14	42	1	38	23	1	35	39	45	1	33	12	284	0	0	0	0
9:30	8	33	3	30	23	7	17	32	40	2	33	10	238	0	0	0	0
9:45	4	32	4	35	28	3	20	25	32	1	27	21	232	0	0	0	1
10:00	5	35	3	26	31	7	12	33	29	3	30	14	228	0	0	0	0
14:15 *	8	43	4	38	34	9	8	52	34	4	30	18	282	0	0	0	0
14:30 *	5	47	4	56	63	9	23	40	35	5	31	30	348	0	0	0	0
14:45 *	8	38	3	60	44	6	21	50	29	6	36	30	331	1	0	0	0
15:00 *	6	44	2	58	48	9	23	42	45	2	28	12	319	0	0	0	0
15:15	9	46	3	79	49	12	23	57	44	7	54	29	412	0	0	0	0
15:30	6	33	2	77	46	10	21	51	40	6	43	21	356	0	0	0	2
15:45	6	47	3	63	32	10	20	71	39	8	39	41	379	2	0	1	0
16:00	6	45	6	54	39	14	22	70	44	2	39	20	361	3	1	0	0
16:15	6	50	2	66	44	6	22	63	36	1	38	14	348	0	0	0	0
16:30	4	47	5	64	35	5	25	75	44	3	45	16	368	2	0	0	1
16:45 *	7	44	3	92	37	13	28	74	37	9	68	34	446	0	0	0	0
17:00 *	7	50	4	61	40	10	26	83	44	6	45	16	392	1	0	0	0
17:15 *	6	49	2	69	35	12	17	84	35	10	54	29	402	1	0	0	0
17:30 *	10	44	2	70	43	14	17	80	44	7	39	21	391	0	0	0	0
17:45	6	45	5	40	40	8	15	71	44	6	31	16	327	1	1	0	0
18:00	11	60	4	47	40	9	20	79	56	7	27	14	374	0	0	2	2
TOTAL	217	1,444	90	1,558	1,058	209	658	1,436	1,265	120	1,098	566		12	2	8	7
APPR.		1,751			2,825			3,359			1,784		9,719			29	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	1	0	5	5	2	1	1	1	0	3	4	23
7:30	0	1	0	0	3	0	1	0	5	0	4	2	16
7:45 *	0	1	0	4	2	0	2	3	3	0	10	1	26
8:00 *	0	3	0	4	4	1	1	3	2	1	9	2	30
8:15 *	0	0	0	4	4	1	2	1	1	0	4	1	18
8:30 *	6	3	1	1	1	0	1	4	4	2	7	1	31
8:45	0	3	0	3	1	0	1	3	1	0	4	2	18
9:00	0	1	0	1	1	0	3	3	4	0	7	4	24
9:15	3	2	0	2	2	0	5	2	2	0	4	2	24
9:30	0	1	1	4	1	1	4	2	3	0	1	1	19
9:45	0	3	0	1	3	0	3	1	3	0	2	1	17
10:00	0	4	0	0	3	1	2	2	2	0	4	2	20
14:15 *	0	1	2	1	4	2	2	4	6	0	1	4	27
14:30 *	0	3	1	9	6	0	6	1	2	0	1	3	32
14:45 *	0	0	0	1	3	0	1	0	4	0	2	2	13
15:00 *	0	2	0	2	5	1	3	4	0	0	2	0	19
15:15	0	0	0	1	0	1	2	2	4	0	2	2	14
15:30	0	4	0	4	3	0	2	0	4	1	3	0	21
15:45	0	1	0	4	2	0	1	0	3	0	2	1	14
16:00	0	0	2	1	2	0	2	3	3	0	5	5	23
16:15	0	2	0	2	6	0	2	1	6	0	1	2	22
16:30	0	2	0	1	2	0	3	4	2	0	4	1	19
16:45 *	0	3	0	0	1	1	2	1	3	1	1	1	14
17:00 *	0	2	1	0	1	1	0	0	0	0	2	2	9
17:15 *	0	2	0	4	0	1	0	1	3	0	1	1	13
17:30 *	0	2	0	3	1	3	0	1	0	0	1	0	11
17:45	1	2	0	1	2	1	0	3	0	0	0	1	11
18:00	1	3	0	0	2	3	2	1	1	0	2	0	15
TOTAL	11	52	8	63	70	20	54	51	72	5	89	48	
APPR.		71			153			177			142		543

TRUCKS

7:15	0	0	0	1	1	1	1	1	0	0	2	4	11
7:30	0	1	0	0	3	0	1	0	0	0	2	2	9
7:45 *	0	1	0	3	1	0	2	3	1	0	7	1	19
8:00 *	0	0	0	3	2	1	1	3	0	1	8	2	21
8:15 *	0	0	0	3	4	0	1	0	1	0	4	0	13
8:30 *	6	3	1	1	1	0	1	3	2	0	6	1	25
8:45	0	3	0	3	1	0	1	2	1	0	4	2	17
9:00	0	1	0	1	1	0	2	3	2	0	7	4	21
9:15	1	1	0	2	1	0	5	2	1	0	3	1	17
9:30	0	1	1	4	1	1	4	2	2	0	1	1	18
9:45	0	3	0	1	3	0	3	1	2	0	2	1	16
10:00	0	4	0	0	3	1	2	2	1	0	3	2	18
14:15 *	0	1	2	1	4	2	2	4	3	0	1	4	24
14:30 *	0	3	1	5	3	0	6	1	2	0	1	2	24
14:45 *	0	0	0	1	1	0	1	0	3	0	2	2	10
15:00 *	0	2	0	2	4	1	3	4	0	0	2	0	18
15:15	0	0	0	1	0	0	2	2	3	0	2	2	12
15:30	0	3	0	3	2	0	2	0	1	1	1	0	13
15:45	0	1	0	2	1	0	1	0	2	0	2	1	10
16:00	0	0	0	0	2	0	2	2	2	0	3	5	16
16:15	0	1	0	2	5	0	2	0	2	0	1	2	15
16:30	0	2	0	1	2	0	3	4	1	0	4	1	18
16:45 *	0	3	0	0	1	1	2	1	2	1	1	1	13
17:00 *	0	2	1	0	1	1	0	0	0	0	2	2	9
17:15 *	0	2	0	4	0	1	0	1	2	0	1	1	12
17:30 *	0	2	0	2	1	3	0	1	0	0	0	0	9
17:45	1	2	0	1	2	1	0	3	0	0	0	1	11
18:00	1	3	0	0	2	3	2	1	0	0	2	0	14
TOTAL	9	45	6	47	53	17	52	46	36	3	74	45	
APPR.		60			117			134			122		433

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 8

Intersection: **Barton** **at** **Jones** Total Vehicles: 3,218 Date: Tuesday
Direction: (East/West) (North/South) M.V.E./Year: 2.527 Feb 3, 2009
Road Condition: Wet Weather: Cloudy AWDT Factor: 2.31 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	4	4	2	2	23	1	1	6	3	2	26	0	74	0	0	0	0
7:30	4	6	2	2	25	2	0	5	6	3	25	1	81	1	0	0	0
7:45	2	8	2	4	26	2	2	6	3	0	39	4	98	0	0	0	0
8:00	3	10	2	6	31	3	0	5	2	1	56	7	126	0	1	0	0
8:15 *	4	12	4	4	33	3	4	4	8	0	67	4	147	0	0	0	0
8:30 *	1	14	0	4	39	1	3	8	10	2	68	6	156	4	4	0	0
8:45 *	6	4	2	3	27	7	0	6	6	3	48	2	114	1	0	0	0
9:00 *	3	7	4	7	38	4	2	3	3	2	54	1	128	0	0	0	0
9:15	3	4	2	3	25	8	4	4	6	3	35	3	100	0	0	1	0
9:30	3	8	1	3	25	2	1	7	5	0	23	3	81	0	0	0	0
9:45	3	2	4	2	33	4	3	3	4	2	29	3	92	0	0	0	0
10:00	5	5	2	5	30	3	5	2	6	1	38	2	104	0	0	0	0
14:15 *	4	4	5	6	40	2	0	1	5	1	24	1	93	0	0	0	0
14:30 *	1	5	3	3	26	4	3	5	3	3	31	5	92	0	0	0	0
14:45 *	3	5	1	1	32	5	4	4	4	2	28	4	93	1	0	0	0
15:00 *	5	6	4	3	37	7	3	5	7	1	29	3	110	0	0	1	0
15:15	6	13	4	2	42	6	6	14	9	4	39	4	149	0	0	1	2
15:30	5	2	7	5	38	4	5	5	5	5	41	1	123	0	0	0	0
15:45	6	7	1	1	41	5	7	9	3	8	49	2	139	0	0	0	0
16:00	5	3	3	2	47	6	2	4	1	4	32	3	112	0	0	0	0
16:15	4	8	3	1	43	7	0	9	5	3	40	1	124	0	0	0	0
16:30	3	5	1	2	24	3	3	12	5	3	37	0	98	0	0	0	0
16:45 *	2	4	2	3	42	4	6	6	4	6	51	2	132	0	0	1	0
17:00 *	3	3	3	0	48	6	8	14	8	2	32	1	128	1	0	0	0
17:15 *	5	5	1	0	42	7	6	15	7	8	58	0	154	0	0	0	0
17:30 *	3	4	1	2	47	1	6	10	4	2	46	1	127	0	0	0	0
17:45	3	8	4	1	37	3	4	10	5	2	41	1	119	0	0	0	0
18:00	4	6	2	3	44	2	3	11	5	1	39	4	124	0	0	0	0
TOTAL	103	172	72	80	985	112	91	193	142	74	1,125	69		8	5	4	2
APPR.		347			1,177			426			1,268		3,218			19	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	1	0	0	0	3	1	0	0	1	0	1	0	7
7:30	0	2	1	0	2	0	0	2	4	1	0	0	12
7:45	0	0	0	1	1	1	1	3	2	0	3	1	13
8:00	0	0	0	1	3	0	0	1	1	0	6	0	12
8:15 *	0	0	0	1	5	0	0	2	3	0	6	0	17
8:30 *	0	3	0	0	4	1	1	0	4	0	7	3	23
8:45 *	1	0	1	0	5	2	0	2	1	0	6	1	19
9:00 *	1	2	0	2	3	0	1	0	2	0	4	1	16
9:15	1	2	0	0	9	0	0	2	3	0	5	2	24
9:30	1	3	0	1	6	1	0	1	0	0	3	1	17
9:45	0	1	0	1	3	0	1	0	1	0	5	0	12
10:00	1	1	0	1	8	1	3	0	2	0	8	0	25
14:15 *	0	2	0	3	8	0	0	0	2	0	6	0	21
14:30 *	0	0	1	1	4	1	1	0	1	0	4	0	13
14:45 *	1	0	0	0	7	0	1	2	0	1	1	2	15
15:00 *	0	1	0	0	5	0	0	0	0	0	6	1	13
15:15	0	1	1	0	6	0	1	0	1	0	12	0	22
15:30	1	0	0	3	7	0	0	2	1	0	3	1	18
15:45	0	0	0	1	6	1	0	1	1	1	4	2	17
16:00	0	0	1	0	6	2	0	0	0	1	1	1	12
16:15	0	2	0	0	2	1	0	0	1	0	4	0	10
16:30	0	0	0	0	3	0	0	0	0	0	2	0	5
16:45 *	0	0	0	0	0	0	0	0	0	0	4	0	4
17:00 *	0	1	0	0	1	1	0	1	1	0	3	0	8
17:15 *	0	1	0	0	3	0	0	0	0	0	0	0	4
17:30 *	0	2	0	0	0	0	0	0	0	0	2	0	4
17:45	0	0	0	0	2	0	0	0	1	1	2	0	6
18:00	0	0	0	0	3	0	0	0	0	0	1	0	4
TOTAL	8	24	5	16	115	13	10	19	33	5	109	16	
APPR.		37			144			62			130		373

TRUCKS

7:15	1	0	0	0	2	1	0	0	1	0	1	0	6
7:30	0	1	1	0	1	0	0	1	4	1	0	0	9
7:45	0	0	0	1	0	0	1	3	2	0	1	1	9
8:00	0	0	0	1	1	0	0	1	1	0	3	0	7
8:15 *	0	0	0	1	2	0	0	2	3	0	4	0	12
8:30 *	0	3	0	0	3	1	1	0	4	0	5	2	19
8:45 *	1	0	0	0	4	1	0	2	0	0	6	1	15
9:00 *	1	1	0	1	3	0	1	0	2	0	4	1	14
9:15	1	2	0	0	9	0	0	2	3	0	5	0	22
9:30	1	3	0	1	6	0	0	1	0	0	3	1	16
9:45	0	1	0	1	2	0	1	0	1	0	5	0	11
10:00	0	1	0	1	8	1	3	0	2	0	8	0	24
14:15 *	0	2	0	3	6	0	0	0	2	0	5	0	18
14:30 *	0	0	1	1	4	1	1	0	1	0	4	0	13
14:45 *	0	0	0	0	7	0	1	2	0	0	1	2	13
15:00 *	0	1	0	0	2	0	0	0	0	0	6	1	10
15:15	0	1	1	0	4	0	1	0	1	0	9	0	17
15:30	1	0	0	3	5	0	0	2	1	0	3	1	16
15:45	0	0	0	0	4	0	0	1	1	1	4	2	13
16:00	0	0	1	0	6	2	0	0	0	1	1	0	11
16:15	0	0	0	0	1	0	0	0	1	0	2	0	4
16:30	0	0	0	0	3	0	0	0	0	0	2	0	5
16:45 *	0	0	0	0	0	0	0	0	0	0	4	0	4
17:00 *	0	1	0	0	1	1	0	1	1	0	3	0	8
17:15 *	0	1	0	0	3	0	0	0	0	0	0	0	4
17:30 *	0	2	0	0	0	0	0	0	0	0	2	0	4
17:45	0	0	0	0	2	0	0	0	1	1	2	0	6
18:00	0	0	0	0	3	0	0	0	0	0	1	0	4
TOTAL	6	20	4	14	92	8	10	18	32	4	94	12	
APPR.		30			114			60			110		314

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 56

Intersection: **Barton St** **at** **Jones Rd** Total Vehicles: 3,864 Date: Friday
Direction: (East/West) (North/South) M.V.E./Year: 2.838 Jan 31, 2014
Road Condition: Wet Weather: Cloudy AWDT Factor: 2.16 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	6	10	4	1	24	2	3	8	1	4	31	0	94	1	0	0	1
7:30	2	10	4	5	36	3	2	0	2	1	42	5	112	0	1	1	0
7:45	2	6	3	3	33	3	1	4	1	1	57	6	120	0	0	2	0
8:00 *	3	20	2	11	60	9	4	9	3	1	63	3	188	0	0	0	0
8:15 *	6	8	3	4	57	4	4	9	2	2	52	5	156	0	0	0	0
8:30 *	2	5	0	9	52	4	5	1	2	1	58	5	144	0	0	1	0
8:45 *	2	6	5	2	39	3	3	3	3	1	61	1	129	0	1	0	0
9:00	4	4	6	3	44	11	8	7	3	3	36	4	133	0	0	4	0
9:15	4	2	3	3	36	2	3	2	5	3	41	4	108	0	0	0	0
9:30	3	5	2	2	31	1	2	3	4	1	47	3	104	0	0	0	0
9:45	1	0	0	2	41	2	4	1	2	0	33	0	86	0	0	0	0
10:00	4	4	1	2	34	1	3	1	3	2	47	3	105	0	0	1	0
14:15 *	5	9	2	5	49	4	1	1	3	1	42	3	125	0	0	0	0
14:30 *	0	6	3	6	74	1	4	10	4	1	25	4	138	0	0	0	2
14:45 *	5	2	1	2	58	5	2	4	4	1	46	5	135	0	0	0	0
15:00 *	2	4	4	3	50	5	3	11	3	1	49	2	137	0	0	2	0
15:15	4	8	4	2	61	6	7	8	4	2	61	4	171	0	0	1	0
15:30 *	4	5	2	2	67	2	5	8	4	3	49	1	152	0	0	0	0
15:45 *	3	10	1	4	61	8	4	13	3	1	78	7	193	0	0	0	0
16:00 *	8	3	3	1	56	3	6	4	5	4	46	1	140	0	0	8	0
16:15 *	4	7	3	4	60	10	11	10	3	6	70	2	190	0	1	0	1
16:30	3	2	5	1	40	4	3	8	5	2	50	3	126	0	0	0	0
16:45	5	2	2	1	61	4	7	9	6	4	80	3	184	0	1	0	0
17:00	5	2	3	1	63	3	8	10	4	3	54	2	158	0	0	0	0
17:15	3	5	1	0	58	6	6	13	11	1	67	2	173	0	1	0	0
17:30	3	2	1	3	55	2	6	6	6	2	50	2	138	0	0	0	0
17:45	2	2	2	1	49	2	0	3	3	1	44	0	109	0	0	0	0
18:00	0	2	2	2	52	1	1	4	0	2	47	3	116	0	0	0	0
TOTAL	95	151	72	85	1,401	111	116	170	99	55	1,426	83		1	5	20	4
APPR.		318			1,597			385			1,564		3,864			30	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	1	0	0	0	4	0	0	0	1	0	3	0	9
7:30	1	0	0	0	1	0	0	0	1	0	4	0	7
7:45	0	0	1	1	1	1	0	0	0	1	7	1	13
8:00 *	0	0	0	1	4	0	0	4	1	0	3	0	13
8:15 *	1	2	0	1	2	1	1	3	2	0	4	0	17
8:30 *	0	1	0	1	2	0	1	0	0	0	6	1	12
8:45 *	0	0	0	0	2	0	1	0	1	0	2	0	6
9:00	1	1	0	0	3	1	1	0	2	1	4	1	15
9:15	0	0	1	0	0	1	1	0	0	0	5	0	8
9:30	0	1	0	0	2	0	1	1	1	0	8	0	14
9:45	0	0	0	0	7	0	1	0	0	0	1	0	9
10:00	0	1	0	1	5	0	0	0	1	1	3	1	13
14:15 *	0	2	0	1	3	0	0	0	0	0	3	0	9
14:30 *	0	2	1	0	6	1	1	2	1	0	4	3	21
14:45 *	0	1	0	0	1	0	0	0	2	0	3	2	9
15:00 *	0	0	1	0	6	1	1	0	0	0	3	0	12
15:15	1	1	0	1	3	0	3	1	0	0	2	2	14
15:30 *	0	1	0	0	4	0	1	1	0	0	1	0	8
15:45 *	0	1	0	0	8	0	0	0	0	0	4	0	13
16:00 *	0	0	0	1	3	1	0	0	0	0	4	0	9
16:15 *	1	1	0	1	3	0	0	0	0	0	4	0	10
16:30	0	0	0	0	1	0	0	1	0	0	0	0	2
16:45	0	0	0	0	1	0	0	1	2	0	5	0	9
17:00	0	0	0	0	1	0	0	0	0	0	1	0	2
17:15	0	1	0	0	1	0	0	0	0	0	3	0	5
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	1	0	0	0	0	0	0	0	1
18:00	0	0	0	0	2	0	0	0	0	0	0	0	2
TOTAL	6	16	4	9	77	7	13	14	15	3	87	11	
APPR.		26			93			42			101		262

TRUCKS

7:15	1	0	0	0	2	0	0	0	0	0	3	0	6
7:30	0	0	0	0	0	0	0	0	1	0	2	0	3
7:45	0	0	1	1	1	0	0	0	0	0	5	1	9
8:00 *	0	0	0	1	3	0	0	4	1	0	3	0	12
8:15 *	0	2	0	1	1	0	1	3	2	0	3	0	13
8:30 *	0	1	0	1	2	0	1	0	0	0	4	1	10
8:45 *	0	0	0	0	2	0	1	0	1	0	2	0	6
9:00	1	1	0	0	2	0	1	0	2	1	3	1	12
9:15	0	0	1	0	0	1	1	0	0	0	2	0	5
9:30	0	1	0	0	2	0	1	1	1	0	7	0	13
9:45	0	0	0	0	7	0	1	0	0	0	1	0	9
10:00	0	1	0	1	5	0	0	0	1	1	3	1	13
14:15 *	0	2	0	1	3	0	0	0	0	0	3	0	9
14:30 *	0	2	0	0	5	0	1	2	1	0	4	3	18
14:45 *	0	1	0	0	1	0	0	0	2	0	3	2	9
15:00 *	0	0	1	0	3	1	1	0	0	0	3	0	9
15:15	0	1	0	1	3	0	2	1	0	0	2	2	12
15:30 *	0	0	0	0	3	0	1	1	0	0	1	0	6
15:45 *	0	1	0	0	7	0	0	0	0	0	4	0	12
16:00 *	0	0	0	0	3	0	0	0	0	0	3	0	6
16:15 *	0	1	0	1	1	0	0	0	0	0	3	0	6
16:30	0	0	0	0	1	0	0	1	0	0	0	0	2
16:45	0	0	0	0	1	0	0	1	2	0	5	0	9
17:00	0	0	0	0	1	0	0	0	0	0	1	0	2
17:15	0	1	0	0	1	0	0	0	0	0	2	0	4
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	1	0	0	0	0	0	0	0	1
18:00	0	0	0	0	2	0	0	0	0	0	0	0	2
TOTAL	2	15	3	8	63	2	12	14	14	2	72	11	
APPR.		20			73			40			85		218

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 192

Intersection: **Barton St** **at** **Jones Rd** Total Vehicles: 4,860 Date: Tuesday
Direction: (East/West) (North/South) M.V.E./Year: 3.354 Jul 21, 2015
Road Condition: Dry Weather: Clear AWDT Factor: 2.03 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			Total	Pedestrians N	E	S	W
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Veh's	side	side	side	side
7:15	1	7	4	1	24	5	6	5	2	0	25	0	80	0	1	1	0
7:30	8	4	2	3	32	5	1	5	7	1	40	5	113	0	1	1	0
7:45	4	9	4	3	39	3	4	8	8	3	51	5	141	0	0	4	0
8:00	5	10	4	8	50	3	4	8	7	6	58	8	171	0	0	0	0
8:15	5	15	10	8	45	9	2	11	6	1	53	5	170	0	0	0	0
8:30	6	10	7	6	50	4	5	12	6	3	52	1	162	0	0	3	0
8:45	5	10	5	5	46	6	6	4	18	0	47	2	154	0	0	1	2
9:00	6	10	3	10	52	6	5	8	18	3	51	3	175	0	0	0	0
9:15 *	5	12	10	2	55	5	10	12	9	3	59	3	185	0	1	3	2
9:30 *	8	10	9	7	62	6	8	12	6	5	60	5	198	0	0	0	0
9:45 *	10	8	7	3	51	4	4	5	4	3	54	5	158	2	1	0	0
10:00 *	6	9	12	8	46	13	5	9	11	4	48	5	176	0	0	0	0
13:45	7	9	5	4	65	7	5	2	2	5	55	5	171	0	0	0	0
14:00	11	9	5	7	66	8	9	4	9	5	60	6	199	0	0	0	0
14:15	1	11	3	6	44	2	5	4	7	4	37	5	129	0	0	0	0
14:30	6	10	4	5	53	5	5	5	9	4	47	6	159	0	0	0	0
14:45 *	5	4	3	6	72	5	11	5	2	5	59	6	183	0	0	0	0
15:00 *	14	7	6	4	64	10	16	6	13	8	52	7	207	0	0	0	0
15:15 *	4	7	4	10	58	8	12	6	10	7	57	11	194	0	0	0	0
15:30 *	9	4	4	6	50	10	8	5	11	4	50	7	168	0	0	0	0
16:15	9	6	6	5	68	12	11	4	16	5	52	8	202	0	0	2	0
16:30	4	2	5	6	60	9	11	7	15	8	46	6	179	0	0	0	2
16:45 *	10	6	8	9	73	15	13	17	28	11	62	3	255	0	3	0	0
17:00 *	10	5	5	8	76	10	10	5	12	4	62	9	216	0	0	0	0
17:15 *	2	4	6	5	66	4	5	5	9	2	66	6	180	0	0	0	0
17:30 *	6	2	8	7	68	5	7	3	8	4	77	8	203	0	0	0	0
17:45	6	2	8	5	52	6	7	8	10	6	50	12	172	0	0	0	4
18:00	9	5	5	9	58	2	8	0	9	4	50	1	160	0	0	0	0
TOTAL	182	207	162	166	1,545	187	203	185	272	118	1,480	153		2	7	15	10
APPR.		551			1,898			660			1,751		4,860			34	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	1	0	0	0	0	0	0	0	0	0	6	0	7
7:30	2	0	0	1	6	0	0	1	3	0	8	0	21
7:45	0	1	0	0	4	0	0	3	6	0	4	0	18
8:00	0	2	1	6	7	1	1	2	4	1	4	4	33
8:15	0	0	0	1	3	1	0	0	1	0	6	0	12
8:30	0	0	0	1	4	0	0	1	1	1	7	1	16
8:45	0	1	0	0	4	0	1	0	4	0	4	0	14
9:00	0	0	0	2	5	1	1	0	2	0	5	0	16
9:15 *	1	1	0	0	8	0	0	0	2	0	7	1	20
9:30 *	0	1	1	4	10	2	0	2	4	1	5	2	32
9:45 *	0	1	0	0	5	0	1	0	0	0	6	0	13
10:00 *	1	0	1	1	4	1	1	2	3	0	7	0	21
13:45	0	0	0	0	2	0	0	1	0	0	4	2	9
14:00	1	0	1	2	6	1	0	0	2	0	5	2	20
14:15	0	2	0	2	3	0	1	0	1	0	2	1	12
14:30	1	3	0	2	9	0	1	1	2	0	6	0	25
14:45 *	0	1	0	3	7	0	1	0	0	1	7	2	22
15:00 *	2	4	0	0	4	1	2	2	4	1	7	3	30
15:15 *	0	0	0	4	6	0	1	1	1	2	6	4	25
15:30 *	3	1	0	2	6	1	0	0	2	1	5	1	22
16:15	1	2	2	0	6	1	0	0	2	0	5	1	20
16:30	0	0	0	1	4	0	1	0	3	1	2	1	13
16:45 *	0	0	0	0	4	1	1	0	3	0	6	2	17
17:00 *	2	1	0	1	5	1	0	0	1	0	3	1	15
17:15 *	1	0	1	2	4	1	0	0	1	1	8	1	20
17:30 *	1	0	1	2	6	1	0	0	2	1	9	4	27
17:45	0	0	1	0	5	0	0	0	0	1	7	2	16
18:00	2	0	0	2	3	0	0	0	1	1	5	1	15
TOTAL	19	21	9	39	140	14	13	16	55	13	156	36	
APPR.		49			193			84			205		531

TRUCKS

7:15	1	0	0	0	0	0	0	0	0	0	6	0	7
7:30	2	0	0	1	5	0	0	1	3	0	8	0	20
7:45	0	1	0	0	4	0	0	3	6	0	4	0	18
8:00	0	2	1	6	7	1	1	2	4	1	4	4	33
8:15	0	0	0	1	2	1	0	0	1	0	6	0	11
8:30	0	0	0	1	4	0	0	1	1	1	7	1	16
8:45	0	1	0	0	4	0	1	0	4	0	4	0	14
9:00	0	0	0	2	5	1	1	0	2	0	5	0	16
9:15 *	1	1	0	0	8	0	0	0	2	0	6	1	19
9:30 *	0	1	1	4	10	2	0	2	4	1	5	2	32
9:45 *	0	1	0	0	5	0	1	0	0	0	6	0	13
10:00 *	1	0	1	1	4	1	1	2	3	0	6	0	20
13:45	0	0	0	0	2	0	0	1	0	0	4	2	9
14:00	1	0	1	2	6	1	0	0	2	0	5	2	20
14:15	0	2	0	2	3	0	1	0	1	0	2	1	12
14:30	1	3	0	2	9	0	1	1	2	0	6	0	25
14:45 *	0	1	0	2	7	0	1	0	0	1	7	2	21
15:00 *	2	4	0	0	4	1	2	2	4	1	7	3	30
15:15 *	0	0	0	4	6	0	1	1	1	2	6	4	25
15:30 *	3	1	0	2	6	1	0	0	2	1	5	1	22
16:15	1	2	2	0	6	1	0	0	2	0	5	1	20
16:30	0	0	0	1	4	0	1	0	3	1	2	1	13
16:45 *	0	0	0	0	4	1	1	0	3	0	6	2	17
17:00 *	2	1	0	1	5	1	0	0	1	0	3	1	15
17:15 *	1	0	1	2	4	1	0	0	1	1	8	1	20
17:30 *	1	0	1	2	6	1	0	0	2	1	9	4	27
17:45	0	0	1	0	5	0	0	0	0	1	7	2	16
18:00	2	0	0	2	3	0	0	0	1	1	5	1	15
TOTAL	19	21	9	38	138	14	13	16	55	13	154	36	
APPR.		49			190			84			203		526

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 2

Intersection: **Barton St.** **at** **Glover Rd.** Total Vehicles: 3,257 Date: Monday
Direction: (East/West) (North/South) M.V.E./Year: 2.602 Feb 23, 2004
Road Condition: Dry Weather: Cloudy AWDT Factor: 2.35 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	1	7	0	2	22	1	0	3	2	0	28	8	74	0	0	0	0
7:30	1	8	1	10	21	1	0	3	4	0	35	10	94	0	0	0	0
7:45 *	3	10	0	7	19	3	1	2	10	0	59	8	122	0	0	0	0
8:00 *	2	19	3	12	20	3	4	1	6	2	63	15	150	0	0	0	0
8:15 *	4	13	2	10	23	2	3	5	14	1	47	8	132	0	0	0	0
8:30 *	5	11	2	10	22	2	0	6	16	0	47	8	129	0	0	0	0
8:45	3	2	1	5	23	8	1	7	10	2	51	3	116	0	0	0	0
9:00	3	5	2	7	25	4	1	8	4	3	45	7	114	0	0	0	0
9:15	2	6	2	9	33	4	3	9	2	1	25	4	100	0	0	0	0
9:30	1	3	2	5	17	2	0	3	11	1	24	3	72	0	0	0	0
9:45	1	4	6	4	31	2	3	3	6	2	28	7	97	0	0	0	0
10:00	2	3	3	6	22	2	2	3	7	3	24	2	79	0	0	0	0
14:15 *	2	2	2	14	36	3	2	6	6	2	26	5	106	0	0	0	0
14:30 *	1	4	0	10	27	2	1	5	12	0	29	1	92	0	0	0	0
14:45 *	4	9	2	9	44	4	5	16	19	0	28	6	146	0	0	0	0
15:00 *	2	6	1	15	33	4	6	10	14	1	31	6	129	0	0	0	0
15:15	3	1	1	4	32	4	6	14	17	4	39	4	129	0	0	0	0
15:30 *	3	5	1	7	43	4	8	6	12	2	32	4	127	0	0	0	0
15:45 *	5	7	2	10	45	7	7	17	12	0	32	9	153	0	0	0	0
16:00 *	4	5	4	10	40	8	2	11	15	1	25	4	129	0	0	0	0
16:15 *	2	1	1	10	55	6	5	10	16	4	28	3	141	0	0	0	0
16:30	6	5	3	6	35	4	3	11	8	2	24	4	111	0	0	0	0
16:45	3	5	2	4	58	5	11	24	26	2	22	4	166	0	0	0	0
17:00	1	1	1	5	53	2	6	11	9	2	37	1	129	0	0	0	0
17:15	2	1	1	5	46	4	5	15	19	1	37	1	137	0	0	0	0
17:30	2	4	0	3	42	1	9	7	2	1	37	3	111	0	0	0	0
17:45	3	0	1	5	26	1	4	19	8	2	23	2	94	0	0	0	0
18:00	3	0	0	3	26	2	2	4	5	0	33	0	78	0	0	0	0
TOTAL	74	147	46	207	919	95	100	239	292	39	959	140		0	0	0	0
APPR.		267			1,221			631			1,138		3,257			0	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	0	0	0	4	1	0	0	2	0	0	0	7
7:30	0	0	0	1	1	0	0	0	0	0	2	0	4
7:45 *	0	1	0	0	5	1	0	0	2	0	3	0	12
8:00 *	0	0	1	1	1	0	1	1	0	0	3	0	8
8:15 *	0	0	0	0	6	0	0	0	2	0	2	0	10
8:30 *	0	0	0	1	0	0	0	1	4	0	1	0	7
8:45	3	0	0	0	5	1	0	1	4	0	0	0	14
9:00	1	0	0	2	4	0	1	1	1	0	1	1	12
9:15	0	0	0	2	5	0	0	0	0	0	1	0	8
9:30	0	0	0	0	2	0	0	0	3	0	5	0	10
9:45	0	0	0	0	3	0	0	0	0	0	3	0	6
10:00	0	0	0	0	2	0	0	1	1	0	1	0	5
14:15 *	0	0	0	1	6	0	1	0	2	0	2	0	12
14:30 *	1	0	0	3	1	0	1	0	1	0	4	0	11
14:45 *	1	2	0	0	5	0	0	0	2	0	2	0	12
15:00 *	0	0	1	3	1	0	1	0	0	0	4	1	11
15:15	0	0	0	1	2	0	0	0	2	0	9	0	14
15:30 *	0	0	0	0	0	0	0	0	2	0	0	0	2
15:45 *	0	2	0	1	1	0	0	0	2	0	5	0	11
16:00 *	1	0	0	2	6	0	1	0	2	0	2	0	14
16:15 *	0	0	0	1	2	0	0	0	1	0	0	1	5
16:30	0	0	0	2	2	0	0	0	3	0	2	0	9
16:45	0	1	0	1	2	0	0	0	0	0	0	0	4
17:00	0	0	0	0	4	0	0	0	1	0	2	0	7
17:15	0	0	0	0	2	0	0	0	1	0	5	0	8
17:30	0	0	0	1	0	0	0	0	0	0	0	0	1
17:45	0	0	0	0	0	0	0	0	3	0	1	0	4
18:00	0	0	0	0	0	0	0	0	0	0	2	0	2
TOTAL	7	6	2	23	72	3	6	5	41	0	62	3	
APPR.		15			98			52			65		230

TRUCKS

7:15	0	0	0	0	3	0	0	0	2	0	0	0	5
7:30	0	0	0	1	1	0	0	0	0	0	2	0	4
7:45 *	0	0	0	0	2	0	0	0	2	0	2	0	6
8:00 *	0	0	0	1	1	0	1	0	0	0	0	0	3
8:15 *	0	0	0	0	6	0	0	0	2	0	0	0	8
8:30 *	0	0	0	1	0	0	0	1	4	0	1	0	7
8:45	0	0	0	0	3	1	0	0	4	0	0	0	8
9:00	0	0	0	1	4	0	1	1	1	0	1	1	10
9:15	0	0	0	2	5	0	0	0	0	0	1	0	8
9:30	0	0	0	0	2	0	0	0	3	0	5	0	10
9:45	0	0	0	0	3	0	0	0	0	0	3	0	6
10:00	0	0	0	0	2	0	0	1	1	0	1	0	5
14:15 *	0	0	0	1	1	0	0	0	2	0	2	0	6
14:30 *	1	0	0	3	0	0	1	0	1	0	4	0	10
14:45 *	0	1	0	0	5	0	0	0	2	0	2	0	10
15:00 *	0	0	0	1	1	0	1	0	0	0	3	1	7
15:15	0	0	0	1	2	0	0	0	2	0	7	0	12
15:30 *	0	0	0	0	0	0	0	0	2	0	0	0	2
15:45 *	0	1	0	0	1	0	0	0	2	0	3	0	7
16:00 *	0	0	0	2	5	0	1	0	2	0	0	0	10
16:15 *	0	0	0	1	2	0	0	0	1	0	0	1	5
16:30	0	0	0	2	2	0	0	0	3	0	1	0	8
16:45	0	1	0	1	2	0	0	0	0	0	0	0	4
17:00	0	0	0	0	4	0	0	0	1	0	2	0	7
17:15	0	0	0	0	2	0	0	0	1	0	5	0	8
17:30	0	0	0	1	0	0	0	0	0	0	0	0	1
17:45	0	0	0	0	0	0	0	0	3	0	1	0	4
18:00	0	0	0	0	0	0	0	0	0	0	2	0	2
TOTAL	1	3	0	19	59	1	5	3	41	0	48	3	
APPR.		4			79			49			51		183

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 1

Intersection: **Barton St** **at** **Glover Rd** Total Vehicles: 3,015 Date: Wednesday
Direction: (East/West) (North/South) M.V.E./Year: 2.358 Feb 6, 2008
Road Condition: Wet Weather: Cloudy AWDT Factor: 2.3 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	3	7	1	9	25	0	1	5	3	0	38	4	96	0	0	0	0
7:30	3	7	1	18	15	1	0	3	3	1	26	8	86	0	0	0	0
7:45	2	3	1	5	20	2	4	1	3	2	39	5	87	0	0	0	0
8:00 *	4	14	0	21	14	2	2	3	12	2	55	18	147	0	0	0	0
8:15 *	8	8	1	11	19	4	4	4	9	2	49	8	127	0	0	0	0
8:30 *	5	5	1	17	20	3	1	8	6	0	48	8	122	0	0	0	0
8:45 *	5	4	0	11	15	4	3	9	11	0	35	3	100	0	0	0	0
9:00	7	9	1	7	18	1	3	18	2	2	29	5	102	0	0	0	0
9:15	3	8	0	5	16	3	3	3	6	2	22	6	77	0	0	0	0
9:30	3	7	1	7	17	6	6	6	5	1	26	3	88	0	0	0	0
9:45	1	4	1	4	23	4	3	1	7	1	20	5	74	0	0	0	0
10:00	0	4	0	12	12	0	1	4	6	0	19	4	62	0	0	0	0
14:15 *	1	6	0	5	22	6	3	3	6	1	23	2	78	0	0	0	0
14:30 *	5	6	2	5	26	3	2	2	7	0	22	2	82	0	0	0	0
14:45 *	6	5	1	17	34	4	6	13	10	0	30	6	132	0	0	0	0
15:00 *	2	5	0	9	56	3	3	12	15	3	19	6	133	0	0	0	0
15:15 *	3	9	0	5	30	2	10	13	12	3	27	2	116	0	0	0	0
15:30 *	0	8	3	12	35	7	8	8	8	3	33	5	130	0	0	0	0
15:45 *	7	13	4	12	43	3	6	19	14	2	43	2	168	0	0	0	0
16:00 *	4	6	0	8	39	6	6	4	15	1	28	1	118	0	0	0	0
16:15	1	1	0	8	42	2	1	9	11	2	25	2	104	0	0	0	0
16:30	2	4	3	5	31	4	2	5	8	0	35	1	100	0	0	0	0
16:45	2	5	0	2	39	5	15	19	16	0	26	2	131	0	0	0	0
17:00	6	10	0	7	38	4	13	7	13	4	31	1	134	0	0	0	0
17:15	1	3	1	5	35	5	11	19	13	0	40	0	133	0	0	0	0
17:30	2	4	1	4	61	4	5	6	10	0	22	1	120	0	0	0	0
17:45	0	0	2	3	47	4	0	3	7	2	13	2	83	0	0	0	0
18:00	1	3	3	3	40	3	5	4	5	1	17	0	85	0	0	0	0
TOTAL	87	168	28	237	832	95	127	211	243	35	840	112		0	0	0	0
APPR.		283			1,164			581			987		3,015			0	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	0	0	0	0	0	0	0	2	0	3	0	5
7:30	0	0	0	1	1	0	0	0	2	0	2	0	6
7:45	0	0	0	0	5	1	0	0	0	0	3	0	9
8:00 *	0	1	0	1	1	2	0	0	4	0	5	0	14
8:15 *	0	0	0	1	2	0	0	0	2	0	2	0	7
8:30 *	0	0	0	1	0	0	0	0	1	0	3	0	5
8:45 *	0	2	0	1	2	1	0	0	7	0	1	0	14
9:00	2	0	0	0	2	0	0	1	0	0	1	0	6
9:15	0	0	0	1	1	0	1	0	1	0	0	0	4
9:30	0	1	0	1	3	0	2	0	1	0	0	0	8
9:45	0	0	0	2	1	0	0	0	0	0	3	1	7
10:00	0	2	0	2	4	0	0	0	2	0	3	0	13
14:15 *	0	0	0	0	2	0	0	0	3	0	2	1	8
14:30 *	0	0	0	0	2	0	0	0	0	0	2	0	4
14:45 *	0	0	0	6	2	0	0	0	2	0	3	0	13
15:00 *	0	0	0	2	5	0	0	0	3	0	2	1	13
15:15 *	0	0	0	1	3	0	2	0	0	0	1	0	7
15:30 *	0	1	1	2	2	0	1	2	3	0	2	1	15
15:45 *	0	1	0	4	1	0	0	0	0	0	5	0	11
16:00 *	0	0	0	0	3	0	0	1	2	0	4	1	11
16:15	0	0	0	2	3	0	0	1	1	0	1	1	9
16:30	1	0	0	0	4	0	0	0	2	0	2	0	9
16:45	0	0	0	1	1	0	0	0	2	0	2	0	6
17:00	0	0	0	1	0	0	0	0	1	0	2	1	5
17:15	0	0	0	1	1	0	0	0	0	0	0	0	2
17:30	0	0	0	0	0	0	0	0	2	0	2	0	4
17:45	0	0	0	0	1	0	0	0	3	0	1	0	5
18:00	0	0	0	1	1	0	0	0	0	0	0	0	2
TOTAL	3	8	1	32	53	4	6	5	46	0	57	7	
APPR.		12			89			57			64		222

