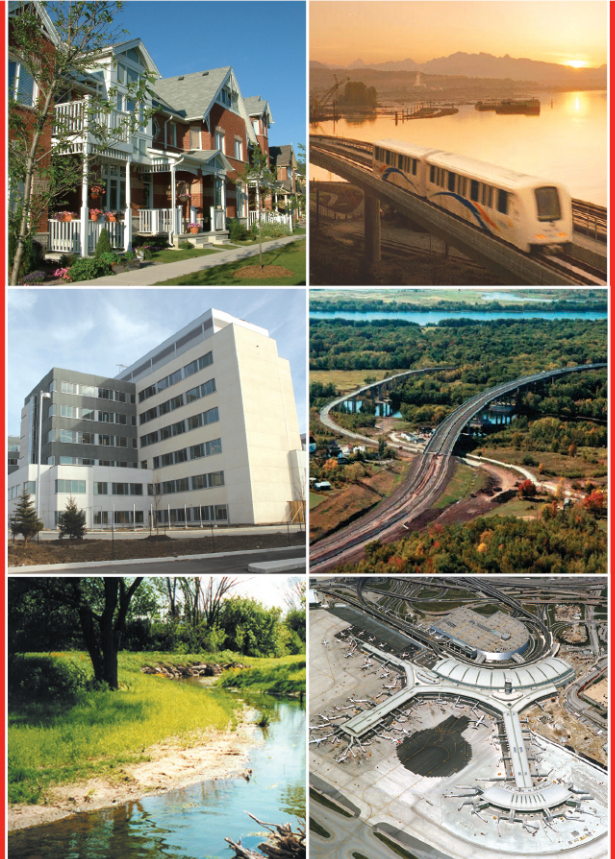


MMM Group Limited



## Traffic Impact Study

129 South Street Condominium  
Development – Town of Gananoque

*Prepared for:*  
*Riviyra Developments Inc.*

COMMUNITIES  
TRANSPORTATION  
BUILDINGS  
INFRASTRUCTURE



October 2013 | 16-13083-001-T01

MMM Group Limited  
100 Commerce Valley Drive West,  
Thornhill, Ontario, L3T 0A1  
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October 15, 2013  
16-13083-001-T01

Mr. Ken Dantzer  
Riviya Developments Inc.  
P.O. Box 70  
Glenburnie, ON K0H 1S0

Dear Mr. Dantzer:

Subject: **Traffic Impact Study  
129 South Street  
Town of Gananoque**

MMM Group Limited is very pleased to present our Traffic Impact Study for your proposed condominium development to be located at 129 South Street in the Town of Gananoque.

This report analyzes the transportation impacts for this development, and addresses the suitability of the proposed parking arrangement and site circulation requirements. The expected traffic conditions in 2018 are not greatly impacted by the construction of this development, and the available roadway capacity is anticipated to be adequate to support the 88 a.m. and 103 p.m. peak hour trips generated by this site. Additionally, the proposed parking supply exceeds the Town's By-law requirements, and no issues are expected to arise from a traffic operations perspective.

We trust that this study adequately addresses the transportation impacts of your proposed development. Please contact us if you have any questions or comments with respect to our report.

Yours very truly,

**MMM GROUP LIMITED**



David B. Richardson, P.Eng., PTOE  
Senior Project Manager & Partner  
Transportation Planning



Christopher Tam, EIT  
Project Engineer  
Transportation Planning

# **TRAFFIC IMPACT STUDY**

## **PROPOSED RESIDENTIAL DEVELOPMENT 129 SOUTH STREET**

### **TOWN OF GANANOQUE**

**Prepared for:**

**Riviyra Developments Inc.**

*October 2013*  
*16-13083-001-T01*

## PROJECT TEAM MEMBER LIST

Project Manager: Dave Richardson, P.Eng., PTOE

Project Coordinator: Raymond Maitlall, B.A.Pols.

Technical Staff: Christopher Tam, P.Eng.  
Katherine Ellard, C.Tech

Support Staff: Charles Ho

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## 1.0 INTRODUCTION

MMM Group Limited was retained by Riviya Developments Inc. to prepare a Traffic Impact Study (TIS) in support of the proposed residential development to be located at 129 South Street in the Town of Gananoque.

This development is proposed to consist of 102 condominium units, and this report documents the assessment of the transportation issues associated with the proposed development.

The study area is shown in **Figure 1.1** while the concept development site plan is illustrated in **Figure 1.2**.





**FIGURE 1.1**  
Proposed Site Location





**FIGURE 1.2**  
Proposed Ground Level Site Layout

## 2.0 EXISTING CONDITIONS

### 2.1 Study Area and Data Collection

The study area for this traffic impact study includes the following intersections. The existing lane configurations are shown in **Figure 2.1**:

- South Street at Stone Street South (Unsignalized);
- Stone Street South at Water Street (Unsignalized);
- King Street East at Stone Street South (Signalized);
- King Street East at Charles Street South (Signalized); and
- King Street East at William Street South (Signalized).

Accu-Traffic Inc. was retained to conduct turning movement counts (TMC) at the above-noted intersections. The TMCs were collected during the weekday periods from 7 to 9 a.m. and from 4 to 6 p.m. on Tuesday, September 24, 2013. The existing weekday a.m. and p.m. traffic volumes are shown in **Figure 2.2**. The peak hour traffic data, along with the existing signal timing plans for the signalized intersections are provided in **Appendix A**.

### 2.2 Transit

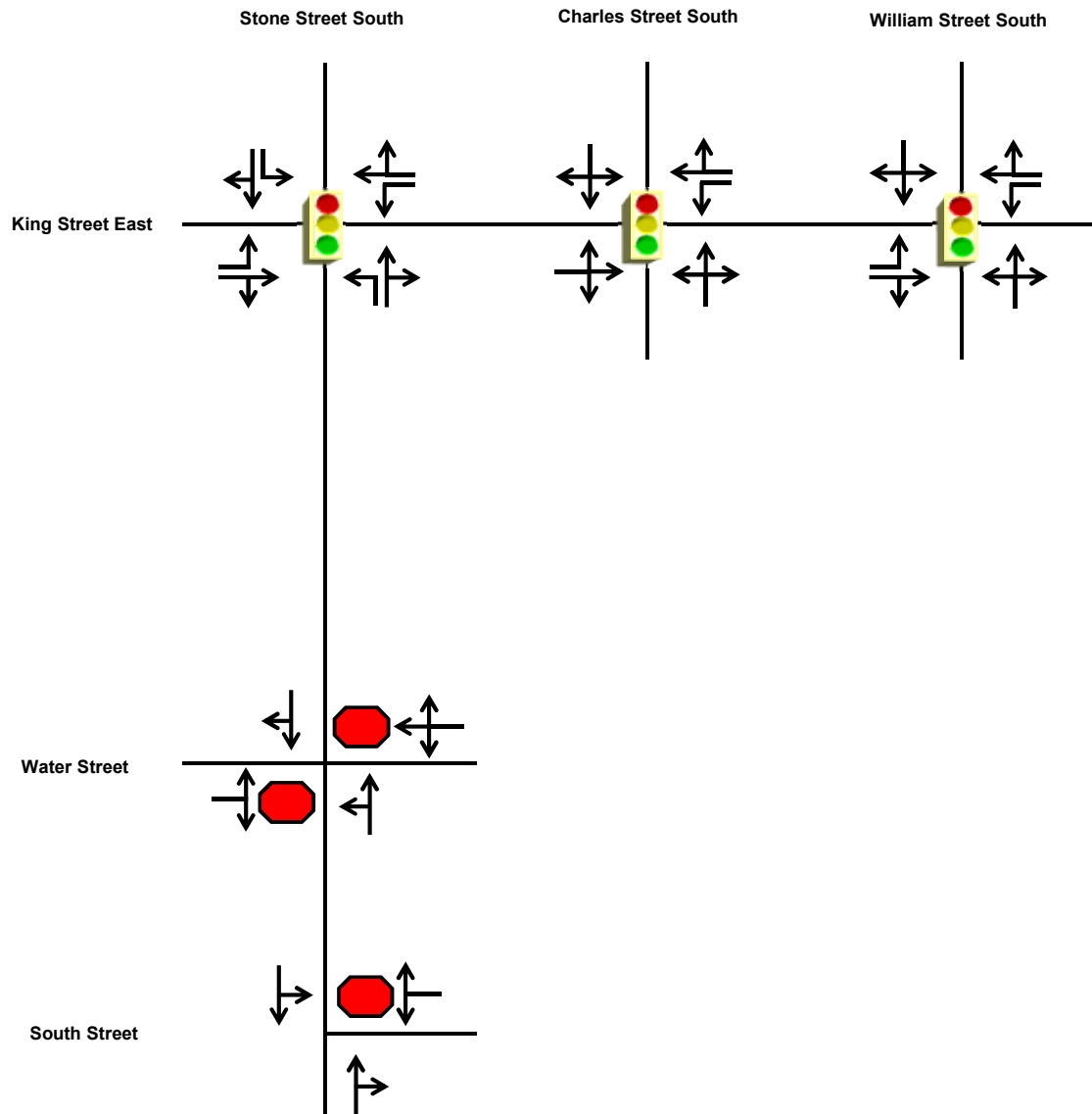
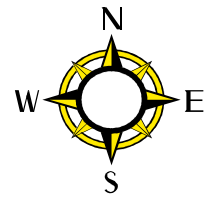
Currently, there is no transit service offered in the Town of Gananoque, nor are there any plans for future service. Accordingly, this travel mode has not been factored into our analysis.

### 2.3 Methodology

Traffic conditions in the study area were analyzed using the **Synchro 8** traffic analysis software. This software incorporates the methodology outlined in the *Highway Capacity Manual (HCM)*, *Transportation Research Board, 2000*. The intersection capacity analysis provides an indication of traffic operations based on calculations of volume-to-capacity (v/c) and delays for individual movements at an intersection. A Level of Service (LOS) denoted by letters 'A' through 'D' represents satisfactory traffic operations. LOS denoted by the letters 'E' and 'F' indicates congested traffic operations. The Level of Service definitions for signalized and unsignalized intersections are included in **Appendix B**.

### 2.4 Existing Traffic Operations

Traffic operations were analyzed at the previously noted intersections to determine the existing LOS during the weekday a.m. and p.m. peak hours. The results of the intersection capacity analysis for existing conditions are summarized in **Table 2.1**. Detailed intersection capacity analysis sheets are included in **Appendix C**.



**LEGEND**



Signalized Intersection



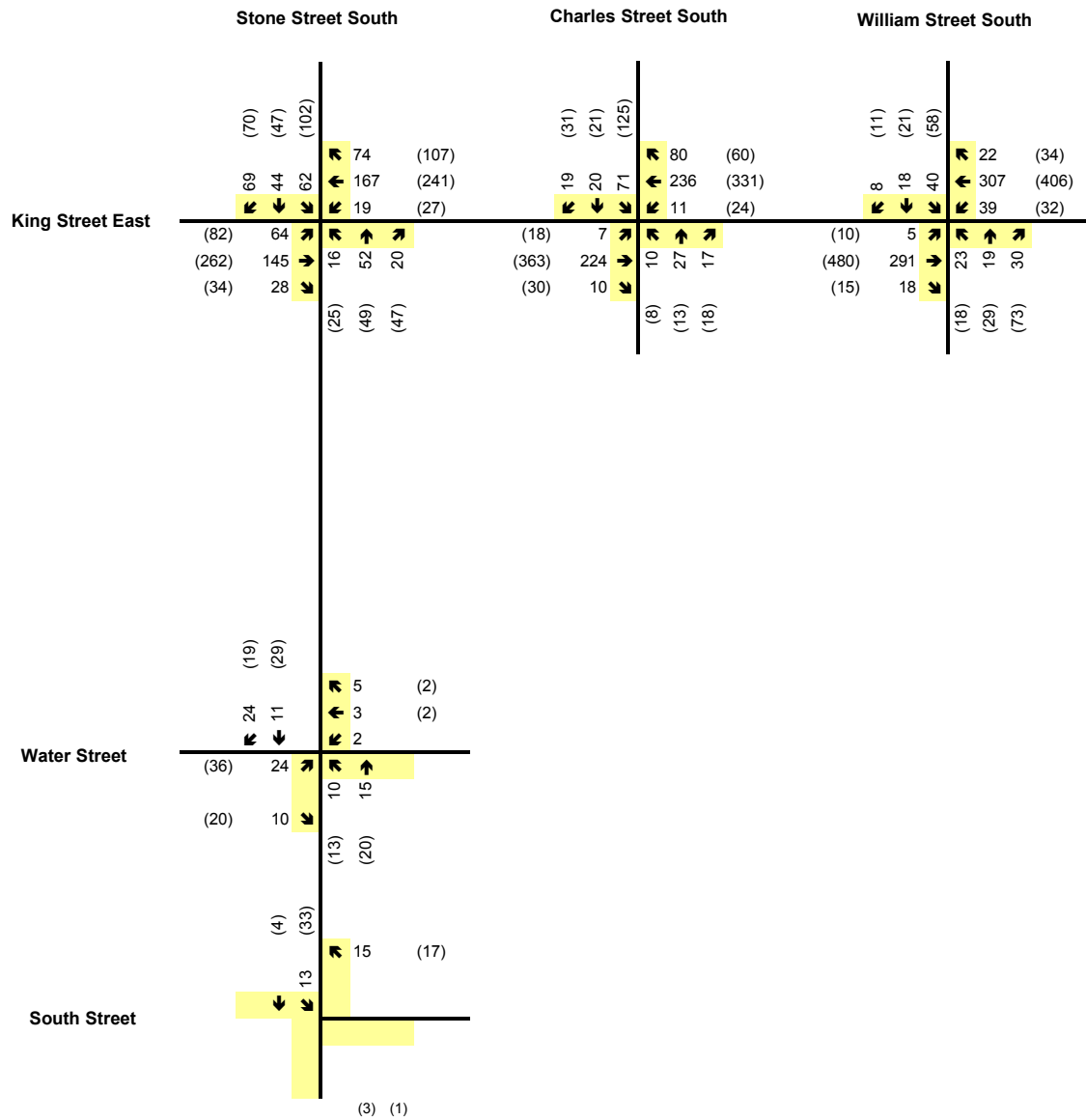
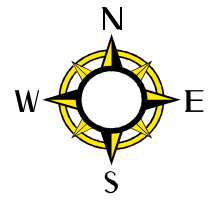
Existing Lane Configurations



Stop Control

**FIGURE 2.1**  
Existing Lane Configurations





**LEGEND**

XX AM Peak Hour Volumes  
 (XX) PM Peak Hour Volumes

**FIGURE 2.2**  
 Existing Peak Hour Traffic Volumes

**TABLE 2.1  
 EXISTING TRAFFIC CONDITIONS**

Intersection	Control Type	Weekday A.M. Peak Hour		Weekday P.M. Peak Hour	
		LOS (Delay in seconds)	Critical Movement(s) (v/c)	LOS (Delay in seconds)	Critical Movement(s) (v/c)
South Street at Stone Street South	Unsignalized	A (7.9)	--	A (6.7)	--
Stone Street South at Water Street	Unsignalized	A (4.6)	--	A (4.7)	--
King Street East at Stone Street South	Signalized	C (20.9)	--	B (19.5)	--
King Street East at Charles Street South	Signalized	B (11.6)	--	B (12.3)	--
King Street East at William Street South	Signalized	A (9.7)	--	B (10.6)	--

Notes: 1. The LOS at an unsignalized intersection is defined by the movement with the highest delay under HCM 2000.  
 2. Critical movements are those with a volume-to-capacity ratio exceeding 0.80 for a signalized intersection or with a LOS of 'D', 'E' or 'F'

Under existing conditions, the study area intersections operate at LOS C or better, indicating that there are low delays at these intersections. No operational issues are noted from the results of the traffic analysis.