TRUCKS

7:15	0	0	0	0	0	0	0	0	2	0	2	0	4
7:30	0	0	0	1	1	0	0	0	2	0	1	0	5
7:45	0	0	0	0	3	0	0	0	0	0	3	0	6
8:00 *	0	0	0	1	1	0	0	0	3	0	2	0	7
8:15 *	0	0	0	1	2	0	0	0	2	0	1	0	6
8:30 *	0	0	0	0	0	0	0	0	1	0	3	0	4
8:45 *	0	2	0	1	1	1	0	0	7	0	1	0	13
9:00	0	0	0	0	1	0	0	1	0	0	1	0	3
9:15	0	0	0	1	1	0	1	0	1	0	0	0	4
9:30	0	1	0	1	3	0	2	0	1	0	0	0	8
9:45	0	0	0	2	1	0	0	0	0	0	3	1	7
10:00	0	2	0	2	4	0	0	0	2	0	3	0	13
14:15 *	0	0	0	0	2	0	0	0	3	0	2	1	8
14:30 *	0	0	0	0	2	0	0	0	0	0	2	0	4
14:45 *	0	0	0	6	2	0	0	0	2	0	3	0	13
15:00 *	0	0	0	1	4	0	0	0	3	0	2	1	11
15:15 *	0	0	0	1	2	0	2	0	0	0	1	0	6
15:30 *	0	1	1	2	2	0	1	1	3	0	1	1	13
15:45 *	0	1	0	4	1	0	0	0	0	0	4	0	10
16:00 *	0	0	0	0	2	0	0	1	2	0	2	1	8
16:15	0	0	0	2	1	0	0	1	1	0	0	1	6
16:30	1	0	0	0	4	0	0	0	2	0	2	0	9
16:45	0	0	0	1	1	0	0	0	2	0	2	0	6
17:00	0	0	0	1	0	0	0	0	1	0	2	1	5
17:15	0	0	0	1	1	0	0	0	0	0	0	0	2
17:30	0	0	0	0	0	0	0	0	2	0	2	0	4
17:45	0	0	0	0	1	0	0	0	3	0	1	0	5
18:00	0	0	0	1	1	0	0	0	0	0	0	0	2
TOTAL	1	7	1	30	44	1	6	4	45	0	46	7	
APPR.		9			75			55			53		192

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 44

Intersection: **Barton St** **at** **Glover Rd** Total Vehicles: 4,101 Date: Thursday
Direction: (East/West) (North/South) M.V.E./Year: 2.691 Oct 10, 2013
Road Condition: Dry Weather: Clear AWDT Factor: 1.93 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	4	8	0	15	22	2	4	8	6	0	23	9	101	0	0	0	0
7:30	8	6	0	9	24	4	4	4	7	1	35	7	109	0	0	0	0
7:45	6	6	1	2	24	1	6	3	9	1	45	6	110	0	0	0	0
8:00 *	8	6	1	20	33	3	4	9	14	0	59	10	167	0	0	1	0
8:15 *	2	10	3	17	28	5	8	7	17	0	43	7	147	1	0	0	0
8:30 *	6	8	8	14	28	4	10	5	12	4	38	6	143	0	0	0	0
8:45 *	5	10	2	16	36	6	6	7	5	2	45	5	145	0	0	0	1
9:00	7	6	1	11	39	10	1	21	8	7	37	8	156	0	0	0	0
9:15	8	10	4	9	32	9	3	18	5	4	36	6	144	0	0	0	0
9:30	10	4	1	11	20	2	1	3	9	1	31	7	100	0	0	0	0
9:45	6	3	4	12	29	4	1	5	16	0	39	2	121	0	0	0	0
10:00	1	5	1	10	21	5	0	3	7	2	35	0	90	0	0	0	1
14:15 *	7	5	2	13	42	3	5	3	6	1	41	1	129	0	0	1	1
14:30 *	4	7	2	13	50	6	3	6	10	2	32	1	136	0	0	0	0
14:45 *	3	12	2	13	48	7	6	10	15	1	25	9	151	0	0	0	0
15:00 *	6	14	2	11	56	4	8	13	20	2	28	7	171	1	0	0	0
15:15	8	5	2	6	35	3	8	15	17	3	48	4	154	0	0	0	0
15:30	4	8	3	9	39	9	7	16	7	0	34	4	140	0	0	0	0
15:45	12	13	5	13	53	10	7	19	30	2	29	5	198	0	0	0	0
16:00	6	10	1	9	52	6	8	7	12	1	43	5	160	0	0	0	0
16:15	7	10	3	4	47	4	4	11	12	3	34	4	143	0	0	0	0
16:30	7	5	3	11	49	6	7	11	8	2	40	1	150	0	0	0	0
16:45 *	8	5	1	10	49	7	14	13	31	2	51	2	193	0	0	0	0
17:00 *	3	10	2	12	69	8	5	15	12	2	38	6	182	0	0	0	0
17:15 *	6	14	3	5	63	1	12	19	18	5	44	7	197	0	0	0	0
17:30 *	4	10	5	12	53	4	6	10	5	0	47	5	161	0	0	0	0
17:45	8	10	0	7	57	7	6	11	7	2	33	4	152	0	0	0	0
18:00	4	5	4	13	56	5	7	3	13	1	35	5	151	0	0	1	0
TOTAL	168	225	66	307	1,154	145	161	275	338	51	1,068	143		2	0	3	3
APPR.		459			1,606			774			1,262		4,101			8	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	0	0	2	2	0	0	0	2	0	0	1	7
7:30	2	0	0	2	0	0	0	0	3	1	2	0	10
7:45	0	0	0	0	3	0	0	0	3	0	3	0	9
8:00 *	0	0	0	4	6	0	0	0	3	0	2	0	15
8:15 *	0	0	0	1	2	1	0	0	2	0	0	2	8
8:30 *	0	1	1	1	5	0	3	1	5	1	4	1	23
8:45 *	0	0	0	0	2	0	0	2	3	0	0	0	7
9:00	0	0	0	1	4	0	0	2	3	2	4	0	16
9:15	1	1	2	0	0	0	2	1	1	0	5	2	15
9:30	0	0	0	0	3	0	0	0	2	0	2	1	8
9:45	0	0	1	2	6	0	1	0	4	0	3	1	18
10:00	0	0	0	1	3	0	0	0	2	0	3	0	9
14:15 *	0	0	0	1	2	0	2	0	1	0	6	0	12
14:30 *	0	0	1	2	6	0	1	0	0	0	6	1	17
14:45 *	0	0	0	2	0	0	3	0	0	0	5	3	13
15:00 *	0	2	0	0	5	0	1	0	4	0	1	0	13
15:15	0	0	0	1	2	0	0	1	3	1	6	0	14
15:30	0	2	1	1	3	0	2	2	1	0	3	0	15
15:45	0	1	1	3	2	0	0	2	4	0	5	2	20
16:00	0	1	0	1	2	1	1	1	2	0	1	0	10
16:15	0	0	0	0	2	0	1	1	5	0	1	1	11
16:30	0	0	0	1	3	1	0	1	3	0	4	1	14
16:45 *	1	0	0	1	2	0	0	0	1	0	0	0	5
17:00 *	0	0	0	0	6	0	0	0	1	0	2	0	9
17:15 *	0	0	1	0	3	0	0	0	0	0	2	0	6
17:30 *	0	0	0	1	0	1	1	0	1	0	3	1	8
17:45	0	0	0	1	1	0	0	0	1	0	2	0	5
18:00	0	0	0	1	2	0	0	0	0	0	0	0	3
TOTAL	4	8	8	30	77	4	18	14	60	5	75	17	
APPR.		20			111			92			97		320

TRUCKS

7:15	0	0	0	1	2	0	0	0	2	0	0	1	6
7:30	0	0	0	2	0	0	0	0	3	0	1	0	6
7:45	0	0	0	0	3	0	0	0	2	0	1	0	6
8:00 *	0	0	0	3	6	0	0	0	3	0	2	0	14
8:15 *	0	0	0	1	2	0	0	0	2	0	0	0	5
8:30 *	0	1	1	1	5	0	1	1	5	0	3	0	18
8:45 *	0	0	0	0	2	0	0	1	3	0	0	0	6
9:00	0	0	0	1	2	0	0	0	3	0	4	0	10
9:15	0	0	2	0	0	0	2	1	1	0	3	2	11
9:30	0	0	0	0	3	0	0	0	2	0	2	1	8
9:45	0	0	1	2	6	0	1	0	4	0	3	1	18
10:00	0	0	0	1	3	0	0	0	2	0	3	0	9
14:15 *	0	0	0	1	2	0	2	0	1	0	6	0	12
14:30 *	0	0	0	1	4	0	1	0	0	0	6	0	12
14:45 *	0	0	0	2	0	0	2	0	0	0	5	3	12
15:00 *	0	0	0	0	2	0	1	0	4	0	1	0	8
15:15	0	0	0	1	2	0	0	1	3	0	4	0	11
15:30	0	0	1	0	3	0	2	0	1	0	3	0	10
15:45	0	1	1	2	2	0	0	0	3	0	5	2	16
16:00	0	0	0	1	2	0	0	1	2	0	0	0	6
16:15	0	0	0	0	2	0	1	0	5	0	1	1	10
16:30	0	0	0	1	3	0	0	1	3	0	4	1	13
16:45 *	1	0	0	1	2	0	0	0	1	0	0	0	5
17:00 *	0	0	0	0	6	0	0	0	1	0	2	0	9
17:15 *	0	0	0	0	3	0	0	0	0	0	2	0	5
17:30 *	0	0	0	1	0	1	1	0	1	0	3	1	8
17:45	0	0	0	1	1	0	0	0	1	0	2	0	5
18:00	0	0	0	1	2	0	0	0	0	0	0	0	3
TOTAL	1	2	6	25	70	1	14	6	58	0	66	13	
APPR.		9			96			78			79		262

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 190

Intersection: **Barton St** **at** **Glover Rd** Total Vehicles: 4,599 Date: Wednesday
Direction: (East/West) (North/South) M.V.E./Year: 3.159 Jul 22, 2015
Road Condition: Dry Weather: Clear AWDT Factor: 2.02 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	3	4	0	11	19	1	0	3	4	3	29	3	80	0	0	0	0
7:30	4	5	1	9	26	3	1	4	3	2	36	5	99	0	0	0	0
7:45	7	6	3	9	25	4	2	6	10	2	37	6	117	1	0	0	0
8:00	11	11	5	16	35	6	3	7	13	3	47	11	168	0	0	0	0
8:15	5	7	3	15	38	6	2	10	15	2	30	7	140	0	0	0	0
8:30	13	9	2	16	36	5	1	7	14	6	41	1	151	0	0	0	0
8:45 *	6	10	7	19	40	10	3	8	18	3	37	7	168	0	0	0	0
9:00 *	8	20	7	19	45	12	12	7	20	6	49	9	214	0	0	0	0
9:15 *	12	5	4	17	23	14	3	8	15	3	37	6	147	0	0	0	0
9:30 *	11	7	5	16	29	9	3	5	20	5	38	6	154	0	0	0	0
9:45	3	6	1	6	25	4	1	3	9	2	29	3	92	0	1	0	0
10:00	7	7	5	15	33	8	3	6	13	6	32	6	141	0	0	0	0
13:45	12	12	4	17	27	10	5	9	20	11	29	14	170	4	0	0	0
14:00 *	9	8	7	21	36	9	14	6	18	10	33	12	183	0	0	0	0
14:15 *	12	10	9	22	36	10	4	4	11	6	44	17	185	0	0	0	0
14:30 *	8	11	6	14	32	6	7	6	15	8	30	9	152	0	0	0	0
14:45 *	7	11	8	22	33	17	7	8	21	5	29	8	176	0	0	0	3
15:00	8	5	6	12	32	9	6	0	8	2	27	15	130	0	0	0	0
15:15	15	9	5	18	45	5	13	9	19	9	46	15	208	1	0	0	0
15:30	7	7	3	19	34	5	3	5	16	7	27	10	143	2	0	0	0
16:15	9	7	4	21	45	12	8	5	18	4	43	12	188	2	0	0	0
16:30	11	8	4	13	44	8	14	8	15	4	35	7	171	1	0	0	0
16:45	13	6	11	13	43	15	12	7	16	12	47	14	209	0	0	0	0
17:00 *	9	4	7	12	55	14	15	10	17	3	50	11	207	2	0	0	0
17:15 *	11	9	10	10	49	0	12	15	16	12	42	13	199	0	2	0	0
17:30 *	12	10	7	20	69	15	11	14	15	4	55	12	244	0	0	0	0
17:45 *	20	2	5	12	50	14	16	11	19	9	47	17	222	4	0	0	0
18:00	6	1	8	10	41	7	7	3	13	1	36	8	141	0	0	0	0
TOTAL	259	217	147	424	1,045	238	188	194	411	150	1,062	264		17	3	0	3
APPR.		623			1,707			793			1,476		4,599			23	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	0	0	2	3	0	0	0	1	0	4	1	11
7:30	0	0	0	1	3	0	0	0	1	0	3	0	8
7:45	0	0	0	1	2	0	0	0	1	0	0	0	4
8:00	1	0	1	3	4	0	1	0	2	0	4	1	17
8:15	0	0	0	2	3	0	0	1	2	0	0	1	9
8:30	0	0	0	2	3	0	0	0	2	0	4	0	11
8:45 *	1	0	0	2	1	1	1	1	4	0	0	2	13
9:00 *	1	2	0	2	4	1	1	0	3	0	5	1	20
9:15 *	0	0	0	1	2	0	2	0	3	0	8	1	17
9:30 *	0	0	0	2	4	0	1	0	3	0	7	2	19
9:45	0	0	0	2	1	0	0	0	3	0	3	0	9
10:00	0	0	0	4	6	0	0	0	4	0	3	1	18
13:45	0	0	0	5	6	0	1	0	4	1	5	2	24
14:00 *	0	0	0	4	4	0	3	0	4	1	8	2	26
14:15 *	0	1	0	7	5	0	1	0	1	0	6	3	24
14:30 *	0	1	0	4	3	0	2	0	4	1	5	1	21
14:45 *	1	1	0	1	4	2	1	0	4	0	5	0	19
15:00	0	0	0	1	3	1	1	0	1	0	2	2	11
15:15	1	0	0	2	3	0	2	1	4	1	4	4	22
15:30	1	1	0	3	5	1	1	0	4	1	6	1	24
16:15	0	0	0	2	5	1	7	1	2	0	7	2	27
16:30	0	0	0	3	8	0	3	0	3	0	7	1	25
16:45	2	1	0	1	2	1	1	0	4	1	5	2	20
17:00 *	2	0	1	3	4	0	0	0	5	0	8	3	26
17:15 *	1	0	1	2	4	0	2	0	2	1	5	2	20
17:30 *	2	1	1	3	8	1	2	0	1	0	6	2	27
17:45 *	1	0	0	2	4	0	2	1	1	1	6	3	21
18:00	1	0	1	1	3	0	1	0	1	0	2	2	12
TOTAL	15	8	5	68	107	9	36	5	74	8	128	42	
APPR.		28			184			115			178		505

TRUCKS

7:15	0	0	0	2	3	0	0	0	1	0	4	1	11
7:30	0	0	0	1	2	0	0	0	1	0	2	0	6
7:45	0	0	0	1	2	0	0	0	1	0	0	0	4
8:00	1	0	1	3	4	0	1	0	2	0	4	1	17
8:15	0	0	0	2	3	0	0	1	2	0	0	1	9
8:30	0	0	0	2	3	0	0	0	2	0	4	0	11
8:45 *	1	0	0	2	1	1	1	1	4	0	0	2	13
9:00 *	1	2	0	2	4	1	1	0	3	0	5	1	20
9:15 *	0	0	0	1	2	0	2	0	3	0	8	1	17
9:30 *	0	0	0	2	4	0	1	0	3	0	7	2	19
9:45	0	0	0	2	1	0	0	0	3	0	3	0	9
10:00	0	0	0	4	6	0	0	0	4	0	3	1	18
13:45	0	0	0	5	6	0	1	0	4	1	5	2	24
14:00 *	0	0	0	4	4	0	3	0	4	1	8	2	26
14:15 *	0	1	0	6	5	0	1	0	1	0	6	3	23
14:30 *	0	1	0	4	3	0	2	0	4	1	5	1	21
14:45 *	1	1	0	1	2	2	1	0	4	0	5	0	17
15:00	0	0	0	1	3	1	1	0	1	0	2	2	11
15:15	1	0	0	2	3	0	2	1	4	1	4	4	22
15:30	1	1	0	3	5	1	1	0	4	1	6	1	24
16:15	0	0	0	2	5	1	7	1	2	0	7	2	27
16:30	0	0	0	3	8	0	3	0	3	0	7	1	25
16:45	2	1	0	1	2	1	1	0	4	1	5	2	20
17:00 *	2	0	1	3	4	0	0	0	5	0	7	3	25
17:15 *	1	0	1	2	4	0	2	0	2	1	5	2	20
17:30 *	2	1	1	3	8	1	2	0	1	0	6	2	27
17:45 *	1	0	0	2	4	0	2	1	1	1	6	3	21
18:00	1	0	1	1	3	0	1	0	1	0	2	2	12
TOTAL	15	8	5	67	104	9	36	5	74	8	126	42	
APPR.		28			180			115			176		499

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 6

Intersection: **Barton St.** **at** **McNeilly Rd.** Total Vehicles: 2,413 Date: Thursday
Direction: (East/West) (North/South) M.V.E./Year: 1.813 Feb 26, 2004
Road Condition: Dry Weather: Clear AWDT Factor: 2.21 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			Total	Pedestrians N	E	S	W
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Veh's	side	side	side	side
7:15	11	5	0	2	11	1	0	11	3	0	23	0	67	0	0	0	0
7:30	7	3	1	1	25	0	0	4	1	4	35	0	81	0	0	0	0
7:45	16	8	3	1	15	0	2	3	1	1	37	1	88	0	0	0	0
8:00 *	24	13	2	1	23	3	0	1	2	3	54	2	128	0	0	0	0
8:15 *	21	15	3	1	19	0	0	0	3	2	46	2	112	0	0	0	0
8:30 *	7	6	2	0	9	2	0	0	6	4	46	0	82	0	0	0	0
8:45 *	10	5	4	1	20	2	0	1	3	6	41	0	93	0	0	0	0
9:00	8	1	1	3	17	3	0	3	1	4	33	1	75	0	0	0	0
9:15	5	2	1	1	21	0	1	1	4	2	21	0	59	0	0	0	0
9:30	4	3	2	0	19	2	0	2	2	1	24	1	60	0	0	0	0
9:45	3	1	0	2	16	1	1	2	2	1	26	0	55	0	0	0	0
10:00	5	0	1	2	13	3	1	1	0	3	15	0	44	0	0	0	0
14:15 *	5	2	1	0	37	1	2	1	2	1	34	1	87	0	0	0	0
14:30 *	6	6	1	2	26	3	0	1	1	0	30	1	77	0	0	0	0
14:45 *	5	7	3	1	30	8	0	4	0	0	27	0	85	0	0	0	0
15:00 *	3	3	0	1	35	5	1	0	3	2	28	1	82	0	0	0	0
15:15	4	2	1	1	35	11	1	14	3	6	28	0	106	0	0	0	0
15:30	6	3	1	0	36	7	1	2	3	0	22	0	81	0	0	0	0
15:45	6	1	5	0	53	9	1	9	0	2	35	0	121	0	0	0	0
16:00	8	3	1	0	37	9	1	3	1	2	24	0	89	0	0	0	0
16:15	5	2	4	1	35	4	0	4	3	1	23	1	83	0	0	0	0
16:30	4	4	1	1	34	6	0	2	5	0	24	0	81	0	0	0	0
16:45 *	3	2	1	3	60	13	0	5	1	2	22	0	112	0	0	0	0
17:00 *	3	3	3	1	47	11	0	7	2	1	16	1	95	0	0	0	0
17:15 *	5	2	4	3	60	5	2	10	0	5	18	0	114	0	0	0	0
17:30 *	1	1	3	4	41	11	1	7	2	3	36	0	110	0	0	0	0
17:45	4	1	3	0	36	9	1	4	2	0	22	0	82	0	0	0	0
18:00	1	0	2	2	36	4	0	4	0	1	14	0	64	0	0	0	0
TOTAL	190	104	54	35	846	133	16	106	56	57	804	12		0	0	0	0
APPR.		348			1,014			178			873		2,413			0	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	1	0	0	0	2	0	0	0	0	0	1	0	4
7:30	0	0	0	0	4	0	0	1	0	0	0	0	5
7:45	1	1	1	0	2	0	1	0	0	0	1	0	7
8:00 *	0	0	0	1	3	1	0	0	0	0	3	0	8
8:15 *	0	0	1	0	3	0	0	0	0	0	2	1	7
8:30 *	0	0	0	0	1	0	0	0	1	0	3	0	5
8:45 *	0	0	0	0	2	0	0	1	0	0	2	0	5
9:00	0	0	0	0	2	0	0	1	0	0	3	0	6
9:15	0	0	0	0	3	0	0	0	0	0	0	0	3
9:30	0	0	0	0	1	0	0	0	0	0	0	0	1
9:45	0	0	0	0	2	0	0	0	0	0	1	0	3
10:00	0	0	0	0	1	0	0	0	0	0	0	0	1
14:15 *	0	0	0	0	7	0	0	0	0	0	1	0	8
14:30 *	1	0	0	0	1	0	0	0	0	0	2	0	4
14:45 *	0	1	0	0	2	0	0	0	0	0	1	0	4
15:00 *	0	0	0	0	0	1	0	0	0	0	1	0	2
15:15	0	0	0	0	2	1	0	0	0	0	2	0	5
15:30	0	0	1	0	1	0	0	0	0	0	0	0	2
15:45	0	0	1	0	2	0	0	0	0	0	2	0	5
16:00	1	0	0	0	4	0	0	0	0	0	2	0	7
16:15	0	0	0	0	0	0	0	0	0	0	1	0	1
16:30	1	1	0	0	1	0	0	0	0	0	2	0	5
16:45 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00 *	0	0	0	0	1	0	0	0	0	0	2	0	3
17:15 *	0	0	0	1	0	0	0	0	0	0	0	0	1
17:30 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	5	3	4	2	47	3	1	3	1	0	32	1	
APPR.		12			52			5			33		102

TRUCKS

7:15	1	0	0	0	2	0	0	0	0	0	1	0	4
7:30	0	0	0	0	3	0	0	0	0	0	0	0	3
7:45	0	0	1	0	0	0	1	0	0	0	0	0	2
8:00 *	0	0	0	1	2	1	0	0	0	0	0	0	4
8:15 *	0	0	0	0	3	0	0	0	0	0	1	1	5
8:30 *	0	0	0	0	1	0	0	0	1	0	3	0	5
8:45 *	0	0	0	0	2	0	0	0	0	0	2	0	4
9:00	0	0	0	0	2	0	0	1	0	0	3	0	6
9:15	0	0	0	0	3	0	0	0	0	0	0	0	3
9:30	0	0	0	0	1	0	0	0	0	0	0	0	1
9:45	0	0	0	0	2	0	0	0	0	0	1	0	3
10:00	0	0	0	0	1	0	0	0	0	0	0	0	1
14:15 *	0	0	0	0	1	0	0	0	0	0	1	0	2
14:30 *	1	0	0	0	0	0	0	0	0	0	2	0	3
14:45 *	0	0	0	0	2	0	0	0	0	0	0	0	2
15:00 *	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	1	1	0	0	0	0	0	0	2
15:30	0	0	0	0	1	0	0	0	0	0	0	0	1
15:45	0	0	0	0	2	0	0	0	0	0	0	0	2
16:00	1	0	0	0	3	0	0	0	0	0	0	0	4
16:15	0	0	0	0	0	0	0	0	0	0	1	0	1
16:30	1	1	0	0	1	0	0	0	0	0	0	0	3
16:45 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00 *	0	0	0	0	1	0	0	0	0	0	2	0	3
17:15 *	0	0	0	1	0	0	0	0	0	0	0	0	1
17:30 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	1	1	2	34	2	1	1	1	0	17	1	
APPR.		6			38			3			18		65

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 82

Intersection: **Barton St** **at** **McNeilly Rd** Total Vehicles: 2,778 Date: Friday
Direction: (East/West) (North/South) M.V.E./Year: 1.804 Nov 28, 2014
Road Condition: Dry Weather: Cloudy AWDT Factor: 1.91 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	8	10	1	4	19	3	1	3	3	0	22	3	77	0	0	0	0
7:30	7	10	1	6	16	0	0	1	1	1	23	2	68	0	2	0	0
7:45	10	8	0	6	19	1	1	5	1	0	25	1	77	0	0	0	0
8:00 *	22	19	1	8	26	2	0	0	9	3	45	0	135	0	0	0	0
8:15 *	14	12	2	5	26	0	3	1	7	1	29	1	101	0	0	0	0
8:30 *	10	21	4	8	40	7	1	4	6	2	41	2	146	0	0	0	0
8:45 *	9	17	2	3	23	4	3	2	5	3	43	3	117	0	0	0	0
9:00	7	17	2	3	21	3	0	9	6	2	32	1	103	0	0	1	0
9:15	7	6	1	4	19	1	0	4	2	3	26	5	78	0	0	0	0
9:30	6	6	1	3	19	4	1	1	1	2	28	0	72	0	0	0	0
9:45	2	5	1	3	10	2	0	6	2	3	17	0	51	0	0	0	0
10:00	8	8	2	5	16	2	1	4	3	0	22	0	71	0	0	0	0
13:45	8	5	2	5	30	2	0	4	4	5	28	1	94	0	0	0	0
14:00	5	5	1	1	28	8	2	3	2	4	26	0	85	0	1	1	0
14:15	7	1	4	5	25	8	4	1	2	1	21	0	79	0	0	0	0
14:30	3	6	2	3	37	7	1	5	6	5	23	0	98	0	0	0	0
14:45 *	5	5	3	2	61	6	1	6	3	1	21	0	114	0	0	0	0
15:00 *	8	3	0	4	43	8	3	8	3	5	26	1	112	0	0	2	0
15:15 *	8	2	2	1	31	5	1	11	4	4	30	1	100	0	1	0	3
15:30 *	10	4	2	4	40	8	1	7	3	2	30	1	112	0	0	0	0
16:15	4	6	2	3	47	6	1	12	6	3	17	1	108	0	0	0	0
16:30 *	8	2	4	5	36	7	2	13	8	1	27	1	114	0	0	0	0
16:45 *	4	2	1	1	51	15	3	19	4	4	19	0	123	0	0	0	0
17:00 *	3	4	0	6	48	12	6	16	7	2	29	0	133	1	0	0	0
17:15 *	7	5	0	3	52	7	0	24	13	3	26	0	140	0	0	0	0
17:30	3	1	3	4	41	10	0	12	3	1	21	2	101	0	0	0	1
17:45	1	3	1	1	40	3	0	12	2	3	27	0	93	0	1	0	0
18:00	9	4	0	1	36	1	0	5	2	2	15	1	76	0	0	0	0
TOTAL	203	197	45	107	900	142	36	198	118	66	739	27		1	5	4	4
APPR.		445			1,149			352			832		2,778			14	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	0	0	0	2	1	0	0	0	0	1	0	4
7:30	1	0	1	0	2	0	0	0	0	0	3	2	9
7:45	0	0	0	0	0	0	0	0	0	0	3	0	3
8:00 *	0	0	0	0	3	0	0	0	0	0	4	0	7
8:15 *	1	0	0	1	3	0	0	0	0	0	2	0	7
8:30 *	0	0	1	0	3	1	0	0	0	0	5	0	10
8:45 *	0	1	1	0	3	0	1	0	0	1	1	0	8
9:00	1	0	1	0	3	1	0	0	0	0	6	0	12
9:15	0	0	0	1	1	0	0	0	0	0	1	1	4
9:30	0	0	0	0	2	0	0	0	0	0	1	0	3
9:45	0	0	0	0	1	2	0	0	2	0	2	0	7
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0
13:45	0	1	0	0	4	0	0	0	1	1	5	0	12
14:00	0	2	1	1	1	0	0	0	0	1	3	0	9
14:15	0	1	1	0	3	0	0	0	0	1	5	0	11
14:30	0	0	1	0	4	1	0	0	0	2	2	0	10
14:45 *	0	0	0	0	1	0	0	0	1	1	1	0	4
15:00 *	0	0	0	0	4	0	0	0	1	0	1	0	6
15:15 *	1	0	1	0	2	0	0	2	0	1	1	0	8
15:30 *	0	0	1	1	3	1	0	0	0	0	4	0	10
16:15	0	0	1	1	2	0	0	0	1	0	3	0	8
16:30 *	0	0	0	0	1	1	0	0	1	0	1	0	4
16:45 *	1	0	0	0	0	1	0	2	0	0	1	0	5
17:00 *	0	1	0	1	2	0	0	1	0	0	2	0	7
17:15 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	1	0	0	0	0	0	1	0	2
18:00	1	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	6	6	10	6	51	9	1	5	7	8	59	3	
APPR.		22			66			13			70		171

TRUCKS

7:15	0	0	0	0	1	1	0	0	0	0	1	0	3
7:30	0	0	1	0	1	0	0	0	0	0	1	2	5
7:45	0	0	0	0	0	0	0	0	0	0	2	0	2
8:00 *	0	0	0	0	1	0	0	0	0	0	3	0	4
8:15 *	0	0	0	1	3	0	0	0	0	0	1	0	5
8:30 *	0	0	0	0	1	1	0	0	0	0	3	0	5
8:45 *	0	1	0	0	2	0	1	0	0	0	0	0	4
9:00	1	0	1	0	3	0	0	0	0	0	2	0	7
9:15	0	0	0	1	0	0	0	0	0	0	0	1	2
9:30	0	0	0	0	2	0	0	0	0	0	1	0	3
9:45	0	0	0	0	1	2	0	0	2	0	2	0	7
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0
13:45	0	1	0	0	4	0	0	0	1	1	5	0	12
14:00	0	2	1	1	1	0	0	0	0	1	3	0	9
14:15	0	1	1	0	3	0	0	0	0	1	5	0	11
14:30	0	0	1	0	3	0	0	0	0	2	2	0	8
14:45 *	0	0	0	0	0	0	0	0	1	1	0	0	2
15:00 *	0	0	0	0	0	0	0	0	1	0	1	0	2
15:15 *	0	0	0	0	2	0	0	0	0	0	0	0	2
15:30 *	0	0	0	1	2	0	0	0	0	0	3	0	6
16:15	0	0	0	1	1	0	0	0	1	0	1	0	4
16:30 *	0	0	0	0	0	0	0	0	1	0	0	0	1
16:45 *	1	0	0	0	0	1	0	2	0	0	1	0	5
17:00 *	0	1	0	1	2	0	0	1	0	0	1	0	6
17:15 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	1	0	0	0	0	0	1	0	2
18:00	1	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	3	6	5	6	34	5	1	3	7	6	39	3	
APPR.		14			45			11			48		118

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 4

Intersection: **Barton St.** **at** **Lewis Rd.** Total Vehicles: 2,319 Date: Friday
Direction: (East/West) (North/South) M.V.E./Year: 1.648 Feb 27, 2004
Road Condition: Dry Weather: Clear AWDT Factor: 2.09 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	5	9	0	0	11	2	1	1	1	1	18	0	49	0	0	0	0
7:30 *	5	7	1	1	17	4	0	3	1	2	28	0	69	0	0	0	0
7:45 *	4	13	2	1	15	3	0	3	0	1	36	2	80	0	0	0	0
8:00 *	6	19	1	4	21	2	1	5	1	4	52	2	118	0	0	0	0
8:15 *	7	9	3	4	17	3	2	2	1	5	38	0	91	0	0	0	0
8:30	8	3	2	2	16	1	0	2	0	2	29	1	66	0	0	0	0
8:45	2	4	1	0	17	2	0	2	1	5	44	0	78	0	0	0	0
9:00	4	4	3	1	17	4	0	3	1	6	29	0	72	0	0	0	0
9:15	5	9	1	1	24	1	0	3	1	0	7	1	53	0	0	0	0
9:30	4	2	3	1	14	2	1	3	2	0	22	0	54	0	0	0	0
9:45	4	4	4	1	14	1	0	3	1	0	22	0	54	0	0	0	0
10:00	3	3	3	4	15	4	0	5	0	1	26	0	64	0	0	0	0
14:15 *	5	2	2	0	34	3	3	4	2	1	22	2	80	0	0	0	0
14:30 *	7	6	1	2	25	1	0	7	2	2	21	1	75	0	0	0	0
14:45 *	3	4	2	0	23	1	0	9	1	0	29	3	75	0	0	0	0
15:00 *	4	3	5	1	34	7	0	14	6	1	27	0	102	0	0	0	0
15:15	6	7	4	1	14	5	1	8	0	4	22	0	72	0	0	0	0
15:30	5	4	9	1	45	10	3	12	3	2	19	0	113	0	0	0	0
15:45	1	1	6	1	45	5	2	10	2	1	21	0	95	0	0	0	0
16:00	4	2	9	1	31	8	3	7	1	0	23	2	91	0	0	0	0
16:15	4	2	2	0	37	5	2	10	4	0	19	0	85	0	0	0	0
16:30 *	1	4	3	1	40	9	1	4	1	1	24	0	89	0	0	0	0
16:45 *	3	0	8	0	64	10	0	14	3	1	19	2	124	0	0	0	0
17:00 *	4	3	3	2	36	8	5	14	3	1	38	2	119	0	0	0	0
17:15 *	4	2	5	4	48	4	1	15	3	1	24	0	111	0	0	0	0
17:30	4	1	5	0	31	1	3	7	3	1	18	1	75	0	0	0	0
17:45	3	0	3	0	40	3	1	6	0	2	20	0	78	0	0	0	0
18:00	2	5	5	2	31	2	1	10	2	3	24	0	87	0	0	0	0
TOTAL	117	132	96	36	776	111	31	186	46	48	721	19		0	0	0	0
APPR.		345			923			263			788		2,319			0	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	0	0	0	0	0	0	0	0	0	1	0	1
7:30 *	0	0	0	0	3	0	0	0	0	0	0	0	3
7:45 *	1	0	1	0	1	1	0	0	0	0	3	0	7
8:00 *	0	0	0	0	4	0	0	0	0	0	1	0	5
8:15 *	1	0	0	0	3	0	1	0	0	0	1	0	6
8:30	1	0	1	0	2	0	0	0	0	1	0	0	5
8:45	0	0	1	0	0	0	0	1	0	0	1	0	3
9:00	0	0	0	1	1	0	0	0	0	0	1	0	3
9:15	0	0	0	0	3	0	0	0	0	0	0	0	3
9:30	0	0	0	0	2	0	1	0	0	0	0	0	3
9:45	0	1	0	0	0	0	0	1	0	0	2	0	4
10:00	0	0	0	0	4	0	0	1	0	0	0	0	5
14:15 *	0	0	0	0	3	0	0	0	0	0	1	0	4
14:30 *	0	0	0	0	3	0	0	0	0	0	1	0	4
14:45 *	0	0	0	0	0	0	0	0	0	0	2	0	2
15:00 *	1	0	0	0	5	0	0	0	0	0	1	0	7
15:15	0	0	0	0	2	0	0	0	0	0	5	0	7
15:30	0	0	0	0	1	0	0	0	0	0	0	0	1
15:45	0	0	1	0	0	0	0	0	0	0	2	0	3
16:00	1	0	0	0	3	0	0	1	0	0	0	0	5
16:15	1	0	0	0	2	0	0	0	1	0	0	0	4
16:30 *	0	0	0	0	0	0	0	0	0	0	1	0	1
16:45 *	0	0	0	0	0	0	0	0	1	0	1	0	2
17:00 *	0	0	0	1	0	0	0	0	0	0	0	0	1
17:15 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	6	1	4	2	42	1	2	4	2	1	24	0	
APPR.		11			45			8			25		89

TRUCKS

7:15	0	0	0	0	0	0	0	0	0	0	1	0	1
7:30 *	0	0	0	0	2	0	0	0	0	0	0	0	2
7:45 *	0	0	0	0	0	0	0	0	0	0	1	0	1
8:00 *	0	0	0	0	3	0	0	0	0	0	0	0	3
8:15 *	0	0	0	0	2	0	0	0	0	0	0	0	2
8:30	1	0	0	0	2	0	0	0	0	1	0	0	4
8:45	0	0	1	0	0	0	0	0	0	0	1	0	2
9:00	0	0	0	1	1	0	0	0	0	0	1	0	3
9:15	0	0	0	0	3	0	0	0	0	0	0	0	3
9:30	0	0	0	0	2	0	1	0	0	0	0	0	3
9:45	0	1	0	0	0	0	0	1	0	0	2	0	4
10:00	0	0	0	0	4	0	0	1	0	0	0	0	5
14:15 *	0	0	0	0	0	0	0	0	0	0	1	0	1
14:30 *	0	0	0	0	0	0	0	0	0	0	1	0	1
14:45 *	0	0	0	0	0	0	0	0	0	0	1	0	1
15:00 *	1	0	0	0	4	0	0	0	0	0	1	0	6
15:15	0	0	0	0	1	0	0	0	0	0	1	0	2
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	1	0	0	1	0	0	0	0	2
16:15	0	0	0	0	2	0	0	0	0	0	0	0	2
16:30 *	0	0	0	0	0	0	0	0	0	0	1	0	1
16:45 *	0	0	0	0	0	0	0	0	1	0	1	0	2
17:00 *	0	0	0	1	0	0	0	0	0	0	0	0	1
17:15 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	1	1	2	27	0	1	3	1	1	13	0	
APPR.		4			29			5			14		52

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 81

Intersection: **Barton St** **at** **Lewis Rd** Total Vehicles: 2,569 Date: Monday
Direction: (East/West) (North/South) M.V.E./Year: 1.869 Nov 24, 2014
Road Condition: Wet Weather: Cloudy AWDT Factor: 2.14 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			Total	Pedestrians N	E	S	W
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Veh's	side	side	side	side
7:15	2	7	1	1	7	4	0	2	1	3	9	4	41	0	0	0	0
7:30	7	8	8	2	8	4	2	6	2	5	19	3	74	0	1	0	0
7:45	9	16	3	2	9	6	0	2	1	7	28	4	87	0	0	0	0
8:00 *	2	13	4	3	14	7	2	9	1	11	32	5	103	0	0	0	0
8:15 *	2	12	3	3	11	5	2	12	1	11	29	7	98	0	0	0	0
8:30 *	23	15	25	7	12	23	0	23	4	49	25	0	206	0	0	26	0
8:45 *	12	14	21	5	14	13	1	10	3	14	21	5	133	0	0	2	0
9:00	5	7	4	2	10	3	0	4	1	8	29	3	76	0	0	0	0
9:15	4	4	4	0	19	2	4	1	1	8	21	1	69	0	0	0	0
9:30	4	4	1	1	9	0	2	3	1	0	17	5	47	0	0	0	0
9:45	3	13	2	1	9	1	1	2	0	2	16	6	56	0	0	3	0
10:00	3	8	2	2	14	2	2	3	2	3	9	0	50	0	0	0	0
13:45	2	2	3	5	16	2	4	1	3	2	18	3	61	0	0	0	0
14:00	0	1	2	2	21	5	1	4	3	2	13	0	54	0	0	0	0
14:15	3	8	3	1	22	11	1	11	2	4	24	4	94	0	0	0	0
14:30	1	4	3	1	20	8	2	7	2	8	13	3	72	0	0	0	0
14:45 *	3	2	4	0	13	9	2	11	3	13	18	0	78	0	0	4	1
15:00 *	13	8	17	2	18	11	2	12	2	12	18	1	116	0	1	28	0
15:15 *	11	12	20	3	24	7	4	15	7	4	10	2	119	0	0	9	0
15:30 *	8	10	5	2	27	2	1	3	1	4	18	4	85	0	0	0	0
16:15	3	3	20	2	35	4	3	7	4	5	18	4	108	0	0	0	0
16:30	2	0	8	3	26	4	3	11	3	9	17	1	87	0	0	0	0
16:45 *	6	8	17	1	53	12	7	7	2	1	21	1	136	0	0	1	0
17:00 *	5	3	5	2	39	8	6	16	2	5	16	1	108	1	1	0	0
17:15 *	5	1	14	0	57	11	3	15	5	5	17	2	135	0	0	0	0
17:30 *	4	0	17	2	36	4	4	11	1	2	18	2	101	0	0	0	0
17:45	10	3	13	1	26	5	8	10	1	6	20	2	105	0	0	0	0
18:00	4	2	4	1	30	2	5	4	0	3	15	0	70	0	0	0	0
TOTAL	156	188	233	57	599	175	72	222	59	206	529	73		1	3	73	1
APPR.		577			831			353			808		2,569			78	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	0	0	0	1	0	0	0	1	0	0	0	2
7:30	0	0	1	1	1	0	0	0	0	0	3	0	6
7:45	0	0	0	0	0	0	0	0	1	0	0	0	1
8:00 *	0	2	1	0	1	0	0	1	0	0	3	0	8
8:15 *	0	0	0	1	0	0	0	0	0	0	2	0	3
8:30 *	4	0	6	0	0	4	0	0	0	8	2	0	24
8:45 *	0	1	2	1	2	1	0	1	0	0	0	0	8
9:00	1	0	1	0	2	0	0	0	0	0	2	1	7
9:15	1	0	0	0	3	0	1	0	0	0	4	0	9
9:30	0	0	0	0	1	0	1	0	1	0	1	0	4
9:45	0	0	0	0	0	0	0	0	0	0	1	0	1
10:00	0	0	0	1	2	0	1	0	0	0	0	0	4
13:45	1	0	0	0	1	0	2	0	1	0	3	1	9
14:00	0	0	0	1	3	0	0	0	1	0	2	0	7
14:15	0	0	0	0	0	0	0	1	2	0	2	3	8
14:30	0	0	0	1	4	0	0	0	0	0	1	0	6
14:45 *	0	0	0	0	0	1	0	0	0	2	1	0	4
15:00 *	1	0	0	0	3	2	1	1	0	3	1	0	12
15:15 *	2	1	6	1	2	0	0	0	0	0	1	1	14
15:30 *	0	1	0	1	1	0	0	0	0	0	2	0	5
16:15	0	0	0	1	2	0	0	0	1	0	2	1	7
16:30	0	0	0	3	3	0	0	0	1	0	0	0	7
16:45 *	0	0	0	1	1	0	0	0	0	0	1	0	3
17:00 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15 *	0	0	0	0	0	0	0	0	0	0	2	0	2
17:30 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	1	0	0	0	0	1
TOTAL	10	5	17	13	33	8	6	5	9	13	36	7	
APPR.		32			54			20			56		162

TRUCKS

7:15	0	0	0	0	0	0	0	0	1	0	0	0	1
7:30	0	0	1	1	0	0	0	0	0	0	0	0	2
7:45	0	0	0	0	0	0	0	0	1	0	0	0	1
8:00 *	0	2	1	0	0	0	0	1	0	0	3	0	7
8:15 *	0	0	0	1	0	0	0	0	0	0	1	0	2
8:30 *	1	0	0	0	0	0	0	0	0	1	1	0	3
8:45 *	0	1	0	1	1	0	0	1	0	0	0	0	4
9:00	0	0	1	0	2	0	0	0	0	0	0	1	4
9:15	1	0	0	0	2	0	1	0	0	0	3	0	7
9:30	0	0	0	0	1	0	1	0	1	0	0	0	3
9:45	0	0	0	0	0	0	0	0	0	0	1	0	1
10:00	0	0	0	1	2	0	1	0	0	0	0	0	4
13:45	1	0	0	0	1	0	2	0	1	0	3	1	9
14:00	0	0	0	1	3	0	0	0	1	0	2	0	7
14:15	0	0	0	0	0	0	0	1	2	0	2	3	8
14:30	0	0	0	1	3	0	0	0	0	0	1	0	5
14:45 *	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00 *	1	0	0	0	2	0	0	1	0	0	1	0	5
15:15 *	0	0	0	1	1	0	0	0	0	0	0	1	3
15:30 *	0	0	0	1	0	0	0	0	0	0	2	0	3
16:15	0	0	0	1	1	0	0	0	1	0	2	1	6
16:30	0	0	0	3	1	0	0	0	1	0	0	0	5
16:45 *	0	0	0	1	0	0	0	0	0	0	0	0	1
17:00 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15 *	0	0	0	0	0	0	0	0	0	0	2	0	2
17:30 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	1	0	0	0	0	1
TOTAL	4	3	3	13	20	0	5	5	9	1	24	7	
APPR.		10			33			19			32		94

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 8

Intersection: **Barton St** **at** **Lewis Rd** Total Vehicles: 2,467 Date: Thursday
Direction: (East/West) (North/South) M.V.E./Year: 1.854 Mar 3, 2016
Road Condition: Dry Weather: Cloudy AWDT Factor: 2.21 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	3	8	1	1	6	2	1	7	0	3	14	3	49	0	0	0	0
7:30	2	7	5	1	10	2	1	2	2	7	26	4	69	0	0	0	0
7:45	4	11	3	1	8	6	0	4	2	7	35	4	85	0	0	0	0
8:00 *	5	7	4	3	6	7	3	7	1	6	22	6	77	0	0	0	0
8:15 *	2	18	7	5	15	14	1	16	3	14	24	1	120	0	2	0	1
8:30 *	16	18	27	2	9	32	2	14	3	49	13	4	189	0	10	0	0
8:45 *	16	16	22	4	4	8	0	2	3	15	28	1	119	0	8	2	2
9:00	7	7	2	2	12	1	1	3	0	4	19	3	61	0	0	0	1
9:15	4	5	1	5	12	5	2	1	4	2	27	6	74	0	0	0	0
9:30	4	2	2	2	8	3	2	2	4	2	13	3	47	0	0	0	0
9:45	0	6	0	5	8	1	1	5	0	0	13	2	41	0	0	0	0
10:00	3	4	3	3	11	5	1	4	3	4	9	1	51	0	0	0	0
13:45	1	9	4	3	18	4	1	4	1	4	15	2	66	0	0	0	0
14:00	2	5	2	3	14	3	2	8	1	0	11	1	52	0	0	0	0
14:15	3	6	7	2	9	5	0	9	6	4	13	0	64	0	0	0	0
14:30 *	6	6	3	4	26	6	2	5	2	15	12	0	87	0	0	0	0
14:45 *	2	4	4	3	22	11	8	12	1	15	12	2	96	0	0	0	0
15:00 *	9	10	21	4	16	11	1	9	4	15	15	1	116	0	3	0	21
15:15 *	15	8	17	4	22	0	2	13	6	4	14	2	107	0	0	0	15
15:30	3	4	12	2	29	4	3	5	4	5	10	1	82	0	0	0	0
16:15	9	4	12	2	30	4	6	13	3	2	28	2	115	0	0	0	0
16:30	2	1	13	2	31	8	1	8	5	4	11	3	89	0	1	0	0
16:45 *	4	4	15	2	47	9	7	15	5	5	10	2	125	0	0	0	1
17:00 *	2	2	8	1	27	1	2	7	2	7	24	2	85	0	0	0	0
17:15 *	1	4	10	1	40	10	9	14	5	8	16	1	119	0	0	0	0
17:30 *	4	1	16	4	39	3	8	16	2	3	8	1	105	0	0	0	0
17:45	7	2	8	3	23	5	6	9	3	3	15	0	84	0	0	0	1
18:00	7	10	5	4	33	4	5	5	1	3	14	2	93	3	0	0	0
TOTAL	143	189	234	78	535	174	78	219	76	210	471	60		3	24	2	42
APPR.		566			787			373			741		2,467			71	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	0	0	1	2	0	0	0	0	0	1	0	4
7:30	0	0	0	0	1	1	0	0	1	0	2	0	5
7:45	0	1	1	0	0	0	0	0	0	0	1	1	4
8:00 *	0	0	0	0	1	0	0	0	1	0	2	0	4
8:15 *	0	0	0	1	2	0	1	0	0	1	1	0	6
8:30 *	1	1	4	0	3	4	1	0	1	6	1	1	23
8:45 *	1	0	2	1	1	1	0	0	1	0	0	0	7
9:00	2	0	0	0	2	0	0	0	0	0	3	0	7
9:15	0	0	0	1	2	0	0	0	1	0	2	0	6
9:30	0	0	0	0	0	0	1	1	1	0	1	1	5
9:45	0	0	0	1	1	0	0	1	0	0	0	0	3
10:00	0	0	0	0	1	1	0	0	0	0	0	0	2
13:45	0	0	0	0	5	1	0	0	0	0	0	1	7
14:00	0	0	0	1	2	0	0	0	1	0	2	1	7
14:15	1	1	0	0	1	0	0	0	1	0	2	0	6
14:30 *	0	0	1	2	4	0	0	0	1	1	2	0	11
14:45 *	0	0	0	0	1	1	0	0	0	3	2	0	7
15:00 *	2	0	0	2	1	3	0	0	2	1	2	0	13
15:15 *	2	2	5	2	1	0	0	0	0	1	1	0	14
15:30	0	0	0	0	3	1	0	0	1	0	0	0	5
16:15	0	0	0	0	3	0	2	0	0	0	2	1	8
16:30	0	0	1	1	1	0	0	0	2	1	0	0	6
16:45 *	0	0	0	0	3	0	0	0	0	0	0	0	3
17:00 *	0	0	0	1	1	0	0	2	0	0	1	0	5
17:15 *	0	1	0	0	2	0	0	0	0	0	0	0	3
17:30 *	0	0	1	1	0	0	0	0	1	0	0	0	3
17:45	0	0	0	0	0	0	0	0	1	0	0	0	1
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	9	6	15	15	44	13	5	4	16	14	28	6	
APPR.		30			72			25			48		175

TRUCKS

7:15	0	0	0	0	1	0	0	0	0	0	0	0	1
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 *	0	0	0	0	1	0	0	0	0	0	2	0	3
8:15 *	0	0	0	0	1	0	0	0	0	0	0	0	1
8:30 *	1	0	0	0	1	1	0	0	0	0	0	1	4
8:45 *	0	0	0	0	0	1	0	0	0	0	0	0	1
9:00	1	0	0	0	0	0	0	0	0	0	1	0	2
9:15	0	0	0	0	2	0	0	0	0	0	2	0	4
9:30	0	0	0	0	0	0	0	0	0	0	1	1	2
9:45	0	0	0	0	1	0	0	1	0	0	0	0	2
10:00	0	0	0	0	1	1	0	0	0	0	0	0	2
13:45	0	0	0	0	1	0	0	0	0	0	0	0	1
14:00	0	0	0	0	1	0	0	0	0	0	1	0	2
14:15	0	1	0	0	0	0	0	0	1	0	2	0	4
14:30 *	0	0	0	0	1	0	0	0	0	1	1	0	3
14:45 *	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00 *	1	0	0	0	1	0	0	0	0	0	1	0	3
15:15 *	0	0	0	0	0	0	0	0	0	0	1	0	1
15:30	0	0	0	0	2	1	0	0	0	0	0	0	3
16:15	0	0	0	0	2	0	2	0	0	0	2	1	7
16:30	0	0	0	1	1	0	0	0	0	0	0	0	2
16:45 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00 *	0	0	0	1	1	0	0	2	0	0	1	0	5
17:15 *	0	1	0	0	2	0	0	0	0	0	0	0	3
17:30 *	0	0	1	0	0	0	0	0	0	0	0	0	1
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	2	1	2	20	4	2	3	1	1	15	3	
APPR.		6			26			6			19		57

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 89

Intersection: **Barton St.** **at** **Winona Rd.** Total Vehicles: 2,927 Date: Monday
Direction: (East/West) (North/South) M.V.E./Year: 2.130 Nov 28, 2005
Road Condition: Dry Weather: Cloudy AWDT Factor: 2.14 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	1	5	10	0	19	5	0	14	2	10	12	0	78	0	0	0	0
7:30	3	4	17	1	11	5	4	7	3	6	18	1	80	1	0	0	0
7:45	2	2	12	2	18	6	2	14	7	6	23	2	96	0	0	0	2
8:00 *	6	12	20	2	17	22	2	21	5	29	40	0	176	2	0	1	15
8:15 *	10	19	21	4	22	9	1	25	14	18	25	2	170	0	1	0	6
8:30 *	4	12	14	8	20	3	2	17	6	3	15	0	104	0	0	0	2
8:45 *	5	9	6	6	12	5	2	19	4	9	20	2	99	0	0	0	0
9:00	6	5	11	5	13	9	0	9	7	6	8	0	79	0	0	0	0
9:15	6	12	9	2	9	4	4	8	3	4	13	3	77	2	0	2	6
9:30	3	7	8	5	10	6	3	13	3	4	10	1	73	0	0	1	0
9:45	4	4	4	1	14	8	1	8	9	7	10	1	71	0	0	3	0
10:00	7	10	8	4	6	7	2	10	9	4	9	0	76	0	0	0	0
14:15 *	3	6	3	3	22	8	0	6	7	11	19	2	90	0	0	0	0
14:30 *	6	9	14	5	17	12	0	13	3	6	16	1	102	0	0	4	0
14:45 *	19	16	18	4	28	4	3	9	4	5	15	2	127	5	1	16	17
15:00 *	5	6	6	4	18	5	0	9	4	5	14	1	77	0	0	1	3
15:15	0	7	4	6	23	5	1	7	3	5	18	4	83	0	1	1	0
15:30	10	17	8	4	24	11	0	9	5	11	11	1	111	0	0	0	0
15:45	6	20	14	8	24	9	1	7	3	14	17	0	123	1	0	0	1
16:00	6	3	5	8	23	4	2	10	6	8	13	4	92	2	0	0	0
16:15	4	14	7	3	34	8	0	6	6	11	19	2	114	0	0	0	0
16:30	3	8	15	8	23	3	0	8	1	10	18	3	100	0	0	0	0
16:45 *	5	9	16	12	38	9	1	8	5	4	19	6	132	0	0	2	1
17:00 *	7	15	8	10	34	6	2	15	7	11	14	3	132	0	0	0	0
17:15 *	6	10	9	5	34	3	4	15	7	15	24	3	135	0	0	0	0
17:30 *	4	14	8	6	23	11	1	10	4	10	17	4	112	0	0	2	1
17:45	6	8	4	8	30	8	1	7	2	16	13	3	106	0	0	2	0
18:00	2	18	6	5	25	3	1	16	9	5	17	5	112	0	0	0	0
TOTAL	149	281	285	139	591	198	40	320	148	253	467	56		13	3	35	54
APPR.		715			928			508			776		2,927			105	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	0	0	0	2	0	0	0	0	0	0	0	2
7:30	1	0	0	0	1	0	1	1	0	0	2	1	7
7:45	0	1	0	0	1	0	0	2	1	0	1	1	7
8:00 *	0	1	0	0	0	2	0	2	0	3	1	0	9
8:15 *	0	2	0	0	2	0	0	0	1	0	2	0	7
8:30 *	0	2	1	1	3	0	0	2	1	0	2	0	12
8:45 *	1	1	2	0	0	0	0	3	0	1	0	0	8
9:00	0	0	1	1	2	1	0	0	1	0	0	0	6
9:15	1	0	0	0	2	0	0	0	1	1	0	0	5
9:30	0	0	0	0	3	0	0	0	0	0	1	0	4
9:45	0	0	0	0	3	0	0	0	2	0	1	1	7
10:00	0	1	0	0	2	1	0	1	0	0	0	0	5
14:15 *	0	1	0	0	0	2	0	2	1	1	0	0	7
14:30 *	0	0	0	0	1	2	0	1	0	1	0	0	5
14:45 *	1	0	0	0	2	0	0	0	0	0	1	0	4
15:00 *	0	0	0	1	0	0	0	1	0	0	2	0	4
15:15	0	0	0	1	3	0	0	0	1	0	1	1	7
15:30	0	0	1	0	1	0	0	0	0	0	0	0	2
15:45	0	2	0	1	0	2	1	0	1	0	0	0	7
16:00	1	0	0	0	1	0	0	0	1	0	1	0	4
16:15	0	1	0	0	1	0	0	1	1	0	0	0	4
16:30	0	0	0	0	0	0	0	2	0	0	0	0	2
16:45 *	0	0	0	0	0	0	0	0	0	0	1	0	1
17:00 *	0	0	0	0	1	1	0	0	0	0	0	0	2
17:15 *	0	0	1	0	0	0	0	0	0	0	1	0	2
17:30 *	0	0	0	0	1	0	0	0	0	0	0	0	1
17:45	0	0	0	0	1	0	0	0	0	0	0	0	1
18:00	0	1	0	0	0	0	0	0	0	0	0	0	1
TOTAL	5	13	6	5	33	11	2	18	12	7	17	4	
APPR.		24			49			32			28		133

TRUCKS

7:15	0	0	0	0	2	0	0	0	0	0	0	0	2
7:30	0	0	0	0	0	0	0	0	0	0	1	1	2
7:45	0	0	0	0	0	0	0	0	0	0	0	1	1
8:00 *	0	0	0	0	0	0	0	0	0	0	1	0	1
8:15 *	0	1	0	0	2	0	0	0	1	0	2	0	6
8:30 *	0	0	1	0	2	0	0	0	0	0	2	0	5
8:45 *	1	1	1	0	0	0	0	1	0	0	0	0	4
9:00	0	0	1	1	1	1	0	0	1	0	0	0	5
9:15	1	0	0	0	2	0	0	0	1	1	0	0	5
9:30	0	0	0	0	3	0	0	0	0	0	1	0	4
9:45	0	0	0	0	3	0	0	0	2	0	1	1	7
10:00	0	1	0	0	2	1	0	1	0	0	0	0	5
14:15 *	0	1	0	0	0	0	0	1	1	1	0	0	4
14:30 *	0	0	0	0	1	0	0	0	0	0	0	0	1
14:45 *	0	0	0	0	2	0	0	0	0	0	0	0	2
15:00 *	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	2	0	0	0	0	0	1	1	4
15:30	0	0	0	0	1	0	0	0	0	0	0	0	1
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	1	0	0	0	0	0	0	0	1
16:15	0	0	0	0	1	0	0	0	1	0	0	0	2
16:30	0	0	0	0	0	0	0	2	0	0	0	0	2
16:45 *	0	0	0	0	0	0	0	0	0	0	1	0	1
17:00 *	0	0	0	0	1	1	0	0	0	0	0	0	2
17:15 *	0	0	1	0	0	0	0	0	0	0	1	0	2
17:30 *	0	0	0	0	1	0	0	0	0	0	0	0	1
17:45	0	0	0	0	1	0	0	0	0	0	0	0	1
18:00	0	1	0	0	0	0	0	0	0	0	0	0	1
TOTAL	2	5	4	1	28	3	0	5	7	2	11	4	
APPR.		11			32			12			17		72

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 116

Intersection: **Barton St** **at** **Winona Rd** Total Vehicles: 2,722 Date: Monday
Direction: (East/West) (North/South) M.V.E./Year: 1.925 Sep 18, 2006
Road Condition: Dry Weather: Clear AWDT Factor: 2.08 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	2	4	7	0	10	6	0	7	4	2	9	0	51	0	0	1	0
7:30	2	4	4	4	15	3	5	7	3	7	16	2	72	0	0	1	0
7:45 *	4	8	7	2	14	10	2	14	8	8	18	2	97	3	0	3	12
8:00 *	10	10	17	5	14	16	2	32	9	25	34	2	176	1	0	7	15
8:15 *	13	19	16	4	15	9	1	18	4	5	27	1	132	0	0	3	1
8:30 *	5	7	10	5	15	7	0	16	7	5	19	0	96	0	0	0	0
8:45	11	9	4	1	16	5	0	8	7	4	14	0	79	0	0	4	0
9:00	1	8	4	2	17	6	3	11	8	3	21	0	84	0	0	3	0
9:15	13	10	2	4	16	5	0	10	2	3	14	3	82	0	0	1	4
9:30	2	9	3	4	20	1	1	8	7	6	12	1	74	0	0	0	0
9:45	5	9	4	4	11	5	1	7	6	3	14	1	70	0	0	0	0
10:00	3	6	3	5	16	4	2	12	0	3	20	3	77	0	0	0	2
14:15 *	1	4	5	4	15	5	1	9	0	8	20	1	73	0	0	0	0
14:30 *	2	6	4	2	14	16	0	10	1	9	19	3	86	0	0	2	4
14:45 *	13	17	9	5	19	8	3	8	3	3	20	2	110	3	0	35	12
15:00 *	6	7	3	8	26	2	1	9	2	1	18	3	86	4	0	5	3
15:15	2	10	4	5	29	0	1	7	1	3	21	1	84	0	0	0	0
15:30	5	8	5	6	24	2	1	9	3	4	18	2	87	0	4	1	0
15:45	3	20	4	6	38	4	0	9	5	3	18	1	111	0	0	1	1
16:00	6	9	4	10	23	6	3	16	8	3	19	0	107	0	1	1	2
16:15	2	15	4	7	16	6	5	12	3	3	13	3	89	0	0	0	0
16:30	6	8	3	7	24	9	1	14	4	7	11	4	98	0	0	1	1
16:45 *	3	19	5	11	57	7	0	11	8	6	21	2	150	0	0	1	3
17:00 *	5	14	3	10	35	2	3	14	4	9	29	2	130	0	0	1	1
17:15 *	3	13	8	5	49	6	3	11	7	6	25	7	143	0	0	1	1
17:30 *	3	13	2	8	32	6	1	6	5	7	15	10	108	0	0	2	2
17:45	4	12	3	5	27	11	0	9	2	4	22	2	101	0	0	0	2
18:00	4	9	2	5	17	4	0	9	1	4	11	3	69	0	0	1	2
TOTAL	139	287	149	144	624	171	40	313	122	154	518	61		11	5	75	68
APPR.		575			939			475			733		2,722			159	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	0	0	0	2	0	0	0	0	0	0	0	2
7:30	0	0	0	0	1	0	3	0	1	0	0	0	5
7:45 *	0	4	0	1	2	0	0	2	0	0	0	0	9
8:00 *	0	0	0	1	0	3	0	2	2	4	1	1	14
8:15 *	1	0	0	0	2	0	0	0	0	0	2	0	5
8:30 *	0	1	0	1	2	0	0	1	1	0	1	0	7
8:45	2	2	0	0	4	0	0	1	1	1	0	0	11
9:00	0	0	0	0	2	0	0	0	0	0	0	0	2
9:15	2	0	0	1	4	0	0	0	0	0	0	0	7
9:30	0	1	0	0	5	0	0	0	1	0	1	0	8
9:45	1	1	0	0	2	0	0	1	0	0	0	1	6
10:00	0	0	0	0	2	0	0	0	0	1	1	0	4
14:15 *	1	0	0	0	4	1	0	2	0	0	1	0	9
14:30 *	0	0	0	0	3	4	0	0	0	1	3	1	12
14:45 *	0	0	0	0	0	1	1	0	0	0	5	1	8
15:00 *	0	0	0	1	1	0	0	0	1	0	4	0	7
15:15	0	1	0	0	3	0	1	0	0	0	4	0	9
15:30	0	0	0	1	0	0	0	0	0	0	2	0	3
15:45	0	1	1	1	2	0	0	0	2	0	1	0	8
16:00	2	0	0	2	3	2	0	2	1	0	0	0	12
16:15	0	1	0	1	0	0	1	0	1	0	4	0	8
16:30	0	1	0	1	1	0	0	0	0	0	3	0	6
16:45 *	0	1	0	1	1	0	0	0	0	0	1	0	4
17:00 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15 *	0	0	0	0	1	0	0	0	0	0	2	0	3
17:30 *	0	0	0	0	3	0	0	0	0	0	0	0	3
17:45	0	0	0	0	2	0	0	0	0	0	0	1	3
18:00	0	0	0	0	0	0	0	0	0	0	1	0	1
TOTAL	9	14	1	12	52	11	6	11	11	7	37	5	
APPR.		24			75			28			49		176

TRUCKS

7:15	0	0	0	0	2	0	0	0	0	0	0	0	2
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 *	0	3	0	0	1	0	0	0	0	0	0	0	4
8:00 *	0	0	0	1	0	1	0	0	1	0	0	0	3
8:15 *	0	0	0	0	1	0	0	0	0	0	2	0	3
8:30 *	0	1	0	0	2	0	0	0	0	0	1	0	4
8:45	0	0	0	0	3	0	0	0	0	0	0	0	3
9:00	0	0	0	0	2	0	0	0	0	0	0	0	2
9:15	2	0	0	1	4	0	0	0	0	0	0	0	7
9:30	0	1	0	0	5	0	0	0	1	0	1	0	8
9:45	1	1	0	0	2	0	0	1	0	0	0	1	6
10:00	0	0	0	0	2	0	0	0	0	1	1	0	4
14:15 *	1	0	0	0	4	0	0	0	0	0	1	0	6
14:30 *	0	0	0	0	3	0	0	0	0	0	3	1	7
14:45 *	0	0	0	0	0	0	1	0	0	0	3	0	4
15:00 *	0	0	0	0	1	0	0	0	1	0	3	0	5
15:15	0	0	0	0	1	0	1	0	0	0	3	0	5
15:30	0	0	0	1	0	0	0	0	0	0	1	0	2
15:45	0	0	0	0	2	0	0	0	1	0	1	0	4
16:00	0	0	0	0	3	1	0	1	0	0	0	0	5
16:15	0	0	0	0	0	0	0	0	1	0	3	0	4
16:30	0	0	0	1	1	0	0	0	0	0	3	0	5
16:45 *	0	1	0	1	1	0	0	0	0	0	1	0	4
17:00 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15 *	0	0	0	0	1	0	0	0	0	0	2	0	3
17:30 *	0	0	0	0	3	0	0	0	0	0	0	0	3
17:45	0	0	0	0	2	0	0	0	0	0	0	1	3
18:00	0	0	0	0	0	0	0	0	0	0	1	0	1
TOTAL	4	7	0	5	46	2	2	2	5	1	30	3	
APPR.		11			53			9			34		107

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 3

Intersection: **Barton St.** **at** **Winona Rd.** Total Vehicles: 2,842 Date: Thursday
Direction: (East/West) (North/South) M.V.E./Year: 1.894 Sep 8, 2011
Road Condition: Dry Weather: Cloudy AWDT Factor: 1.96 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	1	12	4	6	7	4	0	13	2	4	13	0	66	0	0	1	1
7:30	1	7	3	4	14	6	1	12	3	8	7	1	67	0	0	0	1
7:45 *	5	7	9	3	14	9	1	11	6	8	21	4	98	2	0	1	3
8:00 *	6	13	18	3	13	15	4	30	13	22	16	5	158	6	1	4	10
8:15 *	11	17	14	3	13	12	2	40	8	16	17	6	159	0	0	0	2
8:30 *	3	12	9	7	15	1	4	14	4	3	23	1	96	0	0	1	0
8:45	6	13	11	3	9	5	3	16	7	7	16	1	97	0	0	1	1
9:00	5	12	3	2	15	6	4	28	14	6	16	3	114	0	0	0	0
9:15	6	10	5	4	19	3	2	19	1	6	14	2	91	0	0	0	1
9:30	3	11	8	2	11	2	2	11	8	4	8	1	71	0	0	0	1
9:45	5	12	5	1	10	6	2	7	2	3	10	2	65	0	0	1	1
10:00	3	7	2	1	12	2	0	13	2	3	10	1	56	0	1	2	1
13:45	2	4	4	7	12	6	2	10	1	1	13	1	63	0	0	0	0
14:00	4	10	3	4	17	8	1	9	4	4	13	2	79	0	0	1	0
14:15	3	10	1	3	12	4	0	15	3	6	17	1	75	0	0	0	0
14:30 *	0	15	7	3	17	13	1	15	3	10	14	1	99	1	0	0	3
14:45 *	16	27	9	7	18	9	2	7	4	2	13	5	119	3	0	10	14
15:00 *	8	13	5	11	12	7	3	11	6	5	17	4	102	0	0	0	2
15:15 *	6	13	3	5	19	4	2	6	2	6	15	1	82	0	0	0	2
15:30	2	7	0	3	24	3	1	16	4	2	17	6	85	1	2	3	0
16:15	4	11	5	11	29	6	2	7	10	5	17	2	109	0	0	1	2
16:30	7	17	4	6	26	10	1	18	9	5	11	1	115	3	0	0	3
16:45	3	13	4	8	30	8	1	12	1	6	19	1	106	0	0	0	0
17:00 *	7	15	4	9	43	5	0	18	8	8	13	5	135	2	2	0	0
17:15 *	2	20	4	7	30	3	7	18	9	13	21	4	138	0	0	0	2
17:30 *	6	23	11	8	34	5	5	30	10	6	14	7	159	0	0	1	2
17:45 *	5	19	4	13	30	4	0	10	2	10	14	5	116	0	0	2	1
18:00	3	21	5	11	23	5	1	14	6	9	22	2	122	2	0	0	1
TOTAL	133	371	164	155	528	171	54	430	152	188	421	75		20	6	29	54
APPR.		668			854			636			684		2,842			109	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	0	0	0	2	2	0	0	0	0	1	0	5
7:30	0	1	0	1	1	0	0	2	0	0	1	0	6
7:45 *	0	0	1	1	0	0	0	0	0	0	0	1	3
8:00 *	0	0	0	0	2	3	0	2	3	4	1	0	15
8:15 *	0	0	0	0	1	0	0	2	0	0	1	0	4
8:30 *	0	0	0	0	1	0	0	0	0	1	2	0	4
8:45	2	0	1	0	0	0	0	0	0	1	2	0	6
9:00	0	0	0	0	2	0	0	2	1	0	2	0	7
9:15	0	0	0	0	2	1	0	1	0	0	0	0	4
9:30	0	1	0	0	1	0	0	1	1	0	1	0	5
9:45	0	0	0	0	0	1	0	0	0	1	3	0	5
10:00	1	0	0	0	2	0	0	0	0	0	1	0	4
13:45	0	0	0	0	1	0	0	0	0	0	1	0	2
14:00	0	1	0	0	0	0	0	0	0	0	2	0	3
14:15	1	1	0	0	1	1	0	0	0	2	1	0	7
14:30 *	0	1	0	0	2	5	1	0	0	1	1	1	12
14:45 *	1	0	0	0	3	3	0	0	0	1	1	3	12
15:00 *	1	2	1	1	1	0	0	1	1	0	1	0	9
15:15 *	0	1	0	1	0	0	0	0	0	1	5	0	8
15:30	0	0	0	2	1	0	0	1	1	0	1	0	6
16:15	0	2	1	0	3	0	1	0	1	0	3	0	11
16:30	0	0	0	0	0	0	0	0	1	1	1	0	3
16:45	0	0	0	0	2	0	0	0	0	0	0	0	2
17:00 *	0	0	0	0	0	1	0	2	0	0	0	0	3
17:15 *	0	1	0	1	0	0	0	0	0	0	0	0	2
17:30 *	0	0	0	0	2	0	0	0	0	0	0	1	3
17:45 *	0	1	0	0	0	0	0	0	0	0	1	0	2
18:00	0	0	0	0	1	0	0	0	0	0	0	0	1
TOTAL	6	12	4	7	31	17	2	14	9	13	33	6	
APPR.		22			55			25			52		154

TRUCKS

7:15	0	0	0	0	2	2	0	0	0	0	1	0	5
7:30	0	0	0	0	0	0	0	2	0	0	0	0	2
7:45 *	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 *	0	0	0	0	1	0	0	0	0	0	1	0	2
8:15 *	0	0	0	0	0	0	0	0	0	0	1	0	1
8:30 *	0	0	0	0	1	0	0	0	0	0	1	0	2
8:45	1	0	0	0	0	0	0	0	0	0	2	0	3
9:00	0	0	0	0	1	0	0	0	0	0	1	0	2
9:15	0	0	0	0	2	1	0	1	0	0	0	0	4
9:30	0	0	0	0	1	0	0	1	1	0	1	0	4
9:45	0	0	0	0	0	0	0	0	0	1	3	0	4
10:00	0	0	0	0	2	0	0	0	0	0	1	0	3
13:45	0	0	0	0	1	0	0	0	0	0	1	0	2
14:00	0	1	0	0	0	0	0	0	0	0	2	0	3
14:15	1	1	0	0	1	0	0	0	0	0	1	0	4
14:30 *	0	1	0	0	2	1	1	0	0	0	1	1	7
14:45 *	1	0	0	0	3	0	0	0	0	0	1	2	7
15:00 *	1	1	1	0	0	0	0	0	1	0	1	0	5
15:15 *	0	1	0	0	0	0	0	0	0	0	5	0	6
15:30	0	0	0	0	0	0	0	0	0	0	1	0	1
16:15	0	0	0	0	2	0	0	0	0	0	1	0	3
16:30	0	0	0	0	0	0	0	0	1	0	1	0	2
16:45	0	0	0	0	2	0	0	0	0	0	0	0	2
17:00 *	0	0	0	0	0	1	0	2	0	0	0	0	3
17:15 *	0	1	0	0	0	0	0	0	0	0	0	0	1
17:30 *	0	0	0	0	2	0	0	0	0	0	0	1	3
17:45 *	0	1	0	0	0	0	0	0	0	0	1	0	2
18:00	0	0	0	0	1	0	0	0	0	0	0	0	1
TOTAL	4	7	1	0	24	5	1	6	3	1	28	4	
APPR.		12			29			10			33		84

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 7

Intersection: **Barton St** **at** **Winona Rd** Total Vehicles: 2,533 Date: Wednesday
Direction: (East/West) (North/South) M.V.E./Year: 1.981 Feb 20, 2013
Road Condition: Dry Weather: Cloudy AWDT Factor: 2.3 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	2	4	2	1	15	4	2	10	4	2	2	1	49	0	0	0	1
7:30	2	7	6	1	9	7	3	11	3	5	19	3	76	1	3	1	0
7:45	0	12	9	3	18	10	1	17	6	5	13	3	97	0	1	0	1
8:00	5	4	7	9	11	8	2	19	5	5	26	1	102	0	0	0	0
8:15 *	3	11	13	7	9	3	2	17	10	4	24	3	106	3	1	7	0
8:30 *	5	3	6	13	27	8	3	14	32	11	29	1	152	3	0	0	0
8:45 *	4	12	2	20	24	5	4	10	9	6	13	2	111	0	0	0	0
9:00 *	7	9	5	4	13	3	2	32	4	8	16	1	104	0	0	0	0
9:15	2	15	4	0	9	0	0	18	5	5	13	0	71	0	0	0	0
9:30	4	8	4	3	7	4	0	11	11	2	3	1	58	2	0	0	0
9:45	4	7	2	4	4	7	0	11	3	3	11	1	57	0	0	0	0
10:00	4	11	1	4	11	3	1	11	3	2	12	0	63	0	1	0	0
13:45	3	9	3	3	7	4	0	12	0	2	11	4	58	0	0	0	0
14:00	0	6	2	3	4	2	1	10	2	2	6	1	39	0	0	1	2
14:15	5	8	1	3	9	3	0	9	2	2	10	1	53	2	0	0	0
14:30	2	8	6	4	17	7	0	2	3	4	12	0	65	0	4	1	2
14:45 *	5	9	4	3	15	6	3	7	14	1	11	3	81	0	1	0	2
15:00 *	1	8	3	14	17	2	1	10	8	1	10	0	75	1	0	3	5
15:15 *	5	9	2	17	22	12	0	20	5	6	12	1	111	0	0	0	4
15:30 *	4	15	4	2	23	4	1	16	4	4	14	4	95	0	0	0	0
16:15	6	12	8	6	22	5	1	9	6	14	13	4	106	0	0	0	2
16:30	2	11	5	8	24	3	1	14	0	5	13	2	88	2	0	0	0
16:45 *	4	23	7	8	49	9	2	14	3	6	18	5	148	0	4	0	1
17:00 *	6	18	7	6	29	6	4	8	6	4	16	2	112	0	2	0	0
17:15 *	6	15	6	13	33	10	7	17	4	8	21	3	143	0	0	0	0
17:30 *	8	17	2	6	33	6	3	10	4	8	11	2	110	0	0	0	1
17:45	9	21	7	11	24	8	1	10	3	5	18	8	125	1	0	2	0
18:00	5	13	3	2	13	5	1	10	6	6	10	4	78	0	0	0	0
TOTAL	113	305	131	178	498	154	46	359	165	136	387	61		15	17	15	21
APPR.		549			830			570			584		2,533			68	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	1	0	0	1	0	0	0	1	0	0	0	3
7:30	0	0	1	1	2	0	0	0	0	0	2	0	6
7:45	0	0	0	0	2	1	0	0	3	0	1	0	7
8:00	0	0	0	1	0	1	0	0	0	0	0	0	2
8:15 *	0	0	0	1	1	1	0	0	1	1	2	0	7
8:30 *	1	0	0	1	5	0	0	0	1	0	3	0	11
8:45 *	0	0	0	3	1	0	0	1	0	0	1	0	6
9:00 *	0	1	0	0	2	0	0	1	1	1	0	0	6
9:15	0	1	0	0	1	0	0	0	0	1	1	0	4
9:30	0	0	0	0	0	1	0	0	0	0	1	0	2
9:45	0	0	0	0	0	0	0	0	0	0	1	0	1
10:00	1	1	0	0	0	0	0	0	1	0	2	0	5
13:45	0	1	0	0	0	1	0	0	0	0	3	0	5
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	1	1	0	1	0	3
14:30	0	0	0	1	1	0	0	0	1	0	2	0	5
14:45 *	1	0	0	0	3	0	0	0	2	0	2	0	8
15:00 *	0	0	0	2	0	1	0	1	0	0	1	0	5
15:15 *	1	1	0	4	1	1	0	1	0	0	2	1	12
15:30 *	0	0	0	0	1	0	0	0	0	0	0	0	1
16:15	0	0	0	0	0	1	0	1	0	1	1	0	4
16:30	0	0	0	0	2	0	0	0	0	0	1	0	3
16:45 *	0	0	0	0	3	0	0	0	0	0	2	0	5
17:00 *	0	0	1	1	0	0	0	0	0	0	0	0	2
17:15 *	0	0	0	1	1	0	0	0	0	0	3	0	5
17:30 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	1	0	0	0	0	1	2
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	6	2	16	27	8	1	6	12	4	32	2	
APPR.		12			51			19			38		120

TRUCKS

7:15	0	0	0	0	1	0	0	0	0	0	0	0	1
7:30	0	0	0	1	1	0	0	0	0	0	2	0	4
7:45	0	0	0	0	2	0	0	0	1	0	0	0	3
8:00	0	0	0	1	0	1	0	0	0	0	0	0	2
8:15 *	0	0	0	0	1	1	0	0	0	1	1	0	4
8:30 *	0	0	0	0	3	0	0	0	0	0	0	0	3
8:45 *	0	0	0	0	0	0	0	0	0	0	1	0	1
9:00 *	0	1	0	0	2	0	0	1	0	0	0	0	4
9:15	0	0	0	0	1	0	0	0	0	0	1	0	2
9:30	0	0	0	0	0	1	0	0	0	0	1	0	2
9:45	0	0	0	0	0	0	0	0	0	0	1	0	1
10:00	1	1	0	0	0	0	0	0	1	0	1	0	4
13:45	0	1	0	0	0	1	0	0	0	0	3	0	5
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	1	0	0	1	0	2
14:30	0	0	0	0	1	0	0	0	1	0	1	0	3
14:45 *	1	0	0	0	3	0	0	0	1	0	1	0	6
15:00 *	0	0	0	0	0	0	0	1	0	0	0	0	1
15:15 *	0	1	0	0	0	0	0	0	0	0	1	1	3
15:30 *	0	0	0	0	1	0	0	0	0	0	0	0	1
16:15	0	0	0	0	0	0	0	1	0	0	1	0	2
16:30	0	0	0	0	2	0	0	0	0	0	1	0	3
16:45 *	0	0	0	0	2	0	0	0	0	0	2	0	4
17:00 *	0	0	1	1	0	0	0	0	0	0	0	0	2
17:15 *	0	0	0	1	1	0	0	0	0	0	3	0	5
17:30 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	1	0	0	0	0	1	2
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	4	1	4	21	4	1	4	4	1	22	2	
APPR.		7			29			9			25		70

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 83

Intersection: **Barton St** **at** **Winona Rd** Total Vehicles: 2,489 Date: Monday
Direction: (East/West) (North/South) M.V.E./Year: 1.786 Dec 1, 2014
Road Condition: Dry Weather: Cloudy AWDT Factor: 2.11 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	0	3	3	0	8	4	0	11	4	6	4	3	46	0	0	0	0
7:30	2	5	5	2	16	3	2	15	4	2	10	0	66	2	0	1	5
7:45	1	5	7	1	8	1	2	13	4	4	12	1	59	0	0	0	0
8:00 *	4	11	6	5	19	3	0	23	9	6	20	3	109	0	0	1	0
8:15 *	5	8	12	6	16	5	1	9	7	5	15	3	92	0	0	1	3
8:30 *	6	11	7	11	20	3	3	13	24	4	25	0	127	2	3	3	2
8:45 *	3	8	7	15	16	11	3	9	12	3	20	3	110	0	0	0	0
9:00	4	8	3	7	10	7	1	19	5	9	13	2	88	0	0	0	2
9:15	2	15	5	2	5	6	3	28	3	9	13	4	95	2	0	0	2
9:30	7	8	9	3	14	5	1	9	2	3	9	2	72	0	1	0	2
9:45	0	10	4	1	11	4	0	11	4	7	9	0	61	0	0	2	0
10:00	5	8	4	4	15	4	0	10	5	4	15	0	74	0	0	0	3
13:45	2	5	1	2	12	4	0	7	2	0	12	3	50	0	0	0	0
14:00	8	10	3	2	4	5	1	12	4	5	8	1	63	0	0	0	0
14:15	2	7	2	4	8	5	0	7	1	2	8	2	48	0	0	1	1
14:30	3	11	3	3	15	7	2	12	4	1	15	0	76	0	0	0	0
14:45 *	4	11	3	3	17	6	3	12	10	5	19	1	94	0	0	1	0
15:00 *	4	11	4	2	13	3	0	7	9	4	18	2	77	0	0	1	0
15:15 *	4	17	3	12	26	5	2	9	6	0	9	0	93	1	0	4	2
15:30 *	3	11	4	7	15	7	0	19	4	3	10	0	83	0	0	1	4
16:15	7	19	8	8	20	5	0	12	3	6	12	4	104	0	0	0	4
16:30	4	14	5	10	22	5	1	13	9	4	19	0	106	0	0	2	3
16:45 *	5	21	3	11	37	3	1	17	8	3	25	0	134	1	0	0	3
17:00 *	5	16	2	9	39	5	3	16	5	6	17	2	125	0	0	2	0
17:15 *	6	16	3	5	41	8	4	12	1	7	18	6	127	0	0	0	1
17:30 *	6	19	5	8	38	3	6	15	3	7	12	4	126	0	0	0	0
17:45	3	20	0	7	23	5	2	17	2	4	15	5	103	0	0	0	0
18:00	5	13	3	6	19	8	2	3	2	4	16	0	81	0	0	0	0
TOTAL	110	321	124	156	507	140	43	360	156	123	398	51		8	4	20	37
APPR.		555			803			559			572		2,489			69	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	0	1	0	2	0	0	1	1	1	0	0	6
7:30	1	0	1	0	1	0	0	2	1	0	1	0	7
7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 *	0	0	1	0	1	1	0	0	2	0	0	0	5
8:15 *	0	1	0	1	0	0	0	1	0	0	0	1	4
8:30 *	1	1	1	1	2	0	0	0	3	0	5	0	14
8:45 *	0	1	0	0	6	1	0	1	0	0	1	0	10
9:00	0	0	1	1	2	1	0	0	2	2	0	0	9
9:15	0	1	0	0	0	0	0	0	0	1	3	0	5
9:30	0	0	0	0	3	0	0	0	0	0	0	0	3
9:45	0	0	0	0	2	1	0	0	0	0	0	0	3
10:00	1	0	0	0	2	0	0	0	1	0	2	0	6
13:45	0	0	0	0	2	0	0	0	0	0	1	0	3
14:00	0	1	0	0	0	1	0	2	0	0	2	0	6
14:15	0	1	0	1	0	0	0	0	0	1	0	0	3
14:30	0	0	1	0	2	1	0	0	0	0	3	0	7
14:45 *	0	0	0	1	4	1	0	1	1	1	6	1	16
15:00 *	2	0	2	1	2	0	0	0	0	0	2	1	10
15:15 *	2	0	0	3	3	0	0	1	0	0	3	0	12
15:30 *	0	0	0	2	2	1	0	1	0	0	1	0	7
16:15	0	2	0	1	3	1	0	0	0	0	3	1	11
16:30	0	1	0	1	1	0	0	1	0	0	2	0	6
16:45 *	0	0	0	1	2	0	0	0	0	0	2	0	5
17:00 *	0	0	0	0	1	0	0	0	0	0	0	0	1
17:15 *	0	0	0	0	1	1	1	1	0	0	2	0	6
17:30 *	0	1	0	0	0	0	0	0	0	0	0	0	1
17:45	0	1	0	0	0	0	0	0	0	0	1	0	2
18:00	0	1	0	1	0	0	0	0	0	0	0	0	2
TOTAL	7	12	8	15	44	10	1	12	11	6	40	4	
APPR.		27			69			24			50		170