### 3.0 SITE-GENERATED TRAFFIC

#### 3.1 Trip Generation

The trip generation associated with the proposed residential development was based on the *Institute of Transportation Engineers (ITE) Trip Generation Manual, 9<sup>th</sup> Edition*. Land Use Code 230 – Condominium was used to develop site-generated trips for this development. A summary of the trip generation information for the proposed development is presented in **Table 3.1**.

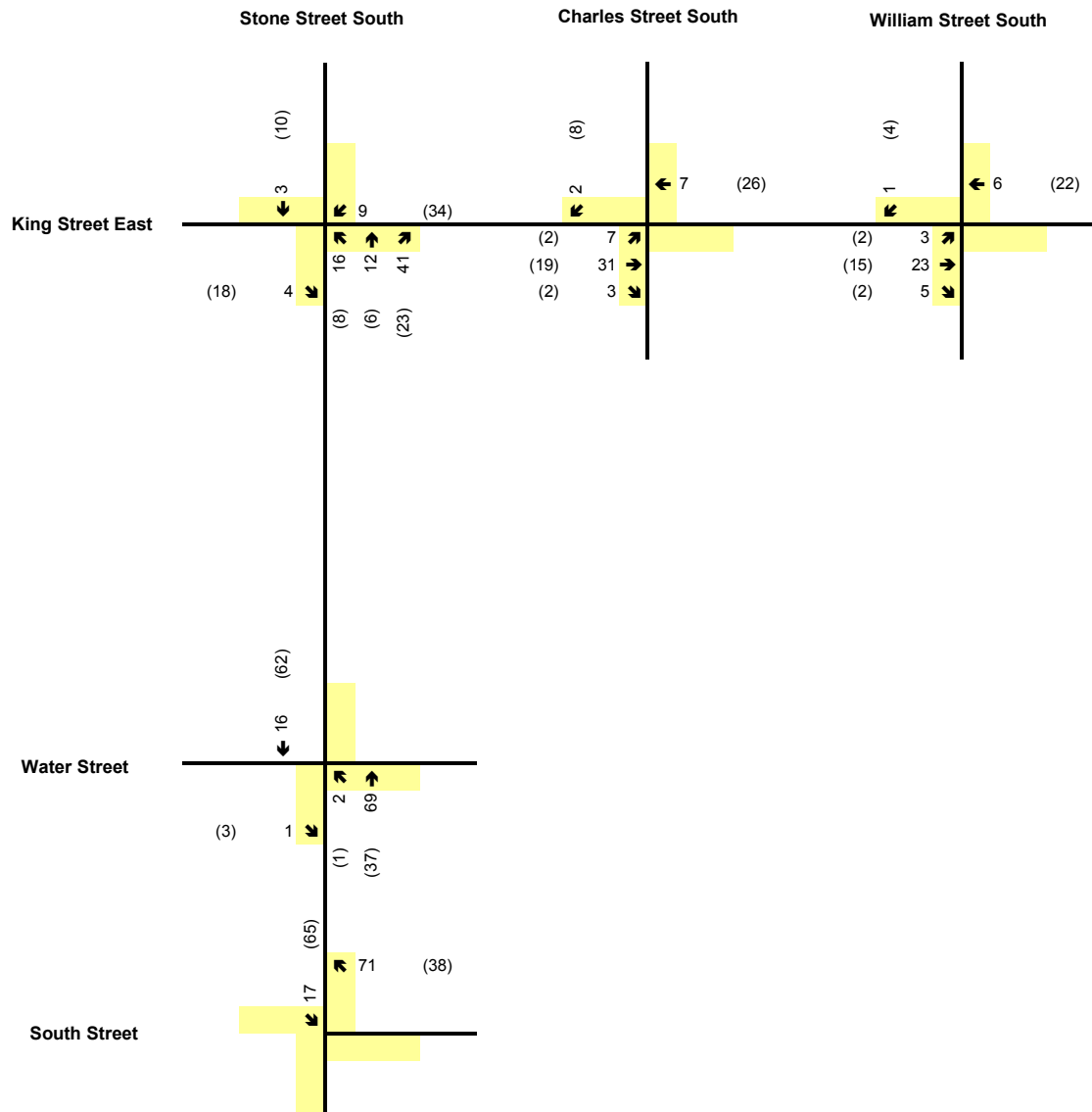
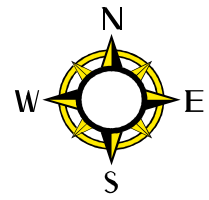
**TABLE 3.1  
 TRIP GENERATION**

ITE LAND USE CODE (MAGNITUDE)	WEEKDAY A.M. PEAK HOUR		WEEKDAY P.M. PEAK HOUR	
	Inbound Trips	Outbound Trips	Inbound Trips	Outbound Trips
230 Condominium (102 units)	17	71	66	37
<b>TOTAL</b>	<b>88</b>		<b>103</b>	

As indicated in Table 3.2, the proposed development is expected to generate a total of 88 and 103 trips in the weekday a.m. and p.m. peak hours, respectively.

#### 3.2 Trip Distribution and Assignment

The projected residential distribution was developed based on the distribution of existing traffic in the area, as determined by the turning movement counts which were conducted. The distribution is summarized in **Table 3.2**, and **Figure 3.1** illustrates the resulting site traffic assignment of the trips generated by this development.



**LEGEND**

XX AM Peak Hour Volumes  
 (XX) PM Peak Hour Volumes

**FIGURE 3.1**  
 Site-Generated Peak Hour  
 Traffic Volumes



**TABLE 3.2  
 TRIP DISTRIBUTION**

Location of Gateway	WEEKDAY A.M. PEAK HOUR		WEEKDAY P.M. PEAK HOUR	
	Inbound	Outbound	Inbound	Outbound
King Street (E of William)	36.8%	32.3%	33.8%	40.0%
King Street (W of Stone)	23.7%	22.6%	27.1%	22.0%
Water Street (W of Stone)	3.4%	3.3%	4.0%	2.2%
Water Street (E of Stone)	1.0%	0%	0.3%	0.0%
William Street (N of King)	6.6%	4.1%	6.4%	4.8%
William Street (S of King)	0.0%	6.7%	0.0%	4.5%
Charles Street (N of King)	11.0%	10.2%	12.7%	6.0%
Charles Street (S of King)	0.0%	3.7%	0.0%	4.9%
Stone Street (N of King)	17.5%	17.0%	15.7%	15.6%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

## 4.0 FUTURE TRAFFIC CONDITIONS

### 4.1 Background Information

Based on information from the Town of Gananoque, there are no major roadway improvements proposed within the study area over the five-year study horizon.

### 4.2 Background Growth

The future background volumes were determined by using the average growth rate within the Town of Gananoque, as calculated by comparing the existing population and the future projected population in 2029 as indicated in the Official Plan. This growth rate was determined to be 0.8% per year. As a result, existing traffic volumes were grown by this amount per year to the 2018 horizon year that was used for the future analysis. **Figure 4.1** illustrates the future background traffic volumes.

### 4.3 Future Background Traffic Operations

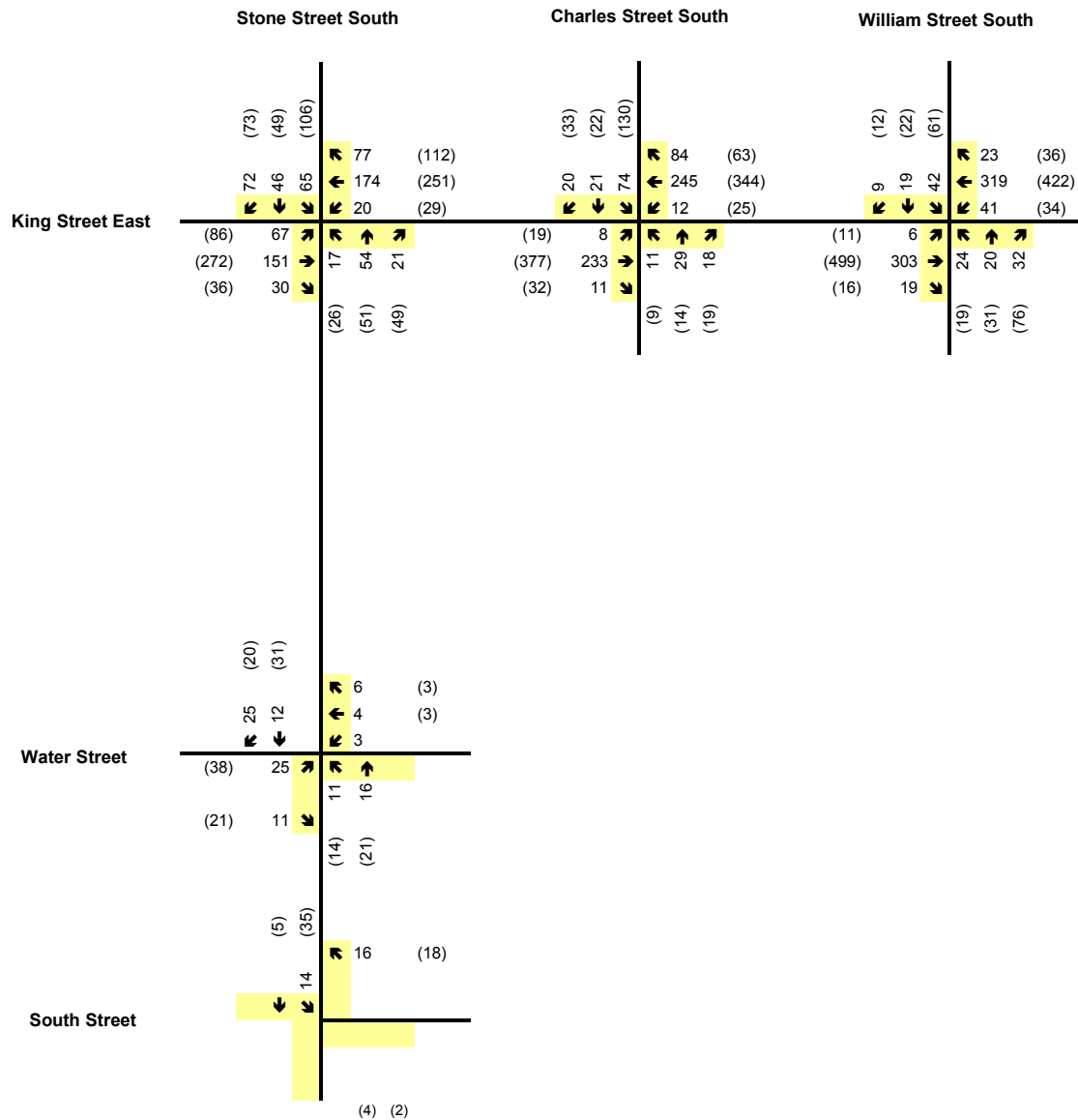
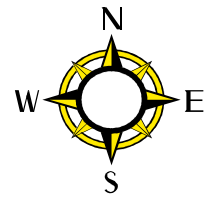
The projected 2018 future background traffic volumes consist of existing traffic volumes plus the adjacent background development traffic as discussed in Section 4.3. The results of the intersection capacity analysis are shown in **Table 4.1**. Detailed intersection capacity analysis sheets are included in **Appendix D**.

**TABLE 4.1  
 FUTURE BACKGROUND TRAFFIC CONDITIONS**

Intersection	Control Type	Weekday A.M. Peak Hour		Weekday P.M. Peak Hour	
		LOS (Delay in seconds)	Critical Movement(s) (v/c)	LOS (Delay in seconds)	Critical Movement(s) (v/c)
South Street at Stone Street South	Unsignalized	A (7.9)	--	A (6.4)	--
Stone Street South at Water Street	Unsignalized	A (4.7)	--	A (4.8)	--
King Street East at Stone Street South	Signalized	C (21.2)	--	B (20.0)	--
King Street East at Charles Street South	Signalized	B (11.8)	--	B (12.7)	--
King Street East at William Street South	Signalized	A (9.8)	--	B (10.9)	--

Notes: 1. The LOS at an unsignalized intersection is defined by the movement with the highest delay under HCM 2000.

2. Critical movements are those with a volume-to-capacity ratio exceeding 0.80 for a signalized intersection or with a LOS of 'D', 'E' or 'F'



**LEGEND**

XX AM Peak Hour Volumes  
 (XX) PM Peak Hour Volumes

**FIGURE 4.1**  
 Future Background Traffic Volumes

The future background traffic conditions remain largely unchanged from the existing traffic conditions, with delays increasing by a very small amount. As a result, the future background scenario is expected to continue to operate well during both peak hours.