TRUCKS

7:15	0	0	0	0	1	0	0	1	1	1	0	0	4
7:30	0	0	0	0	1	0	0	0	0	0	0	0	1
7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 *	0	0	0	0	1	0	0	0	1	0	0	0	2
8:15 *	0	0	0	0	0	0	0	1	0	0	0	0	1
8:30 *	0	1	1	0	2	0	0	0	0	0	0	0	4
8:45 *	0	1	0	0	1	1	0	0	0	0	1	0	4
9:00	0	0	0	0	1	0	0	0	0	0	0	0	1
9:15	0	0	0	0	0	0	0	0	0	0	3	0	3
9:30	0	0	0	0	3	0	0	0	0	0	0	0	3
9:45	0	0	0	0	2	1	0	0	0	0	0	0	3
10:00	1	0	0	0	2	0	0	0	1	0	2	0	6
13:45	0	0	0	0	2	0	0	0	0	0	1	0	3
14:00	0	1	0	0	0	1	0	0	0	0	2	0	4
14:15	0	1	0	1	0	0	0	0	0	1	0	0	3
14:30	0	0	1	0	2	1	0	0	0	0	3	0	7
14:45 *	0	0	0	0	3	1	0	1	0	0	4	1	10
15:00 *	1	0	2	0	2	0	0	0	0	0	2	1	8
15:15 *	2	0	0	0	1	0	0	0	0	0	2	0	5
15:30 *	0	0	0	2	2	0	0	0	0	0	0	0	4
16:15	0	1	0	0	2	1	0	0	0	0	2	0	6
16:30	0	1	0	0	1	0	0	1	0	0	2	0	5
16:45 *	0	0	0	1	0	0	0	0	0	0	1	0	2
17:00 *	0	0	0	0	1	0	0	0	0	0	0	0	1
17:15 *	0	0	0	0	1	1	1	1	0	0	2	0	6
17:30 *	0	1	0	0	0	0	0	0	0	0	0	0	1
17:45	0	1	0	0	0	0	0	0	0	0	1	0	2
18:00	0	1	0	1	0	0	0	0	0	0	0	0	2
TOTAL	4	9	4	5	31	7	1	5	3	2	28	2	
APPR.		17			43			9			32		101

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 11

Intersection: **Barton St** **at** **Winona Rd** Total Vehicles: 2,647 Date: Friday
Direction: (East/West) (North/South) M.V.E./Year: 1.881 Feb 19, 2016
Road Condition: Dry Weather: Cloudy AWDT Factor: 2.09 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	1	5	1	4	7	11	1	11	3	3	9	1	57	0	0	0	0
7:30	0	8	4	1	11	5	2	9	9	4	10	1	64	0	0	2	1
7:45	4	4	6	3	9	4	1	21	11	4	15	0	82	1	0	0	0
8:00	1	9	5	3	18	6	3	15	7	4	17	3	91	0	0	0	2
8:15	3	6	7	3	7	3	3	11	11	3	10	3	70	2	0	0	4
8:30 *	1	7	9	10	26	3	1	13	31	5	27	0	133	2	0	0	0
8:45 *	7	11	7	16	15	7	1	13	8	7	19	2	113	2	0	0	0
9:00 *	1	15	8	1	20	8	11	11	7	6	16	1	105	0	0	0	4
9:15 *	3	8	17	0	27	1	13	14	5	31	31	11	161	2	0	0	2
9:30	3	18	5	0	11	1	7	12	4	9	20	5	95	6	2	0	1
9:45	6	12	2	5	12	4	1	14	3	3	7	0	69	0	0	4	0
10:00	3	6	3	1	8	2	1	11	2	4	12	3	56	0	0	0	0
13:45	1	13	0	4	13	2	0	10	4	3	7	0	57	0	0	0	0
14:00	3	14	4	5	9	6	4	5	3	3	13	0	69	0	0	0	0
14:15	3	11	2	4	9	7	0	4	7	3	10	2	62	0	0	0	0
14:30	6	17	3	7	25	5	1	4	3	1	19	0	91	0	0	0	0
14:45 *	4	8	4	4	15	6	3	11	14	4	16	3	92	0	1	0	0
15:00 *	5	13	4	14	16	3	2	12	7	1	8	1	86	1	0	2	5
15:15 *	4	19	11	9	25	6	1	12	4	5	11	1	108	0	0	10	0
15:30 *	5	18	9	7	24	4	4	15	4	5	9	3	107	0	0	0	1
16:15	5	11	1	17	27	7	5	12	14	6	15	1	121	0	0	0	1
16:30 *	5	12	6	3	36	2	2	11	6	9	22	2	116	0	0	0	0
16:45 *	4	10	3	11	32	5	4	17	5	10	18	4	123	0	0	0	1
17:00 *	1	15	3	7	23	4	3	7	0	6	12	3	84	0	0	0	0
17:15 *	4	17	4	12	40	6	3	11	5	5	10	4	121	0	1	2	0
17:30	4	17	1	11	36	4	2	13	4	6	10	2	110	0	1	0	0
17:45	7	17	3	12	22	3	3	8	2	3	9	4	93	0	0	0	0
18:00	2	14	7	4	26	7	1	19	5	4	20	2	111	0	0	0	0
TOTAL	96	335	139	178	549	132	83	326	188	157	402	62		16	5	20	22
APPR.		570			859			597			621		2,647			63	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	2	0	1	3	0	0	0	0	0	0	0	6
7:30	0	0	1	0	1	1	0	3	1	1	1	0	9
7:45	0	0	0	0	1	0	0	0	0	0	2	0	3
8:00	0	1	0	0	1	1	0	0	1	0	0	0	4
8:15	0	2	0	0	1	0	0	0	2	0	2	0	7
8:30 *	0	0	0	2	3	0	0	1	3	0	2	0	11
8:45 *	1	1	1	2	0	1	0	0	0	1	2	0	9
9:00 *	0	2	0	0	0	0	1	2	2	0	4	0	11
9:15 *	1	1	1	0	1	0	1	0	0	1	1	0	7
9:30	0	1	0	0	1	0	0	0	0	0	2	0	4
9:45	0	0	0	0	2	0	0	0	0	0	0	0	2
10:00	1	0	1	0	1	0	0	0	0	0	1	0	4
13:45	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15	0	0	0	0	1	1	0	0	0	0	0	0	2
14:30	1	1	0	1	2	0	0	0	0	0	2	0	7
14:45 *	0	0	0	0	0	0	0	0	0	1	3	0	4
15:00 *	1	1	0	0	0	0	0	0	0	0	3	0	5
15:15 *	0	0	1	3	3	0	0	1	0	0	2	0	10
15:30 *	0	1	0	0	1	0	0	3	0	0	1	0	6
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30 *	0	1	0	0	0	0	1	0	0	0	1	0	3
16:45 *	0	0	0	0	1	0	0	0	0	0	0	0	1
17:00 *	0	1	0	0	0	0	0	0	0	0	1	1	3
17:15 *	0	1	0	0	0	0	1	0	0	0	0	0	2
17:30	0	0	0	0	2	0	0	0	0	0	0	0	2
17:45	0	0	0	0	1	0	0	0	0	0	0	0	1
18:00	0	0	0	0	0	0	0	0	0	0	1	0	1
TOTAL	5	16	5	9	26	4	4	10	9	4	31	1	
APPR.		26			39			23			36		124

TRUCKS

7:15	0	1	0	1	2	0	0	0	0	0	0	0	4
7:30	0	0	0	0	1	0	0	1	0	1	0	0	3
7:45	0	0	0	0	0	0	0	0	0	0	2	0	2
8:00	0	0	0	0	1	1	0	0	1	0	0	0	3
8:15	0	0	0	0	1	0	0	0	0	0	0	0	1
8:30 *	0	0	0	0	0	0	0	1	0	0	0	0	1
8:45 *	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 *	0	0	0	0	0	0	0	0	0	0	1	0	1
9:15 *	0	1	0	0	0	0	1	0	0	0	1	0	3
9:30	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45	0	0	0	0	1	0	0	0	0	0	0	0	1
10:00	1	0	1	0	0	0	0	0	0	0	1	0	3
13:45	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15	0	0	0	0	1	0	0	0	0	0	0	0	1
14:30	0	1	0	0	0	0	0	0	0	0	0	0	1
14:45 *	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00 *	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15 *	0	0	1	0	1	0	0	0	0	0	0	0	2
15:30 *	0	1	0	0	0	0	0	1	0	0	1	0	3
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30 *	0	0	0	0	0	0	1	0	0	0	0	0	1
16:45 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00 *	0	1	0	0	0	0	0	0	0	0	0	1	2
17:15 *	0	1	0	0	0	0	1	0	0	0	0	0	2
17:30	0	0	0	0	2	0	0	0	0	0	0	0	2
17:45	0	0	0	0	1	0	0	0	0	0	0	0	1
18:00	0	0	0	0	0	0	0	0	0	0	1	0	1
TOTAL	1	6	2	1	11	1	3	3	1	1	7	1	
APPR.		9			13			7			9		38

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 88

Intersection: **Barton St.** **at** **Fifty Rd.** Total Vehicles: 3,049 Date: Monday
Direction: (East/West) (North/South) M.V.E./Year: 2.187 Dec 5, 2005
Road Condition: Dry Weather: Cloudy AWDT Factor: 2.11 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			Total	Pedestrians N	E	S	W
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Veh's	side	side	side	side
7:15	3	42	0	21	0	3	0	10	13	0	0	0	92	0	0	0	0
7:30 *	9	37	0	27	0	4	0	21	13	0	0	0	111	0	0	0	0
7:45 *	14	37	0	31	0	4	0	23	15	0	0	0	124	0	0	0	0
8:00 *	10	32	1	39	0	2	0	22	37	0	1	0	144	0	0	0	0
8:15 *	10	40	0	40	0	4	0	17	22	0	0	0	133	0	0	0	0
8:30	6	28	0	32	0	5	0	21	17	0	0	0	109	0	2	1	0
8:45	7	19	0	27	1	6	0	17	14	1	0	0	92	2	2	0	0
9:00	9	22	0	12	0	7	0	21	7	0	0	0	78	0	0	0	0
9:15	5	19	0	13	0	4	0	13	13	0	0	0	67	0	0	0	0
9:30	3	18	0	13	0	5	0	15	11	0	0	0	65	0	0	0	0
9:45	6	18	0	19	0	7	0	10	12	0	0	0	72	0	0	0	0
10:00	1	15	0	8	0	4	0	17	9	0	0	0	54	0	0	0	0
14:15 *	7	20	0	16	0	11	0	18	11	0	0	0	83	0	0	0	0
14:30 *	5	13	0	15	0	13	0	21	18	0	0	0	85	0	0	0	0
14:45 *	6	23	1	16	1	11	0	23	13	1	1	0	96	0	2	2	0
15:00 *	4	26	1	13	0	10	0	28	15	1	0	0	98	0	0	0	0
15:15	8	19	0	24	0	6	0	26	17	0	0	0	100	0	0	0	0
15:30	9	21	0	25	0	10	1	39	18	0	0	1	124	0	0	0	0
15:45	6	24	0	22	1	11	0	32	22	0	1	0	119	0	0	0	0
16:00	7	26	0	16	0	13	0	31	14	0	0	0	107	0	0	2	0
16:15	5	27	1	26	0	15	0	37	19	0	1	0	131	1	2	0	0
16:30	3	23	0	26	1	10	0	34	33	0	1	0	131	0	0	0	0
16:45 *	4	27	0	32	1	7	0	36	34	0	1	0	142	0	0	0	0
17:00 *	4	22	0	27	1	18	0	36	33	0	0	1	142	0	0	0	0
17:15 *	8	31	0	29	1	14	0	39	32	0	0	0	154	0	0	0	0
17:30 *	6	37	0	21	0	13	0	28	34	0	0	0	139	0	0	0	0
17:45	7	26	0	23	0	12	0	34	30	0	0	0	132	0	0	0	0
18:00	8	27	0	21	0	11	1	33	23	0	0	1	125	0	0	0	0
TOTAL	180	719	4	634	7	240	2	702	549	3	6	3		3	8	5	0
APPR.		903			881			1,253			12		3,049			16	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	3	0	0	0	0	0	0	1	0	0	0	4
7:30 *	1	1	0	2	0	0	0	1	0	0	0	0	5
7:45 *	0	1	0	0	0	0	0	4	1	0	0	0	6
8:00 *	0	2	0	1	0	0	0	3	2	0	0	0	8
8:15 *	2	1	0	5	0	0	0	1	1	0	0	0	10
8:30	1	2	0	2	0	1	0	0	0	0	0	0	6
8:45	2	2	0	2	0	0	0	3	3	0	0	0	12
9:00	0	2	0	1	0	0	0	2	0	0	0	0	5
9:15	0	0	0	1	0	0	0	0	0	0	0	0	1
9:30	2	2	0	1	0	0	0	0	0	0	0	0	5
9:45	0	2	0	5	0	0	0	1	0	0	0	0	8
10:00	0	2	0	1	0	0	0	3	2	0	0	0	8
14:15 *	0	1	0	1	0	0	0	1	2	0	0	0	5
14:30 *	0	0	0	2	0	1	0	2	1	0	0	0	6
14:45 *	1	5	0	0	0	0	0	0	0	0	0	0	6
15:00 *	0	1	0	2	0	0	0	3	1	0	0	0	7
15:15	0	2	0	3	0	0	0	2	1	0	0	0	8
15:30	1	1	0	2	0	1	0	2	0	0	0	0	7
15:45	0	3	0	0	0	0	0	0	2	0	0	0	5
16:00	2	3	0	0	0	0	0	1	1	0	0	0	7
16:15	0	1	0	1	0	1	0	2	0	0	0	0	5
16:30	0	0	0	2	0	0	0	1	2	0	0	0	5
16:45 *	0	1	0	1	0	0	0	0	0	0	0	0	2
17:00 *	0	1	0	0	0	1	0	2	1	0	0	0	5
17:15 *	0	1	0	0	0	0	0	2	1	0	0	0	4
17:30 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	1	1	0	0	0	2
18:00	0	1	0	0	0	0	0	0	0	0	0	0	1
TOTAL	12	41	0	35	0	5	0	37	23	0	0	0	
APPR.		53			40			60			0		153

TRUCKS

7:15	0	3	0	0	0	0	0	0	1	0	0	0	4
7:30 *	1	1	0	1	0	0	0	1	0	0	0	0	4
7:45 *	0	1	0	0	0	0	0	1	0	0	0	0	2
8:00 *	0	2	0	1	0	0	0	2	0	0	0	0	5
8:15 *	2	1	0	5	0	0	0	1	1	0	0	0	10
8:30	1	0	0	1	0	1	0	0	0	0	0	0	3
8:45	1	0	0	2	0	0	0	1	2	0	0	0	6
9:00	0	2	0	0	0	0	0	2	0	0	0	0	4
9:15	0	0	0	1	0	0	0	0	0	0	0	0	1
9:30	2	2	0	1	0	0	0	0	0	0	0	0	5
9:45	0	2	0	5	0	0	0	1	0	0	0	0	8
10:00	0	2	0	1	0	0	0	3	2	0	0	0	8
14:15 *	0	1	0	1	0	0	0	1	1	0	0	0	4
14:30 *	0	0	0	2	0	1	0	1	1	0	0	0	5
14:45 *	1	2	0	0	0	0	0	0	0	0	0	0	3
15:00 *	0	0	0	2	0	0	0	2	0	0	0	0	4
15:15	0	2	0	1	0	0	0	0	1	0	0	0	4
15:30	1	1	0	2	0	1	0	1	0	0	0	0	6
15:45	0	2	0	0	0	0	0	0	2	0	0	0	4
16:00	1	2	0	0	0	0	0	1	0	0	0	0	4
16:15	0	1	0	1	0	1	0	2	0	0	0	0	5
16:30	0	0	0	1	0	0	0	1	2	0	0	0	4
16:45 *	0	1	0	1	0	0	0	0	0	0	0	0	2
17:00 *	0	1	0	0	0	0	0	2	1	0	0	0	4
17:15 *	0	1	0	0	0	0	0	2	1	0	0	0	4
17:30 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	1	1	0	0	0	2
18:00	0	1	0	0	0	0	0	0	0	0	0	0	1
TOTAL	10	31	0	29	0	4	0	26	16	0	0	0	
APPR.		41			33			42			0		116

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 7

Intersection: **Barton St** **at** **Fifty Rd** Total Vehicles: 3,183 Date: Wednesday
Direction: (East/West) (North/South) M.V.E./Year: 2.489 Feb 20, 2013
Road Condition: Dry Weather: Cloudy AWDT Factor: 2.3 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	2	42	0	11	0	2	0	15	2	0	0	0	74	0	0	0	0
7:30	10	44	0	23	0	4	0	16	13	0	0	0	110	0	0	0	0
7:45	7	54	0	22	0	2	0	27	8	0	0	0	120	0	0	0	0
8:00 *	11	61	1	23	0	3	0	33	14	0	0	0	146	0	0	0	0
8:15 *	11	41	0	23	0	3	0	30	17	0	0	0	125	0	0	0	1
8:30 *	6	54	0	23	0	5	0	30	23	0	0	0	141	0	0	0	0
8:45 *	4	56	0	28	0	1	0	18	14	0	0	1	122	0	0	0	0
9:00	5	47	0	15	0	5	0	39	5	0	0	0	116	0	0	0	0
9:15	5	44	0	11	0	5	0	28	12	0	0	0	105	0	0	0	0
9:30	2	28	0	5	0	2	0	27	5	0	0	0	69	0	0	0	0
9:45	3	32	0	8	0	3	0	20	11	0	0	0	77	0	0	0	0
10:00	2	26	0	9	0	4	0	23	8	0	0	0	72	0	0	0	0
13:45	4	23	0	5	0	6	1	35	8	0	0	0	82	0	0	0	0
14:00	4	19	0	7	0	4	0	30	14	0	0	0	78	0	0	0	0
14:15	6	29	0	8	0	6	1	21	6	0	0	1	78	0	0	0	0
14:30	1	34	0	13	0	3	0	20	12	0	0	0	83	0	0	0	0
14:45 *	4	24	0	8	0	11	0	30	12	0	0	0	89	0	0	0	0
15:00 *	6	31	0	13	0	9	0	33	7	1	0	0	100	0	0	0	0
15:15 *	6	29	0	12	0	10	0	31	14	0	0	0	102	0	0	0	0
15:30 *	5	27	0	14	0	9	0	45	20	0	0	0	120	0	0	0	0
16:15	3	35	0	15	0	9	0	56	24	0	0	0	142	0	0	1	0
16:30	5	31	0	21	0	9	0	53	21	0	0	0	140	0	0	0	0
16:45 *	6	27	0	30	0	15	0	38	26	0	0	0	142	0	0	0	0
17:00 *	5	43	0	30	0	16	0	61	21	0	0	0	176	0	0	0	0
17:15 *	6	35	1	26	0	15	0	47	21	0	1	2	154	0	0	0	0
17:30 *	8	35	0	32	0	11	0	41	22	0	0	0	149	0	0	0	0
17:45	6	29	0	21	0	10	0	45	26	0	0	0	137	0	0	0	0
18:00	5	34	0	25	0	7	0	41	22	0	0	0	134	0	0	0	0
TOTAL	148	1,014	2	481	0	189	2	933	408	1	1	4		0	0	1	1
APPR.		1,164			670			1,343			6		3,183			2	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	0	0	1	0	0	0	2	0	0	0	0	3
7:30	0	0	0	0	0	2	0	0	2	0	0	0	4
7:45	0	2	0	1	0	0	0	3	1	0	0	0	7
8:00 *	0	0	0	0	0	1	0	1	0	0	0	0	2
8:15 *	0	4	0	1	0	0	0	1	2	0	0	0	8
8:30 *	1	3	0	3	0	0	0	3	2	0	0	0	12
8:45 *	0	4	0	2	0	0	0	0	0	0	0	0	6
9:00	1	3	0	2	0	0	0	6	1	0	0	0	13
9:15	0	2	0	0	0	1	0	1	1	0	0	0	5
9:30	0	2	0	0	0	0	0	1	0	0	0	0	3
9:45	0	1	0	0	0	1	0	4	2	0	0	0	8
10:00	1	0	0	0	0	0	0	1	0	0	0	0	2
13:45	1	0	0	0	0	0	0	3	1	0	0	0	5
14:00	1	1	0	0	0	0	0	2	1	0	0	0	5
14:15	0	2	0	1	0	0	0	3	0	0	0	0	6
14:30	0	2	0	1	0	0	0	0	2	0	0	0	5
14:45 *	1	3	0	1	0	0	0	2	0	0	0	0	7
15:00 *	1	1	0	1	0	0	0	1	1	0	0	0	5
15:15 *	1	2	0	0	0	0	0	0	0	0	0	0	3
15:30 *	0	2	0	0	0	1	0	3	0	0	0	0	6
16:15	0	1	0	1	0	0	0	1	1	0	0	0	4
16:30	1	1	0	1	0	0	0	0	1	0	0	0	4
16:45 *	0	0	0	2	0	1	0	1	2	0	0	0	6
17:00 *	0	1	0	0	0	0	0	0	0	0	0	0	1
17:15 *	0	0	0	0	0	1	0	3	2	0	0	0	6
17:30 *	1	1	0	0	0	0	0	0	0	0	0	0	2
17:45	0	1	0	0	0	0	0	2	0	0	0	0	3
18:00	0	0	0	0	0	0	0	1	0	0	0	0	1
TOTAL	10	39	0	18	0	8	0	45	22	0	0	0	
APPR.		49			26			67			0		142

TRUCKS

7:15	0	0	0	1	0	0	0	2	0	0	0	0	3
7:30	0	0	0	0	0	0	0	0	2	0	0	0	2
7:45	0	1	0	1	0	0	0	1	1	0	0	0	4
8:00 *	0	0	0	0	0	1	0	1	0	0	0	0	2
8:15 *	0	3	0	1	0	0	0	1	1	0	0	0	6
8:30 *	1	3	0	2	0	0	0	2	0	0	0	0	8
8:45 *	0	3	0	1	0	0	0	0	0	0	0	0	4
9:00	0	2	0	2	0	0	0	1	1	0	0	0	6
9:15	0	2	0	0	0	1	0	1	1	0	0	0	5
9:30	0	2	0	0	0	0	0	1	0	0	0	0	3
9:45	0	1	0	0	0	1	0	4	2	0	0	0	8
10:00	0	0	0	0	0	0	0	1	0	0	0	0	1
13:45	1	0	0	0	0	0	0	3	1	0	0	0	5
14:00	1	1	0	0	0	0	0	2	1	0	0	0	5
14:15	0	2	0	1	0	0	0	3	0	0	0	0	6
14:30	0	2	0	1	0	0	0	0	1	0	0	0	4
14:45 *	0	3	0	1	0	0	0	2	0	0	0	0	6
15:00 *	1	1	0	1	0	0	0	1	1	0	0	0	5
15:15 *	0	1	0	0	0	0	0	0	0	0	0	0	1
15:30 *	0	1	0	0	0	1	0	0	0	0	0	0	2
16:15	0	1	0	0	0	0	0	1	0	0	0	0	2
16:30	1	1	0	1	0	0	0	0	1	0	0	0	4
16:45 *	0	0	0	1	0	1	0	1	2	0	0	0	5
17:00 *	0	1	0	0	0	0	0	0	0	0	0	0	1
17:15 *	0	0	0	0	0	1	0	3	2	0	0	0	6
17:30 *	1	1	0	0	0	0	0	0	0	0	0	0	2
17:45	0	1	0	0	0	0	0	2	0	0	0	0	3
18:00	0	0	0	0	0	0	0	1	0	0	0	0	1
TOTAL	6	33	0	14	0	6	0	34	17	0	0	0	
APPR.		39			20			51			0		110

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 10

Intersection: **Barton St** **at** **Fifty Rd** Total Vehicles: 3,863 Date: Tuesday
Direction: (East/West) (North/South) M.V.E./Year: 3.034 Mar 8, 2016
Road Condition: Dry Weather: Cloudy AWDT Factor: 2.31 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	5	47	0	19	0	3	0	9	4	0	0	0	87	0	0	0	0
7:30	6	83	0	19	0	6	0	31	11	0	0	0	156	0	0	0	0
7:45 *	8	75	1	21	0	1	0	40	18	0	0	0	164	0	0	0	0
8:00 *	8	65	0	18	0	1	0	40	19	0	0	0	151	0	0	0	0
8:15 *	4	70	0	22	0	7	0	18	22	0	0	0	143	0	0	0	0
8:30 *	12	65	0	26	0	2	0	34	18	0	0	0	157	0	0	0	0
8:45	12	59	0	20	0	7	0	25	17	0	0	0	140	0	1	0	0
9:00	7	42	0	30	0	7	0	27	26	0	0	1	140	0	0	0	0
9:15	7	38	0	40	0	6	0	23	41	0	0	0	155	0	0	0	0
9:30	5	41	0	16	0	8	0	22	7	0	0	0	99	0	0	0	0
9:45	7	37	0	13	0	5	0	26	8	0	0	0	96	0	0	0	0
10:00	1	30	0	5	0	2	0	22	8	0	0	0	68	0	0	0	0
13:45	5	28	0	11	0	7	0	25	9	0	0	0	85	0	0	0	0
14:00	8	20	0	11	0	8	0	48	18	0	0	0	113	0	0	0	3
14:15	4	33	0	10	0	9	0	27	5	0	0	0	88	0	0	0	0
14:30	7	34	0	12	0	6	1	52	14	0	0	0	126	0	0	1	0
14:45 *	5	31	0	10	1	4	0	40	17	0	1	1	110	0	1	0	1
15:00 *	4	32	0	21	0	3	0	42	11	0	1	0	114	0	0	0	0
15:15 *	10	33	0	19	0	5	0	57	12	0	0	0	136	0	0	0	0
15:30 *	6	41	0	15	0	17	0	41	39	0	0	0	159	0	0	0	0
16:15	6	44	0	33	0	5	0	64	19	0	1	0	172	0	0	0	0
16:30	5	32	0	22	0	11	1	61	26	0	0	0	158	0	0	0	0
16:45 *	6	40	0	39	0	15	0	56	27	0	0	1	184	0	0	0	0
17:00 *	2	52	0	23	0	13	0	70	26	0	0	0	186	0	1	0	1
17:15 *	5	49	0	45	0	13	0	65	21	0	0	0	198	0	0	0	0
17:30 *	2	42	0	35	0	15	0	60	23	0	0	0	177	0	0	0	0
17:45	7	44	0	21	0	14	1	49	24	0	0	0	160	0	0	0	0
18:00	3	38	0	18	0	6	2	49	25	0	0	0	141	0	0	0	1
TOTAL	167	1,245	1	594	1	206	5	1,123	515	0	3	3		0	3	1	6
APPR.		1,413			801			1,643			6		3,863			10	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	2	0	1	0	1	0	0	0	0	0	0	4
7:30	0	4	0	0	0	2	0	2	0	0	0	0	8
7:45 *	0	2	0	0	0	0	0	4	0	0	0	0	6
8:00 *	0	9	0	1	0	1	0	4	0	0	0	0	15
8:15 *	0	1	0	1	0	2	0	2	3	0	0	0	9
8:30 *	0	1	0	3	0	0	0	1	2	0	0	0	7
8:45	2	5	0	1	0	2	0	3	1	0	0	0	14
9:00	0	1	0	2	0	1	0	1	6	0	0	0	11
9:15	0	2	0	0	0	1	0	2	0	0	0	0	5
9:30	1	1	0	0	0	0	0	3	0	0	0	0	5
9:45	2	3	0	1	0	1	0	1	0	0	0	0	8
10:00	0	1	0	0	0	0	0	4	1	0	0	0	6
13:45	1	3	0	0	0	1	0	2	0	0	0	0	7
14:00	1	1	0	1	0	1	0	2	1	0	0	0	7
14:15	0	2	0	0	0	2	0	3	0	0	0	0	7
14:30	2	4	0	0	0	0	0	3	0	0	0	0	9
14:45 *	1	2	0	1	0	0	0	2	2	0	0	0	8
15:00 *	1	5	0	0	0	0	0	3	0	0	0	0	9
15:15 *	0	3	0	3	0	0	0	8	0	0	0	0	14
15:30 *	0	3	0	0	0	0	0	2	5	0	0	0	10
16:15	0	1	0	2	0	0	0	3	1	0	0	0	7
16:30	0	1	0	0	0	0	0	0	1	0	0	0	2
16:45 *	0	1	0	0	0	0	0	2	0	0	0	0	3
17:00 *	0	2	0	0	0	0	0	4	0	0	0	0	6
17:15 *	0	0	0	1	0	0	0	0	1	0	0	0	2
17:30 *	0	0	0	1	0	1	0	4	0	0	0	0	6
17:45	0	1	0	0	0	0	0	3	1	0	0	0	5
18:00	0	0	0	1	0	0	0	1	0	0	0	0	2
TOTAL	11	61	0	20	0	16	0	69	25	0	0	0	
APPR.		72			36			94			0		202

TRUCKS

7:15	0	1	0	1	0	1	0	0	0	0	0	0	3
7:30	0	3	0	0	0	1	0	1	0	0	0	0	5
7:45 *	0	2	0	0	0	0	0	3	0	0	0	0	5
8:00 *	0	4	0	1	0	0	0	2	0	0	0	0	7
8:15 *	0	1	0	1	0	1	0	1	0	0	0	0	4
8:30 *	0	1	0	2	0	0	0	1	0	0	0	0	4
8:45	1	3	0	0	0	0	0	2	1	0	0	0	7
9:00	0	1	0	0	0	0	0	0	1	0	0	0	2
9:15	0	0	0	0	0	0	0	1	0	0	0	0	1
9:30	1	1	0	0	0	0	0	1	0	0	0	0	3
9:45	1	2	0	1	0	0	0	0	0	0	0	0	4
10:00	0	1	0	0	0	0	0	2	1	0	0	0	4
13:45	0	1	0	0	0	0	0	1	0	0	0	0	2
14:00	0	0	0	1	0	1	0	1	1	0	0	0	4
14:15	0	0	0	0	0	1	0	2	0	0	0	0	3
14:30	0	1	0	0	0	0	0	1	0	0	0	0	2
14:45 *	0	1	0	0	0	0	0	1	0	0	0	0	2
15:00 *	0	3	0	0	0	0	0	2	0	0	0	0	5
15:15 *	0	1	0	1	0	0	0	2	0	0	0	0	4
15:30 *	0	1	0	0	0	0	0	1	1	0	0	0	3
16:15	0	1	0	2	0	0	0	1	1	0	0	0	5
16:30	0	0	0	0	0	0	0	0	1	0	0	0	1
16:45 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00 *	0	2	0	0	0	0	0	2	0	0	0	0	4
17:15 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30 *	0	0	0	1	0	0	0	1	0	0	0	0	2
17:45	0	0	0	0	0	0	0	3	1	0	0	0	4
18:00	0	0	0	1	0	0	0	1	0	0	0	0	2
TOTAL	3	31	0	12	0	5	0	33	8	0	0	0	
APPR.		34			17			41			0		92

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 33

Intersection: **Fifty Rd** **at** **South Service Rd** Total Vehicles: 7,272 Date: Tuesday
Direction: (North/South) (East/West) M.V.E./Year: 4.994 Oct 15, 2013
Road Condition: Dry Weather: Clear AWDT Factor: 2.02 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	1	67	1	29	3	1	8	26	38	4	12	15	205	0	0	0	0
7:30	6	71	2	29	7	0	12	35	48	2	13	10	235	0	0	0	0
7:45	7	71	2	18	3	0	22	45	61	2	23	22	276	0	0	0	0
8:00 *	9	78	3	18	11	1	23	56	81	3	37	7	327	0	0	0	0
8:15 *	2	73	0	22	6	3	19	69	83	2	28	14	321	0	0	0	0
8:30 *	1	58	6	21	11	0	19	54	80	3	18	7	278	0	0	0	0
8:45 *	6	95	7	34	12	2	27	38	74	1	23	16	335	0	0	0	0
9:00	3	58	5	21	7	1	30	72	47	6	11	23	284	0	0	0	0
9:15	1	50	4	22	8	1	20	39	45	5	10	16	221	0	0	0	0
9:30	2	63	6	17	3	1	12	46	19	6	9	14	198	0	0	0	0
9:45	6	44	4	16	6	2	10	26	37	3	13	13	180	0	0	0	0
10:00	1	47	10	24	8	3	11	23	21	1	14	10	173	0	0	0	0
13:45	0	45	5	32	15	0	14	34	20	0	19	7	191	0	0	0	0
14:00	3	38	4	15	14	1	10	42	21	3	8	17	176	0	0	0	0
14:15	0	42	9	17	11	3	11	34	20	4	8	6	165	0	0	0	0
14:30	1	34	5	22	11	4	9	40	21	4	11	5	167	0	0	0	0
14:45 *	2	33	10	27	9	7	12	43	25	3	15	10	196	0	0	0	0
15:00 *	4	50	5	37	15	4	19	38	25	5	16	12	230	0	0	0	0
15:15 *	1	51	8	60	21	3	10	54	16	15	15	22	276	0	0	0	0
15:30 *	1	54	3	38	24	2	17	59	20	8	32	35	293	0	0	0	0
16:15	0	84	4	44	36	12	14	71	27	6	12	33	343	0	0	0	0
16:30	2	59	8	40	23	1	18	83	26	3	14	14	291	0	0	0	2
16:45 *	2	65	6	50	22	6	17	66	26	1	16	44	321	0	0	0	0
17:00 *	4	79	5	60	26	3	19	79	28	5	20	31	359	0	0	0	0
17:15 *	0	71	16	63	23	1	17	85	27	4	4	30	341	0	0	0	0
17:30 *	0	79	6	72	29	5	19	75	15	8	10	23	341	0	0	0	0
17:45	1	77	12	33	19	5	17	76	29	8	10	19	306	0	0	0	0
18:00	0	65	6	27	13	2	22	70	9	5	7	17	243	0	0	0	0
TOTAL	66	1,701	162	908	396	74	458	1,478	989	120	428	492		0	0	0	2
APPR.		1,929			1,378			2,925			1,040		7,272			2	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	4	0	9	0	0	0	2	3	0	0	2	20
7:30	0	1	0	6	2	0	0	3	4	0	1	0	17
7:45	0	4	0	2	1	0	3	4	4	0	1	1	20
8:00 *	0	1	0	1	0	0	0	2	5	0	3	3	15
8:15 *	0	6	0	2	0	0	0	6	7	0	2	2	25
8:30 *	0	3	1	6	1	0	2	10	7	0	2	0	32
8:45 *	0	10	4	11	5	1	6	1	2	0	4	3	47
9:00	1	1	1	6	1	0	4	8	1	0	1	4	28
9:15	0	6	0	8	2	0	1	1	2	0	2	3	25
9:30	0	2	0	5	1	0	1	7	5	3	1	2	27
9:45	2	4	0	5	0	0	1	1	6	0	3	2	24
10:00	0	2	3	8	1	2	3	1	2	0	0	1	23
13:45	0	2	0	6	1	0	2	4	3	0	4	2	24
14:00	0	4	1	5	2	1	1	5	5	0	2	2	28
14:15	0	3	2	2	2	0	1	1	5	1	0	0	17
14:30	0	3	0	4	4	1	1	4	6	1	2	0	26
14:45 *	0	4	0	5	1	1	0	4	3	0	4	0	22
15:00 *	1	6	0	8	3	0	5	5	5	0	0	2	35
15:15 *	0	5	0	11	0	1	3	3	3	2	1	6	35
15:30 *	0	3	0	2	2	0	3	3	0	1	5	2	21
16:15	0	8	0	3	0	0	1	5	6	0	1	2	26
16:30	1	3	0	6	2	0	2	2	2	0	2	0	20
16:45 *	0	4	0	2	1	1	4	2	5	0	2	0	21
17:00 *	2	3	0	3	2	0	1	4	8	0	0	2	25
17:15 *	0	0	1	2	0	0	3	2	1	0	0	2	11
17:30 *	0	1	0	3	0	0	0	0	0	0	1	1	6
17:45	0	1	0	0	0	0	1	2	0	0	1	1	6
18:00	0	4	0	1	1	0	1	0	1	0	0	0	8
TOTAL	7	98	13	132	35	8	50	92	101	8	45	45	
APPR.		118			175			243			98		634

TRUCKS

7:15	0	3	0	8	0	0	0	1	3	0	0	2	17
7:30	0	1	0	5	2	0	0	3	2	0	1	0	14
7:45	0	3	0	2	1	0	3	1	3	0	1	1	15
8:00 *	0	1	0	1	0	0	0	2	5	0	3	3	15
8:15 *	0	1	0	2	0	0	0	3	7	0	2	1	16
8:30 *	0	3	1	6	1	0	1	3	6	0	2	0	23
8:45 *	0	5	4	9	5	1	5	1	2	0	4	3	39
9:00	1	1	1	6	1	0	4	2	1	0	1	4	22
9:15	0	6	0	7	2	0	1	1	2	0	2	3	24
9:30	0	2	0	5	1	0	1	7	5	3	1	2	27
9:45	2	4	0	5	0	0	1	1	6	0	3	2	24
10:00	0	1	3	8	1	2	3	1	2	0	0	1	22
13:45	0	2	0	6	1	0	2	4	3	0	4	2	24
14:00	0	4	1	5	2	1	1	5	5	0	2	2	28
14:15	0	3	2	2	2	0	1	1	5	1	0	0	17
14:30	0	3	0	4	4	1	1	3	6	1	2	0	25
14:45 *	0	2	0	5	1	1	0	2	2	0	4	0	17
15:00 *	1	6	0	8	3	0	5	5	5	0	0	2	35
15:15 *	0	0	0	9	0	1	3	1	3	2	1	6	26
15:30 *	0	1	0	2	2	0	2	1	0	1	5	1	15
16:15	0	3	0	3	0	0	1	3	6	0	1	2	19
16:30	1	2	0	6	2	0	1	1	1	0	2	0	16
16:45 *	0	3	0	2	1	1	4	2	5	0	2	0	20
17:00 *	2	2	0	3	2	0	1	3	8	0	0	2	23
17:15 *	0	0	1	2	0	0	3	2	1	0	0	2	11
17:30 *	0	1	0	3	0	0	0	0	0	0	1	1	6
17:45	0	1	0	0	0	0	1	2	0	0	1	1	6
18:00	0	4	0	1	1	0	1	0	1	0	0	0	8
TOTAL	7	68	13	125	35	8	46	61	95	8	45	43	
APPR.		88			168			202			96		554

City of Hamilton **TURNING MOVEMENT COUNT** Loc. Code: 87

Intersection: **Highway 8** **at** **Fifty Rd** Total Vehicles: 5,895 Date: Wednesday
Direction: (East/West) (North/South) M.V.E./Year: 4.129 Dec 3, 2014
Road Condition: Wet Weather: Cloudy AWDT Factor: 2.06 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W				Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total Veh's	N side	E side	S side	W side
7:15	3	20	2	24	15	1	11	7	12	2	25	13	135	0	0	0	0
7:30	11	17	5	26	26	2	21	10	13	1	41	17	190	0	0	0	0
7:45	11	28	5	38	20	2	11	6	18	3	41	28	211	0	0	1	0
8:00	13	30	14	28	29	3	7	2	17	1	37	29	210	0	0	1	0
8:15 *	8	29	7	22	30	3	10	7	19	3	45	25	208	0	0	0	0
8:30 *	4	21	9	28	32	0	9	9	29	0	54	22	217	0	0	0	0
8:45 *	5	38	11	22	35	1	13	8	27	4	44	26	234	0	0	0	0
9:00 *	10	27	4	16	28	4	13	6	37	1	44	22	212	0	0	0	0
9:15	10	20	4	28	39	3	15	9	15	3	42	15	203	0	0	0	0
9:30	5	25	9	23	39	1	12	5	13	3	53	22	210	0	0	0	0
9:45	8	21	7	29	38	2	11	4	15	0	40	18	193	0	0	0	0
10:00	8	22	5	19	36	6	17	7	10	4	36	18	188	0	0	0	0
13:45	4	8	5	13	31	9	14	5	14	2	42	25	172	0	0	0	0
14:00	4	7	1	12	34	5	18	7	22	1	41	19	171	0	0	0	0
14:15	0	5	6	16	40	6	18	6	13	1	44	14	169	0	0	0	0
14:30	4	8	0	17	49	2	14	11	13	3	40	23	184	0	0	0	0
14:45 *	6	6	1	12	44	4	17	10	26	2	43	12	183	0	0	0	0
15:00 *	3	10	2	16	64	8	23	13	11	2	40	14	206	0	0	0	0
15:15 *	1	3	4	19	44	8	25	13	33	1	30	15	196	0	0	2	0
15:30 *	7	3	5	26	52	9	21	17	20	3	37	24	224	0	0	0	0
16:15	6	7	0	16	57	9	25	24	22	10	36	24	236	0	0	0	0
16:30	4	10	4	19	56	7	30	23	18	3	39	17	230	0	0	0	0
16:45 *	0	6	2	22	61	10	40	18	25	5	46	18	253	0	0	0	0
17:00 *	4	11	6	21	72	9	30	25	18	5	46	22	269	0	0	0	0
17:15 *	3	14	5	32	77	8	23	31	30	10	53	27	313	0	0	0	0
17:30 *	2	15	3	26	65	7	26	24	19	10	41	14	252	0	0	0	0
17:45	1	11	6	19	59	5	23	21	19	4	38	14	220	0	0	0	0
18:00	4	12	3	22	55	5	8	18	25	4	37	13	206	0	0	0	0
TOTAL	149	434	135	611	1,227	139	505	346	553	91	1,155	550		0	0	4	0
APPR.		718			1,977			1,404			1,796		5,895			4	

TRUCKS & BUSES

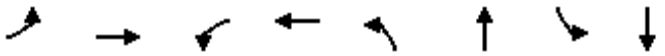
15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	1	0	0	0	0	2	0	1	0	0	0	4
7:30	1	1	0	1	2	0	4	1	1	0	4	0	15
7:45	1	0	0	3	2	0	1	0	3	0	4	3	17
8:00	0	0	0	5	0	0	0	0	0	0	2	2	9
8:15 *	0	0	0	1	0	2	1	0	2	0	0	5	11
8:30 *	1	0	3	2	0	0	1	0	3	0	4	0	14
8:45 *	0	3	2	0	2	1	3	0	1	0	3	0	15
9:00 *	0	0	0	3	2	0	4	0	5	0	1	2	17
9:15	0	0	0	7	2	0	0	0	0	0	3	3	15
9:30	0	0	0	2	0	0	1	0	1	0	2	0	6
9:45	1	1	0	0	0	0	2	1	1	0	3	2	11
10:00	1	2	1	0	2	0	2	1	0	0	1	2	12
13:45	0	0	0	0	0	0	4	0	2	0	0	6	12
14:00	0	0	0	1	1	0	3	0	0	0	3	2	10
14:15	0	0	0	0	0	0	6	0	0	0	0	8	14
14:30	0	1	0	1	0	0	3	0	2	0	1	6	14
14:45 *	1	0	0	1	2	1	2	2	2	0	0	3	14
15:00 *	0	0	0	1	2	0	5	0	0	0	1	5	14
15:15 *	0	0	1	2	1	2	5	0	1	0	4	4	20
15:30 *	1	0	0	0	0	0	6	1	3	0	1	4	16
16:15	0	0	0	0	1	1	5	0	1	0	0	3	11
16:30	2	0	0	0	1	0	2	1	1	0	2	3	12
16:45 *	0	0	0	0	1	1	4	0	1	1	0	4	12
17:00 *	0	0	1	1	1	0	1	1	0	1	0	1	7
17:15 *	0	0	0	0	1	0	0	0	1	1	0	0	3
17:30 *	0	0	0	0	2	0	2	1	1	1	0	0	7
17:45	0	0	0	0	0	0	1	0	0	0	0	1	2
18:00	0	0	0	0	2	0	0	1	0	0	0	0	3
TOTAL	9	9	8	31	27	8	70	10	33	4	39	69	
APPR.		26			66			113			112		317

TRUCKS

7:15	0	1	0	0	0	0	1	0	0	0	0	0	2
7:30	0	0	0	1	0	0	3	0	0	0	1	0	5
7:45	1	0	0	3	2	0	0	0	1	0	3	3	13
8:00	0	0	0	1	0	0	0	0	0	0	2	2	5
8:15 *	0	0	0	1	0	1	1	0	2	0	0	2	7
8:30 *	1	0	2	2	0	0	1	0	2	0	1	0	9
8:45 *	0	3	1	0	1	0	3	0	0	0	2	0	10
9:00 *	0	0	0	1	0	0	3	0	1	0	1	2	8
9:15	0	0	0	7	2	0	0	0	0	0	2	3	14
9:30	0	0	0	2	0	0	1	0	1	0	2	0	6
9:45	1	0	0	0	0	0	2	1	1	0	3	2	10
10:00	1	2	1	0	2	0	2	1	0	0	1	2	12
13:45	0	0	0	0	0	0	4	0	2	0	0	6	12
14:00	0	0	0	1	1	0	3	0	0	0	3	2	10
14:15	0	0	0	0	0	0	6	0	0	0	0	8	14
14:30	0	1	0	1	0	0	3	0	2	0	1	6	14
14:45 *	0	0	0	1	1	1	2	1	2	0	0	2	10
15:00 *	0	0	0	1	2	0	5	0	0	0	0	5	13
15:15 *	0	0	0	1	0	0	5	0	0	0	2	4	12
15:30 *	0	0	0	0	0	0	5	1	0	0	1	4	11
16:15	0	0	0	0	1	1	5	0	1	0	0	3	11
16:30	2	0	0	0	1	0	2	1	1	0	0	3	10
16:45 *	0	0	0	0	1	1	4	0	1	1	0	4	12
17:00 *	0	0	1	1	1	0	1	1	0	1	0	1	7
17:15 *	0	0	0	0	1	0	0	0	1	1	0	0	3
17:30 *	0	0	0	0	2	0	2	1	1	1	0	0	7
17:45	0	0	0	0	0	0	1	0	0	0	0	1	2
18:00	0	0	0	0	0	0	0	1	0	0	0	0	1
TOTAL	6	7	5	24	18	4	65	8	19	4	25	65	
APPR.		18			46			92			94		250

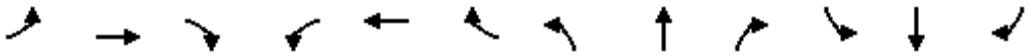
Appendix B

Existing Intersection Operations



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	264	196	16	306	53	373	159	487
v/c Ratio	0.63	0.14	0.04	0.23	0.26	0.54	0.51	0.69
Control Delay	22.9	10.8	12.7	9.3	17.2	17.7	21.2	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.9	10.8	12.7	9.3	17.2	17.7	21.2	16.0
Queue Length 50th (m)	18.6	5.1	0.9	6.6	3.3	25.5	10.9	22.8
Queue Length 95th (m)	55.2	14.3	4.8	18.5	13.1	61.8	33.3	67.1
Internal Link Dist (m)		359.6		41.6		1057.3		1465.1
Turn Bay Length (m)	35.0		35.0		30.0		50.0	
Base Capacity (vph)	635	2073	617	1956	339	1148	524	1068
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	0.42	0.09	0.03	0.16	0.16	0.32	0.30	0.46

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	243	160	20	15	206	75	49	324	19	146	144	304
Future Volume (vph)	243	160	20	15	206	75	49	324	19	146	144	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.3	6.3		6.3	6.3	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
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		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.96		1.00	0.99		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1722	3331		1505	3104		1615	1863		1755	1636	
Flt Permitted	0.57	1.00		0.63	1.00		0.32	1.00		0.46	1.00	
Satd. Flow (perm)	1025	3331		995	3104		552	1863		852	1636	
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)	264	174	22	16	224	82	53	352	21	159	157	330
RTOR Reduction (vph)	0	12	0	0	48	0	0	3	0	0	103	0
Lane Group Flow (vph)	264	184	0	16	258	0	53	370	0	159	384	0
Confl. Peds. (#/hr)			3	3			1					1
Heavy Vehicles (%)	6%	7%	11%	21%	15%	7%	13%	2%	6%	4%	8%	3%
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)	23.4	23.4		23.4	23.4		20.9	20.9		20.9	20.9	
Effective Green, g (s)	23.4	23.4		23.4	23.4		20.9	20.9		20.9	20.9	
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.37	0.37		0.37	0.37	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.3	6.3		6.3	6.3	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	423	1377		411	1283		203	687		314	604	
v/s Ratio Prot		0.06			0.08			0.20			c0.23	
v/s Ratio Perm	c0.26			0.02			0.10			0.19		
v/c Ratio	0.62	0.13		0.04	0.20		0.26	0.54		0.51	0.64	
Uniform Delay, d1	13.1	10.3		9.9	10.6		12.5	14.1		13.8	14.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.1	0.0		0.0	0.0		0.9	1.0		1.8	2.5	
Delay (s)	15.2	10.3		9.9	10.7		13.4	15.1		15.6	17.2	
Level of Service	B	B		A	B		B	B		B	B	
Approach Delay (s)		13.1			10.6			14.9			16.8	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	56.6	Sum of lost time (s)	12.3
Intersection Capacity Utilization	93.1%	ICU Level of Service	F
Analysis Period (min)	15		

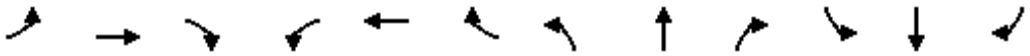
c Critical Lane Group

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	250	329	195	212
v/c Ratio	0.50	0.50	0.38	0.42
Control Delay	12.5	10.0	11.9	8.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.5	10.0	11.9	8.3
Queue Length 50th (m)	9.7	10.4	7.0	3.5
Queue Length 95th (m)	24.9	26.4	22.1	16.8
Internal Link Dist (m)	297.1	79.4	641.1	213.7
Turn Bay Length (m)				
Base Capacity (vph)	1335	1653	807	736
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.19	0.20	0.24	0.29

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	92	130	8	8	195	99	28	120	32	47	31	117
Future Volume (vph)	92	130	8	8	195	99	28	120	32	47	31	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.8			5.8			5.7			5.7	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		1.00			0.96			0.98			0.92	
Flt Protected		0.98			1.00			0.99			0.99	
Satd. Flow (prot)		1771			1748			1763			1575	
Flt Permitted		0.77			0.99			0.91			0.86	
Satd. Flow (perm)		1397			1727			1625			1377	
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)	100	141	9	9	212	108	30	130	35	51	34	127
RTOR Reduction (vph)	0	3	0	0	40	0	0	12	0	0	81	0
Lane Group Flow (vph)	0	247	0	0	289	0	0	183	0	0	131	0
Heavy Vehicles (%)	7%	3%	38%	0%	4%	7%	4%	3%	16%	20%	0%	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)		12.3			12.3			10.7			10.7	
Effective Green, g (s)		12.3			12.3			10.7			10.7	
Actuated g/C Ratio		0.36			0.36			0.31			0.31	
Clearance Time (s)		5.8			5.8			5.7			5.7	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		498			615			503			427	
v/s Ratio Prot												
v/s Ratio Perm		c0.18			0.17			c0.11			0.09	
v/c Ratio		0.50			0.47			0.36			0.31	
Uniform Delay, d1		8.7			8.6			9.3			9.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.8			0.6			0.5			0.4	
Delay (s)		9.5			9.2			9.7			9.5	
Level of Service		A			A			A			A	
Approach Delay (s)		9.5			9.2			9.7			9.5	
Approach LOS		A			A			A			A	

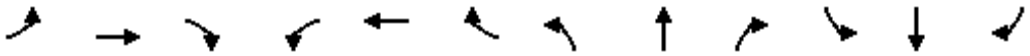
Intersection Summary			
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	34.5	Sum of lost time (s)	11.5
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	224	29	16	231	19	30	41	40	26	40	31
Future Volume (Veh/h)	21	224	29	16	231	19	30	41	40	26	40	31
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)	23	243	32	17	251	21	33	45	43	28	43	34
Pedestrians		2			2			3			2	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	274			278			661	616	264	670	622	266
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	274			278			661	616	264	670	622	266
tC, single (s)	4.3			4.2			7.2	6.6	6.2	7.2	6.6	6.5
tC, 2 stage (s)												
tF (s)	2.4			2.3			3.6	4.1	3.3	3.6	4.1	3.6
p0 queue free %	98			99			89	88	94	91	89	95
cM capacity (veh/h)	1165			1253			310	383	764	303	377	707

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	298	289	121	105
Volume Left	23	17	33	28
Volume Right	32	21	43	34
cSH	1165	1253	432	412
Volume to Capacity	0.02	0.01	0.28	0.25
Queue Length 95th (m)	0.5	0.3	8.6	7.6
Control Delay (s)	0.8	0.6	16.6	16.7
Lane LOS	A	A	C	C
Approach Delay (s)	0.8	0.6	16.6	16.7
Approach LOS			C	C

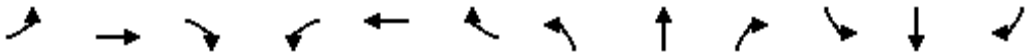
Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	35.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	73	140	46	17	165	29	38	43	24	21	29	75
Future Volume (vph)	73	140	46	17	165	29	38	43	24	21	29	75
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)	79	152	50	18	179	32	41	47	26	23	32	82

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	281	229	114	137
Volume Left (vph)	79	18	41	23
Volume Right (vph)	50	32	26	82
Hadj (s)	0.08	0.14	0.00	-0.06
Departure Headway (s)	5.0	5.1	5.5	5.4
Degree Utilization, x	0.39	0.33	0.17	0.20
Capacity (veh/h)	678	658	583	604
Control Delay (s)	11.2	10.6	9.6	9.7
Approach Delay (s)	11.2	10.6	9.6	9.7
Approach LOS	B	B	A	A

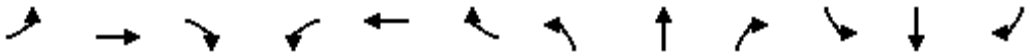
Intersection Summary			
Delay	10.5		
Level of Service	B		
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	25	119	13	9	164	6	57	72	9	7	7	28
Future Volume (vph)	25	119	13	9	164	6	57	72	9	7	7	28
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)	27	129	14	10	178	7	62	78	10	8	8	30

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	170	195	150	46
Volume Left (vph)	27	10	62	8
Volume Right (vph)	14	7	10	30
Hadj (s)	0.13	0.12	0.09	-0.32
Departure Headway (s)	4.8	4.7	4.9	4.7
Degree Utilization, x	0.23	0.26	0.21	0.06
Capacity (veh/h)	708	720	679	689
Control Delay (s)	9.2	9.4	9.2	8.0
Approach Delay (s)	9.2	9.4	9.2	8.0
Approach LOS	A	A	A	A

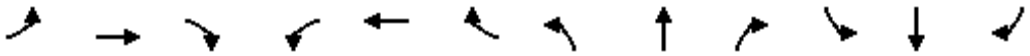
Intersection Summary				
Delay	9.2			
Level of Service	A			
Intersection Capacity Utilization	37.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	14	34	61	84	87	12	39	59	60	6	39	10
Future Volume (vph)	14	34	61	84	87	12	39	59	60	6	39	10
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)	15	37	66	91	95	13	42	64	65	7	42	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	118	199	171	60
Volume Left (vph)	15	91	42	7
Volume Right (vph)	66	13	65	11
Hadj (s)	-0.09	0.16	-0.08	0.07
Departure Headway (s)	4.6	4.8	4.7	5.0
Degree Utilization, x	0.15	0.26	0.22	0.08
Capacity (veh/h)	720	711	721	660
Control Delay (s)	8.5	9.5	9.0	8.4
Approach Delay (s)	8.5	9.5	9.0	8.4
Approach LOS	A	A	A	A

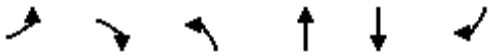
Intersection Summary				
Delay	9.0			
Level of Service	A			
Intersection Capacity Utilization	39.0%	ICU Level of Service	A	
Analysis Period (min)	15			



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	88	19	49	93	14	12	41	41	26	51	51
Future Volume (vph)	27	88	19	49	93	14	12	41	41	26	51	51
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	96	21	53	101	15	13	45	45	28	55	55

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	146	169	103	138
Volume Left (vph)	29	53	13	28
Volume Right (vph)	21	15	45	55
Hadj (s)	0.07	0.13	-0.09	-0.06
Departure Headway (s)	4.8	4.8	4.8	4.8
Degree Utilization, x	0.19	0.23	0.14	0.18
Capacity (veh/h)	701	702	697	700
Control Delay (s)	8.9	9.2	8.5	8.8
Approach Delay (s)	8.9	9.2	8.5	8.8
Approach LOS	A	A	A	A

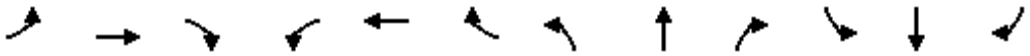
Intersection Summary				
Delay	8.9			
Level of Service	A			
Intersection Capacity Utilization	32.4%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	87	11	32	275	132	77
Future Volume (Veh/h)	87	11	32	275	132	77
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	95	12	35	299	143	84
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				238		
pX, platoon unblocked						
vC, conflicting volume	554	185	227			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	554	185	227			
tC, single (s)	6.5	6.5	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.5	2.2			
p0 queue free %	80	98	97			
cM capacity (veh/h)	474	797	1353			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	107	334	227
Volume Left	95	35	0
Volume Right	12	0	84
cSH	497	1353	1700
Volume to Capacity	0.22	0.03	0.13
Queue Length 95th (m)	6.2	0.6	0.0
Control Delay (s)	14.2	1.0	0.0
Lane LOS	B	A	
Approach Delay (s)	14.2	1.0	0.0
Approach LOS	B		

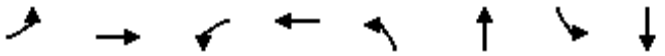
Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	43.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	101	42	6	10	112	47	19	323	17	93	230	337
Future Volume (vph)	101	42	6	10	112	47	19	323	17	93	230	337
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)	110	46	7	11	122	51	21	351	18	101	250	366

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	163	184	390	717
Volume Left (vph)	110	11	21	101
Volume Right (vph)	7	51	18	366
Hadj (s)	0.43	0.04	0.11	-0.14
Departure Headway (s)	7.9	7.4	6.5	6.0
Degree Utilization, x	0.36	0.38	0.71	1.19
Capacity (veh/h)	417	449	534	595
Control Delay (s)	15.2	14.9	23.7	123.0
Approach Delay (s)	15.2	14.9	23.7	123.0
Approach LOS	C	B	C	F

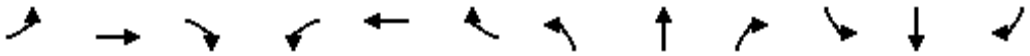
Intersection Summary				
Delay	70.6			
Level of Service	F			
Intersection Capacity Utilization	87.8%	ICU Level of Service	E	
Analysis Period (min)	15			



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	330	230	36	346	34	224	100	545
v/c Ratio	0.78	0.16	0.08	0.24	0.17	0.32	0.22	0.76
Control Delay	33.3	10.1	13.6	9.2	16.4	15.3	15.3	24.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.3	10.1	13.6	9.2	16.4	15.3	15.3	24.0
Queue Length 50th (m)	32.9	6.5	2.5	8.8	2.4	16.8	7.3	48.0
Queue Length 95th (m)	#82.4	14.4	8.4	18.8	9.0	35.9	19.0	94.8
Internal Link Dist (m)		359.6		41.6		1057.3		1465.1
Turn Bay Length (m)	35.0		35.0		30.0		50.0	
Base Capacity (vph)	553	1850	614	1869	274	973	625	978
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	0.60	0.12	0.06	0.19	0.12	0.23	0.16	0.56

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	304	161	51	33	214	104	31	195	11	92	334	167
Future Volume (vph)	304	161	51	33	214	104	31	195	11	92	334	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.3	6.3		6.3	6.3	
Lane Util. Factor	1.00	0.95		1.00	0.95		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	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.95		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3371		1772	3357		1825	1811		1789	1789	
Flt Permitted	0.54	1.00		0.61	1.00		0.27	1.00		0.62	1.00	
Satd. Flow (perm)	1023	3371		1135	3357		510	1811		1165	1789	
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)	330	175	55	36	233	113	34	212	12	100	363	182
RTOR Reduction (vph)	0	32	0	0	66	0	0	2	0	0	24	0
Lane Group Flow (vph)	330	198	0	36	280	0	34	222	0	100	521	0
Confl. Peds. (#/hr)	2					2						
Heavy Vehicles (%)	2%	2%	12%	3%	2%	4%	0%	5%	9%	2%	1%	4%
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)	26.2	26.2		26.2	26.2		24.6	24.6		24.6	24.6	
Effective Green, g (s)	26.2	26.2		26.2	26.2		24.6	24.6		24.6	24.6	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.39	0.39		0.39	0.39	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.3	6.3		6.3	6.3	
Vehicle Extension (s)	1.0	1.0		1.0	1.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	424	1399		471	1393		198	706		454	697	
v/s Ratio Prot		0.06			0.08			0.12			c0.29	
v/s Ratio Perm	c0.32			0.03			0.07			0.09		
v/c Ratio	0.78	0.14		0.08	0.20		0.17	0.31		0.22	0.75	
Uniform Delay, d1	15.9	11.5		11.1	11.8		12.6	13.4		12.8	16.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.0	0.0		0.0	0.0		0.6	0.3		0.3	4.7	
Delay (s)	23.9	11.5		11.2	11.8		13.2	13.7		13.2	21.2	
Level of Service	C	B		B	B		B	B		B	C	
Approach Delay (s)		18.8			11.7			13.7			20.0	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	63.1	Sum of lost time (s)	12.3
Intersection Capacity Utilization	94.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

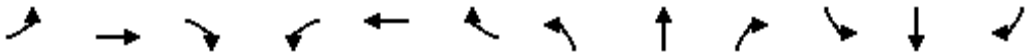
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	463	336	80	350
v/c Ratio	0.71	0.47	0.14	0.70
Control Delay	17.6	10.5	11.6	23.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	17.6	10.5	11.6	23.7
Queue Length 50th (m)	29.5	16.2	3.2	20.3
Queue Length 95th (m)	53.9	31.3	13.0	#67.5
Internal Link Dist (m)	297.1	79.4	641.1	213.7
Turn Bay Length (m)				
Base Capacity (vph)	1207	1290	674	595
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	0.38	0.26	0.12	0.59

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	286	35	31	194	84	9	48	17	124	102	96
Future Volume (vph)	105	286	35	31	194	84	9	48	17	124	102	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.8			5.8			5.7			5.7	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.96			0.97			0.96	
Flt Protected		0.99			0.99			0.99			0.98	
Satd. Flow (prot)		1843			1789			1827			1742	
Flt Permitted		0.84			0.92			0.94			0.84	
Satd. Flow (perm)		1561			1659			1719			1490	
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)	114	311	38	34	211	91	10	52	18	135	111	104
RTOR Reduction (vph)	0	6	0	0	27	0	0	12	0	0	22	0
Lane Group Flow (vph)	0	457	0	0	309	0	0	68	0	0	328	0
Heavy Vehicles (%)	1%	2%	3%	13%	0%	6%	0%	0%	6%	6%	2%	3%
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)		18.8			18.8			14.7			14.7	
Effective Green, g (s)		18.8			18.8			14.7			14.7	
Actuated g/C Ratio		0.42			0.42			0.33			0.33	
Clearance Time (s)		5.8			5.8			5.7			5.7	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		652			693			561			486	
v/s Ratio Prot												
v/s Ratio Perm		c0.29			0.19			0.04			c0.22	
v/c Ratio		0.70			0.45			0.12			0.67	
Uniform Delay, d1		10.8			9.4			10.6			13.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		3.4			0.5			0.1			3.7	
Delay (s)		14.2			9.8			10.7			16.8	
Level of Service		B			A			B			B	
Approach Delay (s)		14.2			9.8			10.7			16.8	
Approach LOS		B			A			B			B	

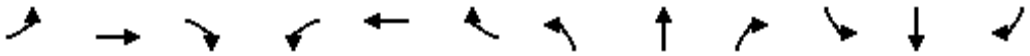
Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	11.5
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	305	37	23	288	28	30	18	29	38	32	62
Future Volume (Veh/h)	31	305	37	23	288	28	30	18	29	38	32	62
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)	34	332	40	25	313	30	33	20	32	41	35	67
Pedestrians					3							
Lane Width (m)					3.7							
Walking Speed (m/s)					1.1							
Percent Blockage					0							
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	343			372			882	813	355	843	818	328
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	343			372			882	813	355	843	818	328
tC, single (s)	4.3			4.2			7.2	6.6	6.3	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.4			2.3			3.6	4.1	3.4	3.5	4.0	3.4
p0 queue free %	97			98			84	93	95	83	88	90
cM capacity (veh/h)	1137			1144			201	292	676	244	297	691

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	406	368	85	143
Volume Left	34	25	33	41
Volume Right	40	30	32	67
cSH	1137	1144	303	374
Volume to Capacity	0.03	0.02	0.28	0.38
Queue Length 95th (m)	0.7	0.5	8.5	13.3
Control Delay (s)	1.0	0.8	21.4	20.5
Lane LOS	A	A	C	C
Approach Delay (s)	1.0	0.8	21.4	20.5
Approach LOS			C	C

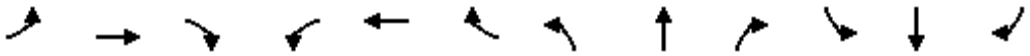
Intersection Summary				
Average Delay	5.4			
Intersection Capacity Utilization	43.0%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	56	233	45	29	202	55	54	26	30	56	52	70
Future Volume (vph)	56	233	45	29	202	55	54	26	30	56	52	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)	61	253	49	32	220	60	59	28	33	61	57	76

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	363	312	120	194
Volume Left (vph)	61	32	59	61
Volume Right (vph)	49	60	33	76
Hadj (s)	0.12	0.14	0.10	-0.02
Departure Headway (s)	5.6	5.6	6.3	6.0
Degree Utilization, x	0.56	0.49	0.21	0.33
Capacity (veh/h)	615	601	484	530
Control Delay (s)	15.4	13.9	11.0	11.9
Approach Delay (s)	15.4	13.9	11.0	11.9
Approach LOS	C	B	B	B

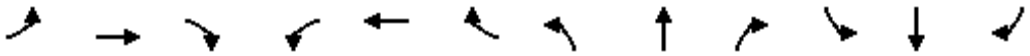
Intersection Summary			
Delay	13.7		
Level of Service	B		
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	16	193	42	10	104	1	23	13	5	11	74	33
Future Volume (vph)	16	193	42	10	104	1	23	13	5	11	74	33
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	210	46	11	113	1	25	14	5	12	80	36

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	273	125	44	128
Volume Left (vph)	17	11	25	12
Volume Right (vph)	46	1	5	36
Hadj (s)	-0.04	0.07	0.14	-0.09
Departure Headway (s)	4.5	4.7	5.2	4.8
Degree Utilization, x	0.34	0.16	0.06	0.17
Capacity (veh/h)	770	717	634	688
Control Delay (s)	9.7	8.7	8.5	8.8
Approach Delay (s)	9.7	8.7	8.5	8.8
Approach LOS	A	A	A	A

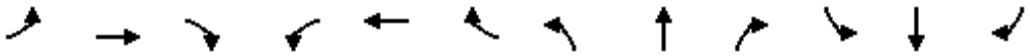
Intersection Summary				
Delay	9.2			
Level of Service	A			
Intersection Capacity Utilization	31.7%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	8	153	23	23	58	6	11	11	49	26	52	14
Future Volume (vph)	8	153	23	23	58	6	11	11	49	26	52	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)	9	166	25	25	63	7	12	12	53	28	57	15

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	200	95	77	100
Volume Left (vph)	9	25	12	28
Volume Right (vph)	25	7	53	15
Hadj (s)	0.01	0.03	-0.33	0.02
Departure Headway (s)	4.4	4.6	4.4	4.7
Degree Utilization, x	0.25	0.12	0.09	0.13
Capacity (veh/h)	778	738	760	709
Control Delay (s)	8.9	8.2	7.8	8.4
Approach Delay (s)	8.9	8.2	7.8	8.4
Approach LOS	A	A	A	A

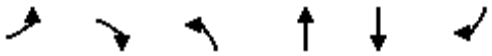
Intersection Summary			
Delay	8.5		
Level of Service	A		
Intersection Capacity Utilization	28.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	33	131	17	30	62	13	14	54	16	12	46	16
Future Volume (vph)	33	131	17	30	62	13	14	54	16	12	46	16
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)	36	142	18	33	67	14	15	59	17	13	50	17

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	196	114	91	80
Volume Left (vph)	36	33	15	13
Volume Right (vph)	18	14	17	17
Hadj (s)	-0.01	0.03	-0.01	-0.05
Departure Headway (s)	4.5	4.6	4.7	4.7
Degree Utilization, x	0.24	0.15	0.12	0.10
Capacity (veh/h)	777	741	710	706
Control Delay (s)	8.9	8.4	8.4	8.2
Approach Delay (s)	8.9	8.4	8.4	8.2
Approach LOS	A	A	A	A

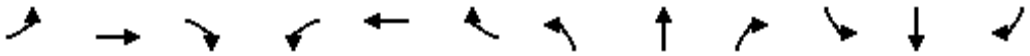
Intersection Summary				
Delay	8.5			
Level of Service	A			
Intersection Capacity Utilization	24.7%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	142	56	15	183	251	97
Future Volume (Veh/h)	142	56	15	183	251	97
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	154	61	16	199	273	105
Pedestrians	1					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				238		
pX, platoon unblocked						
vC, conflicting volume	558	326	379			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	558	326	379			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	68	91	99			
cM capacity (veh/h)	486	714	1189			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	215	215	378
Volume Left	154	16	0
Volume Right	61	0	105
cSH	534	1189	1700
Volume to Capacity	0.40	0.01	0.22
Queue Length 95th (m)	14.7	0.3	0.0
Control Delay (s)	16.2	0.7	0.0
Lane LOS	C	A	
Approach Delay (s)	16.2	0.7	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	40.0%	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)	260	106	16	19	53	136	6	312	35	76	324	102
Future Volume (vph)	260	106	16	19	53	136	6	312	35	76	324	102
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)	283	115	17	21	58	148	7	339	38	83	352	111

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	415	227	384	546
Volume Left (vph)	283	21	7	83
Volume Right (vph)	17	148	38	111
Hadj (s)	0.18	-0.30	0.00	0.02
Departure Headway (s)	8.4	8.9	8.4	8.3
Degree Utilization, x	0.97	0.56	0.89	1.26
Capacity (veh/h)	415	381	419	436
Control Delay (s)	64.4	22.6	49.7	159.3
Approach Delay (s)	64.4	22.6	49.7	159.3
Approach LOS	F	C	E	F

Intersection Summary				
Delay	87.7			
Level of Service	F			
Intersection Capacity Utilization	92.8%	ICU Level of Service	F	
Analysis Period (min)	15			

Appendix C

Traffic Signal Warrants

Signal Warrant Calculation (OTM Book 12)

Horizon Year: Future (2031)

Region/City/Township: Hamilton (Stoney Creek), Ontario

Major Street: Barton
Minor Street: Sunnyhurst / Gordon Dean

North / South (Y/N): N

Number of Approach Lanes (1/2): 1
Tee Intersection Configuration (Y/N): N
Flow Conditions (R/F): F

Land Use North Side (I/C/R): I
Land Use South Side (I/C/R): I
PM Forecast Only (Y/N): N

Overall Warrant		
150% Satisfied:	YES	Warrant for new intersections with forecast traffic
120% Satisfied:	YES	Warrant for existing intersections with forecast traffic
100% Satisfied:	YES	Warrant for existing intersections with existing traffic

Time Period	MAJOR STREET						MINOR STREET					
	Barton						***Sunnyhurst / Gordon Dean***					
	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
AM Peak Hour	9	677	15	8	481	68	226	0	82	7	0	8
PM Peak Hour	27	544	1	9	830	235	136	0	18	7	0	9

Average Hourly Volumes			
VOLUME	PM	SAT	AHV
1A - All	1,581	1,816	849
1B - Minor	323	170	123
2A - Major	1,258	1,646	726
2B - Cross	233	143	94

WARRANT 1 - MINIMUM VEHICULAR VOLUME

	APPROACH LANES	1		2 OR MORE		AVERAGE
1A	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	ALL APPROACHES	480	720	600	900	849
		% FULFILLED				177%

	APPROACH LANES	1		2 OR MORE		AVERAGE
1B	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	MINOR STREET APPROACHES	120	170	120	170	123
		% FULFILLED				103%

WARRANT 2 - DELAY TO CROSS TRAFFIC

	APPROACH LANES	1		2 OR MORE		AVERAGE
2A	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	MAJOR STREET APPROACHES	480	720	600	900	726
		% FULFILLED				151%

	APPROACH LANES	1		2 OR MORE		AVERAGE
2B	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	TRAFFIC CROSSING MAJOR STREET	50	75	50	75	94
		% FULFILLED				188%

1A - MINIMUM VEHICULAR VOLUME: Total vehicle volume on all approaches for average day
1B - MINIMUM VEHICULAR VOLUME: Total vehicle volume on minor streets
2A - DELAY TO CROSS TRAFFIC: Total vehicle volume on major street for average day
2B - DELAY TO CROSS TRAFFIC: Total vehicle and pedestrian volume crossing major street: comprising: (1) lefts from both minor street, (2) heaviest through from minor street, (3) 50% of heavier left turn from major street when following criteria met: (a)

Signal Warrant Calculation (OTM Book 12)

Horizon Year: Future (2031)

Region/City/Township: Hamilton (Stoney Creek), Ontario

Major Street: Barton
Minor Street: Jones

North / South (Y/N): N

Number of Approach Lanes (1/2): 1
Tee Intersection Configuration (Y/N): N
Flow Conditions (R/F): F

Land Use North Side (I/C/R): I
Land Use South Side (I/C/R): I
PM Forecast Only (Y/N): N

Overall Warrant		
150% Satisfied:	NO	Warrant for new intersections with forecast traffic
120% Satisfied:	YES	Warrant for existing intersections with forecast traffic
100% Satisfied:	YES	Warrant for existing intersections with existing traffic

Time Period	MAJOR STREET						MINOR STREET					
	Barton						***Jones***					
	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
AM Peak Hour	59	494	48	25	391	55	100	50	82	34	49	38
PM Peak Hour	69	476	46	9	830	235	73	22	62	46	39	76

Average Hourly Volumes			
VOLUME	PM	SAT	AHV
1A - All	1,425	1,983	852
1B - Minor	353	318	168
2A - Major	1,072	1,665	684
2B - Cross	184	158	86

WARRANT 1 - MINIMUM VEHICULAR VOLUME

	APPROACH LANES	1		2 OR MORE		AVERAGE
1A	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	ALL APPROACHES	480	720	600	900	852
		% FULFILLED				178%

	APPROACH LANES	1		2 OR MORE		AVERAGE
1B	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	MINOR STREET APPROACHES	120	170	120	170	168
		% FULFILLED				140%

WARRANT 2 - DELAY TO CROSS TRAFFIC

	APPROACH LANES	1		2 OR MORE		AVERAGE
2A	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	MAJOR STREET APPROACHES	480	720	600	900	684
		% FULFILLED				143%

	APPROACH LANES	1		2 OR MORE		AVERAGE
2B	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	TRAFFIC CROSSING MAJOR STREET	50	75	50	75	86
		% FULFILLED				171%

1A - MINIMUM VEHICULAR VOLUME: Total vehicle volume on all approaches for average day
1B - MINIMUM VEHICULAR VOLUME: Total vehicle volume on minor streets
2A - DELAY TO CROSS TRAFFIC: Total vehicle volume on major street for average day
2B - DELAY TO CROSS TRAFFIC: Total vehicle and pedestrian volume crossing major street: comprising: (1) lefts from both minor street, (2) heaviest through from minor street, (3) 50% of heavier left turn from major street when following criteria met: (a)

Signal Warrant Calculation (OTM Book 12)

Horizon Year: Future (2031)

Region/City/Township: Hamilton (Stoney Creek), Ontario

Major Street: Barton
Minor Street: Glover

North / South (Y/N): N

Number of Approach Lanes (1/2): 1
Tee Intersection Configuration (Y/N): N
Flow Conditions (R/F): F

Land Use North Side (I/C/R): I
Land Use South Side (I/C/R): I
PM Forecast Only (Y/N): N

Overall Warrant		
150% Satisfied:	NO	Warrant for new intersections with forecast traffic
120% Satisfied:	YES	Warrant for existing intersections with forecast traffic
100% Satisfied:	YES	Warrant for existing intersections with existing traffic

Time Period	MAJOR STREET						MINOR STREET					
	Barton						***Glover***					
	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
AM Peak Hour	56	475	68	92	318	56	46	53	37	25	36	95
PM Peak Hour	57	418	84	71	697	55	66	32	50	69	64	92

Average Hourly Volumes			
VOLUME	PM	SAT	AHV
1A - All	1,357	1,755	778
1B - Minor	292	373	166
2A - Major	1,065	1,382	612
2B - Cross	124	199	81

WARRANT 1 - MINIMUM VEHICULAR VOLUME

	APPROACH LANES	1		2 OR MORE		AVERAGE
1A	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	ALL APPROACHES	480	720	600	900	778
		% FULFILLED				162%

	APPROACH LANES	1		2 OR MORE		AVERAGE
1B	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	MINOR STREET APPROACHES	120	170	120	170	166
		% FULFILLED				139%

WARRANT 2 - DELAY TO CROSS TRAFFIC

	APPROACH LANES	1		2 OR MORE		AVERAGE
2A	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	MAJOR STREET APPROACHES	480	720	600	900	612
		% FULFILLED				127%

	APPROACH LANES	1		2 OR MORE		AVERAGE
2B	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	TRAFFIC CROSSING MAJOR STREET	50	75	50	75	81
		% FULFILLED				162%

1A - MINIMUM VEHICULAR VOLUME: Total vehicle volume on all approaches for average day
1B - MINIMUM VEHICULAR VOLUME: Total vehicle volume on minor streets
2A - DELAY TO CROSS TRAFFIC: Total vehicle volume on major street for average day
2B - DELAY TO CROSS TRAFFIC: Total vehicle and pedestrian volume crossing major street: comprising: (1) lefts from both minor street, (2) heaviest through from minor street, (3) 50% of heavier left turn from major street when following criteria met: (a)

Signal Warrant Calculation (OTM Book 12)

Horizon Year: Future (2031)

Region/City/Township: Hamilton (Stoney Creek), Ontario

Major Street: Barton
Minor Street: McNeilly

North / South (Y/N): N

Number of Approach Lanes (1/2): 1
Tee Intersection Configuration (Y/N): N
Flow Conditions (R/F): F

Land Use North Side (I/C/R): R
Land Use South Side (I/C/R): R
PM Forecast Only (Y/N): N

Overall Warrant		
150% Satisfied:	NO	Warrant for new intersections with forecast traffic
120% Satisfied:	YES	Warrant for existing intersections with forecast traffic
100% Satisfied:	YES	Warrant for existing intersections with existing traffic

Time Period	MAJOR STREET						MINOR STREET					
	Barton						***McNeilly***					
	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
AM Peak Hour	26	484	22	34	288	26	124	213	21	8	37	36
PM Peak Hour	29	305	11	22	599	112	52	71	30	23	232	46

Average Hourly Volumes			
VOLUME	PM	SAT	AHV
1A - All	1,319	1,532	713
1B - Minor	439	454	223
2A - Major	880	1,078	490
2B - Cross	345	307	163

WARRANT 1 - MINIMUM VEHICULAR VOLUME

	APPROACH LANES	1		2 OR MORE		AVERAGE
1A	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	ALL APPROACHES	480	720	600	900	713
		% FULFILLED				148%

	APPROACH LANES	1		2 OR MORE		AVERAGE
1B	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	MINOR STREET APPROACHES	120	170	120	170	223
		% FULFILLED				186%

WARRANT 2 - DELAY TO CROSS TRAFFIC

	APPROACH LANES	1		2 OR MORE		AVERAGE
2A	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	MAJOR STREET APPROACHES	480	720	600	900	490
		% FULFILLED				102%

	APPROACH LANES	1		2 OR MORE		AVERAGE
2B	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	TRAFFIC CROSSING MAJOR STREET	50	75	50	75	163
		% FULFILLED				326%

1A - MINIMUM VEHICULAR VOLUME: Total vehicle volume on all approaches for average day
1B - MINIMUM VEHICULAR VOLUME: Total vehicle volume on minor streets
2A - DELAY TO CROSS TRAFFIC: Total vehicle volume on major street for average day
2B - DELAY TO CROSS TRAFFIC: Total vehicle and pedestrian volume crossing major street: comprising: (1) lefts from both minor street, (2) heaviest through from minor street, (3) 50% of heavier left turn from major street when following criteria met: (a)

Signal Warrant Calculation (OTM Book 12)

Horizon Year: Future (2031)

Region/City/Township: Hamilton (Stoney Creek), Ontario

Major Street: Barton
Minor Street: Lewis

North / South (Y/N): N

Number of Approach Lanes (1/2): 1
Tee Intersection Configuration (Y/N): N
Flow Conditions (R/F): F

Land Use North Side (I/C/R): I
Land Use South Side (I/C/R): R
PM Forecast Only (Y/N): N

Overall Warrant		
150% Satisfied:	NO	Warrant for new intersections with forecast traffic
120% Satisfied:	YES	Warrant for existing intersections with forecast traffic
100% Satisfied:	YES	Warrant for existing intersections with existing traffic

Time Period	MAJOR STREET						MINOR STREET					
	Barton						***Lewis***					
	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
AM Peak Hour	129	286	87	93	231	78	60	142	105	18	73	47
PM Peak Hour	91	271	46	81	476	38	18	55	101	87	168	91

Average Hourly Volumes			
VOLUME	PM	SAT	AHV
1A - All	1,349	1,523	718
1B - Minor	445	520	241
2A - Major	904	1,003	477
2B - Cross	220	273	123

WARRANT 1 - MINIMUM VEHICULAR VOLUME

	APPROACH LANES	1		2 OR MORE		AVERAGE
1A	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	ALL APPROACHES	480	720	600	900	718
		% FULFILLED				150%

	APPROACH LANES	1		2 OR MORE		AVERAGE
1B	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	MINOR STREET APPROACHES	120	170	120	170	241
		% FULFILLED				201%

WARRANT 2 - DELAY TO CROSS TRAFFIC

	APPROACH LANES	1		2 OR MORE		AVERAGE
2A	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	MAJOR STREET APPROACHES	480	720	600	900	477
		% FULFILLED				99%

	APPROACH LANES	1		2 OR MORE		AVERAGE
2B	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	TRAFFIC CROSSING MAJOR STREET	50	75	50	75	123
		% FULFILLED				247%

1A - MINIMUM VEHICULAR VOLUME: Total vehicle volume on all approaches for average day
1B - MINIMUM VEHICULAR VOLUME: Total vehicle volume on minor streets
2A - DELAY TO CROSS TRAFFIC: Total vehicle volume on major street for average day
2B - DELAY TO CROSS TRAFFIC: Total vehicle and pedestrian volume crossing major street: comprising: (1) lefts from both minor street, (2) heaviest through from minor street, (3) 50% of heavier left turn from major street when following criteria met: (a)

Signal Warrant Calculation (OTM Book 12)

Horizon Year: Future (2031)

Region/City/Township: Hamilton (Stoney Creek), Ontario

Major Street: Barton
Minor Street: Winona

North / South (Y/N): N

Number of Approach Lanes (1/2): 1
Tee Intersection Configuration (Y/N): N
Flow Conditions (R/F): F

Land Use North Side (I/C/R): I
Land Use South Side (I/C/R): R
PM Forecast Only (Y/N): N