#### 4.4 Total Future Traffic Conditions

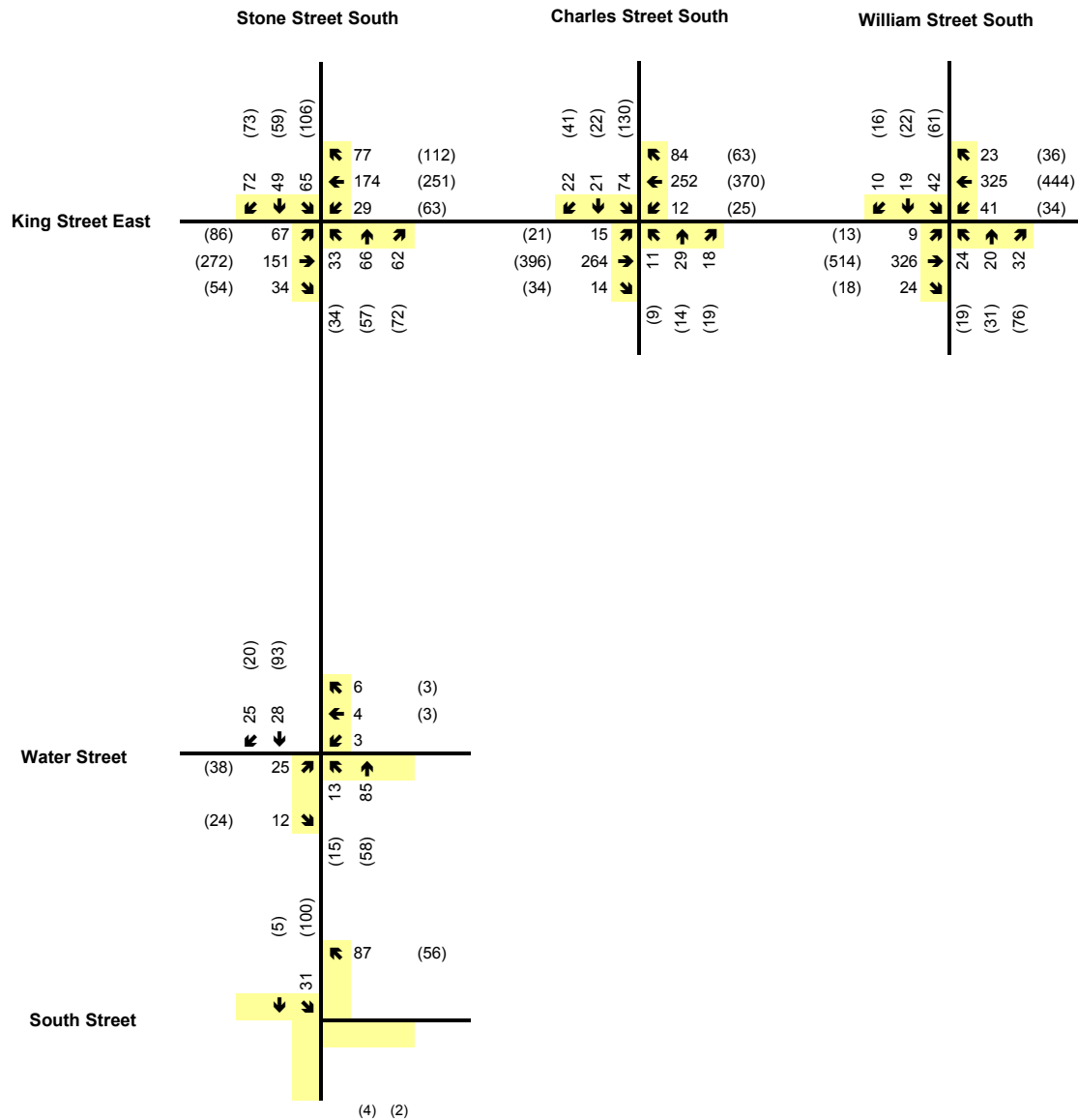
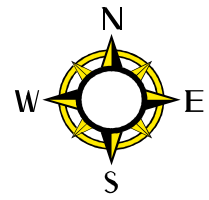
The total future traffic conditions were calculated by taking the site generated traffic as detailed in Section 3 and adding it to the background traffic volumes shown in Figure 4.1. The resulting total future traffic volumes are shown in **Figure 4.2**, and a summary of the total future traffic operations are outlined below in **Table 4.2**. Detailed intersection capacity analysis sheets are included in **Appendix E**.

**TABLE 4.2  
 TOTAL FUTURE TRAFFIC CONDITIONS**

Intersection	Control Type	Weekday A.M. Peak Hour		Weekday P.M. Peak Hour	
		LOS (Delay in seconds)	Critical Movement(s) (v/c)	LOS (Delay in seconds)	Critical Movement(s) (v/c)
South Street at Stone Street South	Unsignalized	A (8.3)	--	A (7.4)	--
Stone Street South at Water Street	Unsignalized	A (2.9)	--	A (3.2)	--
King Street East at Stone Street South	Signalized	C (21.3)	--	C (20.6)	--
King Street East at Charles Street South	Signalized	B (11.4)	--	C (12.9)	--
King Street East at William Street South	Signalized	A (9.8)	--	B (11.2)	--

Notes: 1. The LOS at an unsignalized intersection is defined by the movement with the highest delay under HCM 2000.  
 2. Critical movements are those with a volume-to-capacity ratio exceeding 0.80 for a signalized intersection or with a LOS of 'D', 'E' or 'F'

The addition of the site generated traffic has resulted in very marginal impacts on the study area network. All of the intersections are expected to operate at virtually the same level of service compared to future background conditions, with the estimated increase in delay expected to be, at most, 1.6 seconds per vehicle. As a result, the development can be readily accommodated by the existing road network with no improvements necessary.



**LEGEND**

XX AM Peak Hour Volumes  
 (XX) PM Peak Hour Volumes

**FIGURE 4.2**  
 Total Future  
 Traffic Volumes

## 5.0 PARKING REQUIREMENTS

The Town of Gananoque’s Development Permit By-law dated October 2010 stipulates that parking for apartment dwellings requires a minimum of 1.25 spaces per unit. Additionally, one barrier-free parking space is required for every 20 standard parking spaces (or part thereof), and is to be included as part of the overall total.

**Table 5.1** summarizes the parking requirements related to the proposed development.

**TABLE 5.1  
 BY-LAW PARKING REQUIREMENTS**

Type of Use	Minimum Parking Requirements	Magnitude of Proposed Use	No. of Spaces Required
Residential (Apartment)	1.25 spaces per dwelling unit	102 units	128
Barrier-free Parking	1.0 spaces for every 20 standard spaces (or part thereof)		7*
<b>Total Required</b>			<b>128 spaces</b>
<b>Total Supplied</b>			<b>163 spaces</b>

\* These 7 spaces are included as part of the overall total of required parking spaces.

Based on the above, the proposed development is supplying 35 spaces above the Town’s By-law requirement. The current site plan illustrates a visitor’s parking supply of 17 spaces, as well as a total of seven barrier-free parking spaces for the site. All parking spaces must be a minimum of 3.0 metres in width and 6.0 metres in length, and barrier-free spaces must also be separated by an aisle of a minimum of 1.5 metres in width.

## 6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis, the following conclusions can be drawn:

- Under the existing conditions, all boundary road intersections are operating at good to excellent overall LOS during the a.m. and p.m. peak hours;
- The proposed development is estimated to generate a total of 88 and 103 trips in the weekday a.m. and p.m. peak hours, respectively;
- The future background traffic conditions indicate that there will be only minor increases in delay, but that the overall LOS of the study area intersections will remain good to excellent;
- The total future traffic conditions also indicate that the boundary road intersections will operate at the same Levels of Service as the future background scenario. Therefore, the effect of the proposed development on the overall road network capacity is minimal; and
- The proposed parking supply for the condominium exceeds the requirements of the Town's Development Permit By-law, with a total of 163 spaces. This includes 139 standard stalls, 17 visitor spaces and seven barrier-free spaces for a surplus of 35 spaces for this development.

Based on the preceding traffic study, no roadway or other improvements are required to support the expected traffic generated by the proposed development. Accordingly, from a traffic operations perspective, this development can proceed as planned.



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***APPENDIX A***

***Traffic Count Data and  
Signal Timing Plans***

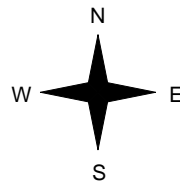
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# Accu-Traffic Inc.

<b>Morning Peak Diagram</b>	<b>Specified Period</b> <b>From:</b> 7:00:00 <b>To:</b> 9:00:00	<b>One Hour Peak</b> <b>From:</b> 8:00:00 <b>To:</b> 9:00:00
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<b>Municipality:</b> Gananoque <b>Site #:</b> 1315400001 <b>Intersection:</b> Stone St & South St <b>TFR File #:</b> 6 <b>Count date:</b> 24-Sep-13	<b>Weather conditions:</b>  <b>Person(s) who counted:</b>
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<b>** Non-Signalized Intersection **</b>	<b>Major Road:</b> Stone St runs N/S
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North Leg Total: 28 North Entering: 13 North Peds: 10 Peds Cross: $\times$	<table style="margin: auto;"> <tr> <td style="text-align: right;">Cyclists</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td rowspan="4" style="font-size: 2em; vertical-align: middle;">↑</td> <td style="text-align: left;">Cyclists</td> <td style="text-align: center;">0</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: left;">Trucks</td> <td style="text-align: center;">0</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: center;">0</td> <td style="text-align: center;">13</td> <td style="text-align: center;">13</td> <td style="text-align: left;">Cars</td> <td style="text-align: center;">15</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: center;">0</td> <td style="text-align: center;">13</td> <td style="text-align: center;">13</td> <td style="text-align: left;">Totals</td> <td style="text-align: center;">15</td> </tr> </table>	Cyclists	0	0	0	↑	Cyclists	0	Trucks	0	0	0	Trucks	0	Cars	0	13	13	Cars	15	Totals	0	13	13	Totals	15	East Leg Total: 28 East Entering: 15 East Peds: 0 Peds Cross: $\times$
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Cars	0	13	13		Cars		15																				
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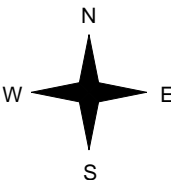
## Comments

# Accu-Traffic Inc.

<b>Afternoon Peak Diagram</b>	<b>Specified Period</b> <b>From:</b> 16:00:00 <b>To:</b> 18:00:00	<b>One Hour Peak</b> <b>From:</b> 16:00:00 <b>To:</b> 17:00:00
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<b>Municipality:</b> Gananoque <b>Site #:</b> 1315400001 <b>Intersection:</b> Stone St & South St <b>TFR File #:</b> 6 <b>Count date:</b> 24-Sep-13	<b>Weather conditions:</b>  <b>Person(s) who counted:</b>
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<b>** Non-Signalized Intersection **</b>	<b>Major Road:</b> Stone St runs N/S
--	--------------------------------------

North Leg Total: 57 North Entering: 37 North Peds: 4 Peds Cross: $\times$	<table style="margin: auto;"> <tr> <td style="text-align: right;">Cyclists</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="border-left: 1px solid black; text-align: center;">2</td> <td rowspan="4" style="text-align: center; vertical-align: middle;"> </td> <td style="text-align: left;">Cyclists</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="border-left: 1px solid black; text-align: center;">0</td> <td style="text-align: left;">Trucks</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: center;">3</td> <td style="text-align: center;">32</td> <td style="border-left: 1px solid black; text-align: center;">35</td> <td style="text-align: left;">Cars</td> <td style="text-align: center;">18</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: center;">4</td> <td style="text-align: center;">33</td> <td style="border-left: 1px solid black;"></td> <td style="text-align: left;">Totals</td> <td style="text-align: center;">20</td> </tr> </table> <p style="text-align: center;">Stone St</p> <div style="text-align: center;"> </div> <div style="text-align: center;">  </div> <div style="text-align: center;"> </div> <p style="text-align: center;">Stone St</p> <table style="margin: auto;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: center;">3</td> <td style="text-align: right;">Cars</td> <td style="text-align: center;">2</td> <td style="text-align: center;">1</td> <td style="border-left: 1px solid black; text-align: center;">3</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: center;">0</td> <td style="text-align: right;">Trucks</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="border-left: 1px solid black; text-align: center;">0</td> </tr> <tr> <td style="text-align: right;">Cyclists</td> <td style="text-align: center;">1</td> <td style="text-align: right;">Cyclists</td> <td style="text-align: center;">1</td> <td style="text-align: center;">0</td> <td style="border-left: 1px solid black; text-align: center;">1</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: center;">4</td> <td style="text-align: right;">Totals</td> <td style="text-align: center;">3</td> <td style="text-align: center;">1</td> <td style="border-left: 1px solid black;"></td> </tr> </table> <div style="text-align: center;"> </div>	Cyclists	1	1	2		Cyclists	1	Trucks	0	0	0	Trucks	1	Cars	3	32	35	Cars	18	Totals	4	33		Totals	20	Cars	3	Cars	2	1	3	Trucks	0	Trucks	0	0	0	Cyclists	1	Cyclists	1	0	1	Totals	4	Totals	3	1		<table style="margin: auto;"> <tr> <td style="text-align: right;">East Leg Total:</td> <td style="text-align: center;">51</td> </tr> <tr> <td style="text-align: right;">East Entering:</td> <td style="text-align: center;">17</td> </tr> <tr> <td style="text-align: right;">East Peds:</td> <td style="text-align: center;">8</td> </tr> <tr> <td style="text-align: right;">Peds Cross:</td> <td style="text-align: center;"><math>\times</math></td> </tr> </table> <table style="margin: auto;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: center;">16</td> <td style="text-align: right;">Trucks</td> <td style="text-align: center;">1</td> <td style="text-align: right;">Cyclists</td> <td style="text-align: center;">0</td> <td style="border-left: 1px solid black; text-align: center;">17</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: center;">0</td> <td style="text-align: right;">Trucks</td> <td style="text-align: center;">0</td> <td style="text-align: right;">Cyclists</td> <td style="text-align: center;">0</td> <td style="border-left: 1px solid black; text-align: center;">0</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: center;">16</td> <td style="text-align: right;">Totals</td> <td style="text-align: center;">1</td> <td style="text-align: right;">Totals</td> <td style="text-align: center;">0</td> <td style="border-left: 1px solid black;"></td> </tr> </table> <p style="text-align: center;">South St</p> <div style="text-align: center;"> </div> <table style="margin: auto;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: center;">33</td> <td style="text-align: right;">Trucks</td> <td style="text-align: center;">0</td> <td style="text-align: right;">Cyclists</td> <td style="text-align: center;">1</td> <td style="border-left: 1px solid black; text-align: center;">34</td> </tr> </table>	East Leg Total:	51	East Entering:	17	East Peds:	8	Peds Cross:	$\times$	Cars	16	Trucks	1	Cyclists	0	17	Cars	0	Trucks	0	Cyclists	0	0	Totals	16	Totals	1	Totals	0		Cars	33	Trucks	0	Cyclists	1	34
Cyclists	1	1	2		Cyclists		1																																																																																
Trucks	0	0	0		Trucks		1																																																																																
Cars	3	32	35		Cars		18																																																																																
Totals	4	33			Totals	20																																																																																	
Cars	3	Cars	2	1	3																																																																																		
Trucks	0	Trucks	0	0	0																																																																																		
Cyclists	1	Cyclists	1	0	1																																																																																		
Totals	4	Totals	3	1																																																																																			
East Leg Total:	51																																																																																						
East Entering:	17																																																																																						
East Peds:	8																																																																																						
Peds Cross:	$\times$																																																																																						
Cars	16	Trucks	1	Cyclists	0	17																																																																																	
Cars	0	Trucks	0	Cyclists	0	0																																																																																	
Totals	16	Totals	1	Totals	0																																																																																		
Cars	33	Trucks	0	Cyclists	1	34																																																																																	
<table style="margin: auto;"> <tr> <td style="text-align: right;">Peds Cross:</td> <td style="text-align: center;"><math>\times</math></td> </tr> <tr> <td style="text-align: right;">South Peds:</td> <td style="text-align: center;">0</td> </tr> <tr> <td style="text-align: right;">South Entering:</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: right;">South Leg Total:</td> <td style="text-align: center;">8</td> </tr> </table>			Peds Cross:	$\times$	South Peds:	0	South Entering:	4	South Leg Total:	8																																																																													
Peds Cross:	$\times$																																																																																						
South Peds:	0																																																																																						
South Entering:	4																																																																																						
South Leg Total:	8																																																																																						


## Comments

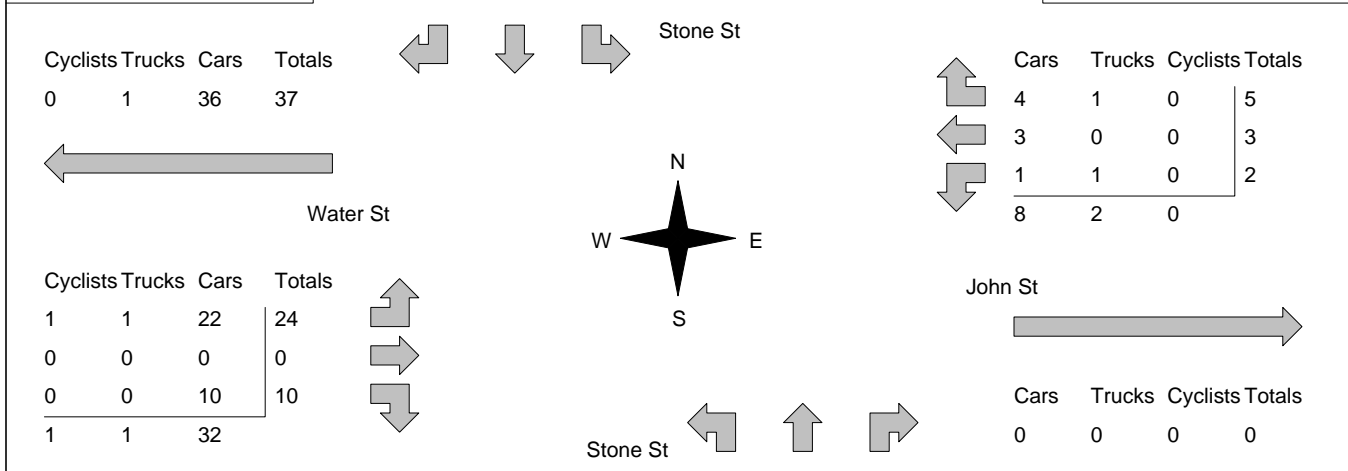
# Accu-Traffic Inc.

<b>Morning Peak Diagram</b>	<b>Specified Period</b> <b>From:</b> 7:00:00 <b>To:</b> 9:00:00	<b>One Hour Peak</b> <b>From:</b> 7:45:00 <b>To:</b> 8:45:00
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<b>Municipality:</b> Gananoque <b>Site #:</b> 1315400002 <b>Intersection:</b> Stone St & Water St <b>TFR File #:</b> 7 <b>Count date:</b> 24-Sep-13	<b>Weather conditions:</b>  <b>Person(s) who counted:</b>
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** Signalized Intersection **	Major Road: Stone St runs N/S
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North Leg Total: 79 North Entering: 35 North Peds: 4 Peds Cross: $\bowtie$	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Cyclists</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Trucks</td><td>1</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>Cars</td><td>23</td><td>11</td><td>0</td><td>34</td></tr> <tr><td>Totals</td><td>24</td><td>11</td><td>0</td><td></td></tr> </table>	Cyclists	0	0	0	0	Trucks	1	0	0	1	Cars	23	11	0	34	Totals	24	11	0			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Cyclists</td><td>1</td></tr> <tr><td>Trucks</td><td>2</td></tr> <tr><td>Cars</td><td>41</td></tr> <tr><td>Totals</td><td>44</td></tr> </table>	Cyclists	1	Trucks	2	Cars	41	Totals	44	East Leg Total: 10 East Entering: 10 East Peds: 5 Peds Cross: $\bowtie$
Cyclists	0	0	0	0																												
Trucks	1	0	0	1																												
Cars	23	11	0	34																												
Totals	24	11	0																													
Cyclists	1																															
Trucks	2																															
Cars	41																															
Totals	44																															




## Comments

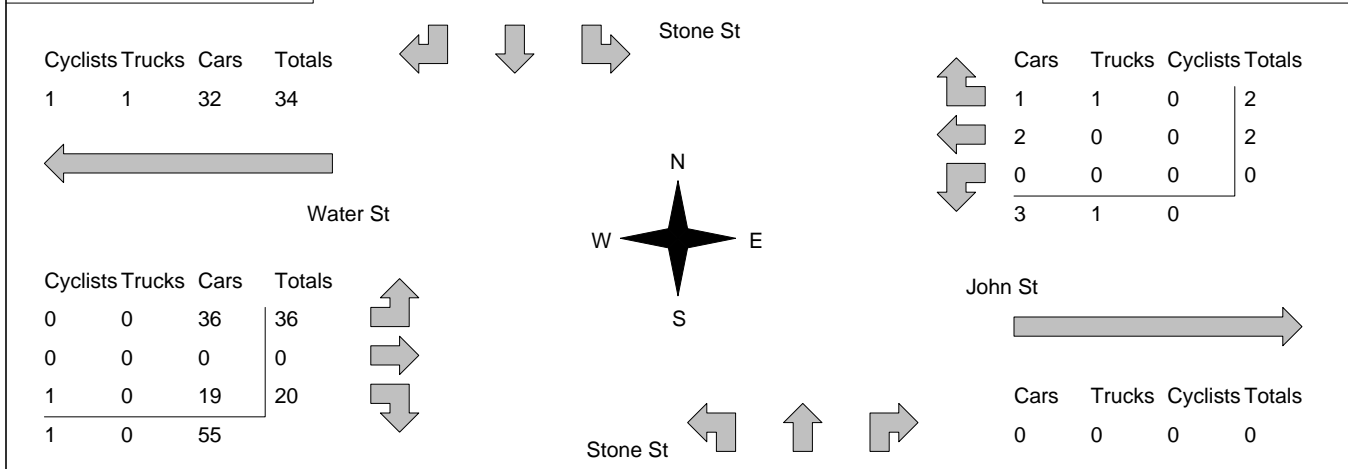
# Accu-Traffic Inc.

<b>Afternoon Peak Diagram</b>	<b>Specified Period</b> <b>From:</b> 16:00:00 <b>To:</b> 18:00:00	<b>One Hour Peak</b> <b>From:</b> 16:00:00 <b>To:</b> 17:00:00
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<b>Municipality:</b> Gananoque <b>Site #:</b> 1315400002 <b>Intersection:</b> Stone St & Water St <b>TFR File #:</b> 7 <b>Count date:</b> 24-Sep-13	<b>Weather conditions:</b>  <b>Person(s) who counted:</b>
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<b>** Signalized Intersection **</b>	<b>Major Road:</b> Stone St runs N/S
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North Leg Total: 106 North Entering: 48 North Peds: 3 Peds Cross: $\bowtie$	<table border="1" style="margin: auto;"> <tr><td>Cyclists</td><td>1</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Cars</td><td>18</td><td>29</td><td>0</td><td>47</td></tr> <tr><td>Totals</td><td>19</td><td>29</td><td>0</td><td></td></tr> </table>	Cyclists	1	0	0	1	Trucks	0	0	0	0	Cars	18	29	0	47	Totals	19	29	0			Cyclists 0 Trucks 1 Cars 57 Totals 58	East Leg Total: 4 East Entering: 4 East Peds: 7 Peds Cross: $\bowtie$
Cyclists	1	0	0	1																				
Trucks	0	0	0	0																				
Cars	18	29	0	47																				
Totals	19	29	0																					




## Comments

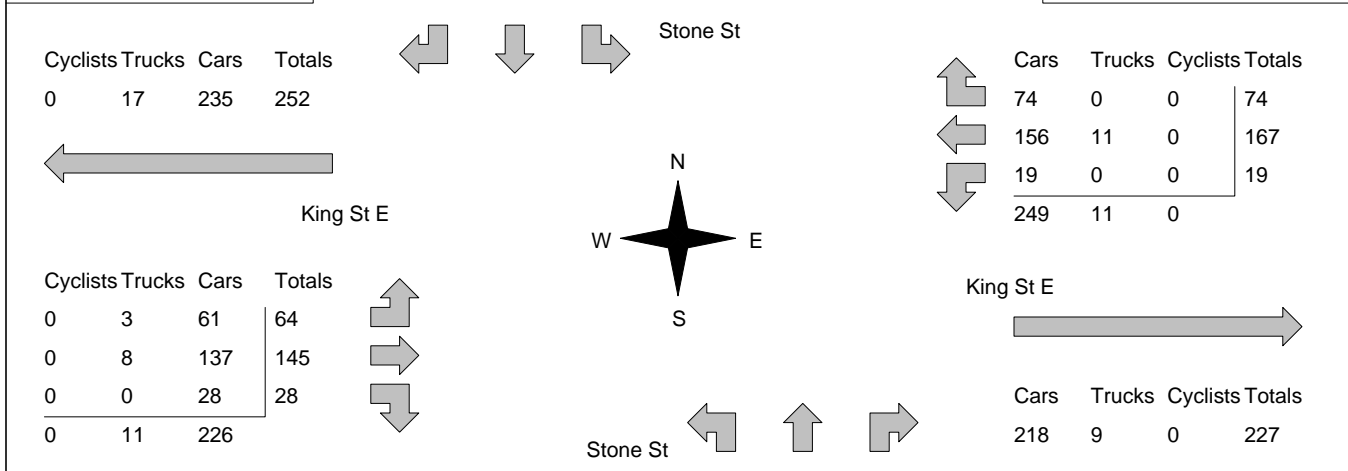
# Accu-Traffic Inc.


<b>Morning Peak Diagram</b>	<b>Specified Period</b> <b>From:</b> 7:00:00 <b>To:</b> 9:00:00	<b>One Hour Peak</b> <b>From:</b> 7:30:00 <b>To:</b> 8:30:00
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<b>Municipality:</b> Gananoque <b>Site #:</b> 1315400003 <b>Intersection:</b> King St E & Stone St <b>TFR File #:</b> 8 <b>Count date:</b> 24-Sep-13	<b>Weather conditions:</b>  <b>Person(s) who counted:</b>
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<b>** Signalized Intersection **</b>	<b>Major Road:</b> King St E runs W/E
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North Leg Total: 365 North Entering: 175 North Peds: 9 Peds Cross: $\bowtie$	<table border="1" style="border-collapse: collapse; margin: auto;"> <tr><td>Cyclists</td><td>0</td><td>2</td><td>0</td><td>2</td></tr> <tr><td>Trucks</td><td>5</td><td>3</td><td>1</td><td>9</td></tr> <tr><td>Cars</td><td>64</td><td>39</td><td>61</td><td>164</td></tr> <tr><td><b>Totals</b></td><td><b>69</b></td><td><b>44</b></td><td><b>62</b></td><td></td></tr> </table>	Cyclists	0	2	0	2	Trucks	5	3	1	9	Cars	64	39	61	164	<b>Totals</b>	<b>69</b>	<b>44</b>	<b>62</b>			<table border="1" style="border-collapse: collapse; margin: auto;"> <tr><td>Cyclists</td><td>2</td></tr> <tr><td>Trucks</td><td>6</td></tr> <tr><td>Cars</td><td>182</td></tr> <tr><td><b>Totals</b></td><td><b>190</b></td></tr> </table>	Cyclists	2	Trucks	6	Cars	182	<b>Totals</b>	<b>190</b>	East Leg Total: 487 East Entering: 260 East Peds: 8 Peds Cross: $\bowtie$
Cyclists	0	2	0	2																												
Trucks	5	3	1	9																												
Cars	64	39	61	164																												
<b>Totals</b>	<b>69</b>	<b>44</b>	<b>62</b>																													
Cyclists	2																															
Trucks	6																															
Cars	182																															
<b>Totals</b>	<b>190</b>																															



Peds Cross: $\bowtie$ West Peds: 12 West Entering: 237 West Leg Total: 489	<table border="1" style="border-collapse: collapse; margin: auto;"> <tr><td>Cars</td><td>86</td></tr> <tr><td>Trucks</td><td>3</td></tr> <tr><td>Cyclists</td><td>2</td></tr> <tr><td><b>Totals</b></td><td><b>91</b></td></tr> </table>	Cars	86	Trucks	3	Cyclists	2	<b>Totals</b>	<b>91</b>		<table border="1" style="border-collapse: collapse; margin: auto;"> <tr><td>Cars</td><td>15</td><td>47</td><td>20</td><td>82</td></tr> <tr><td>Trucks</td><td>1</td><td>3</td><td>0</td><td>4</td></tr> <tr><td>Cyclists</td><td>0</td><td>2</td><td>0</td><td>2</td></tr> <tr><td><b>Totals</b></td><td><b>16</b></td><td><b>52</b></td><td><b>20</b></td><td></td></tr> </table>	Cars	15	47	20	82	Trucks	1	3	0	4	Cyclists	0	2	0	2	<b>Totals</b>	<b>16</b>	<b>52</b>	<b>20</b>		Peds Cross: $\bowtie$ South Peds: 4 South Entering: 88 South Leg Total: 179
Cars	86																															
Trucks	3																															
Cyclists	2																															
<b>Totals</b>	<b>91</b>																															
Cars	15	47	20	82																												
Trucks	1	3	0	4																												
Cyclists	0	2	0	2																												
<b>Totals</b>	<b>16</b>	<b>52</b>	<b>20</b>																													