Overall Warrant		
150% Satisfied:	NO	Warrant for new intersections with forecast traffic
120% Satisfied:	YES	Warrant for existing intersections with forecast traffic
100% Satisfied:	YES	Warrant for existing intersections with existing traffic

Time Period	MAJOR STREET						MINOR STREET					
	Barton						***Winona***					
	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
AM Peak Hour	60	257	17	100	383	23	15	127	50	32	128	116
PM Peak Hour	37	279	25	139	446	21	17	191	20	15	178	119

Average Hourly Volumes			
VOLUME	PM	SAT	AHV
1A - All	1,308	1,487	699
1B - Minor	468	540	252
2A - Major	840	947	447
2B - Cross	175	223	100

WARRANT 1 - MINIMUM VEHICULAR VOLUME

	APPROACH LANES	1		2 OR MORE		AVERAGE
1A	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	ALL APPROACHES	480	720	600	900	699
		% FULFILLED				146%

	APPROACH LANES	1		2 OR MORE		AVERAGE
1B	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	MINOR STREET APPROACHES	120	170	120	170	252
		% FULFILLED				210%

WARRANT 2 - DELAY TO CROSS TRAFFIC

	APPROACH LANES	1		2 OR MORE		AVERAGE
2A	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	MAJOR STREET APPROACHES	480	720	600	900	447
		% FULFILLED				93%

	APPROACH LANES	1		2 OR MORE		AVERAGE
2B	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	TRAFFIC CROSSING MAJOR STREET	50	75	50	75	100
		% FULFILLED				199%

1A - MINIMUM VEHICULAR VOLUME: Total vehicle volume on all approaches for average day
1B - MINIMUM VEHICULAR VOLUME: Total vehicle volume on minor streets
2A - DELAY TO CROSS TRAFFIC: Total vehicle volume on major street for average day
2B - DELAY TO CROSS TRAFFIC: Total vehicle and pedestrian volume crossing major street: comprising: (1) lefts from both minor street, (2) heaviest through from minor street, (3) 50% of heavier left turn from major street when following criteria met: (a)

Signal Warrant Calculation (OTM Book 12)

Horizon Year: Future (2031)

Region/City/Township: Hamilton (Stoney Creek), Ontario

Major Street: Barton
Minor Street: Fifty

North / South (Y/N): N

Number of Approach Lanes (1/2): 1
Tee Intersection Configuration (Y/N): Y
Flow Conditions (R/F): F

Land Use North Side (I/C/R): I
Land Use South Side (I/C/R): R
PM Forecast Only (Y/N): N

Overall Warrant		
150% Satisfied:	YES	Warrant for new intersections with forecast traffic
120% Satisfied:	YES	Warrant for existing intersections with forecast traffic
100% Satisfied:	YES	Warrant for existing intersections with existing traffic

Time Period	MAJOR STREET						MINOR STREET					
	Barton						***Fifty***					
	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
AM Peak Hour				349		46	80	414			231	196
PM Peak Hour				382		147	77	333			421	272

Average Hourly Volumes			
VOLUME	PM	SAT	AHV
1A - All	1,316	1,632	737
1B - Minor	921	1,103	506
2A - Major	395	529	231
2B - Cross	494	498	248

WARRANT 1 - MINIMUM VEHICULAR VOLUME

	APPROACH LANES	1		2 OR MORE		AVERAGE
1A	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	ALL APPROACHES	480	720	600	900	737
		% FULFILLED				154%

	APPROACH LANES	1		2 OR MORE		AVERAGE
1B	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	MINOR STREET APPROACHES	180	255	180	255	506
		% FULFILLED				281%

WARRANT 2 - DELAY TO CROSS TRAFFIC

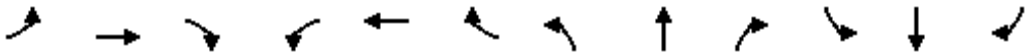
	APPROACH LANES	1		2 OR MORE		AVERAGE
2A	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	MAJOR STREET APPROACHES	480	720	600	900	231
		% FULFILLED				48%

	APPROACH LANES	1		2 OR MORE		AVERAGE
2B	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
		X				
	TRAFFIC CROSSING MAJOR STREET	50	75	50	75	248
		% FULFILLED				496%

1A - MINIMUM VEHICULAR VOLUME: Total vehicle volume on all approaches for average day
1B - MINIMUM VEHICULAR VOLUME: Total vehicle volume on minor streets
2A - DELAY TO CROSS TRAFFIC: Total vehicle volume on major street for average day
2B - DELAY TO CROSS TRAFFIC: Total vehicle and pedestrian volume crossing major street: comprising: (1) lefts from both minor street, (2) heaviest through from minor street, (3) 50% of heavier left turn from major street when following criteria met: (a)

Appendix D

Future Intersection Operations



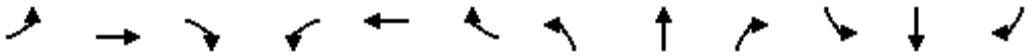
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	297	303	68	41	580	247	206	526	49	238	214	371
Future Volume (vph)	297	303	68	41	580	247	206	526	49	238	214	371
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.3	6.3		6.3	6.3	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
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		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.99		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1722	3280		1504	3096		1615	1853		1755	1645	
Flt Permitted	0.23	1.00		0.51	1.00		0.17	1.00		0.18	1.00	
Satd. Flow (perm)	410	3280		815	3096		290	1853		334	1645	
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)	323	329	74	45	630	268	224	572	53	259	233	403
RTOR Reduction (vph)	0	24	0	0	59	0	0	4	0	0	78	0
Lane Group Flow (vph)	323	379	0	45	839	0	224	621	0	259	558	0
Confl. Peds. (#/hr)			3	3			1					1
Heavy Vehicles (%)	6%	7%	11%	21%	15%	7%	13%	2%	6%	4%	8%	3%
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)	35.0	35.0		35.0	35.0		32.7	32.7		32.7	32.7	
Effective Green, g (s)	35.0	35.0		35.0	35.0		32.7	32.7		32.7	32.7	
Actuated g/C Ratio	0.44	0.44		0.44	0.44		0.41	0.41		0.41	0.41	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.3	6.3		6.3	6.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	179	1435		356	1354		118	757		136	672	
v/s Ratio Prot		0.12			0.27			0.33			0.34	
v/s Ratio Perm	c0.79			0.06			0.77			c0.77		
v/c Ratio	1.80	0.26		0.13	0.62		1.90	0.82		1.90	0.83	
Uniform Delay, d1	22.5	14.3		13.4	17.4		23.6	21.0		23.6	21.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	383.3	0.1		0.2	0.9		434.2	7.1		433.2	8.6	
Delay (s)	405.8	14.4		13.6	18.2		457.9	28.1		456.8	29.7	
Level of Service	F	B		B	B		F	C		F	C	
Approach Delay (s)		188.5			18.0			141.5			153.3	
Approach LOS		F			B			F			F	

Intersection Summary			
HCM 2000 Control Delay	120.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.85		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.3
Intersection Capacity Utilization	107.7%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	159	9	9	239	183	34	185	39	109	61	170
Future Volume (vph)	131	159	9	9	239	183	34	185	39	109	61	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.8			5.8			5.7			5.7	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		1.00			0.94			0.98			0.93	
Flt Protected		0.98			1.00			0.99			0.98	
Satd. Flow (prot)		1769			1720			1779			1582	
Flt Permitted		0.61			0.99			0.91			0.81	
Satd. Flow (perm)		1110			1703			1633			1305	
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)	142	173	10	10	260	199	37	201	42	118	66	185
RTOR Reduction (vph)	0	3	0	0	59	0	0	9	0	0	49	0
Lane Group Flow (vph)	0	322	0	0	410	0	0	271	0	0	320	0
Heavy Vehicles (%)	7%	3%	38%	0%	4%	7%	4%	3%	16%	20%	0%	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)		16.7			16.7			17.0			17.0	
Effective Green, g (s)		16.7			16.7			17.0			17.0	
Actuated g/C Ratio		0.37			0.37			0.38			0.38	
Clearance Time (s)		5.8			5.8			5.7			5.7	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		410			629			614			490	
v/s Ratio Prot												
v/s Ratio Perm		c0.29			0.24			0.17			c0.24	
v/c Ratio		0.79			0.65			0.44			0.65	
Uniform Delay, d1		12.7			11.8			10.5			11.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		9.6			2.4			0.5			3.1	
Delay (s)		22.3			14.3			11.1			14.8	
Level of Service		C			B			B			B	
Approach Delay (s)		22.3			14.3			11.1			14.8	
Approach LOS		C			B			B			B	

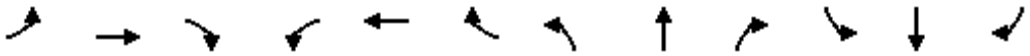
Intersection Summary			
HCM 2000 Control Delay	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	45.2	Sum of lost time (s)	11.5
Intersection Capacity Utilization	93.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	391	55	59	494	48	100	50	82	34	49	38
Future Volume (Veh/h)	25	391	55	59	494	48	100	50	82	34	49	38
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)	27	425	60	64	537	52	109	54	89	37	53	41
Pedestrians		2			2			3			2	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	591			488			1246	1231	460	1290	1235	567
vC1, stage 1 conf vol							512	512		693	693	
vC2, stage 2 conf vol							734	719		597	542	
vCu, unblocked vol	591			488			1246	1231	460	1290	1235	567
tC, single (s)	4.3			4.2			7.2	6.6	6.2	7.2	6.6	6.5
tC, 2 stage (s)							6.2	5.6		6.2	5.6	
tF (s)	2.4			2.3			3.6	4.1	3.3	3.6	4.1	3.6
p0 queue free %	97			94			56	83	85	85	83	91
cM capacity (veh/h)	879			1047			250	322	592	244	319	472

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	27	485	64	589	252	131
Volume Left	27	0	64	0	109	37
Volume Right	0	60	0	52	89	41
cSH	879	1700	1047	1700	334	324
Volume to Capacity	0.03	0.29	0.06	0.35	0.75	0.40
Queue Length 95th (m)	0.7	0.0	1.5	0.0	44.5	14.4
Control Delay (s)	9.2	0.0	8.7	0.0	42.4	23.5
Lane LOS	A		A		E	C
Approach Delay (s)	0.5		0.8		42.4	23.5
Approach LOS					E	C

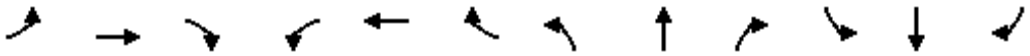
Intersection Summary				
Average Delay	9.4			
Intersection Capacity Utilization	62.2%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	92	318	56	56	475	68	46	53	37	25	36	95
Future Volume (vph)	92	318	56	56	475	68	46	53	37	25	36	95
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)	100	346	61	61	516	74	50	58	40	27	39	103

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	100	407	61	590	148	169
Volume Left (vph)	100	0	61	0	50	27
Volume Right (vph)	0	61	0	74	40	103
Hadj (s)	0.67	0.02	0.50	0.14	-0.03	-0.07
Departure Headway (s)	7.4	6.7	7.1	6.8	7.4	7.3
Degree Utilization, x	0.20	0.76	0.12	1.11	0.31	0.34
Capacity (veh/h)	475	524	493	543	446	461
Control Delay (s)	11.1	26.7	9.9	95.7	13.6	14.1
Approach Delay (s)	23.6		87.7		13.6	14.1
Approach LOS	C		F		B	B

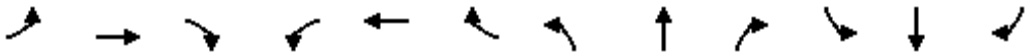
Intersection Summary				
Delay	49.8			
Level of Service	E			
Intersection Capacity Utilization	58.5%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	34	288	26	26	484	22	124	213	21	8	37	36
Future Volume (vph)	34	288	26	26	484	22	124	213	21	8	37	36
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)	37	313	28	28	526	24	135	232	23	9	40	39

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	37	341	28	550	390	88
Volume Left (vph)	37	0	28	0	135	9
Volume Right (vph)	0	28	0	24	23	39
Hadj (s)	0.57	0.11	0.69	0.10	0.08	-0.22
Departure Headway (s)	8.0	7.6	8.0	7.4	7.1	8.0
Degree Utilization, x	0.08	0.72	0.06	1.12	0.77	0.20
Capacity (veh/h)	431	461	442	492	495	390
Control Delay (s)	10.5	26.2	10.3	103.9	29.9	13.0
Approach Delay (s)	24.7		99.4		29.9	13.0
Approach LOS	C		F		D	B

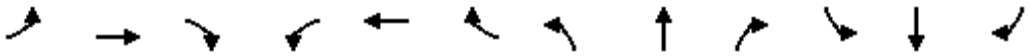
Intersection Summary				
Delay	55.5			
Level of Service	F			
Intersection Capacity Utilization	60.9%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	93	231	78	129	286	87	60	142	105	18	73	47
Future Volume (vph)	93	231	78	129	286	87	60	142	105	18	73	47
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)	101	251	85	140	311	95	65	154	114	20	79	51

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	101	336	140	406	333	150
Volume Left (vph)	101	0	140	0	65	20
Volume Right (vph)	0	85	0	95	114	51
Hadj (s)	0.74	0.12	0.64	-0.07	-0.08	0.07
Departure Headway (s)	8.3	7.7	8.1	7.3	7.2	8.1
Degree Utilization, x	0.23	0.72	0.31	0.83	0.67	0.34
Capacity (veh/h)	412	450	435	480	474	399
Control Delay (s)	12.6	26.7	13.5	35.3	23.3	15.1
Approach Delay (s)	23.4		29.7		23.3	15.1
Approach LOS	C		D		C	C

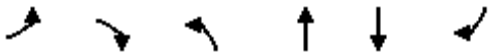
Intersection Summary				
Delay	24.9			
Level of Service	C			
Intersection Capacity Utilization	59.4%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	100	383	23	60	257	17	15	127	50	32	128	116
Future Volume (vph)	100	383	23	60	257	17	15	127	50	32	128	116
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)	109	416	25	65	279	18	16	138	54	35	139	126

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	109	441	65	297	208	300
Volume Left (vph)	109	0	65	0	16	35
Volume Right (vph)	0	25	0	18	54	126
Hadj (s)	0.76	0.05	0.57	0.12	0.02	-0.09
Departure Headway (s)	8.2	7.4	8.3	7.9	7.8	7.4
Degree Utilization, x	0.25	0.91	0.15	0.65	0.45	0.61
Capacity (veh/h)	428	468	415	433	425	465
Control Delay (s)	12.6	48.0	11.6	23.1	17.1	21.4
Approach Delay (s)	41.0		21.1		17.1	21.4
Approach LOS	E		C		C	C

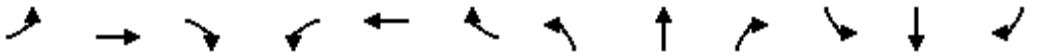
Intersection Summary				
Delay	28.3			
Level of Service	D			
Intersection Capacity Utilization	58.2%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	349	46	80	414	231	196
Future Volume (Veh/h)	349	46	80	414	231	196
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	379	50	87	450	251	213
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				238		
pX, platoon unblocked						
vC, conflicting volume	982	358	464			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	982	358	464			
tC, single (s)	6.5	6.5	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.5	2.2			
p0 queue free %	0	92	92			
cM capacity (veh/h)	250	634	1108			

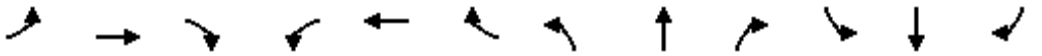
Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	379	50	537	464
Volume Left	379	0	87	0
Volume Right	0	50	0	213
cSH	250	634	1108	1700
Volume to Capacity	1.51	0.08	0.08	0.27
Queue Length 95th (m)	170.3	1.9	1.9	0.0
Control Delay (s)	286.9	11.2	2.1	0.0
Lane LOS	F	B	A	
Approach Delay (s)	254.8		2.1	0.0
Approach LOS	F			

Intersection Summary			
Average Delay	77.2		
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	382	67	84	15	153	57	115	613	31	114	373	692
Future Volume (vph)	382	67	84	15	153	57	115	613	31	114	373	692
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	0.97	1.00		1.00	1.00		1.00	0.95		1.00	1.00	1.00
Frt	1.00	0.92		1.00	0.96		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)	2926	1517		1825	1643		1825	3350		1674	1762	1526
Flt Permitted	0.95	1.00		0.65	1.00		0.28	1.00		0.39	1.00	1.00
Satd. Flow (perm)	2926	1517		1255	1643		539	3350		679	1762	1526
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)	415	73	91	16	166	62	125	666	34	124	405	752
RTOR Reduction (vph)	0	48	0	0	15	0	0	4	0	0	0	420
Lane Group Flow (vph)	415	116	0	16	213	0	125	696	0	124	405	332
Heavy Vehicles (%)	21%	15%	17%	0%	10%	18%	0%	7%	31%	9%	9%	7%
Turn Type	Prot	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases				8			2			6		6
Actuated Green, G (s)	13.5	32.6		14.6	14.6		34.8	34.8		26.6	26.6	26.6
Effective Green, g (s)	13.5	32.6		14.6	14.6		34.8	34.8		26.6	26.6	26.6
Actuated g/C Ratio	0.18	0.43		0.19	0.19		0.46	0.46		0.35	0.35	0.35
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	517	647		239	313		307	1525		236	613	531
v/s Ratio Prot	c0.14	0.08			c0.13		0.02	c0.21			c0.23	
v/s Ratio Perm				0.01			0.17			0.18		0.22
v/c Ratio	0.80	0.18		0.07	0.68		0.41	0.46		0.53	0.66	0.62
Uniform Delay, d1	30.2	13.6		25.3	28.7		13.7	14.3		19.9	21.1	20.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	8.8	0.1		0.1	5.8		0.9	0.2		2.1	2.7	2.3
Delay (s)	38.9	13.7		25.4	34.5		14.6	14.5		22.0	23.8	23.0
Level of Service	D	B		C	C		B	B		C	C	C
Approach Delay (s)		31.8			33.9			14.5			23.2	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	23.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	76.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	481	68	9	677	15	226	0	28	7	0	8
Future Volume (Veh/h)	8	481	68	9	677	15	226	0	28	7	0	8
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)	9	523	74	10	736	16	246	0	30	8	0	9
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	752			597			1343	1350	560	1335	1379	744
vC1, stage 1 conf vol							578	578		764	764	
vC2, stage 2 conf vol							765	772		571	615	
vCu, unblocked vol	752			597			1343	1350	560	1335	1379	744
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			22	100	94	97	100	98
cM capacity (veh/h)	858			980			313	331	528	314	328	415

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	9	597	10	752	276	17
Volume Left	9	0	10	0	246	8
Volume Right	0	74	0	16	30	9
cSH	858	1700	980	1700	328	360
Volume to Capacity	0.01	0.35	0.01	0.44	0.84	0.05
Queue Length 95th (m)	0.2	0.0	0.2	0.0	56.5	1.1
Control Delay (s)	9.2	0.0	8.7	0.0	54.0	15.5
Lane LOS	A		A		F	C
Approach Delay (s)	0.1		0.1		54.0	15.5
Approach LOS					F	C

Intersection Summary				
Average Delay	9.2			
Intersection Capacity Utilization	64.1%	ICU Level of Service		C
Analysis Period (min)	15			

Intersection: 101: Fruitland Rd & Barton St

Movement	EB	EB	EB	WB	WB	WB	B35	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	T	L	TR	L	TR
Maximum Queue (m)	37.4	390.8	387.4	36.8	67.2	67.2	19.7	32.3	545.1	52.4	1494.2
Average Queue (m)	37.2	371.2	356.7	9.5	43.6	47.2	1.2	27.1	360.1	52.0	1290.2
95th Queue (m)	38.6	422.8	428.3	26.7	63.8	65.8	9.0	41.1	777.0	54.0	1865.8
Link Distance (m)		375.8	375.8		52.9	52.9	433.5		1070.2		1477.8
Upstream Blk Time (%)		79	32		2	4					62
Queuing Penalty (veh)		0	0		9	17					0
Storage Bay Dist (m)	35.0			35.0				30.0		50.0	
Storage Blk Time (%)	82	27		0	13			9	51	61	34
Queuing Penalty (veh)	125	80		0	5			54	105	354	81

Intersection: 102: Fifty Rd & Hwy 8

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	65.2	68.4	54.3	94.9
Average Queue (m)	32.0	29.8	25.7	42.7
95th Queue (m)	54.9	52.5	45.0	81.8
Link Distance (m)	312.0	89.9	656.0	222.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 201: Jones Rd & Barton St

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	17.6	10.5	16.0	7.2	54.4	32.8
Average Queue (m)	2.5	0.5	4.5	0.5	23.9	16.9
95th Queue (m)	10.7	4.2	12.8	4.6	41.1	28.7
Link Distance (m)		358.8		870.0	909.1	912.9
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	25.0		25.0			
Storage Blk Time (%)	0		0	0		
Queuing Penalty (veh)	0		0	0		

Intersection: 202: Glover Rd & Barton St

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	25.1	42.0	27.3	72.0	27.7	37.7
Average Queue (m)	10.9	20.3	12.1	34.5	14.2	17.6
95th Queue (m)	21.7	33.8	27.3	58.7	22.6	29.2
Link Distance (m)		870.0		831.5	1028.9	1251.4
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	25.0		25.0			
Storage Blk Time (%)	0	2	0	16		
Queuing Penalty (veh)	0	2	0	9		

Intersection: 203: McNeilly Rd & Barton St

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	18.6	36.7	27.2	76.0	41.9	19.0
Average Queue (m)	5.8	19.5	8.1	34.0	23.9	9.4
95th Queue (m)	14.5	30.5	24.4	59.6	37.1	16.2
Link Distance (m)		831.5		843.8	1020.7	973.8
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	25.0		25.0			
Storage Blk Time (%)	0	2	0	18		
Queuing Penalty (veh)	0	1	0	5		

Intersection: 204: Lewis Rd & Barton St

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	25.7	59.0	27.3	57.1	46.2	30.0
Average Queue (m)	13.0	24.8	15.9	25.7	23.9	16.2
95th Queue (m)	24.1	42.9	28.4	44.3	39.2	25.9
Link Distance (m)		843.8		844.5	968.6	858.5
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	25.0		25.0			
Storage Blk Time (%)	0	4	0	7		
Queuing Penalty (veh)	1	4	1	9		

Intersection: 205: Winona Rd & Barton St

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	27.3	60.3	26.4	49.0	39.9	45.2
Average Queue (m)	16.0	25.5	11.0	21.8	19.2	24.4
95th Queue (m)	28.3	44.9	22.5	36.0	31.0	37.6
Link Distance (m)		844.5		787.4	1110.8	1172.9
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	25.0		25.0			
Storage Blk Time (%)	1	6	0	3		
Queuing Penalty (veh)	2	6	0	2		

Intersection: 206: Fifty Rd & Barton St

Movement	EB	EB	NB	SB
Directions Served	L	R	LT	TR
Maximum Queue (m)	27.4	268.2	49.4	15.6
Average Queue (m)	26.7	141.5	13.2	1.4
95th Queue (m)	30.3	335.0	33.4	7.8
Link Distance (m)		787.4	222.3	376.8
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	25.0			
Storage Blk Time (%)	70	22		
Queuing Penalty (veh)	32	77		

Intersection: 207: Fifty Rd & South Service Rd

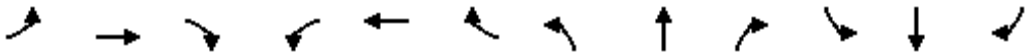
Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	L	TR	L	TR	L	T	TR	L	T
Maximum Queue (m)	89.2	95.0	54.9	22.8	70.6	37.7	51.9	55.6	52.2	91.0
Average Queue (m)	37.5	52.0	18.6	3.9	33.9	13.9	27.0	33.2	23.7	44.9
95th Queue (m)	70.8	79.0	39.4	14.2	59.8	26.2	42.6	48.7	45.7	78.4
Link Distance (m)			332.7		75.4		163.4	163.4		
Upstream Blk Time (%)					0					
Queuing Penalty (veh)					0					
Storage Bay Dist (m)	100.0	100.0		50.0		50.0			50.0	
Storage Blk Time (%)	0	0		0	2	0	0		0	5
Queuing Penalty (veh)	0	0		0	0	0	0		0	6

Intersection: 208: Gordon Dean Ave/Sunnyhurst Ave & Barton St

Movement	EB	WB	NB	SB
Directions Served	L	L	LTR	LTR
Maximum Queue (m)	8.8	8.8	74.2	9.1
Average Queue (m)	0.8	0.5	32.4	3.4
95th Queue (m)	4.8	3.7	59.6	10.5
Link Distance (m)			404.1	361.4
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	25.0	25.0		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 989



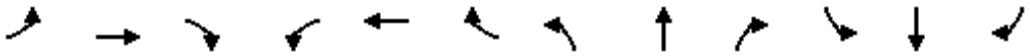
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	414	437	70	52	344	166	42	265	34	241	454	227
Future Volume (vph)	414	437	70	52	344	166	42	265	34	241	454	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.3	6.3		6.3	6.3	
Lane Util. Factor	1.00	0.95		1.00	0.95		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	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.95		1.00	0.98		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3458		1772	3357		1825	1791		1789	1789	
Flt Permitted	0.41	1.00		0.41	1.00		0.12	1.00		0.50	1.00	
Satd. Flow (perm)	770	3458		767	3357		238	1791		941	1789	
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)	450	475	76	57	374	180	46	288	37	262	493	247
RTOR Reduction (vph)	0	16	0	0	74	0	0	6	0	0	23	0
Lane Group Flow (vph)	450	535	0	57	480	0	46	319	0	262	717	0
Confl. Peds. (#/hr)	2					2						
Heavy Vehicles (%)	2%	2%	12%	3%	2%	4%	0%	5%	9%	2%	1%	4%
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)	33.0	33.0		33.0	33.0		32.3	32.3		32.3	32.3	
Effective Green, g (s)	33.0	33.0		33.0	33.0		32.3	32.3		32.3	32.3	
Actuated g/C Ratio	0.43	0.43		0.43	0.43		0.42	0.42		0.42	0.42	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.3	6.3		6.3	6.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	327	1470		326	1427		99	745		391	744	
v/s Ratio Prot		0.15			0.14			0.18			c0.40	
v/s Ratio Perm	c0.58			0.07			0.19			0.28		
v/c Ratio	1.38	0.36		0.17	0.34		0.46	0.43		0.67	0.96	
Uniform Delay, d1	22.3	15.2		13.8	15.0		16.4	16.1		18.3	22.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	187.5	0.2		0.3	0.1		3.4	0.4		4.5	24.1	
Delay (s)	209.8	15.3		14.1	15.1		19.8	16.5		22.8	46.2	
Level of Service	F	B		B	B		B	B		C	D	
Approach Delay (s)		102.7			15.0			16.9			40.1	
Approach LOS		F			B			B			D	

Intersection Summary			
HCM 2000 Control Delay	53.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	77.6	Sum of lost time (s)	12.3
Intersection Capacity Utilization	110.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	350	43	38	237	201	11	100	21	262	187	137
Future Volume (vph)	155	350	43	38	237	201	11	100	21	262	187	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.8			5.8			5.7			5.7	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.94			0.98			0.97	
Flt Protected		0.99			1.00			1.00			0.98	
Satd. Flow (prot)		1841			1743			1854			1749	
Flt Permitted		0.71			0.93			0.95			0.81	
Satd. Flow (perm)		1332			1620			1765			1450	
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)	168	380	47	41	258	218	12	109	23	285	203	149
RTOR Reduction (vph)	0	6	0	0	47	0	0	10	0	0	17	0
Lane Group Flow (vph)	0	589	0	0	470	0	0	134	0	0	620	0
Heavy Vehicles (%)	1%	2%	3%	13%	0%	6%	0%	0%	6%	6%	2%	3%
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)		27.9			27.9			17.0			17.0	
Effective Green, g (s)		27.9			27.9			17.0			17.0	
Actuated g/C Ratio		0.49			0.49			0.30			0.30	
Clearance Time (s)		5.8			5.8			5.7			5.7	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		658			801			532			437	
v/s Ratio Prot												
v/s Ratio Perm		c0.44			0.29			0.08			c0.43	
v/c Ratio		0.90			0.59			0.25			1.42	
Uniform Delay, d1		12.9			10.1			14.9			19.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		14.7			1.1			0.2			201.7	
Delay (s)		27.7			11.2			15.1			221.4	
Level of Service		C			B			B			F	
Approach Delay (s)		27.7			11.2			15.1			221.4	
Approach LOS		C			B			B			F	

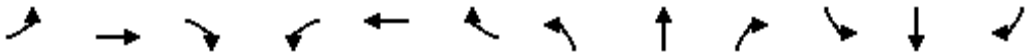
Intersection Summary			
HCM 2000 Control Delay	87.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	56.4	Sum of lost time (s)	11.5
Intersection Capacity Utilization	116.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	761	113	69	476	46	73	22	62	46	39	76
Future Volume (Veh/h)	38	761	113	69	476	46	73	22	62	46	39	76
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)	41	827	123	75	517	50	79	24	67	50	42	83
Pedestrians					3							
Lane Width (m)					3.7							
Walking Speed (m/s)					1.1							
Percent Blockage					0							
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	567			950			1742	1688	892	1683	1724	542
vC1, stage 1 conf vol							970	970		692	692	
vC2, stage 2 conf vol							771	717		991	1032	
vCu, unblocked vol	567			950			1742	1688	892	1683	1724	542
tC, single (s)	4.3			4.2			7.2	6.6	6.3	7.1	6.5	6.3
tC, 2 stage (s)							6.2	5.6		6.1	5.5	
tF (s)	2.4			2.3			3.6	4.1	3.4	3.5	4.0	3.4
p0 queue free %	96			89			53	90	80	60	79	84
cM capacity (veh/h)	935			691			167	237	333	125	201	521

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	41	950	75	567	170	175
Volume Left	41	0	75	0	79	50
Volume Right	0	123	0	50	67	83
cSH	935	1700	691	1700	219	228
Volume to Capacity	0.04	0.56	0.11	0.33	0.78	0.77
Queue Length 95th (m)	1.0	0.0	2.8	0.0	41.7	41.3
Control Delay (s)	9.0	0.0	10.8	0.0	62.0	58.9
Lane LOS	A		B		F	F
Approach Delay (s)	0.4		1.3		62.0	58.9
Approach LOS					F	F

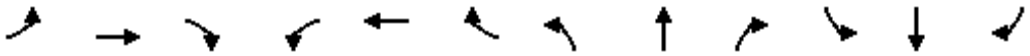
Intersection Summary				
Average Delay	11.1			
Intersection Capacity Utilization	75.8%	ICU Level of Service	D	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	71	697	55	57	418	84	66	32	50	69	64	92
Future Volume (vph)	71	697	55	57	418	84	66	32	50	69	64	92
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)	77	758	60	62	454	91	72	35	54	75	70	100

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	77	818	62	545	161	245
Volume Left (vph)	77	0	62	0	72	75
Volume Right (vph)	0	60	0	91	54	100
Hadj (s)	0.82	0.09	0.62	0.12	0.05	-0.03
Departure Headway (s)	8.1	7.4	8.0	7.5	8.3	7.9
Degree Utilization, x	0.17	1.68	0.14	1.13	0.37	0.53
Capacity (veh/h)	434	491	447	487	407	446
Control Delay (s)	11.7	334.7	11.0	106.5	16.2	19.5
Approach Delay (s)	306.9		96.8		16.2	19.5
Approach LOS	F		F		C	C

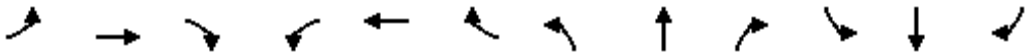
Intersection Summary				
Delay	178.6			
Level of Service	F			
Intersection Capacity Utilization	68.0%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	22	599	112	29	305	11	52	71	30	23	232	46
Future Volume (vph)	22	599	112	29	305	11	52	71	30	23	232	46
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)	24	651	122	32	332	12	57	77	33	25	252	50

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	24	773	32	344	167	327
Volume Left (vph)	24	0	32	0	57	25
Volume Right (vph)	0	122	0	12	33	50
Hadj (s)	0.62	-0.07	0.50	0.04	0.04	-0.02
Departure Headway (s)	8.1	7.3	8.1	7.7	8.1	7.4
Degree Utilization, x	0.05	1.58	0.07	0.73	0.38	0.67
Capacity (veh/h)	435	493	428	455	404	469
Control Delay (s)	10.3	288.1	10.6	27.6	15.9	24.4
Approach Delay (s)	279.7		26.2		15.9	24.4
Approach LOS	F		D		C	C

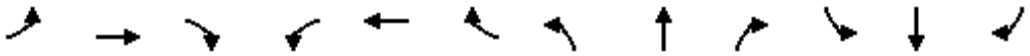
Intersection Summary				
Delay	146.0			
Level of Service	F			
Intersection Capacity Utilization	68.0%	ICU Level of Service		C
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	81	476	38	91	271	46	18	55	101	87	168	91
Future Volume (vph)	81	476	38	91	271	46	18	55	101	87	168	91
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)	88	517	41	99	295	50	20	60	110	95	183	99

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	88	558	99	345	190	377
Volume Left (vph)	88	0	99	0	20	95
Volume Right (vph)	0	41	0	50	110	99
Hadj (s)	0.93	0.01	0.50	-0.07	-0.26	-0.04
Departure Headway (s)	8.9	8.0	8.6	8.0	8.3	7.6
Degree Utilization, x	0.22	1.24	0.24	0.77	0.44	0.80
Capacity (veh/h)	395	456	407	436	399	460
Control Delay (s)	13.2	148.2	13.0	31.7	17.5	34.7
Approach Delay (s)	129.8		27.6		17.5	34.7
Approach LOS	F		D		C	D

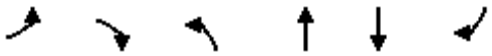
Intersection Summary				
Delay	67.9			
Level of Service	F			
Intersection Capacity Utilization	75.0%	ICU Level of Service	D	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	139	446	21	37	279	25	17	191	20	15	178	119
Future Volume (vph)	139	446	21	37	279	25	17	191	20	15	178	119
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)	151	485	23	40	303	27	18	208	22	16	193	129

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	151	508	40	330	248	338
Volume Left (vph)	151	0	40	0	18	16
Volume Right (vph)	0	23	0	27	22	129
Hadj (s)	0.50	-0.02	0.50	0.00	0.05	-0.21
Departure Headway (s)	8.5	8.0	8.7	8.2	8.3	7.7
Degree Utilization, x	0.36	1.12	0.10	0.76	0.57	0.72
Capacity (veh/h)	415	453	398	422	408	444
Control Delay (s)	14.9	107.2	11.5	31.4	21.7	28.3
Approach Delay (s)	86.1		29.2		21.7	28.3
Approach LOS	F		D		C	D

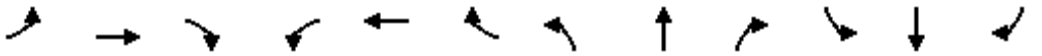
Intersection Summary				
Delay	51.1			
Level of Service	F			
Intersection Capacity Utilization	58.9%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	382	147	77	333	421	272
Future Volume (Veh/h)	382	147	77	333	421	272
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	415	160	84	362	458	296
Pedestrians	1					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				238		
pX, platoon unblocked						
vC, conflicting volume	1137	607	755			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1137	607	755			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	68	90			
cM capacity (veh/h)	202	496	864			

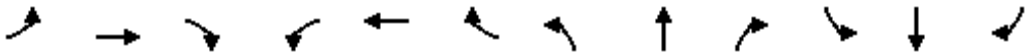
Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	415	160	446	754
Volume Left	415	0	84	0
Volume Right	0	160	0	296
cSH	202	496	864	1700
Volume to Capacity	2.05	0.32	0.10	0.44
Queue Length 95th (m)	239.7	10.5	2.4	0.0
Control Delay (s)	529.1	15.7	2.8	0.0
Lane LOS	F	C	A	
Approach Delay (s)	386.2		2.8	0.0
Approach LOS	F			

Intersection Summary			
Average Delay	125.8		
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	824	156	153	27	92	166	138	559	53	93	528	631
Future Volume (vph)	824	156	153	27	92	166	138	559	53	93	528	631
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		3.0	6.0		3.0	6.0	6.0
Lane Util. Factor	0.97	1.00		1.00	1.00		1.00	0.95		1.00	1.00	1.00
Frt	1.00	0.93		1.00	0.90		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)	3404	1694		1825	1658		1372	3498		1644	1865	1420
Flt Permitted	0.95	1.00		0.56	1.00		0.13	1.00		0.24	1.00	1.00
Satd. Flow (perm)	3404	1694		1073	1658		194	3498		424	1865	1420
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)	896	170	166	29	100	180	150	608	58	101	574	686
RTOR Reduction (vph)	0	36	0	0	66	0	0	7	0	0	0	465
Lane Group Flow (vph)	896	300	0	29	214	0	150	659	0	101	574	221
Heavy Vehicles (%)	4%	3%	7%	0%	6%	4%	33%	3%	3%	11%	3%	15%
Turn Type	Prot	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases				8			2			6		6
Actuated Green, G (s)	23.0	44.8		15.8	15.8		36.3	29.8		39.7	31.5	31.5
Effective Green, g (s)	23.0	44.8		15.8	15.8		36.3	29.8		39.7	31.5	31.5
Actuated g/C Ratio	0.24	0.46		0.16	0.16		0.37	0.30		0.41	0.32	0.32
Clearance Time (s)	6.0	6.0		6.0	6.0		3.0	6.0		3.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	800	775		173	267		150	1065		274	600	457
v/s Ratio Prot	c0.26	0.18			c0.13		c0.07	0.19		c0.03	c0.31	
v/s Ratio Perm				0.03			0.30			0.12		0.16
v/c Ratio	1.12	0.39		0.17	0.80		1.00	0.62		0.37	0.96	0.48
Uniform Delay, d1	37.4	17.5		35.3	39.5		27.5	29.1		19.3	32.5	26.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	70.2	0.3		0.5	15.7		73.5	1.1		0.8	26.1	0.8
Delay (s)	107.6	17.8		35.8	55.2		101.0	30.2		20.1	58.6	27.4
Level of Service	F	B		D	E		F	C		C	E	C
Approach Delay (s)		83.1			53.3			43.2			40.0	
Approach LOS		F			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	56.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	97.8	Sum of lost time (s)	21.0
Intersection Capacity Utilization	92.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	830	235	27	544	1	136	0	18	7	0	9
Future Volume (Veh/h)	9	830	235	27	544	1	136	0	18	7	0	9
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)	10	902	255	29	591	1	148	0	20	8	0	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	592			1157			1708	1700	1030	1592	1826	592
vC1, stage 1 conf vol							1050	1050		650	650	
vC2, stage 2 conf vol							659	650		942	1177	
vCu, unblocked vol	592			1157			1708	1700	1030	1592	1826	592
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			95			35	100	93	96	100	98
cM capacity (veh/h)	984			604			229	254	284	228	209	507

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	10	1157	29	592	168	18
Volume Left	10	0	29	0	148	8
Volume Right	0	255	0	1	20	10
cSH	984	1700	604	1700	235	329
Volume to Capacity	0.01	0.68	0.05	0.35	0.72	0.05
Queue Length 95th (m)	0.2	0.0	1.1	0.0	36.5	1.3
Control Delay (s)	8.7	0.0	11.3	0.0	51.4	16.6
Lane LOS	A		B		F	C
Approach Delay (s)	0.1		0.5		51.4	16.6
Approach LOS					F	C

Intersection Summary				
Average Delay	4.7			
Intersection Capacity Utilization	79.9%	ICU Level of Service	D	
Analysis Period (min)	15			

Intersection: 101: Fruitland Rd & Barton St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (m)	37.4	392.2	387.6	26.2	42.9	47.2	32.3	74.8	52.4	703.6
Average Queue (m)	37.2	366.6	357.2	10.1	22.2	27.0	10.0	32.3	45.9	424.0
95th Queue (m)	37.7	434.2	441.0	21.7	36.0	42.8	24.5	58.6	67.0	711.7
Link Distance (m)		375.8	375.8		52.9	52.9		1070.2		1477.8
Upstream Blk Time (%)		78	26		0	0				
Queuing Penalty (veh)		0	0		0	0				
Storage Bay Dist (m)	35.0			35.0			30.0		50.0	
Storage Blk Time (%)	65	27		0	1		0	8	8	48
Queuing Penalty (veh)	142	110		0	0		0	3	52	114

Intersection: 102: Fifty Rd & Hwy 8

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	139.0	74.5	29.1	227.8
Average Queue (m)	64.4	34.6	12.7	215.7
95th Queue (m)	118.3	58.6	24.2	248.3
Link Distance (m)	312.0	89.9	656.0	222.3
Upstream Blk Time (%)		0		29
Queuing Penalty (veh)		0		163
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 201: Jones Rd & Barton St

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	20.1	22.7	22.7	20.9	92.3	97.0
Average Queue (m)	3.6	1.3	8.6	0.7	37.8	37.5
95th Queue (m)	12.4	9.9	19.1	10.1	86.4	97.1
Link Distance (m)		390.8		870.0	909.1	912.9
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	25.0		25.0			
Storage Blk Time (%)	0	0	0	0		
Queuing Penalty (veh)	1	0	2	0		

Intersection: 202: Glover Rd & Barton St

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	27.3	310.8	27.3	107.1	30.4	43.4
Average Queue (m)	22.8	134.5	14.3	39.8	16.1	21.3
95th Queue (m)	37.9	293.7	30.9	77.7	26.2	35.4
Link Distance (m)		870.0		831.5	1028.9	1251.4
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	25.0		25.0			
Storage Blk Time (%)	1	69	0	22		
Queuing Penalty (veh)	7	49	1	12		

Intersection: 203: McNeilly Rd & Barton St

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	27.2	71.2	17.2	37.2	25.9	43.8
Average Queue (m)	7.5	39.0	5.0	18.9	14.6	20.4
95th Queue (m)	25.4	64.6	12.7	31.6	23.3	33.5
Link Distance (m)		831.5		843.8	1020.7	973.8
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	25.0		25.0			
Storage Blk Time (%)	0	35	0	2		
Queuing Penalty (veh)	1	8	0	1		