## Comments

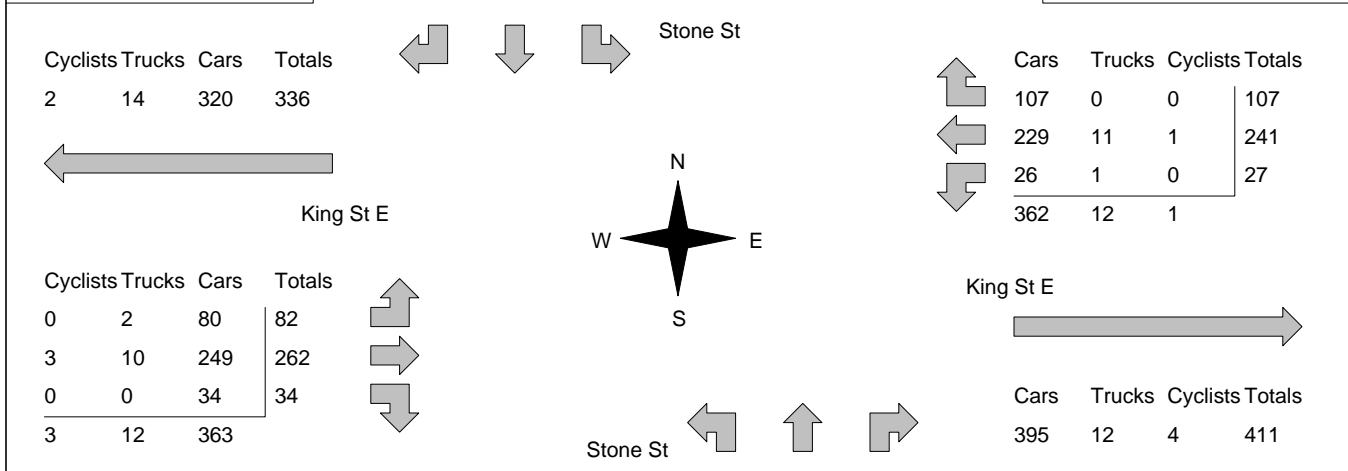
# Accu-Traffic Inc.

<b>Afternoon Peak Diagram</b>	<b>Specified Period</b> <b>From:</b> 16:00:00 <b>To:</b> 18:00:00	<b>One Hour Peak</b> <b>From:</b> 16:00:00 <b>To:</b> 17:00:00
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<b>Municipality:</b> Gananoque <b>Site #:</b> 1315400003 <b>Intersection:</b> King St E & Stone St <b>TFR File #:</b> 8 <b>Count date:</b> 24-Sep-13	<b>Weather conditions:</b>  <b>Person(s) who counted:</b>
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<b>** Signalized Intersection **</b>	<b>Major Road:</b> King St E runs W/E
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North Leg Total: 457 North Entering: 219 North Peds: 8 Peds Cross: $\bowtie$	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Cyclists</td><td>0</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>Trucks</td><td>1</td><td>0</td><td>2</td><td>3</td></tr> <tr><td>Cars</td><td>69</td><td>47</td><td>99</td><td>215</td></tr> <tr><td><b>Totals</b></td><td><b>70</b></td><td><b>47</b></td><td><b>102</b></td><td></td></tr> </table>	Cyclists	0	0	1	1	Trucks	1	0	2	3	Cars	69	47	99	215	<b>Totals</b>	<b>70</b>	<b>47</b>	<b>102</b>			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Cyclists</td><td>0</td></tr> <tr><td>Trucks</td><td>3</td></tr> <tr><td>Cars</td><td>235</td></tr> <tr><td><b>Totals</b></td><td><b>238</b></td></tr> </table>	Cyclists	0	Trucks	3	Cars	235	<b>Totals</b>	<b>238</b>	East Leg Total: 786 East Entering: 375 East Peds: 39 Peds Cross: $\bowtie$
Cyclists	0	0	1	1																												
Trucks	1	0	2	3																												
Cars	69	47	99	215																												
<b>Totals</b>	<b>70</b>	<b>47</b>	<b>102</b>																													
Cyclists	0																															
Trucks	3																															
Cars	235																															
<b>Totals</b>	<b>238</b>																															



## Comments




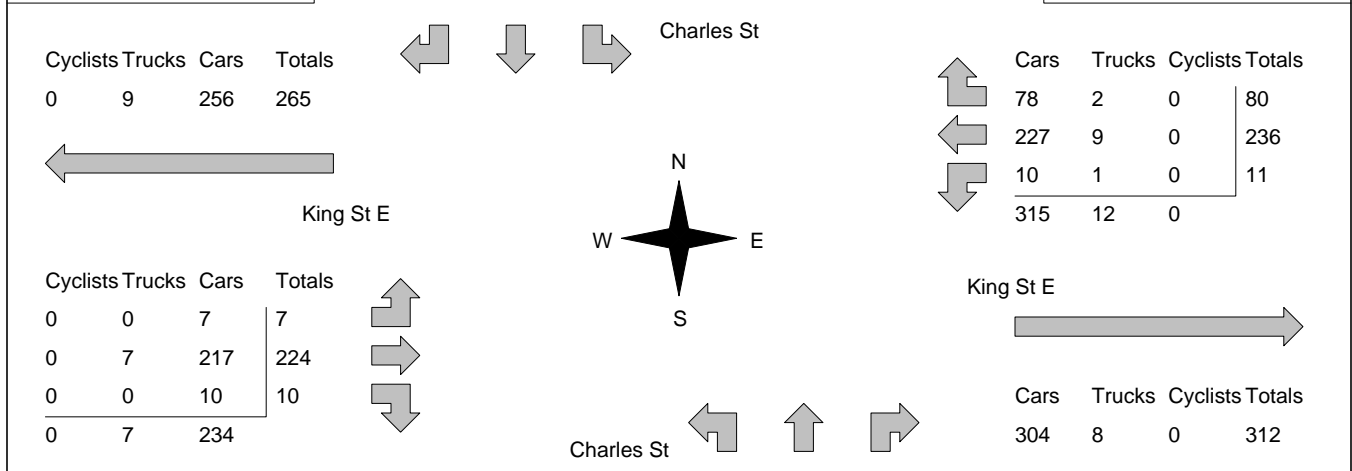
# Accu-Traffic Inc.


<b>Morning Peak Diagram</b>	<b>Specified Period</b> <b>From:</b> 7:00:00 <b>To:</b> 9:00:00	<b>One Hour Peak</b> <b>From:</b> 7:45:00 <b>To:</b> 8:45:00
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<b>Municipality:</b> Gananoque <b>Site #:</b> 1315400004 <b>Intersection:</b> King St E & Charles St <b>TFR File #:</b> 12 <b>Count date:</b> 24-Sep-13	<b>Weather conditions:</b>  <b>Person(s) who counted:</b>
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<b>** Signalized Intersection **</b>	<b>Major Road:</b> King St E runs W/E
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North Leg Total: 224 North Entering: 110 North Peds: 11 Peds Cross: $\bowtie$	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Cyclists</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Trucks</td><td>0</td><td>2</td><td>0</td><td>2</td></tr> <tr><td>Cars</td><td>19</td><td>18</td><td>71</td><td>108</td></tr> <tr><td><b>Totals</b></td><td><b>19</b></td><td><b>20</b></td><td><b>71</b></td><td></td></tr> </table>	Cyclists	0	0	0	0	Trucks	0	2	0	2	Cars	19	18	71	108	<b>Totals</b>	<b>19</b>	<b>20</b>	<b>71</b>			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Cyclists</td><td>0</td></tr> <tr><td>Trucks</td><td>2</td></tr> <tr><td>Cars</td><td>112</td></tr> <tr><td><b>Totals</b></td><td><b>114</b></td></tr> </table>	Cyclists	0	Trucks	2	Cars	112	<b>Totals</b>	<b>114</b>	East Leg Total: 639 East Entering: 327 East Peds: 5 Peds Cross: $\bowtie$
Cyclists	0	0	0	0																												
Trucks	0	2	0	2																												
Cars	19	18	71	108																												
<b>Totals</b>	<b>19</b>	<b>20</b>	<b>71</b>																													
Cyclists	0																															
Trucks	2																															
Cars	112																															
<b>Totals</b>	<b>114</b>																															



Peds Cross: $\bowtie$ West Peds: 9 West Entering: 241 West Leg Total: 506	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Cars</td><td>38</td></tr> <tr><td>Trucks</td><td>3</td></tr> <tr><td>Cyclists</td><td>0</td></tr> <tr><td><b>Totals</b></td><td><b>41</b></td></tr> </table>	Cars	38	Trucks	3	Cyclists	0	<b>Totals</b>	<b>41</b>		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Cars</td><td>10</td><td>27</td><td>16</td><td>53</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>Cyclists</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td><b>Totals</b></td><td><b>10</b></td><td><b>27</b></td><td><b>17</b></td><td></td></tr> </table>	Cars	10	27	16	53	Trucks	0	0	1	1	Cyclists	0	0	0	0	<b>Totals</b>	<b>10</b>	<b>27</b>	<b>17</b>		Peds Cross: $\bowtie$ South Peds: 4 South Entering: 54 South Leg Total: 95
Cars	38																															
Trucks	3																															
Cyclists	0																															
<b>Totals</b>	<b>41</b>																															
Cars	10	27	16	53																												
Trucks	0	0	1	1																												
Cyclists	0	0	0	0																												
<b>Totals</b>	<b>10</b>	<b>27</b>	<b>17</b>																													


## Comments

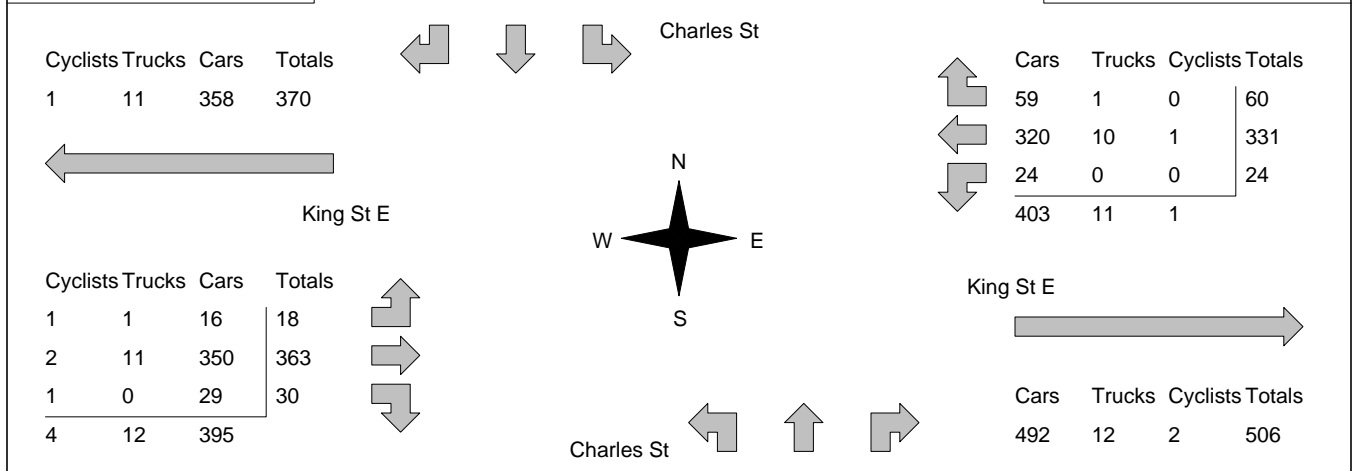
# Accu-Traffic Inc.

<b>Afternoon Peak Diagram</b>	<b>Specified Period</b> <b>From:</b> 16:00:00 <b>To:</b> 18:00:00	<b>One Hour Peak</b> <b>From:</b> 16:00:00 <b>To:</b> 17:00:00
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<b>Municipality:</b> Gananoque <b>Site #:</b> 1315400004 <b>Intersection:</b> King St E & Charles St <b>TFR File #:</b> 12 <b>Count date:</b> 24-Sep-13	<b>Weather conditions:</b>  <b>Person(s) who counted:</b>
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<b>** Signalized Intersection **</b>	<b>Major Road:</b> King St E runs W/E
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North Leg Total: 268 North Entering: 177 North Peds: 6 Peds Cross: $\bowtie$	<table border="1" style="margin: auto;"> <tr><td>Cyclists</td><td>0</td><td>3</td><td>0</td><td>3</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>Cars</td><td>31</td><td>18</td><td>124</td><td>173</td></tr> <tr><td>Totals</td><td>31</td><td>21</td><td>125</td><td></td></tr> </table>	Cyclists	0	3	0	3	Trucks	0	0	1	1	Cars	31	18	124	173	Totals	31	21	125			Cyclists 2 Trucks 3 Cars 86 Totals 91	East Leg Total: 921 East Entering: 415 East Peds: 19 Peds Cross: $\bowtie$
Cyclists	0	3	0	3																				
Trucks	0	0	1	1																				
Cars	31	18	124	173																				
Totals	31	21	125																					



Peds Cross: $\bowtie$ West Peds: 61 West Entering: 411 West Leg Total: 781	<table border="1" style="margin: auto;"> <tr><td>Cars</td><td>71</td><td>7</td><td>11</td><td>18</td><td>36</td></tr> <tr><td>Trucks</td><td>0</td><td>1</td><td>1</td><td>0</td><td>2</td></tr> <tr><td>Cyclists</td><td>4</td><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>Totals</td><td>75</td><td>8</td><td>13</td><td>18</td><td></td></tr> </table>	Cars	71	7	11	18	36	Trucks	0	1	1	0	2	Cyclists	4	0	1	0	1	Totals	75	8	13	18		Peds Cross: $\bowtie$ South Peds: 60 South Entering: 39 South Leg Total: 114
Cars	71	7	11	18	36																					
Trucks	0	1	1	0	2																					
Cyclists	4	0	1	0	1																					
Totals	75	8	13	18																						


## Comments

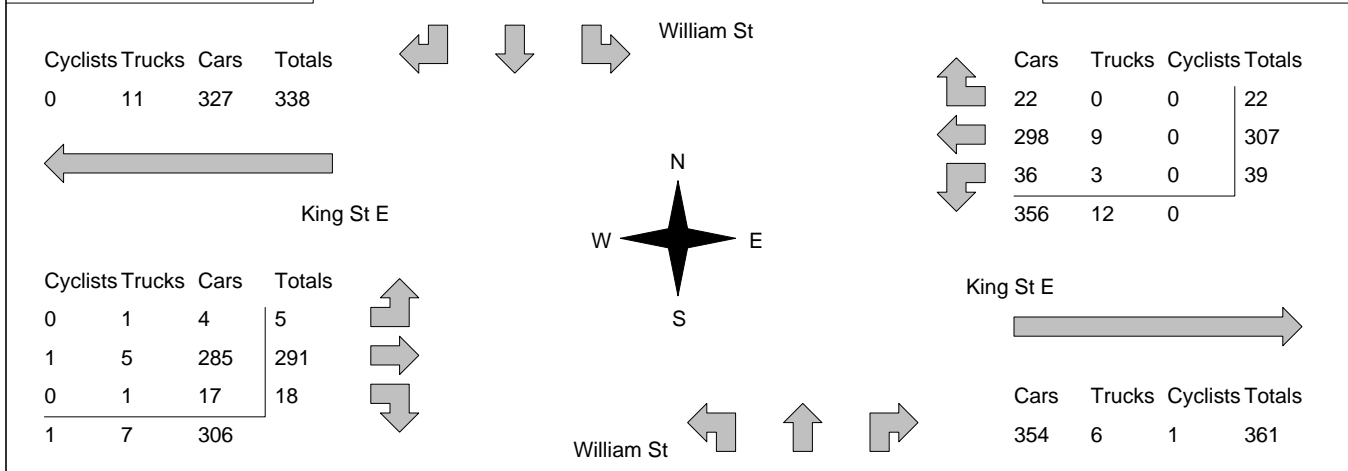
# Accu-Traffic Inc.

<b>Morning Peak Diagram</b>	<b>Specified Period</b> <b>From:</b> 7:00:00 <b>To:</b> 9:00:00	<b>One Hour Peak</b> <b>From:</b> 7:45:00 <b>To:</b> 8:45:00
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<b>Municipality:</b> Gananoque <b>Site #:</b> 1315400005 <b>Intersection:</b> King St E & William St <b>TFR File #:</b> 13 <b>Count date:</b> 24-Sep-13	<b>Weather conditions:</b>  <b>Person(s) who counted:</b>
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** Signalized Intersection **	Major Road: King St E runs W/E
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North Leg Total: 112 North Entering: 66 North Peds: 10 Peds Cross: $\nabla$	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Cyclists</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Trucks</td><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>Cars</td><td>8</td><td>17</td><td>40</td><td>65</td></tr> <tr><td>Totals</td><td>8</td><td>18</td><td>40</td><td></td></tr> </table>	Cyclists	0	0	0	0	Trucks	0	1	0	1	Cars	8	17	40	65	Totals	8	18	40			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Cyclists</td><td>0</td></tr> <tr><td>Trucks</td><td>1</td></tr> <tr><td>Cars</td><td>45</td></tr> <tr><td>Totals</td><td>46</td></tr> </table>	Cyclists	0	Trucks	1	Cars	45	Totals	46	East Leg Total: 729 East Entering: 368 East Peds: 28 Peds Cross: $\nabla$
Cyclists	0	0	0	0																												
Trucks	0	1	0	1																												
Cars	8	17	40	65																												
Totals	8	18	40																													
Cyclists	0																															
Trucks	1																															
Cars	45																															
Totals	46																															



Peds Cross: $\nabla$ West Peds: 2 West Entering: 314 West Leg Total: 652	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Cars</td><td>70</td></tr> <tr><td>Trucks</td><td>5</td></tr> <tr><td>Cyclists</td><td>0</td></tr> <tr><td>Totals</td><td>75</td></tr> </table>	Cars	70	Trucks	5	Cyclists	0	Totals	75	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Cars</td><td>21</td><td>19</td><td>29</td><td>69</td></tr> <tr><td>Trucks</td><td>2</td><td>0</td><td>1</td><td>3</td></tr> <tr><td>Cyclists</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Totals</td><td>23</td><td>19</td><td>30</td><td></td></tr> </table>	Cars	21	19	29	69	Trucks	2	0	1	3	Cyclists	0	0	0	0	Totals	23	19	30		Peds Cross: $\nabla$ South Peds: 5 South Entering: 72 South Leg Total: 147
Cars	70																														
Trucks	5																														
Cyclists	0																														
Totals	75																														
Cars	21	19	29	69																											
Trucks	2	0	1	3																											
Cyclists	0	0	0	0																											
Totals	23	19	30																												

**Comments**

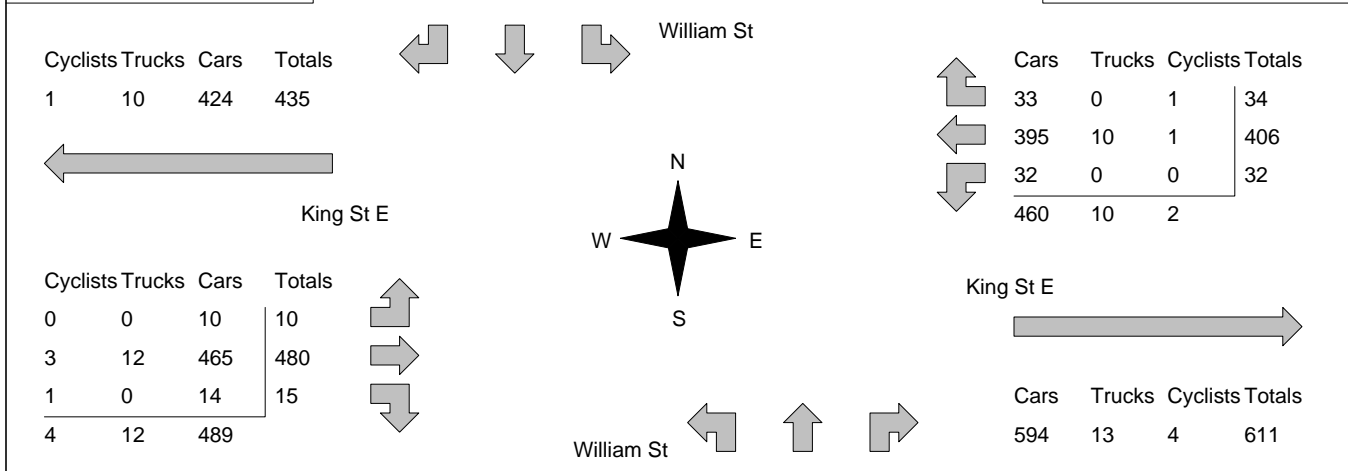
# Accu-Traffic Inc.

<b>Afternoon Peak Diagram</b>	<b>Specified Period</b> <b>From:</b> 16:00:00 <b>To:</b> 18:00:00	<b>One Hour Peak</b> <b>From:</b> 16:00:00 <b>To:</b> 17:00:00
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<b>Municipality:</b> Gananoque <b>Site #:</b> 1315400005 <b>Intersection:</b> King St E & William St <b>TFR File #:</b> 13 <b>Count date:</b> 24-Sep-13	<b>Weather conditions:</b>  <b>Person(s) who counted:</b>
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<b>** Signalized Intersection **</b>	<b>Major Road:</b> King St E runs W/E
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North Leg Total: 163 North Entering: 90 North Peds: 18 Peds Cross: ⚡	<table style="border-collapse: collapse;"> <tr><td>Cyclists</td><td>0</td><td>3</td><td>0</td><td>3</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Cars</td><td>11</td><td>18</td><td>58</td><td>87</td></tr> <tr><td><b>Totals</b></td><td><b>11</b></td><td><b>21</b></td><td><b>58</b></td><td></td></tr> </table>	Cyclists	0	3	0	3	Trucks	0	0	0	0	Cars	11	18	58	87	<b>Totals</b>	<b>11</b>	<b>21</b>	<b>58</b>		↑	<table style="border-collapse: collapse;"> <tr><td>Cyclists</td><td>3</td></tr> <tr><td>Trucks</td><td>1</td></tr> <tr><td>Cars</td><td>69</td></tr> <tr><td><b>Totals</b></td><td><b>73</b></td></tr> </table>	Cyclists	3	Trucks	1	Cars	69	<b>Totals</b>	<b>73</b>	East Leg Total: 1083 East Entering: 472 East Peds: 33 Peds Cross: ⚡
Cyclists	0	3	0	3																												
Trucks	0	0	0	0																												
Cars	11	18	58	87																												
<b>Totals</b>	<b>11</b>	<b>21</b>	<b>58</b>																													
Cyclists	3																															
Trucks	1																															
Cars	69																															
<b>Totals</b>	<b>73</b>																															



Peds Cross: ⚡ West Peds: 11 West Entering: 505 West Leg Total: 940	<table style="border-collapse: collapse;"> <tr><td>Cars</td><td>64</td></tr> <tr><td>Trucks</td><td>0</td></tr> <tr><td>Cyclists</td><td>4</td></tr> <tr><td><b>Totals</b></td><td><b>68</b></td></tr> </table>	Cars	64	Trucks	0	Cyclists	4	<b>Totals</b>	<b>68</b>	↓	<table style="border-collapse: collapse;"> <tr><td>Cars</td><td>18</td><td>26</td><td>71</td><td>115</td></tr> <tr><td>Trucks</td><td>0</td><td>1</td><td>1</td><td>2</td></tr> <tr><td>Cyclists</td><td>0</td><td>2</td><td>1</td><td>3</td></tr> <tr><td><b>Totals</b></td><td><b>18</b></td><td><b>29</b></td><td><b>73</b></td><td></td></tr> </table>	Cars	18	26	71	115	Trucks	0	1	1	2	Cyclists	0	2	1	3	<b>Totals</b>	<b>18</b>	<b>29</b>	<b>73</b>		Peds Cross: ⚡ South Peds: 25 South Entering: 120 South Leg Total: 188
Cars	64																															
Trucks	0																															
Cyclists	4																															
<b>Totals</b>	<b>68</b>																															
Cars	18	26	71	115																												
Trucks	0	1	1	2																												
Cyclists	0	2	1	3																												
<b>Totals</b>	<b>18</b>	<b>29</b>	<b>73</b>																													

## Comments



# SIGNAL TIMING PLAN (Tourist Season)

LOCATION: King St and Charles St Gananoque Ontario

MODE of OPERATION: Fixed (Time Based Coordination)

TIMING DEVELOPED BY: Signalcorps

DATE TIMING DEVELOPED: June 2, 2011

## CONTROLLER TIMING DATA

## MOVEMENT (FAZE)

PHASE	King St EB/WB			Charles St N/S				
	1	2	3	4	5	6	7	8
<b>MIN GREEN</b>	-	27	-	24	-	-	-	-
BIKE GREEN	-	-	-	-	-	-	-	-
CS MGRN	-	-	-	-	-	-	-	-
<b>WALK</b>	-	11	-	8	-	-	-	-
<b>PEDESTRIAN CLEARANCE</b>	-	16	-	16	-	-	-	-
VEHICLE EXTENSION	-	-	-	-	-	-	-	-
VEHICLE EXTENSION 2	-	-	-	-	-	-	-	-
MAX EXTENSION	-	-	-	-	-	-	-	-
<b>MAX 1</b>	-	71	-	29	-	-	-	-
<b>MAX 2</b>	-	33	-	28	-	-	-	-
<b>MAX 3</b>	-	-	-	-	-	-	-	-
DET MAX	-	-	-	-	-	-	-	-
<b>YELLOW</b>	-	3	-	3	-	-	-	-
<b>RED CLEAR</b>	-	2	-	2	-	-	-	-
<b>RED REVERT</b>	-	2	-	2	-	-	-	-
ACT B4	-	-	-	-	-	-	-	-
SEC/ACT	-	-	-	-	-	-	-	-
MAX INI	-	-	-	-	-	-	-	-
TIME B4 INIT	-	-	-	-	-	-	-	-
CARS WT	-	-	-	-	-	-	-	-
TT REDUC	-	-	-	-	-	-	-	-
MIN GAP	-	-	-	-	-	-	-	-

**COORDINATED PATTERN 1****TS2 FORMAT**

TIMING PLAN: AM (0800-1145) Mon-Fri

CYCLE LENGTH: 100

OFFSETS: 35

**SPLITS**

PHASE 1	-	PHASE 2	71	PHASE 3	-	PHASE 4	29
PHASE 5	-	PHASE 6	-	PHASE 7	-	PHASE 8	-

VEHICLE PERM	(1)	0	(2)	0
VEHICLE PERM 2 DISP	0			
PHASE RESERVICE	NO			
SPLIT EXTENSION RING(1)	0	(2)	0	
SPLIT DMD PATTERN	(1)	0	(2)	0
XARTERY PATTERN	0			

PHASE NUMBER	1	2	3	4	5	6	7	8
COORDINATED PHASES	-	X	-	-	-	-	-	-
VEHICLE RECALL	-	-	-	-	-	-	-	-
VEHICLE MAX RECALL	-	X	-	X	-	-	-	-
PED RECALL	-	X	-	X	-	-	-	-
PHASE OMIT	-	-	-	-	-	-	-	-
SPARE	-	-	-	-	-	-	-	-

ALTERNATE SEQUENCE	A	B	C	D	E	F
	-	-	-	-	-	-

**COORDINATED PATTERN 2****TS2 FORMAT**

TIMING PLAN: MIDDAY (1145-1615) Mon-Fri

CYCLE LENGTH: 100

OFFSETS: 11

**SPLITS**

PHASE 1	-	PHASE 2	71	PHASE 3	-	PHASE 4	29
PHASE 5	-	PHASE 6	-	PHASE 7	-	PHASE 8	-

VEHICLE PERM	(1)	0	(2)	0
VEHICLE PERM 2 DISP	0			
PHASE RESERVICE	NO			
SPLIT EXTENSION RIN	(1)	0	(2)	0
SPLIT DMD PATTERN	(1)	0	(2)	0
XARTERY PATTERN	0			