Intersection: 204: Lewis Rd & Barton St

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	27.3	53.4	26.4	38.6	35.3	49.9
Average Queue (m)	16.3	28.8	11.3	18.7	15.6	24.0
95th Queue (m)	30.6	47.0	21.1	32.4	26.9	39.0
Link Distance (m)		843.8		844.5	968.6	858.5
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	25.0		25.0			
Storage Blk Time (%)	0	11	0	2		
Queuing Penalty (veh)	1	9	0	2		

Intersection: 205: Winona Rd & Barton St

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	27.3	133.7	27.2	43.3	40.6	58.4
Average Queue (m)	16.5	43.2	7.7	21.9	21.0	24.3
95th Queue (m)	29.1	143.9	19.8	36.1	33.2	42.6
Link Distance (m)		844.5		787.3	1110.8	1172.9
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	25.0		25.0			
Storage Blk Time (%)	0	15	0	4		
Queuing Penalty (veh)	2	20	0	1		

Intersection: 206: Fifty Rd & Barton St

Movement	EB	EB	NB	SB	B2
Directions Served	L	R	LT	TR	T
Maximum Queue (m)	27.4	694.5	46.6	302.1	75.5
Average Queue (m)	27.1	413.6	11.9	183.8	14.7
95th Queue (m)	30.2	814.1	34.7	430.4	87.6
Link Distance (m)		787.3	222.3	365.7	174.5
Upstream Blk Time (%)		5		11	0
Queuing Penalty (veh)		25		75	1
Storage Bay Dist (m)	25.0				
Storage Blk Time (%)	74	39			
Queuing Penalty (veh)	109	149			

Intersection: 207: Fifty Rd & South Service Rd

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	TR	L	TR	L	T	TR	L	T	R
Maximum Queue (m)	101.0	102.4	204.4	31.6	79.9	52.3	79.6	66.8	102.4	271.2	194.3
Average Queue (m)	96.4	101.3	164.7	7.9	41.4	32.8	39.9	42.5	48.2	159.2	73.6
95th Queue (m)	109.6	106.4	254.7	24.4	72.6	56.1	67.9	61.9	116.9	310.2	260.4
Link Distance (m)			188.7		75.5		174.5	174.5			
Upstream Blk Time (%)			25		1						
Queuing Penalty (veh)			0		0						
Storage Bay Dist (m)	100.0	100.0		50.0		50.0			100.0		
Storage Blk Time (%)	4	26	7	0	7	4	2		0	32	
Queuing Penalty (veh)	11	79	60	0	2	12	3		1	30	

Intersection: 208: Gordon Dean Ave/Sunnyhurst Ave & Barton St

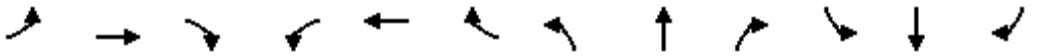
Movement	EB	EB	WB	NB	SB
Directions Served	L	TR	L	LTR	LTR
Maximum Queue (m)	8.9	5.1	15.6	103.2	18.0
Average Queue (m)	0.8	0.4	4.8	48.0	4.4
95th Queue (m)	4.9	3.1	12.7	124.3	13.1
Link Distance (m)		401.8		196.6	184.6
Upstream Blk Time (%)				4	
Queuing Penalty (veh)				0	
Storage Bay Dist (m)	25.0		25.0		
Storage Blk Time (%)			0		
Queuing Penalty (veh)			0		

Zone Summary

Zone wide Queuing Penalty: 1260

Appendix E

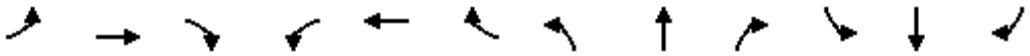
Future Intersection Operations with Improvements



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	297	303	68	41	580	247	206	526	49	238	214	371
Future Volume (vph)	297	303	68	41	580	247	206	526	49	238	214	371
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.0		4.5	6.0	6.0	4.5	6.3	6.3	4.5	6.3	6.3
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	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	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1722	3279		1506	3174	1526	1614	1883	1541	1755	1779	1565
Flt Permitted	0.18	1.00		0.51	1.00	1.00	0.52	1.00	1.00	0.12	1.00	1.00
Satd. Flow (perm)	323	3279		816	3174	1526	889	1883	1541	215	1779	1565
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)	323	329	74	45	630	268	224	572	53	259	233	403
RTOR Reduction (vph)	0	17	0	0	0	200	0	0	36	0	0	246
Lane Group Flow (vph)	323	386	0	45	630	68	224	572	17	259	233	157
Confl. Peds. (#/hr)			3	3			1					1
Heavy Vehicles (%)	6%	7%	11%	21%	15%	7%	13%	2%	6%	4%	8%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	45.5	37.0		29.9	25.9	25.9	47.0	34.6	34.6	46.4	34.3	34.3
Effective Green, g (s)	45.5	37.0		29.9	25.9	25.9	47.0	34.6	34.6	46.4	34.3	34.3
Actuated g/C Ratio	0.42	0.34		0.27	0.24	0.24	0.43	0.32	0.32	0.43	0.31	0.31
Clearance Time (s)	4.5	6.0		4.5	6.0	6.0	4.5	6.3	6.3	4.5	6.3	6.3
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	328	1113		249	754	362	465	597	489	262	559	492
v/s Ratio Prot	c0.14	0.12		0.01	0.20		0.05	0.30		c0.11	0.13	
v/s Ratio Perm	c0.27			0.04		0.04	0.15		0.01	c0.31		0.10
v/c Ratio	0.98	0.35		0.18	0.84	0.19	0.48	0.96	0.03	0.99	0.42	0.32
Uniform Delay, d1	25.2	27.0		29.6	39.5	33.2	20.6	36.5	25.7	29.6	29.5	28.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	45.2	0.2		0.4	8.0	0.3	0.8	26.6	0.0	51.9	0.7	0.5
Delay (s)	70.4	27.1		29.9	47.5	33.4	21.4	63.1	25.7	81.5	30.1	29.0
Level of Service	E	C		C	D	C	C	E	C	F	C	C
Approach Delay (s)		46.4			42.7			49.8			44.5	
Approach LOS		D			D			D			D	

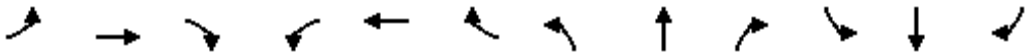
Intersection Summary			
HCM 2000 Control Delay	45.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	109.0	Sum of lost time (s)	21.3
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	159	9	9	239	183	34	185	39	109	61	170
Future Volume (vph)	131	159	9	9	239	183	34	185	39	109	61	170
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		5.7	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	
Frt	1.00	0.99		1.00	0.93		1.00	0.97		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1706	1816		1825	1706		1755	1778		1521	1591	
Flt Permitted	0.42	1.00		0.64	1.00		0.60	1.00		0.61	1.00	
Satd. Flow (perm)	757	1816		1233	1706		1115	1778		973	1591	
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)	142	173	10	10	260	199	37	201	42	118	66	185
RTOR Reduction (vph)	0	4	0	0	51	0	0	13	0	0	127	0
Lane Group Flow (vph)	142	179	0	10	408	0	37	230	0	118	124	0
Heavy Vehicles (%)	7%	3%	38%	0%	4%	7%	4%	3%	16%	20%	0%	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)	15.0	15.0		15.0	15.0		12.2	12.2		12.2	12.2	
Effective Green, g (s)	15.0	15.0		15.0	15.0		12.2	12.2		12.2	12.2	
Actuated g/C Ratio	0.39	0.39		0.39	0.39		0.32	0.32		0.32	0.32	
Clearance Time (s)	5.8	5.8		5.8	5.8		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)	293	703		477	661		351	560		306	501	
v/s Ratio Prot		0.10			c0.24			c0.13			0.08	
v/s Ratio Perm	0.19			0.01			0.03			0.12		
v/c Ratio	0.48	0.26		0.02	0.62		0.11	0.41		0.39	0.25	
Uniform Delay, d1	8.9	8.1		7.3	9.5		9.4	10.4		10.3	9.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	0.2		0.0	1.7		0.1	0.5		0.8	0.3	
Delay (s)	10.2	8.2		7.3	11.3		9.5	10.9		11.1	10.1	
Level of Service	B	A		A	B		A	B		B	B	
Approach Delay (s)		9.1			11.2			10.7			10.4	
Approach LOS		A			B			B			B	

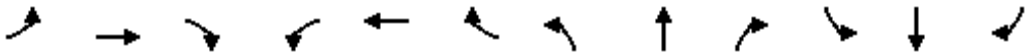
Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	38.7	Sum of lost time (s)	11.5
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	391	55	59	494	48	100	50	82	34	49	38
Future Volume (vph)	25	391	55	59	494	48	100	50	82	34	49	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			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	0.98		1.00	0.99			0.95			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1459	1667		1703	1696			1667			1555	
Flt Permitted	0.31	1.00		0.41	1.00			0.80			0.86	
Satd. Flow (perm)	483	1667		743	1696			1361			1361	
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)	27	425	60	64	537	52	109	54	89	37	53	41
RTOR Reduction (vph)	0	9	0	0	6	0	0	35	0	0	30	0
Lane Group Flow (vph)	27	476	0	64	583	0	0	217	0	0	101	0
Confl. Peds. (#/hr)	2		3	3		2	2		2	2		2
Heavy Vehicles (%)	25%	13%	11%	7%	11%	17%	7%	8%	5%	7%	11%	30%
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)	20.7	20.7		20.7	20.7			12.6			12.6	
Effective Green, g (s)	20.7	20.7		20.7	20.7			12.6			12.6	
Actuated g/C Ratio	0.46	0.46		0.46	0.46			0.28			0.28	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	220	761		339	774			378			378	
v/s Ratio Prot		0.29			c0.34							
v/s Ratio Perm	0.06			0.09				c0.16			0.07	
v/c Ratio	0.12	0.63		0.19	0.75			0.57			0.27	
Uniform Delay, d1	7.1	9.4		7.3	10.2			14.0			12.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.3	1.6		0.3	4.2			2.1			0.4	
Delay (s)	7.3	11.0		7.6	14.4			16.1			13.1	
Level of Service	A	B		A	B			B			B	
Approach Delay (s)		10.8			13.7			16.1			13.1	
Approach LOS		B			B			B			B	

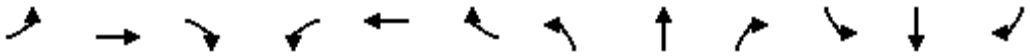
Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	45.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



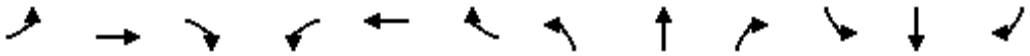
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	92	318	56	56	475	68	46	53	37	25	36	95
Future Volume (vph)	92	318	56	56	475	68	46	53	37	25	36	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.98			0.96			0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1659	1749		1825	1666			1756			1511	
Flt Permitted	0.34	1.00		0.52	1.00			0.83			0.91	
Satd. Flow (perm)	602	1749		996	1666			1488			1389	
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)	100	346	61	61	516	74	50	58	40	27	39	103
RTOR Reduction (vph)	0	11	0	0	9	0	0	25	0	0	80	0
Lane Group Flow (vph)	100	396	0	61	581	0	0	123	0	0	89	0
Heavy Vehicles (%)	10%	8%	4%	0%	12%	21%	5%	5%	0%	24%	4%	18%
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)	19.5	19.5		19.5	19.5			9.1			9.1	
Effective Green, g (s)	19.5	19.5		19.5	19.5			9.1			9.1	
Actuated g/C Ratio	0.48	0.48		0.48	0.48			0.22			0.22	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	289	840		478	800			333			311	
v/s Ratio Prot		0.23			c0.35							
v/s Ratio Perm	0.17			0.06				c0.08			0.06	
v/c Ratio	0.35	0.47		0.13	0.73			0.37			0.29	
Uniform Delay, d1	6.6	7.1		5.8	8.4			13.3			13.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.7	0.4		0.1	3.3			0.7			0.5	
Delay (s)	7.3	7.5		6.0	11.7			14.0			13.6	
Level of Service	A	A		A	B			B			B	
Approach Delay (s)		7.5			11.2			14.0			13.6	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	40.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	288	26	26	484	22	124	213	21	8	37	36
Future Volume (vph)	34	288	26	26	484	22	124	213	21	8	37	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.99			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1755	1728		1644	1773			1826			1772	
Flt Permitted	0.30	1.00		0.54	1.00			0.85			0.94	
Satd. Flow (perm)	559	1728		927	1773			1579			1683	
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	313	28	28	526	24	135	232	23	9	40	39
RTOR Reduction (vph)	0	5	0	0	3	0	0	4	0	0	25	0
Lane Group Flow (vph)	37	336	0	28	547	0	0	386	0	0	63	0
Heavy Vehicles (%)	4%	10%	8%	11%	8%	0%	2%	1%	22%	14%	0%	0%
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)	19.5	19.5		19.5	19.5			16.7			16.7	
Effective Green, g (s)	19.5	19.5		19.5	19.5			16.7			16.7	
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.35			0.35	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	226	699		375	717			547			583	
v/s Ratio Prot		0.19			c0.31							
v/s Ratio Perm	0.07			0.03				c0.24			0.04	
v/c Ratio	0.16	0.48		0.07	0.76			0.71			0.11	
Uniform Delay, d1	9.2	10.6		8.8	12.4			13.6			10.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.3	0.5		0.1	4.8			4.1			0.1	
Delay (s)	9.5	11.1		8.9	17.2			17.8			10.8	
Level of Service	A	B		A	B			B			B	
Approach Delay (s)		11.0			16.8			17.8			10.8	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	48.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	231	78	129	286	87	60	142	105	18	73	47
Future Volume (vph)	93	231	78	129	286	87	60	142	105	18	73	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	0.99		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	0.96		1.00	0.96			0.95			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1601	1561		1688	1754			1709			1576	
Flt Permitted	0.48	1.00		0.56	1.00			0.90			0.91	
Satd. Flow (perm)	813	1561		992	1754			1545			1450	
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)	101	251	85	140	311	95	65	154	114	20	79	51
RTOR Reduction (vph)	0	25	0	0	23	0	0	41	0	0	34	0
Lane Group Flow (vph)	101	311	0	140	383	0	0	292	0	0	116	0
Confl. Peds. (#/hr)			2	2			3		2	2		3
Heavy Vehicles (%)	14%	21%	8%	8%	5%	8%	5%	2%	10%	33%	0%	30%
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)	13.4	13.4		13.4	13.4			12.2			12.2	
Effective Green, g (s)	13.4	13.4		13.4	13.4			12.2			12.2	
Actuated g/C Ratio	0.36	0.36		0.36	0.36			0.32			0.32	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	289	556		353	625			501			470	
v/s Ratio Prot		0.20			c0.22							
v/s Ratio Perm	0.12			0.14				c0.19			0.08	
v/c Ratio	0.35	0.56		0.40	0.61			0.58			0.25	
Uniform Delay, d1	8.9	9.7		9.1	10.0			10.6			9.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.7	1.2		0.7	1.8			1.7			0.3	
Delay (s)	9.6	11.0		9.8	11.8			12.3			9.6	
Level of Service	A	B		A	B			B			A	
Approach Delay (s)		10.6			11.3			12.3			9.6	
Approach LOS		B			B			B			A	

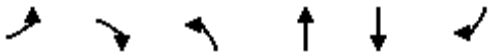
Intersection Summary			
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	37.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	383	23	60	257	17	15	127	50	32	128	116
Future Volume (vph)	100	383	23	60	257	17	15	127	50	32	128	116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.96			0.94	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1580	1814		1755	1737			1690			1651	
Flt Permitted	0.58	1.00		0.45	1.00			0.95			0.93	
Satd. Flow (perm)	962	1814		826	1737			1616			1550	
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)	109	416	25	65	279	18	16	138	54	35	139	126
RTOR Reduction (vph)	0	4	0	0	4	0	0	24	0	0	49	0
Lane Group Flow (vph)	109	437	0	65	293	0	0	184	0	0	251	0
Confl. Peds. (#/hr)	6					6	6					6
Heavy Vehicles (%)	15%	5%	5%	4%	10%	0%	17%	10%	5%	8%	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)	15.4	15.4		15.4	15.4			12.1			12.1	
Effective Green, g (s)	15.4	15.4		15.4	15.4			12.1			12.1	
Actuated g/C Ratio	0.39	0.39		0.39	0.39			0.31			0.31	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	375	707		322	677			495			474	
v/s Ratio Prot		c0.24			0.17							
v/s Ratio Perm	0.11			0.08				0.11			c0.16	
v/c Ratio	0.29	0.62		0.20	0.43			0.37			0.53	
Uniform Delay, d1	8.3	9.7		8.0	8.8			10.7			11.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.4	1.6		0.3	0.4			0.5			1.1	
Delay (s)	8.7	11.3		8.3	9.3			11.2			12.5	
Level of Service	A	B		A	A			B			B	
Approach Delay (s)		10.8			9.1			11.2			12.5	
Approach LOS		B			A			B			B	

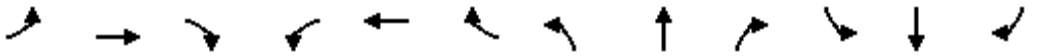
Intersection Summary			
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	39.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



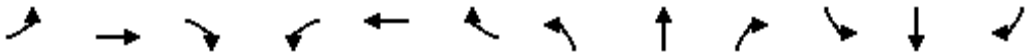
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	349	46	80	414	231	196
Future Volume (vph)	349	46	80	414	231	196
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.99	1.00	1.00
Satd. Flow (prot)	1722	1286		1829	1779	1541
Flt Permitted	0.95	1.00		0.90	1.00	1.00
Satd. Flow (perm)	1722	1286		1656	1779	1541
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	379	50	87	450	251	213
RTOR Reduction (vph)	0	34	0	0	0	120
Lane Group Flow (vph)	379	16	0	537	251	93
Heavy Vehicles (%)	6%	27%	0%	5%	8%	6%
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	15.0	15.0		21.1	21.1	21.1
Effective Green, g (s)	15.0	15.0		21.1	21.1	21.1
Actuated g/C Ratio	0.31	0.31		0.44	0.44	0.44
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	537	401		726	780	675
v/s Ratio Prot	c0.22				0.14	
v/s Ratio Perm		0.01		c0.32		0.06
v/c Ratio	0.71	0.04		0.74	0.32	0.14
Uniform Delay, d1	14.6	11.5		11.2	8.8	8.1
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.2	0.0		4.0	0.2	0.1
Delay (s)	18.8	11.6		15.2	9.1	8.2
Level of Service	B	B		B	A	A
Approach Delay (s)	18.0			15.2	8.7	
Approach LOS	B			B	A	

Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	48.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	382	67	84	15	153	57	115	613	31	114	373	692
Future Volume (vph)	382	67	84	15	153	57	115	613	31	114	373	692
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	3.0	6.0		3.0	6.0	6.0
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.92		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	2926	1517		1825	1746	1384	1825	3350		1674	3349	1526
Flt Permitted	0.95	1.00		0.65	1.00	1.00	0.51	1.00		0.22	1.00	1.00
Satd. Flow (perm)	2926	1517		1255	1746	1384	981	3350		396	3349	1526
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)	415	73	91	16	166	62	125	666	34	124	405	752
RTOR Reduction (vph)	0	35	0	0	0	52	0	4	0	0	0	485
Lane Group Flow (vph)	415	129	0	16	166	10	125	696	0	124	405	267
Heavy Vehicles (%)	21%	15%	17%	0%	10%	18%	0%	7%	31%	9%	9%	7%
Turn Type	Prot	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases				8		8	2			6		6
Actuated Green, G (s)	17.5	37.3		13.8	13.8	13.8	32.7	25.8		36.3	27.6	27.6
Effective Green, g (s)	17.5	37.3		13.8	13.8	13.8	32.7	25.8		36.3	27.6	27.6
Actuated g/C Ratio	0.20	0.43		0.16	0.16	0.16	0.38	0.30		0.42	0.32	0.32
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	3.0	6.0		3.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	589	651		199	277	220	436	995		293	1064	485
v/s Ratio Prot	c0.14	0.09			c0.10		0.02	c0.21		c0.04	0.12	
v/s Ratio Perm				0.01		0.01	0.09			0.13		0.18
v/c Ratio	0.70	0.20		0.08	0.60	0.04	0.29	0.70		0.42	0.38	0.55
Uniform Delay, d1	32.2	15.4		31.1	33.9	30.9	18.1	27.1		16.8	23.0	24.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.8	0.2		0.2	3.5	0.1	0.4	2.2		1.0	0.2	1.4
Delay (s)	36.1	15.6		31.3	37.4	31.0	18.5	29.2		17.8	23.2	25.8
Level of Service	D	B		C	D	C	B	C		B	C	C
Approach Delay (s)		30.3			35.4			27.6			24.2	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	86.8	Sum of lost time (s)	21.0
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	481	68	9	677	15	226	0	28	7	0	8
Future Volume (vph)	8	481	68	9	677	15	226	0	28	7	0	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.99			0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96			0.98	
Satd. Flow (prot)	1789	1883	1601	1789	1877			1777			1709	
Flt Permitted	0.19	1.00	1.00	0.38	1.00			0.74			0.82	
Satd. Flow (perm)	355	1883	1601	724	1877			1368			1434	
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)	9	523	74	10	736	16	246	0	30	8	0	9
RTOR Reduction (vph)	0	0	38	0	1	0	0	40	0	0	12	0
Lane Group Flow (vph)	9	523	36	10	751	0	0	236	0	0	5	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	24.4	24.4	24.4	24.4	24.4			13.5			13.5	
Effective Green, g (s)	24.4	24.4	24.4	24.4	24.4			13.5			13.5	
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49			0.27			0.27	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	173	920	782	354	917			370			387	
v/s Ratio Prot		0.28			c0.40							
v/s Ratio Perm	0.03		0.02	0.01				c0.17			0.00	
v/c Ratio	0.05	0.57	0.05	0.03	0.82			0.64			0.01	
Uniform Delay, d1	6.7	9.0	6.7	6.6	10.9			16.0			13.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	0.8	0.0	0.0	5.8			3.6			0.0	
Delay (s)	6.8	9.8	6.7	6.6	16.6			19.6			13.3	
Level of Service	A	A	A	A	B			B			B	
Approach Delay (s)		9.4			16.5			19.6			13.3	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	49.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 101: Fruitland Rd & Barton St

Movement	EB	EB	EB	WB	WB	WB	WB	B35	B35	NB	NB	NB
Directions Served	L	T	TR	L	T	T	R	T	T	L	T	R
Maximum Queue (m)	72.4	150.3	128.1	37.3	92.2	94.3	54.2	30.5	37.2	62.5	418.3	52.5
Average Queue (m)	57.2	62.8	43.7	12.1	64.8	68.0	44.3	3.1	5.9	52.4	288.2	20.5
95th Queue (m)	84.5	150.6	121.6	33.2	95.5	101.0	64.4	18.9	27.4	79.3	520.7	57.2
Link Distance (m)		372.1	372.1		75.3	75.3		406.2	406.2		1070.3	
Upstream Blk Time (%)					7	11						
Queuing Penalty (veh)					31	51						
Storage Bay Dist (m)	70.0			35.0			50.0			60.0		50.0
Storage Blk Time (%)	22	7		0	38	20	4			5	52	0
Queuing Penalty (veh)	33	20		0	16	50	12			28	133	3

Intersection: 101: Fruitland Rd & Barton St

Movement	SB	SB	SB
Directions Served	L	T	R
Maximum Queue (m)	71.9	178.6	96.7
Average Queue (m)	49.0	60.5	40.5
95th Queue (m)	78.2	173.8	84.9
Link Distance (m)		1474.6	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	70.0		100.0
Storage Blk Time (%)	10	2	0
Queuing Penalty (veh)	57	12	1

Intersection: 102: Fifty Rd & Hwy 8

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	49.8	33.8	8.0	75.1	17.0	43.8	44.4	41.2
Average Queue (m)	18.7	14.3	1.1	31.8	4.5	17.4	16.7	17.2
95th Queue (m)	38.5	27.0	5.3	56.5	12.4	33.7	33.4	34.5
Link Distance (m)		309.4		87.4		653.4		219.9
Upstream Blk Time (%)				0				
Queuing Penalty (veh)				0				
Storage Bay Dist (m)	100.0		100.0		50.0		50.0	
Storage Blk Time (%)				0		0	0	0
Queuing Penalty (veh)				0		0	1	0

Intersection: 201: Jones Rd & Barton St

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	23.6	79.0	45.2	72.6	50.7	36.7
Average Queue (m)	6.6	35.6	11.9	39.9	24.9	16.2
95th Queue (m)	18.6	66.2	29.7	65.5	43.1	29.7
Link Distance (m)		360.4		870.0	909.1	912.9
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	50.0		50.0			
Storage Blk Time (%)		3	0	3		
Queuing Penalty (veh)		1	0	2		

Intersection: 202: Glover Rd & Barton St

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	42.1	64.0	31.9	86.5	39.1	45.3
Average Queue (m)	15.1	25.7	8.7	39.1	17.0	20.3
95th Queue (m)	30.9	48.6	20.6	69.5	30.5	36.7
Link Distance (m)		870.0		831.5	1028.9	1251.4
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	50.0		50.0			
Storage Blk Time (%)	0	0	0	2		
Queuing Penalty (veh)	0	0	0	1		

Intersection: 203: McNeilly Rd & Barton St

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	33.2	67.7	29.4	64.4	60.0	25.6
Average Queue (m)	7.4	26.8	4.9	37.2	30.6	10.1
95th Queue (m)	20.7	52.6	18.2	59.8	50.4	20.8
Link Distance (m)		831.5		843.8	1020.7	973.8
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	50.0		50.0			
Storage Blk Time (%)	0	1	0	2		
Queuing Penalty (veh)	0	0	0	0		

Intersection: 204: Lewis Rd & Barton St

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	44.0	138.0	46.9	63.3	48.1	40.7
Average Queue (m)	15.7	29.6	20.1	29.4	25.9	16.7
95th Queue (m)	32.0	88.7	38.9	52.9	41.6	32.5
Link Distance (m)		843.8		844.5	968.6	858.5
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	50.0		50.0			
Storage Blk Time (%)	0	1	0	1		
Queuing Penalty (veh)	0	1	1	1		

Intersection: 205: Winona Rd & Barton St

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	45.6	63.5	24.1	52.1	47.0	59.7
Average Queue (m)	16.4	30.4	9.1	24.6	22.0	27.8
95th Queue (m)	34.4	51.3	20.7	44.3	40.5	48.0
Link Distance (m)		844.5		781.8	1110.8	1172.9
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	50.0		50.0			
Storage Blk Time (%)	0	1		0		
Queuing Penalty (veh)	0	1		0		

Intersection: 206: Fifty Rd & Barton St

Movement	EB	EB	NB	SB	SB
Directions Served	L	R	LT	T	R
Maximum Queue (m)	52.1	59.3	92.3	45.8	32.8
Average Queue (m)	34.2	10.5	41.7	19.6	14.3
95th Queue (m)	53.6	38.7	70.6	38.2	25.7
Link Distance (m)		781.8	219.9	376.8	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	50.0				100.0
Storage Blk Time (%)	2	0			
Queuing Penalty (veh)	1	1			

Intersection: 207: Fifty Rd & South Service Rd

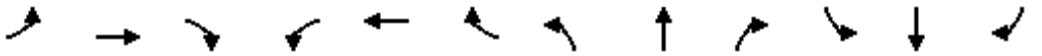
Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	TR	L	T	R	L	T	TR	L	T	T
Maximum Queue (m)	81.0	88.4	57.8	15.2	74.5	52.3	48.5	78.6	81.3	52.4	79.3	62.1
Average Queue (m)	36.5	51.7	17.8	4.5	32.7	13.0	19.0	41.3	45.6	20.9	37.3	22.3
95th Queue (m)	71.5	80.0	43.0	13.2	59.9	36.3	40.0	65.4	69.0	43.5	62.5	51.1
Link Distance (m)			329.0		75.4			163.4	163.4			
Upstream Blk Time (%)					0							
Queuing Penalty (veh)					0							
Storage Bay Dist (m)	100.0	100.0		50.0		50.0	50.0			50.0		
Storage Blk Time (%)	0	0	0		2	0	0	3		0	2	
Queuing Penalty (veh)	0	0	0		1	0	0	4		1	3	

Intersection: 208: Gordon Dean Ave/Sunnyhurst Ave & Barton St

Movement	EB	EB	EB	WB	WB	NB	SB
Directions Served	L	T	R	L	TR	LTR	LTR
Maximum Queue (m)	15.2	69.5	21.3	11.7	96.3	51.5	9.4
Average Queue (m)	2.1	28.6	6.4	1.2	48.1	24.8	1.7
95th Queue (m)	9.0	53.9	15.1	6.8	83.8	44.1	7.1
Link Distance (m)		406.2	406.2		360.4	332.8	342.4
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)	15.0			15.0			
Storage Blk Time (%)	0	14		0	25		
Queuing Penalty (veh)	0	1		0	2		

Zone Summary

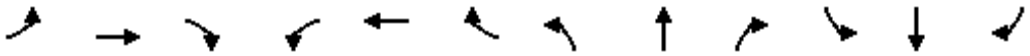
Zone wide Queuing Penalty: 470



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	414	437	70	52	344	166	42	265	34	241	454	227
Future Volume (vph)	414	437	70	52	344	166	42	265	34	241	454	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.0		6.0	6.0	6.0	6.3	6.3	6.3	4.5	6.3	6.3
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1788	3458		1772	3579	1534	1825	1830	1498	1789	1902	1570
Flt Permitted	0.42	1.00		0.45	1.00	1.00	0.44	1.00	1.00	0.36	1.00	1.00
Satd. Flow (perm)	787	3458		832	3579	1534	848	1830	1498	673	1902	1570
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)	450	475	76	57	374	180	46	288	37	262	493	247
RTOR Reduction (vph)	0	14	0	0	0	131	0	0	28	0	0	154
Lane Group Flow (vph)	450	537	0	57	374	49	46	288	9	262	493	93
Confl. Peds. (#/hr)	2					2						
Heavy Vehicles (%)	2%	2%	12%	3%	2%	4%	0%	5%	9%	2%	1%	4%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	34.1	34.1		20.1	20.1	20.1	18.4	18.4	18.4	28.0	28.0	28.0
Effective Green, g (s)	34.1	34.1		20.1	20.1	20.1	18.4	18.4	18.4	28.0	28.0	28.0
Actuated g/C Ratio	0.46	0.46		0.27	0.27	0.27	0.25	0.25	0.25	0.38	0.38	0.38
Clearance Time (s)	4.5	6.0		6.0	6.0	6.0	6.3	6.3	6.3	4.5	6.3	6.3
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	488	1584		224	966	414	209	452	370	329	715	590
v/s Ratio Prot	c0.12	0.16			0.10			0.16		0.05	c0.26	
v/s Ratio Perm	c0.30			0.07		0.03	0.05		0.01	c0.24		0.06
v/c Ratio	0.92	0.34		0.25	0.39	0.12	0.22	0.64	0.02	0.80	0.69	0.16
Uniform Delay, d1	16.9	12.9		21.3	22.1	20.5	22.3	25.0	21.2	20.5	19.5	15.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	23.0	0.1		0.6	0.3	0.1	0.5	2.9	0.0	12.5	2.8	0.1
Delay (s)	39.9	13.1		21.9	22.4	20.6	22.8	28.0	21.2	33.1	22.3	15.5
Level of Service	D	B		C	C	C	C	C	C	C	C	B
Approach Delay (s)		25.1			21.8			26.7			23.4	
Approach LOS		C			C			C			C	

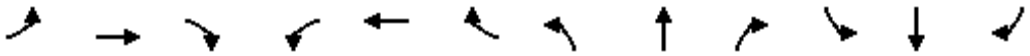
Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	74.4	Sum of lost time (s)	21.3
Intersection Capacity Utilization	95.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	350	43	38	237	201	11	100	21	262	187	137
Future Volume (vph)	155	350	43	38	237	201	11	100	21	262	187	137
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		5.7	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	
Frt	1.00	0.98		1.00	0.93		1.00	0.97		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1807	1850		1615	1741		1825	1852		1722	1757	
Flt Permitted	0.36	1.00		0.42	1.00		0.49	1.00		0.67	1.00	
Satd. Flow (perm)	688	1850		707	1741		938	1852		1219	1757	
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)	168	380	47	41	258	218	12	109	23	285	203	149
RTOR Reduction (vph)	0	5	0	0	37	0	0	9	0	0	31	0
Lane Group Flow (vph)	168	422	0	41	439	0	12	123	0	285	321	0
Heavy Vehicles (%)	1%	2%	3%	13%	0%	6%	0%	0%	6%	6%	2%	3%
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)	21.3	21.3		21.3	21.3		20.2	20.2		20.2	20.2	
Effective Green, g (s)	21.3	21.3		21.3	21.3		20.2	20.2		20.2	20.2	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.38	0.38		0.38	0.38	
Clearance Time (s)	5.8	5.8		5.8	5.8		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)	276	743		284	699		357	705		464	669	
v/s Ratio Prot		0.23			c0.25			0.07			0.18	
v/s Ratio Perm	0.24			0.06			0.01			c0.23		
v/c Ratio	0.61	0.57		0.14	0.63		0.03	0.17		0.61	0.48	
Uniform Delay, d1	12.6	12.3		10.1	12.7		10.3	10.9		13.3	12.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.8	1.0		0.2	1.8		0.0	0.1		2.4	0.5	
Delay (s)	16.3	13.3		10.3	14.5		10.3	11.0		15.7	13.0	
Level of Service	B	B		B	B		B	B		B	B	
Approach Delay (s)		14.1			14.1			10.9			14.2	
Approach LOS		B			B			B			B	

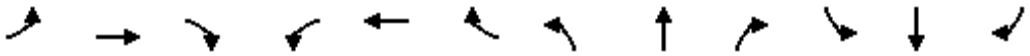
Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	53.0	Sum of lost time (s)	11.5
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	761	113	69	476	46	73	22	62	46	39	76
Future Volume (vph)	38	761	113	69	476	46	73	22	62	46	39	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.99			0.95			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1560	1750		1659	1695			1599			1662	
Flt Permitted	0.39	1.00		0.15	1.00			0.78			0.86	
Satd. Flow (perm)	647	1750		260	1695			1277			1454	
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)	41	827	123	75	517	50	79	24	67	50	42	83
RTOR Reduction (vph)	0	6	0	0	4	0	0	35	0	0	49	0
Lane Group Flow (vph)	41	944	0	75	563	0	0	135	0	0	126	0
Confl. Peds. (#/hr)									3	3		
Heavy Vehicles (%)	17%	7%	12%	10%	10%	31%	14%	6%	7%	3%	0%	12%
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)	39.0	39.0		39.0	39.0			11.8			11.8	
Effective Green, g (s)	39.0	39.0		39.0	39.0			11.8			11.8	
Actuated g/C Ratio	0.62	0.62		0.62	0.62			0.19			0.19	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	401	1086		161	1052			239			273	
v/s Ratio Prot		c0.54			0.33							
v/s Ratio Perm	0.06			0.29				c0.11			0.09	
v/c Ratio	0.10	0.87		0.47	0.54			0.57			0.46	
Uniform Delay, d1	4.8	9.8		6.3	6.8			23.2			22.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	7.6		2.1	0.5			3.0			1.2	
Delay (s)	4.9	17.4		8.5	7.3			26.2			23.9	
Level of Service	A	B		A	A			C			C	
Approach Delay (s)		16.9			7.4			26.2			23.9	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	62.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.3%	ICU Level of Service	D
Analysis Period (min)	15		

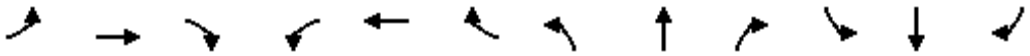
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	697	55	57	418	84	66	32	50	69	64	92
Future Volume (vph)	71	697	55	57	418	84	66	32	50	69	64	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.97			0.95			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1528	1751		1706	1635			1624			1635	
Flt Permitted	0.39	1.00		0.19	1.00			0.74			0.86	
Satd. Flow (perm)	621	1751		333	1635			1221			1432	
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)	77	758	60	62	454	91	72	35	54	75	70	100
RTOR Reduction (vph)	0	4	0	0	10	0	0	26	0	0	35	0
Lane Group Flow (vph)	77	814	0	62	535	0	0	135	0	0	210	0
Confl. Peds. (#/hr)	6					6			2	2		
Heavy Vehicles (%)	19%	9%	2%	7%	13%	19%	12%	4%	10%	11%	2%	13%
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)	32.6	32.6		32.6	32.6			14.0			14.0	
Effective Green, g (s)	32.6	32.6		32.6	32.6			14.0			14.0	
Actuated g/C Ratio	0.56	0.56		0.56	0.56			0.24			0.24	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	345	974		185	909			291			342	
v/s Ratio Prot		c0.46			0.33							
v/s Ratio Perm	0.12			0.19				0.11			c0.15	
v/c Ratio	0.22	0.84		0.34	0.59			0.46			0.61	
Uniform Delay, d1	6.6	10.8		7.1	8.6			19.1			19.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.3	6.3		1.1	1.0			1.2			3.3	
Delay (s)	6.9	17.1		8.2	9.6			20.3			23.1	
Level of Service	A	B		A	A			C			C	
Approach Delay (s)		16.2			9.4			20.3			23.1	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	58.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		

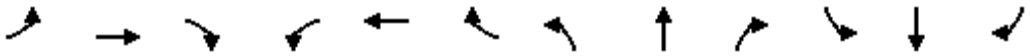
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	599	112	29	305	11	52	71	30	23	232	46
Future Volume (vph)	22	599	112	29	305	11	52	71	30	23	232	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	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	
Frt	1.00	0.98		1.00	0.99			0.97			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.98			1.00	
Satd. Flow (prot)	1704	1830		1825	1839			1744			1810	
Flt Permitted	0.55	1.00		0.18	1.00			0.75			0.96	
Satd. Flow (perm)	978	1830		347	1839			1322			1752	
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)	24	651	122	32	332	12	57	77	33	25	252	50
RTOR Reduction (vph)	0	10	0	0	2	0	0	13	0	0	9	0
Lane Group Flow (vph)	24	763	0	32	342	0	0	154	0	0	318	0
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	7%	2%	5%	0%	4%	0%	5%	8%	0%	0%	4%	3%
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)	28.2	28.2		28.2	28.2			15.3			15.3	
Effective Green, g (s)	28.2	28.2		28.2	28.2			15.3			15.3	
Actuated g/C Ratio	0.51	0.51		0.51	0.51			0.28			0.28	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	496	929		176	934			364			482	
v/s Ratio Prot		c0.42			0.19							
v/s Ratio Perm	0.02			0.09				0.12			c0.18	
v/c Ratio	0.05	0.82		0.18	0.37			0.42			0.66	
Uniform Delay, d1	6.9	11.5		7.4	8.2			16.5			17.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	5.9		0.5	0.2			0.8			3.2	
Delay (s)	6.9	17.4		7.9	8.5			17.3			21.0	
Level of Service	A	B		A	A			B			C	
Approach Delay (s)		17.1			8.4			17.3			21.0	
Approach LOS		B			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	55.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		

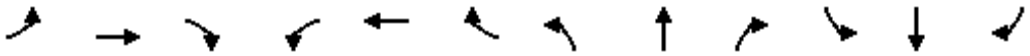
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	476	38	91	271	46	18	55	101	87	168	91
Future Volume (vph)	81	476	38	91	271	46	18	55	101	87	168	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.92			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1460	1832		1825	1848			1694			1754	
Flt Permitted	0.53	1.00		0.30	1.00			0.93			0.86	
Satd. Flow (perm)	822	1832		568	1848			1589			1530	
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)	88	517	41	99	295	50	20	60	110	95	183	99
RTOR Reduction (vph)	0	5	0	0	10	0	0	72	0	0	24	0
Lane Group Flow (vph)	88	553	0	99	335	0	0	118	0	0	353	0
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	25%	4%	0%	0%	2%	0%	0%	9%	2%	0%	4%	7%
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)	18.8	18.8		18.8	18.8			16.0			16.0	
Effective Green, g (s)	18.8	18.8		18.8	18.8			16.0			16.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.34			0.34	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	330	735		228	742			543			523	
v/s Ratio Prot		c0.30			0.18							
v/s Ratio Perm	0.11			0.17				0.07			c0.23	
v/c Ratio	0.27	0.75		0.43	0.45			0.22			0.68	
Uniform Delay, d1	9.4	12.0		10.1	10.2			10.9			13.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.4	4.4		1.3	0.4			0.2			3.4	
Delay (s)	9.8	16.4		11.5	10.7			11.1			16.6	
Level of Service	A	B		B	B			B			B	
Approach Delay (s)		15.5			10.8			11.1			16.6	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	46.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		

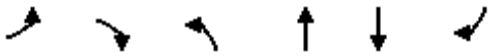
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	139	446	21	37	279	25	17	191	20	15	178	119
Future Volume (vph)	139	446	21	37	279	25	17	191	20	15	178	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.99			0.95	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1825	1888		1823	1835			1797			1789	
Flt Permitted	0.56	1.00		0.37	1.00			0.95			0.97	
Satd. Flow (perm)	1079	1888		716	1835			1722			1746	
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)	151	485	23	40	303	27	18	208	22	16	193	129
RTOR Reduction (vph)	0	3	0	0	5	0	0	6	0	0	40	0
Lane Group Flow (vph)	151	505	0	40	325	0	0	242	0	0	298	0
Confl. Peds. (#/hr)			2	2			1		1	1		1
Heavy Vehicles (%)	0%	1%	0%	0%	3%	8%	0%	6%	0%	17%	0%	0%
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)	17.4	17.4		17.4	17.4			12.9			12.9	
Effective Green, g (s)	17.4	17.4		17.4	17.4			12.9			12.9	
Actuated g/C Ratio	0.41	0.41		0.41	0.41			0.30			0.30	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	443	776		294	754			525			532	
v/s Ratio Prot		c0.27			0.18							
v/s Ratio Perm	0.14			0.06				0.14			c0.17	
v/c Ratio	0.34	0.65		0.14	0.43			0.46			0.56	
Uniform Delay, d1	8.5	10.0		7.8	8.9			11.9			12.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.5	2.0		0.2	0.4			0.6			1.3	
Delay (s)	9.0	12.0		8.0	9.3			12.5			13.6	
Level of Service	A	B		A	A			B			B	
Approach Delay (s)		11.3			9.2			12.5			13.6	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	42.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		