PHASE NUMBER	1	2	3	4	5	6	7	8
COORDINATED PHASES	-	X	-	-	-	-	-	-
VEHICLE RECALL	-	-	-	-	-	-	-	-
VEHICLE MAX RECALL	-	X	-	X	-	-	-	-
PED RECALL	-	X	-	X	-	-	-	-
PHASE OMIT	-	-	-	-	-	-	-	-
SPARE	-	-	-	-	-	-	-	-

ALTERNATE SEQUENCE	A	B	C	D	E	F
	-	-	-	-	-	-

**COORDINATED PATTERN 3**

**TS2 FORMAT**

TIMING PLAN: PM (1615-1800) Mon-Fri

CYCLE LENGTH: 100

OFFSETS: 3

**SPLITS**

PHASE 1	-	PHASE 2	71	PHASE 3	-	PHASE 4	29
PHASE 5	-	PHASE 6	-	PHASE 7	-	PHASE 8	-

VEHICLE PERM	(1)	0	(2)	0
VEHICLE PERM 2 DISP	0			
PHASE RESERVICE	NO			
SPLIT EXTENSION RING	(1)	0	(2)	0
SPLIT DMD PATTERN	(1)	0	(2)	0
XARTERY PATTERN	0			

<b>PHASE NUMBER</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
COORDINATED PHASES	-	X	-	-	-	-	-	-
VEHICLE RECALL	-	-	-	-	-	-	-	-
VEHICLE MAX RECALL	-	X	-	X	-	-	-	-
PED RECALL	-	X	-	X	-	-	-	-
PHASE OMIT	-	-	-	-	-	-	-	-
SPARE	-	-	-	-	-	-	-	-

<b>ALTERNATE SEQUENCE</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
	-	-	-	-	-	-

**COORDINATED PATTERN 4**

**TS2 FORMAT**

TIMING PLAN: WEEKEND (0800-1800) Sat-Sun

CYCLE LENGTH: 100

OFFSETS: 11

**SPLITS**

PHASE 1	-	PHASE 2	71	PHASE 3	-	PHASE 4	29
PHASE 5	-	PHASE 6	-	PHASE 7	-	PHASE 8	-

VEHICLE PERM	(1)	0	(2)	0
VEHICLE PERM 2 DISP	0			
PHASE RESERVICE	NO			
SPLIT EXTENSION RING	(1)	0	(2)	0
SPLIT DMD PATTERN	(1)	0	(2)	0
XARTERY PATTERN	0			

<b>PHASE NUMBER</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
COORDINATED PHASES	-	X	-	-	-	-	-	-
VEHICLE RECALL	-	-	-	-	-	-	-	-
VEHICLE MAX RECALL	-	X	-	X	-	-	-	-
PED RECALL	-	X	-	X	-	-	-	-
PHASE OMIT	-	-	-	-	-	-	-	-
SPARE	-	-	-	-	-	-	-	-

<b>ALTERNATE SEQUENCE</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
	-	-	-	-	-	-

**COORDINATED PATTERN 5****TS2 FORMAT (NO CHANGE)**

TIMING PLAN: OFF PEAK (1800-0800) Mon-Fri  
 CYCLE LENGTH: 61  
 OFFSETS: RECALL

**SPLITS**

PHASE 1 - PHASE 2 33 PHASE 3 - PHASE 4 28  
 PHASE 5 - PHASE 6 - PHASE 7 - PHASE 8 -

VEHICLE PERM (1) 0 (2) 0  
 VEHICLE PERM 2 DISP 0  
 PHASE RESERVICE NO  
 SPLIT EXTENSION RING (1) 0 (2) 0  
 SPLIT DMD PATTERN (1) 0 (2) 0  
 XARTERY PATTERN 0

<b>PHASE NUMBER</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
COORDINATED PHASES	-	X	-	-	-	-	-	-
VEHICLE RECALL	-	-	-	-	-	-	-	-
VEHICLE MAX RECALL	-	X	-	X	-	-	-	-
PED RECALL	-	X	-	X	-	-	-	-
PHASE OMIT	-	-	-	-	-	-	-	-
SPARE	-	-	-	-	-	-	-	-

<b>ALTERNATE SEQUENCE</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
	-	-	-	-	-	-

**COORDINATED PATTERN 6****TS2 FORMAT (NO CHANGE)**

TIMING PLAN: OFF PEAK (1800-0800) Sat-Sun  
 CYCLE LENGTH: 61  
 OFFSETS: RECALL

**SPLITS**

PHASE 1 - PHASE 2 33 PHASE 3 - PHASE 4 28  
 PHASE 5 - PHASE 6 - PHASE 7 - PHASE 8 -

VEHICLE PERM (1) 0 (2) 0  
 VEHICLE PERM 2 DISP 0  
 PHASE RESERVICE NO  
 SPLIT EXTENSION RING (1) 0 (2) 0  
 SPLIT DMD PATTERN (1) 0 (2) 0  
 XARTERY PATTERN 0

<b>PHASE NUMBER</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
COORDINATED PHASES	-	X	-	-	-	-	-	-
VEHICLE RECALL	-	-	-	-	-	-	-	-
VEHICLE MAX RECALL	-	X	-	X	-	-	-	-
PED RECALL	-	X	-	X	-	-	-	-
PHASE OMIT	-	-	-	-	-	-	-	-
SPARE	-	-	-	-	-	-	-	-

<b>ALTERNATE SEQUENCE</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
	-	-	-	-	-	-





# SIGNAL TIMING PLAN (Tourist Season)

LOCATION: **King St and Stone St Gananoque Ontario**

MODE of OPERATION: **Fixed (Time Based Coordination)**

TIMING DEVELOPED BY: **Signalcorps**

DATE TIMING DEVELOPED: **June 2, 2011**

## CONTROLLER TIMING DATA

## MOVEMENT (FAZE)

PHASE	King St			Stone St				
	EW/LT	EB/WB	NS/LT	N/S				
<b>MIN GREEN</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
<b>MIN GREEN</b>	<b>6</b>	<b>27</b>	<b>5</b>	<b>24</b>	-	-	-	-
BIKE GREEN	-	-	-	-	-	-	-	-
CS MGRN	-	-	-	-	-	-	-	-
<b>WALK</b>	-	<b>13</b>	-	<b>7</b>	-	-	-	-
<b>PEDESTRIAN CLEARANCE</b>	-	14	-	17	-	-	-	-
VEHICLE EXTENSION	-	-	-	-	-	-	-	-
VEHICLE EXTENSION 2	-	-	-	-	-	-	-	-
MAX EXTENSION	-	-	-	-	-	-	-	-
<b>MAX 1</b>	<b>10</b>	<b>52</b>	<b>9</b>	<b>29</b>	-	-	-	-
<b>MAX 2</b>	-	<b>32</b>	-	29	-	-	-	-
<b>MAX 3</b>	-	-	-	-	-	-	-	-
DET MAX	-	-	-	-	-	-	-	-
<b>YELLOW</b>	<b>4</b>	<b>3</b>	<b>4</b>	<b>3</b>	-	-	-	-
<b>RED CLEAR</b>	-	<b>2</b>	-	<b>2</b>	-	-	-	-
<b>RED REVERT</b>	-	<b>2</b>	-	<b>2</b>	-	-	-	-
ACT B4	-	-	-	-	-	-	-	-
SEC/ACT	-	-	-	-	-	-	-	-
MAX INI	-	-	-	-	-	-	-	-
TIME B4 INIT	-	-	-	-	-	-	-	-
CARS WT	-	-	-	-	-	-	-	-
TT REDUC	-	-	-	-	-	-	-	-
MIN GAP	-	-	-	-	-	-	-	-

**COORDINATED PATTERN 1****TS2 FORMAT**

TIMING PLAN: AM (0800-1145) Mon-Fri

CYCLE LENGTH: 100

OFFSETS: 69

**SPLITS**

PHASE 1	10	PHASE 2	52	PHASE 3	9	PHASE 4	29
PHASE 5	-	PHASE 6	-	PHASE 7	-	PHASE 8	-

VEHICLE PERM	(1)	0	(2)	0
VEHICLE PERM 2 DISP	0			
PHASE RESERVICE	NO			
SPLIT EXTENSION RING(1)	0	(2)	0	
SPLIT DMD PATTERN	(1)	0	(2)	0
XARTERY PATTERN	0			

PHASE NUMBER	1	2	3	4	5	6	7	8
COORDINATED PHASES	-	X	-	-	-	-	-	-
VEHICLE RECALL	-	-	-	-	-	-	-	-
VEHICLE MAX RECALL	X	X	X	X	-	-	-	-
PED RECALL	-	X	-	X	-	-	-	-
PHASE OMIT	-	-	-	-	-	-	-	-
SPARE	-	-	-	-	-	-	-	-

ALTERNATE SEQUENCE	A	B	C	D	E	F
	-	-	-	-	-	-

**COORDINATED PATTERN 2****TS2 FORMAT**

TIMING PLAN: MIDDAY (1145-1615) Mon-Fri

CYCLE LENGTH: 100

OFFSETS: 47

**SPLITS**

PHASE 1	10	PHASE 2	52	PHASE 3	9	PHASE 4	29
PHASE 5	-	PHASE 6	-	PHASE 7	-	PHASE 8	-

VEHICLE PERM	(1)	0	(2)	0
VEHICLE PERM 2 DISP	0			
PHASE RESERVICE	NO			
SPLIT EXTENSION RIN	(1)	0	(2)	0
SPLIT DMD PATTERN	(1)	0	(2)	0
XARTERY PATTERN	0			

PHASE NUMBER	1	2	3	4	5	6	7	8
COORDINATED PHASES	-	X	-	-	-	-	-	-
VEHICLE RECALL	-	-	-	-	-	-	-	-
VEHICLE MAX RECALL	X	X	X	X	-	-	-	-
PED RECALL	-	X	-	X	-	-	-	-
PHASE OMIT	-	-	-	-	-	-	-	-
SPARE	-	-	-	-	-	-	-	-

ALTERNATE SEQUENCE	A	B	C	D	E	F
	-	-	-	-	-	-

**COORDINATED PATTERN 3****TS2 FORMAT**

TIMING PLAN: PM (1615-1800) Mon-Fri

CYCLE LENGTH: 100

OFFSETS: 31

**SPLITS**

PHASE 1	10	PHASE 2	52	PHASE 3	9	PHASE 4	29
PHASE 5	-	PHASE 6	-	PHASE 7	-	PHASE 8	-

VEHICLE PERM	(1)	0	(2)	0
VEHICLE PERM 2 DISP	0			
PHASE RESERVICE	NO			
SPLIT EXTENSION RING	(1)	0	(2)	0
SPLIT DMD PATTERN	(1)	0	(2)	0
XARTERY PATTERN	0			

PHASE NUMBER	1	2	3	4	5	6	7	8
COORDINATED PHASES	-	X	-	-	-	-	-	-
VEHICLE RECALL	-	-	-	-	-	-	-	-
VEHICLE MAX RECALL	X	X	X	X	-	-	-	-
PED RECALL	-	X	-	X	-	-	-	-
PHASE OMIT	-	-	-	-	-	-	-	-
SPARE	-	-	-	-	-	-	-	-

ALTERNATE SEQUENCE	A	B	C	D	E	F
	-	-	-	-	-	-

**COORDINATED PATTERN 4****TS2 FORMAT**

TIMING PLAN: WEEKEND (0800-1800) Sat-Sun

CYCLE LENGTH: 100

OFFSETS: 46

**SPLITS**

PHASE 1	10	PHASE 2	52	PHASE 3	9	PHASE 4	29
PHASE 5	-	PHASE 6	-	PHASE 7	-	PHASE 8	-

VEHICLE PERM	(1)	0	(2)	0
VEHICLE PERM 2 DISP	0			
PHASE RESERVICE	NO			
SPLIT EXTENSION RING	(1)	0	(2)	0
SPLIT DMD PATTERN	(1)	0	(2)	0
XARTERY PATTERN	0			

PHASE NUMBER	1	2	3	4	5	6	7	8
COORDINATED PHASES	-	X	-	-	-	-	-	-
VEHICLE RECALL	-	-	-	-	-	-	-	-
VEHICLE MAX RECALL	X	X	X	X	-	-	-	-
PED RECALL	-	X	-	X	-	-	-	-
PHASE OMIT	-	-	-	-	-	-	-	-
SPARE	-	-	-	-	-	-	-	-

ALTERNATE SEQUENCE	A	B	C	D	E	F
	-	-	-	-	-	-

**COORDINATED PATTERN 5****TS2 FORMAT (NO CHANGE)**

TIMING PLAN: OFF PEAK (1800-0800) Mon-Fri

CYCLE LENGTH: 61

OFFSETS: RECALL

**SPLITS**

PHASE 1	-	PHASE 2	32	PHASE 3	-	PHASE 4	29
PHASE 5	-	PHASE 6	-	PHASE 7	-	PHASE 8	-

VEHICLE PERM	(1)	0	(2)	0
VEHICLE PERM 2 DISP	0			
PHASE RESERVICE	NO			
SPLIT EXTENSION RING	(1)	0	(2)	0
SPLIT DMD PATTERN	(1)	0	(2)	0
XARTERY PATTERN	0			

PHASE NUMBER	1	2	3	4	5	6	7	8
COORDINATED PHASES	-	X	-	-	-	-	-	-
VEHICLE RECALL	-	-	-	-	-	-	-	-
VEHICLE MAX RECALL	-	X	-	X	-	-	-	-
PED RECALL	-	X	-	X	-	-	-	-
PHASE OMIT	X	-	X	-	-	-	-	-
SPARE	-	-	-	-	-	-	-	-

ALTERNATE SEQUENCE	A	B	C	D	E	F
	-	-	-	-	-	-

**COORDINATED PATTERN 6****TS2 FORMAT (NO CHANGE)**

TIMING PLAN: OFF PEAK (1800-0800) Sat-Sun

CYCLE LENGTH: 61

OFFSETS: RECALL

**SPLITS**

PHASE 1	-	PHASE 2	32	PHASE 3	-	PHASE 4	29
PHASE 5	-	PHASE 6	-	PHASE 7	-	PHASE 8	-

VEHICLE PERM	(1)	0	(2)	0
VEHICLE PERM 2 DISP	0			
PHASE RESERVICE	NO			
SPLIT EXTENSION RING	(1)	0	(2)	0
SPLIT DMD PATTERN	(1)	0	(2)	0
XARTERY PATTERN	0			