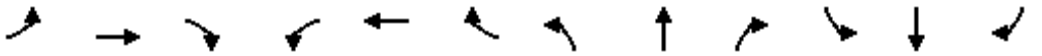
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	382	147	77	333	421	272
Future Volume (vph)	382	147	77	333	421	272
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.99	1.00	1.00
Satd. Flow (prot)	1807	1601		1873	1847	1583
Flt Permitted	0.95	1.00		0.76	1.00	1.00
Satd. Flow (perm)	1807	1601		1437	1847	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	415	160	84	362	458	296
RTOR Reduction (vph)	0	107	0	0	0	175
Lane Group Flow (vph)	415	53	0	446	458	121
Confl. Peds. (#/hr)			1			1
Heavy Vehicles (%)	1%	2%	0%	2%	4%	1%
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	15.3	15.3		18.9	18.9	18.9
Effective Green, g (s)	15.3	15.3		18.9	18.9	18.9
Actuated g/C Ratio	0.33	0.33		0.41	0.41	0.41
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	598	530		587	755	647
v/s Ratio Prot	c0.23				0.25	
v/s Ratio Perm		0.03		c0.31		0.08
v/c Ratio	0.69	0.10		0.76	0.61	0.19
Uniform Delay, d1	13.4	10.7		11.7	10.7	8.7
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.5	0.1		5.6	1.4	0.1
Delay (s)	16.9	10.8		17.3	12.1	8.9
Level of Service	B	B		B	B	A
Approach Delay (s)	15.2			17.3	10.8	
Approach LOS	B			B	B	

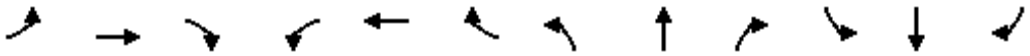
Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	46.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	824	156	153	27	92	166	138	559	53	93	528	631
Future Volume (vph)	824	156	153	27	92	166	138	559	53	93	528	631
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	3.0	6.0		6.0	6.0	6.0
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.95		1.00	1.00	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3404	1694		1825	1812	1570	1372	3498		1644	1865	1420
Flt Permitted	0.95	1.00		0.56	1.00	1.00	0.12	1.00		0.25	1.00	1.00
Satd. Flow (perm)	3404	1694		1073	1812	1570	168	3498		436	1865	1420
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)	896	170	166	29	100	180	150	608	58	101	574	686
RTOR Reduction (vph)	0	31	0	0	0	68	0	6	0	0	0	388
Lane Group Flow (vph)	896	305	0	29	100	112	150	660	0	101	574	298
Heavy Vehicles (%)	4%	3%	7%	0%	6%	4%	33%	3%	3%	11%	3%	15%
Turn Type	Prot	NA		Perm	NA	pm+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4			8	1	5	2		1	6	
Permitted Phases				8		8	2			6		6
Actuated Green, G (s)	32.1	49.6		11.5	11.5	19.8	46.1	36.5		46.5	38.2	38.2
Effective Green, g (s)	32.1	49.6		11.5	11.5	19.8	46.1	36.5		46.5	38.2	38.2
Actuated g/C Ratio	0.29	0.44		0.10	0.10	0.18	0.41	0.32		0.41	0.34	0.34
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	3.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	972	747		109	185	360	171	1135		269	633	482
v/s Ratio Prot	c0.26	0.18			c0.06	0.02	c0.07	0.19		0.03	c0.31	
v/s Ratio Perm				0.03		0.05	0.28			0.13		0.21
v/c Ratio	0.92	0.41		0.27	0.54	0.31	0.88	0.58		0.38	0.91	0.62
Uniform Delay, d1	38.9	21.4		46.6	47.9	40.4	26.2	31.6		21.6	35.4	31.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	13.7	0.4		1.3	3.2	0.5	36.0	0.8		0.9	16.6	2.4
Delay (s)	52.6	21.8		47.9	51.1	40.9	62.2	32.4		22.5	52.0	33.4
Level of Service	D	C		D	D	D	E	C		C	D	C
Approach Delay (s)		44.2			44.8			37.8			40.4	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	41.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	112.4	Sum of lost time (s)	24.0
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	830	235	27	544	1	136	0	18	7	0	9
Future Volume (vph)	9	830	235	27	544	1	136	0	18	7	0	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.98			0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96			0.98	
Satd. Flow (prot)	1789	1883	1601	1789	1883			1775			1704	
Flt Permitted	0.37	1.00	1.00	0.16	1.00			0.74			0.84	
Satd. Flow (perm)	697	1883	1601	305	1883			1369			1460	
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)	10	902	255	29	591	1	148	0	20	8	0	10
RTOR Reduction (vph)	0	0	103	0	0	0	0	33	0	0	14	0
Lane Group Flow (vph)	10	902	152	29	592	0	0	135	0	0	4	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	34.7	34.7	34.7	34.7	34.7			11.6			11.6	
Effective Green, g (s)	34.7	34.7	34.7	34.7	34.7			11.6			11.6	
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60			0.20			0.20	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	414	1120	952	181	1120			272			290	
v/s Ratio Prot		c0.48			0.31							
v/s Ratio Perm	0.01		0.09	0.10				c0.10			0.00	
v/c Ratio	0.02	0.81	0.16	0.16	0.53			0.50			0.01	
Uniform Delay, d1	4.8	9.2	5.3	5.3	7.0			20.8			18.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	4.3	0.1	0.4	0.5			1.4			0.0	
Delay (s)	4.9	13.5	5.4	5.7	7.4			22.2			18.8	
Level of Service	A	B	A	A	A			C			B	
Approach Delay (s)		11.6			7.3			22.2			18.8	
Approach LOS		B			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	11.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	58.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 101: Fruitland Rd & Barton St

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	R	L	T
Maximum Queue (m)	37.4	245.3	230.6	36.4	49.6	47.4	48.2	32.3	78.7	47.5	52.4	142.1
Average Queue (m)	36.9	151.0	126.9	10.2	23.4	24.0	16.8	13.9	42.1	9.9	40.2	60.9
95th Queue (m)	39.8	303.9	284.3	24.1	40.8	39.4	34.3	32.1	70.2	31.7	60.8	110.2
Link Distance (m)		372.1	372.1		122.6	122.6			1070.0			1474.7
Upstream Blk Time (%)		2	0									
Queuing Penalty (veh)		0	0									
Storage Bay Dist (m)	35.0			35.0			50.0	30.0		50.0	50.0	
Storage Blk Time (%)	62	12		0	2	0	0	1	18	0	2	9
Queuing Penalty (veh)	135	51		0	1	0	0	2	14	0	16	43

Intersection: 101: Fruitland Rd & Barton St

Movement	SB
Directions Served	R
Maximum Queue (m)	63.3
Average Queue (m)	17.1
95th Queue (m)	44.0
Link Distance (m)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	100.0
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 102: Fifty Rd & Hwy 8

Movement	EB	EB	WB	WB	B31	NB	NB	SB	SB
Directions Served	L	TR	L	TR	T	L	TR	L	TR
Maximum Queue (m)	50.7	70.4	27.2	89.0	1.4	16.6	27.5	52.3	73.5
Average Queue (m)	23.0	32.8	7.2	37.4	0.0	2.4	10.3	34.4	33.5
95th Queue (m)	44.1	58.1	21.9	69.2	1.0	9.1	22.5	55.2	65.3
Link Distance (m)		309.4		87.4	261.1		653.4		219.9
Upstream Blk Time (%)				0					
Queuing Penalty (veh)				0					
Storage Bay Dist (m)	50.0		25.0			25.0		50.0	
Storage Blk Time (%)	0	1	0	13			1	2	1
Queuing Penalty (veh)	1	2	1	5			0	7	3

Intersection: 201: Jones Rd & Barton St

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	27.2	180.0	27.2	115.0	48.3	52.5
Average Queue (m)	9.2	88.2	16.2	43.6	24.0	22.1
95th Queue (m)	23.3	174.4	29.5	90.1	41.4	41.1
Link Distance (m)		390.8		870.0	909.1	912.9
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	25.0		25.0			
Storage Blk Time (%)	0	25	5	10		
Queuing Penalty (veh)	3	10	26	7		

Intersection: 202: Glover Rd & Barton St

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	27.3	118.9	27.3	109.0	55.0	65.5
Average Queue (m)	12.8	60.0	13.2	42.8	23.1	30.7
95th Queue (m)	26.7	104.9	28.2	84.6	42.8	55.0
Link Distance (m)		870.0		831.5	1028.9	1251.4
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	25.0		25.0			
Storage Blk Time (%)	0	19	2	11		
Queuing Penalty (veh)	4	14	9	6		

Intersection: 203: McNeilly Rd & Barton St

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	27.2	98.8	24.2	59.7	44.7	65.6
Average Queue (m)	4.9	51.3	7.6	24.3	21.1	33.7
95th Queue (m)	17.9	88.7	19.1	46.6	37.7	57.7
Link Distance (m)		831.5		843.8	1020.7	973.8
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	25.0		25.0			
Storage Blk Time (%)	0	18	0	5		
Queuing Penalty (veh)	0	4	1	1		

Intersection: 204: Lewis Rd & Barton St

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	27.4	94.0	27.3	58.0	37.9	68.9
Average Queue (m)	16.7	47.3	15.8	28.1	17.2	33.8
95th Queue (m)	32.9	82.9	28.8	50.8	31.3	57.7
Link Distance (m)		843.8		844.5	968.6	858.5
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	25.0		25.0			
Storage Blk Time (%)	1	17	2	6		
Queuing Penalty (veh)	5	14	7	5		

Intersection: 205: Winona Rd & Barton St

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	27.4	82.5	27.2	51.8	59.4	62.6
Average Queue (m)	19.2	41.6	8.1	26.4	23.9	30.5
95th Queue (m)	32.0	71.3	20.7	46.3	41.8	52.2
Link Distance (m)		844.5		781.8	1110.8	1172.9
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	25.0		25.0			
Storage Blk Time (%)	2	14	0	6		
Queuing Penalty (veh)	9	19	0	2		

Intersection: 206: Fifty Rd & Barton St

Movement	EB	EB	NB	SB	SB
Directions Served	L	R	LT	T	R
Maximum Queue (m)	27.4	87.3	131.1	102.7	27.5
Average Queue (m)	25.2	37.9	53.0	47.6	22.3
95th Queue (m)	30.5	79.7	105.6	86.7	34.4
Link Distance (m)		781.8	219.9	365.7	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	25.0				25.0
Storage Blk Time (%)	19	3		12	2
Queuing Penalty (veh)	27	11		32	7

Intersection: 207: Fifty Rd & South Service Rd

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	TR	L	TR	L	T	TR	L	T	R
Maximum Queue (m)	100.9	102.4	204.1	46.1	84.1	52.4	97.9	86.6	101.4	182.6	157.2
Average Queue (m)	89.5	97.2	117.1	10.8	51.0	37.4	50.0	50.4	27.3	105.7	42.4
95th Queue (m)	114.1	112.9	225.3	34.1	85.8	61.1	83.1	74.4	77.6	172.1	125.4
Link Distance (m)			188.7		75.5		174.5	174.5			
Upstream Blk Time (%)			6		7						
Queuing Penalty (veh)			0		0						
Storage Bay Dist (m)	100.0	100.0		50.0		50.0			100.0		
Storage Blk Time (%)	1	13	3	0	17	8	5		0	13	
Queuing Penalty (veh)	4	40	23	0	5	23	7		0	12	

Intersection: 208: Gordon Dean Ave/Sunnyhurst Ave & Barton St

Movement	EB	EB	EB	WB	WB	NB	SB
Directions Served	L	T	R	L	TR	LTR	LTR
Maximum Queue (m)	15.6	80.6	24.2	23.0	65.3	42.5	15.9
Average Queue (m)	2.2	41.4	11.1	5.6	27.9	19.8	3.3
95th Queue (m)	11.1	71.1	20.6	16.0	55.8	35.7	11.6
Link Distance (m)		328.2	328.2		390.8	193.1	180.7
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)	25.0			25.0			
Storage Blk Time (%)	0	11		0	6		
Queuing Penalty (veh)	0	1		1	2		

Zone Summary

Zone wide Queuing Penalty: 624

Appendix F

Roundabout Operations

```
*************************************************************************
*******
*
*
*  30:7:18                    Barton & McNeilly
6  *
*
*
*************************************************************************
*******
*                                                *
*
* E    (m)    4.50   4.50   4.50   4.50          * TIME PERIOD     min
90  *
* L'   (m)   30.00  30.00  30.00  30.00          * TIME SLICE      min
15  *
* V    (m)    3.50   3.50   3.50   3.50          * RESULTS PERIOD  min
15 75  *
* RAD  (m)   20.00  20.00  20.00  20.00          * TIME COST      $/hr
15.00  *
* PHI  (d)   25.00  25.00  25.00  25.00          * FLOW PERIOD     min
15 75  *
* DIA  (m)   40.00  40.00  40.00  40.00          * FLOW TYPE   pcu/veh
VEH  *
* GRAD SEP       0      0      0      0          * FLOW PEAK  am/op/pm
AM  *
*                                                *
*
*************************************************************************
*******
* LEG NAME *PCU *VEH TURNS (1st exit, 2nd..U)*FLOF*CL*  FLOW RATIO
*FLOW TIME*
*          *    *                              *    *  *              *
*
*N McNeilly*1.01*   36   37    8  0            *1.00*50*0.75 1.125 0.75*15
45 75 *
*W Barton  *1.10*   26  288   34  0            *1.00*50*0.75 1.125 0.75*15
45 75 *
*S McNeilly*1.03*   21  213  124  0            *1.00*50*0.75 1.125 0.75*15
45 75 *
*E Barton  *1.10*   22  484   26  0            *1.00*50*0.75 1.125 0.75*15
45 75 *
*          *    *                              *    *  *              *
*
*          *    *                              *    *  *              *
*
*          *    *                              *    *  *              *
*
*************************************************************************
*******
*                                                                     *
*
* FLOW        veh      81    348    358    532                        * AVEDEL  s
5.5 *
```

```
* CAPACITY    veh     949   1195   1114   1032              * LOS   SIG
A *
* AVE DELAY  mins    0.07   0.07   0.08   0.12              * LOS UNSIG
A *
* MAX DELAY  mins    0.09   0.09   0.10   0.17              *
*
* AVE QUEUE   veh       0      0      0      1              * VEHIC HRS
2.0 *
* MAX QUEUE   veh       0      0      1      1              * COST    $
30 *
*                                                          *
*
************************************************************************
*******

************************************************************************
*******
*
*
*  30:7:18                    Barton & McNeilly
7  *
*
*
************************************************************************
*******
*                                                 *
*
* E    (m)    4.50   4.50   4.50   4.50           * TIME PERIOD     min
90  *
* L'   (m)   30.00  30.00  30.00  30.00           * TIME SLICE      min
15  *
* V    (m)    3.50   3.50   3.50   3.50           * RESULTS PERIOD  min
15 75  *
* RAD  (m)   20.00  20.00  20.00  20.00           * TIME COST      $/hr
15.00  *
* PHI  (d)   25.00  25.00  25.00  25.00           * FLOW PERIOD     min
15 75  *
* DIA  (m)   40.00  40.00  40.00  40.00           * FLOW TYPE   pcu/veh
VEH  *
* GRAD SEP       0      0      0      0           * FLOW PEAK  am/op/pm
PM  *
*                                                 *
*
************************************************************************
*******
* LEG NAME *PCU *VEH TURNS (1st exit, 2nd..U)*FLOF*CL*  FLOW RATIO
*FLOW TIME*
*          *    *                              *    *  *              *
*
*N McNeilly*1.04*   46  232   23  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*W Barton  *1.02*  112  599   22  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
```

```
*S McNeilly*1.05*   30   71   52  0          *1.00*50*0.75 1.125 0.75*15
45 75 *
*E Barton  *1.04*   11  305   29  0          *1.00*50*0.75 1.125 0.75*15
45 75 *
*          *    *                           *    *  *              *
*
*          *    *                           *    *  *              *
*
*          *    *                           *    *  *              *
*
*************************************************************************
*******
*                                                                 *
*
* FLOW        veh     301    733    153    345                    * AVEDEL  s
6.3 *
* CAPACITY    veh    1082   1163    931   1221                    * LOS   SIG
A *
* AVE DELAY  mins    0.08   0.14   0.08   0.07                    * LOS UNSIG
A *
* MAX DELAY  mins    0.10   0.21   0.10   0.09                    *
*
* AVE QUEUE   veh       0      2      0      0                    * VEHIC HRS
2.7 *
* MAX QUEUE   veh       0      2      0      0                    * COST    $
40 *
*                                                                 *
*
*************************************************************************
*******

*************************************************************************
*******
*
*
*  30:7:18                    Barton & Sunnyhurst
8  *
*
*
*************************************************************************
*******
*                                                 *
*
* E    (m)    4.50   4.50   4.50   4.50           * TIME PERIOD     min
90  *
* L'   (m)   30.00  30.00  30.00  30.00           * TIME SLICE      min
15  *
* V    (m)    3.50   3.50   3.50   3.50           * RESULTS PERIOD  min
15 75  *
* RAD  (m)   20.00  20.00  20.00  20.00           * TIME COST      $/hr
15.00  *
* PHI  (d)   25.00  25.00  25.00  25.00           * FLOW PERIOD     min
15 75  *
```

```
* DIA  (m)   40.00  40.00  40.00  40.00          * FLOW TYPE   pcu/veh
VEH  *
* GRAD SEP       0      0      0      0          * FLOW PEAK  am/op/pm
AM  *
*                                                *
*
************************************************************************
*******
* LEG NAME *PCU *VEH TURNS (1st exit, 2nd..U)*FLOF*CL*  FLOW RATIO
*FLOW TIME*
*          *    *                              *    *  *              *
*
*N Sunnyhur*1.02*    8    0    7  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*W Barton  *1.05*   68  488    8  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*S Sunnyhur*1.02*   28    0  226  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*E Barton  *1.05*   15  677    9  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*          *    *                              *    *  *              *
*
*          *    *                              *    *  *              *
*
*          *    *                              *    *  *              *
*
************************************************************************
*******
*                                                          *
*
* FLOW        veh      15    564    254    701             * AVEDEL  s
6.2 *
* CAPACITY    veh     792   1284   1031   1161             * LOS   SIG
A *
* AVE DELAY  mins    0.08   0.08   0.08   0.13             * LOS UNSIG
A *
* MAX DELAY  mins    0.10   0.11   0.10   0.19             *
*
* AVE QUEUE   veh       0      1      0      2             * VEHIC HRS
2.6 *
* MAX QUEUE   veh       0      1      0      2             * COST    $
40 *
*                                                          *
*
************************************************************************
*******

************************************************************************
*******
*
*
*  30:7:18                    Barton & Sunnyhurst
9  *
```

```
*
*
*************************************************************************
*******
*                                                 *
*
* E    (m)    4.50   4.50   4.50   4.50           * TIME PERIOD     min
90  *
* L'   (m)   30.00  30.00  30.00  30.00           * TIME SLICE      min
15  *
* V    (m)    3.50   3.50   3.50   3.50           * RESULTS PERIOD  min
15 75  *
* RAD  (m)   20.00  20.00  20.00  20.00           * TIME COST      $/hr
15.00  *
* PHI  (d)   25.00  25.00  25.00  25.00           * FLOW PERIOD     min
15 75  *
* DIA  (m)   40.00  40.00  40.00  40.00           * FLOW TYPE   pcu/veh
VEH  *
* GRAD SEP       0      0      0      0           * FLOW PEAK  am/op/pm
PM  *
*                                                 *
*
*************************************************************************
*******
* LEG NAME *PCU *VEH TURNS (1st exit, 2nd..U)*FLOF*CL*  FLOW RATIO
*FLOW TIME*
*          *    *                              *    *  *              *
*
*N Sunnyhur*1.02*    8    0    7  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*W Barton  *1.04*  235  832    9  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*S Sunnyhur*1.02*   18    0  136  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*E Barton  *1.05*    1  544   27  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*          *    *                              *    *  *              *
*
*          *    *                              *    *  *              *
*
*          *    *                              *    *  *              *
*
*************************************************************************
*******
*                                                                 *
*
* FLOW        veh      15   1076    154    572                    * AVEDEL  s
14.1 *
* CAPACITY    veh     912   1285    831   1211                    * LOS   SIG
B *
* AVE DELAY  mins    0.07   0.33   0.09   0.09                    * LOS UNSIG
B *
* MAX DELAY  mins    0.09   0.60   0.12   0.13                    *
*
```

```
* AVE QUEUE   veh       0      6      0      1              * VEHIC HRS
7.1 *
* MAX QUEUE   veh       0     10      0      1              * COST    $
106 *
*                                                          *
*
************************************************************************
*******

************************************************************************
*******
*
*
*  30:7:18                        Barton & Jones
9  *
*
*
************************************************************************
*******
*                                                 *
*
* E    (m)    4.50   4.50   4.50   4.50           * TIME PERIOD     min
90  *
* L'   (m)   30.00  30.00  30.00  30.00           * TIME SLICE      min
15  *
* V    (m)    3.50   3.50   3.50   3.50           * RESULTS PERIOD  min
15 75  *
* RAD  (m)   20.00  20.00  20.00  20.00           * TIME COST      $/hr
15.00  *
* PHI  (d)   25.00  25.00  25.00  25.00           * FLOW PERIOD     min
15 75  *
* DIA  (m)   40.00  40.00  40.00  40.00           * FLOW TYPE   pcu/veh
VEH  *
* GRAD SEP       0      0      0      0           * FLOW PEAK  am/op/pm
AM  *
*                                                 *
*
************************************************************************
*******
* LEG NAME *PCU *VEH TURNS (1st exit, 2nd..U)*FLOF*CL*  FLOW RATIO
*FLOW TIME*
*          *    *                              *    *  *              *
*
*N Jones   *1.16*   38   49   34  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*W Barton  *1.13*   55  391   25  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*S Jones   *1.06*   82   50  100  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*E Barton  *1.11*   48  494   59  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*          *    *                              *    *  *              *
*
```

```
*          *    *                          *    *  *              *
*
*          *    *                          *    *  *              *
*
*************************************************************************
*******
*                                                                 *
*
* FLOW        veh     121    471    232    601                    * AVEDEL  s
5.9 *
* CAPACITY    veh     811   1118   1003   1125                    * LOS   SIG
A *
* AVE DELAY  mins    0.09   0.09   0.08   0.11                    * LOS UNSIG
A *
* MAX DELAY  mins    0.11   0.12   0.10   0.16                    *
*
* AVE QUEUE   veh       0      1      0      1                    * VEHIC HRS
2.3 *
* MAX QUEUE   veh       0      1      0      1                    * COST    $
35 *
*                                                                 *
*
*************************************************************************
*******

*************************************************************************
*******
*
*
*  30:7:18                       Barton & Jones
10  *
*
*
*************************************************************************
*******
*                                                 *
*
* E    (m)     4.50   4.50   4.50   4.50          * TIME PERIOD     min
90  *
* L'   (m)    30.00  30.00  30.00  30.00          * TIME SLICE      min
15  *
* V    (m)     3.50   3.50   3.50   3.50          * RESULTS PERIOD  min
15 75  *
* RAD  (m)    20.00  20.00  20.00  20.00          * TIME COST      $/hr
15.00  *
* PHI  (d)    25.00  25.00  25.00  25.00          * FLOW PERIOD     min
15 75  *
* DIA  (m)    40.00  40.00  40.00  40.00          * FLOW TYPE   pcu/veh
VEH  *
* GRAD SEP       0      0      0      0          * FLOW PEAK  am/op/pm
PM  *
*                                                 *
*
```

```
*************************************************************************
*******
* LEG NAME *PCU *VEH TURNS (1st exit, 2nd..U)*FLOF*CL*  FLOW RATIO
*FLOW TIME*
*          *    *                              *    *  *              *
*
*N Jones   *1.07*   76   39   46  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*W Barton  *1.08*  113  761   38  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*S Jones   *1.10*   62   22   73  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*E Barton  *1.11*   46  476   69  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*          *    *                              *    *  *              *
*
*          *    *                              *    *  *              *
*
*          *    *                              *    *  *              *
*
*************************************************************************
*******
*                                                              *
*
* FLOW        veh     161    912    157    591               * AVEDEL  s
10.8 *
* CAPACITY    veh     898   1167    755   1147               * LOS   SIG
B *
* AVE DELAY  mins    0.08   0.26   0.10   0.11               * LOS UNSIG
B *
* MAX DELAY  mins    0.11   0.43   0.14   0.15               *
*
* AVE QUEUE   veh       0      4      0      1               * VEHIC HRS
5.4 *
* MAX QUEUE   veh       0      6      0      1               * COST    $
82 *
*                                                              *
*
*************************************************************************
*******

*************************************************************************
*******
*
*
*  30:7:18                      Barton & Glover
12  *
*
*
*************************************************************************
*******
*                                                  *
*
```

```
* E    (m)    4.50   4.50   4.50   4.50          * TIME PERIOD     min
90  *
* L'   (m)   30.00  30.00  30.00  30.00          * TIME SLICE      min
15  *
* V    (m)    3.50   3.50   3.50   3.50          * RESULTS PERIOD  min
15 75  *
* RAD  (m)   20.00  20.00  20.00  20.00          * TIME COST      $/hr
15.00  *
* PHI  (d)   25.00  25.00  25.00  25.00          * FLOW PERIOD     min
15 75  *
* DIA  (m)   40.00  40.00  40.00  40.00          * FLOW TYPE   pcu/veh
VEH  *
* GRAD SEP       0      0      0      0          * FLOW PEAK  am/op/pm
AM  *
*                                                *
*
*************************************************************************
*******
* LEG NAME *PCU *VEH TURNS (1st exit, 2nd..U)*FLOF*CL*  FLOW RATIO
*FLOW TIME*
*          *    *                              *    *  *              *
*
*N Glover  *1.15*   95   36   25  0            *1.00*50*0.75 1.125 0.75*15
45 75 *
*W Barton  *1.05*  318    0   92  56           *1.00*50*0.75 1.125 0.75*15
45 75 *
*S Glover  *1.04*   37   53   46  0            *1.00*50*0.75 1.125 0.75*15
45 75 *
*E Barton  *1.12*   68  475   56  0            *1.00*50*0.75 1.125 0.75*15
45 75 *
*          *    *                              *    *  *              *
*
*          *    *                              *    *  *              *
*
*          *    *                              *    *  *              *
*
*************************************************************************
*******
*                                                              *
*
* FLOW        veh     156    466    136    599                 * AVEDEL  s
5.9 *
* CAPACITY    veh     827   1220   1203   1079                 * LOS   SIG
A *
* AVE DELAY  mins    0.09   0.08   0.06   0.12                 * LOS UNSIG
A *
* MAX DELAY  mins    0.12   0.10   0.07   0.18                 *
*
* AVE QUEUE   veh       0      1      0      1                 * VEHIC HRS
2.2 *
* MAX QUEUE   veh       0      1      0      2                 * COST    $
33 *
*                                                              *
*
```

```
*************************************************************************
*******

*************************************************************************
*******
*
*
*  30:7:18                      Barton & Glover
13  *
*
*
*************************************************************************
*******
*                                                 *
*
* E    (m)    4.50   4.50   4.50   4.50           * TIME PERIOD     min
90  *
* L'   (m)   30.00  30.00  30.00  30.00           * TIME SLICE      min
15  *
* V    (m)    3.50   3.50   3.50   3.50           * RESULTS PERIOD  min
15 75  *
* RAD  (m)   20.00  20.00  20.00  20.00           * TIME COST      $/hr
15.00  *
* PHI  (d)   25.00  25.00  25.00  25.00           * FLOW PERIOD     min
15 75  *
* DIA  (m)   40.00  40.00  40.00  40.00           * FLOW TYPE   pcu/veh
VEH  *
* GRAD SEP       0      0      0      0           * FLOW PEAK  am/op/pm
PM  *
*                                                 *
*
*************************************************************************
*******
* LEG NAME *PCU *VEH TURNS (1st exit, 2nd..U)*FLOF*CL*  FLOW RATIO
*FLOW TIME*
*          *    *                              *    *  *              *
*
*N Glover  *1.09*   92   64   69  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*W Barton  *1.09*   55  697   22  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*S Glover  *1.10*   50   32   66  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*E Barton  *1.13*   84  418   57  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*          *    *                              *    *  *              *
*
*          *    *                              *    *  *              *
*
*          *    *                              *    *  *              *
*
*************************************************************************
*******
```

```
*                                                                    *
*
* FLOW        veh     225    774    148    559                      * AVEDEL  s
7.8 *
* CAPACITY    veh     922   1134    782   1134                      * LOS   SIG
A *
* AVE DELAY  mins    0.08   0.17   0.09   0.10                      * LOS UNSIG
A *
* MAX DELAY  mins    0.11   0.26   0.13   0.14                      *
*
* AVE QUEUE   veh       0      2      0      1                      * VEHIC HRS
3.7 *
* MAX QUEUE   veh       0      3      0      1                      * COST    $
56 *
*                                                                    *
*
**********************************************************************
*******

**********************************************************************
*******
*
*
*  30:7:18                        Barton & Lewis
6  *
*
*
**********************************************************************
*******
*                                                  *
*
* E    (m)    4.50   4.50   4.50   4.50           * TIME PERIOD     min
90  *
* L'   (m)   30.00  30.00  30.00  30.00           * TIME SLICE      min
15  *
* V    (m)    3.50   3.50   3.50   3.50           * RESULTS PERIOD  min
15 75  *
* RAD  (m)   20.00  20.00  20.00  20.00           * TIME COST      $/hr
15.00  *
* PHI  (d)   25.00  25.00  25.00  25.00           * FLOW PERIOD     min
15 75  *
* DIA  (m)   40.00  40.00  40.00  40.00           * FLOW TYPE   pcu/veh
VEH  *
* GRAD SEP       0      0      0      0           * FLOW PEAK  am/op/pm
AM  *
*                                                  *
*
**********************************************************************
*******
* LEG NAME *PCU *VEH TURNS (1st exit, 2nd..U)*FLOF*CL*  FLOW RATIO
*FLOW TIME*
*          *    *                              *    *  *              *
*
```

```
*N Lewis   *1.15*   47   73   18  0          *1.00*50*0.75 1.125 0.75*15
45 75 *
*W Barton  *1.17*   78  231   93  0          *1.00*50*0.75 1.125 0.75*15
45 75 *
*S Lewis   *1.05*  105  142   60  0          *1.00*50*0.75 1.125 0.75*15
45 75 *
*E Barton  *1.06*   87  286  129  0          *1.00*50*0.75 1.125 0.75*15
45 75 *
*          *    *                           *    *  *              *
*
*          *    *                           *    *  *              *
*
*          *    *                           *    *  *              *
*
*************************************************************************
*******
*                                                                      *
*
* FLOW        veh     138    402    307    502              * AVEDEL  s
5.4 *
* CAPACITY    veh     927   1041   1073   1105              * LOS   SIG
A *
* AVE DELAY  mins    0.07   0.09   0.08   0.10              * LOS UNSIG
A *
* MAX DELAY  mins    0.10   0.12   0.10   0.14              *
*
* AVE QUEUE   veh       0      1      0      1              * VEHIC HRS
2.0 *
* MAX QUEUE   veh       0      1      0      1              * COST    $
30 *
*                                                                      *
*
*************************************************************************
*******

*************************************************************************
*******
*
*
*  30:7:18                      Barton & Lewis
7  *
*
*
*************************************************************************
*******
*                                                  *
*
* E    (m)    4.50   4.50   4.50   4.50           * TIME PERIOD     min
90  *
* L'   (m)   30.00  30.00  30.00  30.00           * TIME SLICE      min
15  *
* V    (m)    3.50   3.50   3.50   3.50           * RESULTS PERIOD  min
15 75  *
```

```
* RAD  (m)   20.00  20.00  20.00  20.00          * TIME COST      $/hr
15.00  *
* PHI  (d)   25.00  25.00  25.00  25.00          * FLOW PERIOD     min
15 75  *
* DIA  (m)   40.00  40.00  40.00  40.00          * FLOW TYPE   pcu/veh
VEH  *
* GRAD SEP       0      0      0      0          * FLOW PEAK  am/op/pm
PM  *
*                                                *
*
*************************************************************************
*******
* LEG NAME *PCU *VEH TURNS (1st exit, 2nd..U)*FLOF*CL*  FLOW RATIO
*FLOW TIME*
*          *    *                             *    *  *              *
*
*N Lewis   *1.04*   91  168   87  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*W Barton  *1.07*   38  476   81  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*S Lewis   *1.04*  101   55   18  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*E Barton  *1.01*   46  271   91  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*          *    *                             *    *  *              *
*
*          *    *                             *    *  *              *
*
*          *    *                             *    *  *              *
*
*************************************************************************
*******
*                                                          *
*
* FLOW        veh     346    595    174    408             * AVEDEL  s
5.7 *
* CAPACITY    veh    1091   1076    923   1251             * LOS   SIG
A *
* AVE DELAY  mins    0.08   0.13   0.08   0.07             * LOS UNSIG
A *
* MAX DELAY  mins    0.11   0.18   0.11   0.09             *
*
* AVE QUEUE   veh       0      1      0      0             * VEHIC HRS
2.4 *
* MAX QUEUE   veh       1      2      0      1             * COST    $
36 *
*                                                          *
*
*************************************************************************
*******

*************************************************************************
*******
```

```
*
*
*  30:7:18                        Barton & Winona
6  *
*
*
************************************************************************
*******
*                                                 *
*
* E    (m)     4.50   4.50   4.50   4.50          * TIME PERIOD     min
90  *
* L'   (m)    30.00  30.00  30.00  30.00          * TIME SLICE      min
15  *
* V    (m)     3.50   3.50   3.50   3.50          * RESULTS PERIOD  min
15 75  *
* RAD  (m)    20.00  20.00  20.00  20.00          * TIME COST      $/hr
15.00  *
* PHI  (d)    25.00  25.00  25.00  25.00          * FLOW PERIOD     min
15 75  *
* DIA  (m)    40.00  40.00  40.00  40.00          * FLOW TYPE   pcu/veh
VEH  *
* GRAD SEP        0      0      0      0          * FLOW PEAK  am/op/pm
AM  *
*                                                 *
*
************************************************************************
*******
* LEG NAME *PCU *VEH TURNS (1st exit, 2nd..U)*FLOF*CL*  FLOW RATIO
*FLOW TIME*
*          *    *                              *    *  *              *
*
*N Winona  *1.08*  116  128   32  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*W Barton  *1.07*   23  383  100  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*S Winona  *1.09*   50  127   15  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*E Barton  *1.08*   17  257   60  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*          *    *                              *    *  *              *
*
*          *    *                              *    *  *              *
*
*          *    *                              *    *  *              *
*
************************************************************************
*******
*                                                              *
*
* FLOW        veh     276    506    192    334               * AVEDEL  s
4.9 *
* CAPACITY    veh    1065   1140    953   1117               * LOS   SIG
A *
```

```
* AVE DELAY  mins    0.07   0.09   0.08   0.08               * LOS UNSIG
A *
* MAX DELAY  mins    0.10   0.13   0.10   0.10               *
*
* AVE QUEUE   veh       0      1      0      0               * VEHIC HRS
1.8 *
* MAX QUEUE   veh       0      1      0      0               * COST    $
27 *
*                                                           *
*
*********************************************************************
*******

*********************************************************************
*******
*
*
*  30:7:18                      Barton & Winona
7  *
*
*
*********************************************************************
*******
*                                                 *
*
* E    (m)    4.50   4.50   4.50   4.50           * TIME PERIOD     min
90  *
* L'   (m)   30.00  30.00  30.00  30.00           * TIME SLICE      min
15  *
* V    (m)    3.50   3.50   3.50   3.50           * RESULTS PERIOD  min
15 75  *
* RAD  (m)   20.00  20.00  20.00  20.00           * TIME COST      $/hr
15.00  *
* PHI  (d)   25.00  25.00  25.00  25.00           * FLOW PERIOD     min
15 75  *
* DIA  (m)   40.00  40.00  40.00  40.00           * FLOW TYPE   pcu/veh
VEH  *
* GRAD SEP       0      0      0      0           * FLOW PEAK  am/op/pm
PM  *
*                                                 *
*
*********************************************************************
*******
* LEG NAME *PCU *VEH TURNS (1st exit, 2nd..U)*FLOF*CL*  FLOW RATIO
*FLOW TIME*
*          *    *                              *    *  *              *
*
*N Winona  *1.01*  119  178   15  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*W Barton  *1.01*   21  446  139  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
*S Winona  *1.05*   20  191   21  0           *1.00*50*0.75 1.125 0.75*15
45 75 *
```

```
*E Barton  *1.03*   25  279   37  0          *1.00*50*0.75 1.125 0.75*15
45 75 *
*          *    *                           *    *  *              *
*
*          *    *                           *    *  *              *
*
*          *    *                           *    *  *              *
*
************************************************************************
*******
*                                                                  *
*
* FLOW        veh     312    606    232    341              * AVEDEL  s
5.1 *
* CAPACITY    veh    1145   1210    959   1114              * LOS   SIG
A *
* AVE DELAY  mins    0.07   0.10   0.08   0.08              * LOS UNSIG
A *
* MAX DELAY  mins    0.09   0.14   0.11   0.10              *
*
* AVE QUEUE   veh       0      1      0      0              * VEHIC HRS
2.1 *
* MAX QUEUE   veh       0      1      0      1              * COST    $
32 *
*                                                                  *
*
************************************************************************
*******

************************************************************************
*******
*
*
*  30:7:18                       Barton & Fifty
3  *
*
*
************************************************************************
*******
*                                                  *
*
* E    (m)    4.50   4.50   4.50                   * TIME PERIOD     min
90  *
* L'   (m)   30.00  30.00  30.00                   * TIME SLICE      min
15  *
* V    (m)    3.50   3.50   3.50                   * RESULTS PERIOD  min
15 75  *
* RAD  (m)   20.00  20.00  20.00                   * TIME COST      $/hr
15.00  *
* PHI  (d)   25.00  25.00  25.00                   * FLOW PERIOD     min
15 75  *
* DIA  (m)   40.00  40.00  40.00                   * FLOW TYPE   pcu/veh
VEH  *
```

```
* GRAD SEP       0      0      0                  * FLOW PEAK  am/op/pm
AM  *
*                                                 *
*
*************************************************************************
*******
* LEG NAME *PCU *VEH TURNS (1st exit, 2nd..U)*FLOF*CL*  FLOW RATIO
*FLOW TIME*
*          *    *                              *    *  *              *
*
*N Fifty   *1.07*  196  231    0               *1.00*50*0.75 1.125 0.75*15
45 75 *
*W Barton  *1.08*   46  349    0               *1.00*50*0.75 1.125 0.75*15
45 75 *
*S Fifty   *1.04*  414   80    0               *1.00*50*0.75 1.125 0.75*15
45 75 *
*          *    *                              *    *  *              *
*
*          *    *                              *    *  *              *
*
*          *    *                              *    *  *              *
*
*          *    *                              *    *  *              *
*
*************************************************************************
*******
*                                                                 *
*
* FLOW        veh     427    395    494                          * AVEDEL  s
5.1 *
* CAPACITY    veh    1224   1124   1096                          * LOS   SIG
A *
* AVE DELAY  mins    0.07   0.08   0.10                          * LOS UNSIG
A *
* MAX DELAY  mins    0.10   0.11   0.14                          *
*
* AVE QUEUE   veh       1      1      1                          * VEHIC HRS
1.9 *
* MAX QUEUE   veh       1      1      1                          * COST    $
28 *
*                                                                 *
*
*************************************************************************
*******

*************************************************************************
*******
*
*
*  30:7:18                        Barton & Fifty
4  *
*
*
```

```
*************************************************************************
*******
*                                                 *
*
* E    (m)    4.50   4.50   4.50                  * TIME PERIOD     min
90  *
* L'   (m)   30.00  30.00  30.00                  * TIME SLICE      min
15  *
* V    (m)    3.50   3.50   3.50                  * RESULTS PERIOD  min
15 75  *
* RAD  (m)   20.00  20.00  20.00                  * TIME COST      $/hr
15.00  *
* PHI  (d)   25.00  25.00  25.00                  * FLOW PERIOD     min
15 75  *
* DIA  (m)   40.00  40.00  40.00                  * FLOW TYPE   pcu/veh
VEH  *
* GRAD SEP       0      0      0                  * FLOW PEAK  am/op/pm
PM  *
*                                                 *
*
*************************************************************************
*******
* LEG NAME *PCU *VEH TURNS (1st exit, 2nd..U)*FLOF*CL*  FLOW RATIO
*FLOW TIME*
*          *    *                               *    *  *              *
*
*N Fifty   *1.03*  272  421    0                 *1.00*50*0.75 1.125 0.75*15
45 75 *
*W Barton  *1.02*  147  382    0                 *1.00*50*0.75 1.125 0.75*15
45 75 *
*S Fifty   *1.00*  333   77    0                 *1.00*50*0.75 1.125 0.75*15
45 75 *
*          *    *                               *    *  *              *
*
*          *    *                               *    *  *              *
*
*          *    *                               *    *  *              *
*
*          *    *                               *    *  *              *
*
*************************************************************************
*******
*                                                                 *
*
* FLOW        veh     693    529    410                          * AVEDEL  s
5.9 *
* CAPACITY    veh    1275   1085   1132                          * LOS   SIG
A *
* AVE DELAY  mins    0.10   0.11   0.08                          * LOS UNSIG
A *
* MAX DELAY  mins    0.14   0.15   0.11                          *
*
* AVE QUEUE   veh       1      1      1                          * VEHIC HRS
2.7 *
```

```
* MAX QUEUE   veh       1      1      1                      * COST    $
40 *
*                                                           *
*
*************************************************************************
*******
```