PHASE NUMBER	1	2	3	4	5	6	7	8
COORDINATED PHASES	-	X	-	-	-	-	-	-
VEHICLE RECALL	-	-	-	-	-	-	-	-
VEHICLE MAX RECALL	-	X	-	X	-	-	-	-
PED RECALL	-	X	-	X	-	-	-	-
PHASE OMIT	X	-	X	-	-	-	-	-
SPARE	-	-	-	-	-	-	-	-

ALTERNATE SEQUENCE	A	B	C	D	E	F
	-	-	-	-	-	-



# SIGNAL TIMING PLAN (Tourist Season)

LOCATION: King St and William St Gananoque Ontario

MODE of OPERATION: Fixed (Time Based Coordination)

TIMING DEVELOPED BY: Signalcorps

DATE TIMING DEVELOPED: June 2, 2011

## CONTROLLER TIMING DATA

## MOVEMENT (FAZE)

PHASE	King St EB/WB			William St N/S				
	1	2	3	4	5	6	7	8
<b>MIN GREEN</b>	-	<b>29</b>	-	<b>22</b>	-	-	-	-
BIKE GREEN	-	-	-	-	-	-	-	-
CS MGRN	-	-	-	-	-	-	-	-
<b>WALK</b>	-	<b>16</b>	-	<b>7</b>	-	-	-	-
<b>PEDESTRIAN CLEARANCE</b>	-	13	-	15	-	-	-	-
VEHICLE EXTENSION	-	-	-	-	-	-	-	-
VEHICLE EXTENSION 2	-	-	-	-	-	-	-	-
MAX EXTENSION	-	-	-	-	-	-	-	-
<b>MAX 1</b>	-	<b>71</b>	-	<b>29</b>	-	-	-	-
<b>MAX 2</b>	-	<b>34</b>	-	27	-	-	-	-
<b>MAX 3</b>	-	-	-	-	-	-	-	-
DET MAX	-	-	-	-	-	-	-	-
<b>YELLOW</b>	-	<b>3</b>	-	<b>3</b>	-	-	-	-
<b>RED CLEAR</b>	-	<b>2</b>	-	<b>2</b>	-	-	-	-
<b>RED REVERT</b>	-	<b>2</b>	-	<b>2</b>	-	-	-	-
ACT B4	-	-	-	-	-	-	-	-
SEC/ACT	-	-	-	-	-	-	-	-
MAX INI	-	-	-	-	-	-	-	-
TIME B4 INIT	-	-	-	-	-	-	-	-
CARS WT	-	-	-	-	-	-	-	-
TT REDUC	-	-	-	-	-	-	-	-
MIN GAP	-	-	-	-	-	-	-	-

**COORDINATED PATTERN 1**

**TS2 FORMAT**

TIMING PLAN: AM (0800-1145) Mon-Fri

CYCLE LENGTH: 100

OFFSETS: 7

**SPLITS**

PHASE 1	-	PHASE 2	71	PHASE 3	-	PHASE 4	29
PHASE 5	-	PHASE 6	-	PHASE 7	-	PHASE 8	-

VEHICLE PERM	(1)	0	(2)	0
VEHICLE PERM 2 DISP	0			
PHASE RESERVICE	NO			
SPLIT EXTENSION RING(1)	0	(2)	0	
SPLIT DMD PATTERN	(1)	0	(2)	0
XARTERY PATTERN	0			

<b>PHASE NUMBER</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
COORDINATED PHASES	-	X	-	-	-	-	-	-
VEHICLE RECALL	-	-	-	-	-	-	-	-
VEHICLE MAX RECALL	-	X	-	X	-	-	-	-
PED RECALL	-	X	-	X	-	-	-	-
PHASE OMIT	-	-	-	-	-	-	-	-
SPARE	-	-	-	-	-	-	-	-

<b>ALTERNATE SEQUENCE</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
	-	-	-	-	-	-

**COORDINATED PATTERN 2**

**TS2 FORMAT**

TIMING PLAN: MIDDAY (1145-1615) Mon-Fri

CYCLE LENGTH: 100

OFFSETS: 92

**SPLITS**

PHASE 1	-	PHASE 2	71	PHASE 3	-	PHASE 4	29
PHASE 5	-	PHASE 6	-	PHASE 7	-	PHASE 8	-

VEHICLE PERM	(1)	0	(2)	0
VEHICLE PERM 2 DISP	0			
PHASE RESERVICE	NO			
SPLIT EXTENSION RIN	(1)	0	(2)	0
SPLIT DMD PATTERN	(1)	0	(2)	0
XARTERY PATTERN	0			

<b>PHASE NUMBER</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
COORDINATED PHASES	-	X	-	-	-	-	-	-
VEHICLE RECALL	-	-	-	-	-	-	-	-
VEHICLE MAX RECALL	-	X	-	X	-	-	-	-
PED RECALL	-	X	-	X	-	-	-	-
PHASE OMIT	-	-	-	-	-	-	-	-
SPARE	-	-	-	-	-	-	-	-

<b>ALTERNATE SEQUENCE</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
	-	-	-	-	-	-

**COORDINATED PATTERN 3****TS2 FORMAT**

TIMING PLAN: PM (1615-1800) Mon-Fri

CYCLE LENGTH: 100

OFFSETS: 76

**SPLITS**

PHASE 1	-	PHASE 2	71	PHASE 3	-	PHASE 4	29
PHASE 5	-	PHASE 6	-	PHASE 7	-	PHASE 8	-

VEHICLE PERM	(1)	0	(2)	0
VEHICLE PERM 2 DISP	0			
PHASE RESERVICE	NO			
SPLIT EXTENSION RING	(1)	0	(2)	0
SPLIT DMD PATTERN	(1)	0	(2)	0
XARTERY PATTERN	0			

PHASE NUMBER	1	2	3	4	5	6	7	8
COORDINATED PHASES	-	X	-	-	-	-	-	-
VEHICLE RECALL	-	-	-	-	-	-	-	-
VEHICLE MAX RECALL	-	X	-	X	-	-	-	-
PED RECALL	-	X	-	X	-	-	-	-
PHASE OMIT	-	-	-	-	-	-	-	-
SPARE	-	-	-	-	-	-	-	-

ALTERNATE SEQUENCE	A	B	C	D	E	F
	-	-	-	-	-	-

**COORDINATED PATTERN 4****TS2 FORMAT**

TIMING PLAN: WEEKEND (0800-1800) Sat-Sun

CYCLE LENGTH: 100

OFFSETS: 88

**SPLITS**

PHASE 1	-	PHASE 2	71	PHASE 3	-	PHASE 4	29
PHASE 5	-	PHASE 6	-	PHASE 7	-	PHASE 8	-

VEHICLE PERM	(1)	0	(2)	0
VEHICLE PERM 2 DISP	0			
PHASE RESERVICE	NO			
SPLIT EXTENSION RING	(1)	0	(2)	0
SPLIT DMD PATTERN	(1)	0	(2)	0
XARTERY PATTERN	0			

PHASE NUMBER	1	2	3	4	5	6	7	8
COORDINATED PHASES	-	X	-	-	-	-	-	-
VEHICLE RECALL	-	-	-	-	-	-	-	-
VEHICLE MAX RECALL	-	X	-	X	-	-	-	-
PED RECALL	-	X	-	X	-	-	-	-
PHASE OMIT	-	-	-	-	-	-	-	-
SPARE	-	-	-	-	-	-	-	-

ALTERNATE SEQUENCE	A	B	C	D	E	F
	-	-	-	-	-	-

**COORDINATED PATTERN 5****TS2 FORMAT (NO CHANGE)**

TIMING PLAN: OFF PEAK (1800-0800) Mon-Fri

CYCLE LENGTH: 61

OFFSETS: RECALL

**SPLITS**

PHASE 1	-	PHASE 2	34	PHASE 3	-	PHASE 4	27
PHASE 5	-	PHASE 6	-	PHASE 7	-	PHASE 8	-

VEHICLE PERM	(1)	0	(2)	0
VEHICLE PERM 2 DISP	0			
PHASE RESERVICE	NO			
SPLIT EXTENSION RING	(1)	0	(2)	0
SPLIT DMD PATTERN	(1)	0	(2)	0
XARTERY PATTERN	0			

PHASE NUMBER	1	2	3	4	5	6	7	8
COORDINATED PHASES	-	X	-	-	-	-	-	-
VEHICLE RECALL	-	-	-	-	-	-	-	-
VEHICLE MAX RECALL	-	X	-	X	-	-	-	-
PED RECALL	-	X	-	X	-	-	-	-
PHASE OMIT	-	-	-	-	-	-	-	-
SPARE	-	-	-	-	-	-	-	-

ALTERNATE SEQUENCE	A	B	C	D	E	F
	-	-	-	-	-	-

**COORDINATED PATTERN 6****TS2 FORMAT (NO CHANGE)**

TIMING PLAN: OFF PEAK (1800-0800) Sat-Sun

CYCLE LENGTH: 61

OFFSETS: RECALL

**SPLITS**

PHASE 1	-	PHASE 2	34	PHASE 3	-	PHASE 4	27
PHASE 5	-	PHASE 6	-	PHASE 7	-	PHASE 8	-

VEHICLE PERM	(1)	0	(2)	0
VEHICLE PERM 2 DISP	0			
PHASE RESERVICE	NO			
SPLIT EXTENSION RING	(1)	0	(2)	0
SPLIT DMD PATTERN	(1)	0	(2)	0
XARTERY PATTERN	0			

PHASE NUMBER	1	2	3	4	5	6	7	8
COORDINATED PHASES	-	X	-	-	-	-	-	-
VEHICLE RECALL	-	-	-	-	-	-	-	-
VEHICLE MAX RECALL	-	X	-	X	-	-	-	-
PED RECALL	-	X	-	X	-	-	-	-
PHASE OMIT	-	-	-	-	-	-	-	-
SPARE	-	-	-	-	-	-	-	-

ALTERNATE SEQUENCE	A	B	C	D	E	F
	-	-	-	-	-	-



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***APPENDIX B***

***Level of Service Definitions***

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## LEVEL OF SERVICE DEFINITIONS AT SIGNALIZED INTERSECTIONS<sup>(1)</sup>

Level of service for signalized intersections is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. Specifically, level-of-service (LOS) criteria are stated in terms of the average control delay per vehicle, typically for a 15-min analysis period. The criteria are given in the table below. Delay may be measured in the field or estimated using software such as Highway Capacity Software. Delay is a complex measure and is dependent upon a number of variables, including quality of progression, the cycle length, the green ratio, and the  $v/c$  ratio for the lane group in question.

Level of Service	Features	Control Delay per vehicle (sec)
A	LOS A describes operations with very low delay, up to 5 sec per vehicle. This level of service occurs when progression is extremely favourable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	$\leq 10$
B	LOS B describes operations with delay greater than 10 and up to 20 sec per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of average delay.	$> 10$ and $\leq 20$
C	LOS C describes operations with delay greater than 20 and up to 35 sec per vehicle. These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.	$> 20$ and $\leq 35$
D	LOS D describes operations with delay greater than 35 and up to 55 sec per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavourable progression, long cycle lengths, of high $v/c$ ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	$> 35$ and $\leq 55$
E	LOS E describes operations with delay greater than 55 and up to 80 sec per vehicle. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high $v/c$ ratios. Individual cycle failures are frequent occurrences.	$> 55$ and $\leq 80$
F	LOS F describes operations with delay in excess of 80 sec per vehicle. This level, considered to be unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection. It may also occur at high $v/c$ ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.	$> 80$

(1) Highway Capacity Manual 2000

## LEVEL OF SERVICE DEFINITIONS AT UNSIGNALIZED INTERSECTIONS<sup>(1)</sup>

The level of service criteria for unsignalized intersections are given in the table below. As used here, total delay is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line; this time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position. The average total delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation.

Level of Service	Features	Average Total Delay (sec/veh)
A	Little or no traffic delay occurs. Approaches appear open, turning movements are easily made, and drivers have freedom of operation.	$\leq 10$
B	Short traffic delays occur. Many drivers begin to feel somewhat restricted in terms of freedom of operation.	$> 10$ and $\leq 15$
C	Average traffic delays occur. Operations are generally stable, but drivers emerging from the minor street may experience difficulty in completing their movement. This may occasionally impact on the stability of flow on the major street.	$> 15$ and $\leq 25$
D	Long traffic delays occur. Motorists emerging from the minor street experience significant restriction and frustration. Drivers on the major street will experience congestion and delay as drivers emerging from the minor street interfere with the major through movements.	$> 25$ and $\leq 35$
E	Very long traffic delays occur. Operations approach the capacity of the intersection.	$> 35$ and $\leq 50$
F	Saturation occurs, with vehicle demand exceeding the available capacity. Very long traffic delays occur.	$> 50$

(1) Highway Capacity Manual 2000.

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***APPENDIX C***

***Intersection Capacity Analysis  
Existing Traffic Conditions***

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Lanes, Volumes, Timings

3: Stone Street South

15/10/2013

	↖	→	↘	↙	←	↖	↙	↘	↗	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↘		↖	↘		↖	↘		↖	↘	
Volume (vph)	64	145	28	19	167	74	16	52	20	62	44	69
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	35.0		0.0	30.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98	0.99		0.99	0.99		0.97	0.99		0.98	0.97	
Frt		0.976			0.954			0.958			0.909	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1629	1664	0	1710	1614	0	1613	1632	0	1676	1476	0
Fit Permitted	0.546			0.623			0.662			0.706		
Satd. Flow (perm)	920	1664	0	1111	1614	0	1089	1632	0	1218	1476	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			30			18			74	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		96.1			200.4			528.8			53.5	
Travel Time (s)		6.9			14.4			38.1			3.9	
Confl. Peds. (#/hr)	9		4	4		9	12		8	8		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	6%	0%	0%	7%	0%	6%	6%	0%	2%	7%	7%
Adj. Flow (vph)	70	158	30	21	182	80	17	57	22	67	48	75
Shared Lane Traffic (%)												
Lane Group Flow (vph)	70	188	0	21	262	0	17	79	0	67	123	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Minimum Split (s)	10.0	52.0		10.0	52.0		9.0	29.0		9.0	29.0	
Total Split (s)	10.0	52.0		10.0	52.0		9.0	29.0		9.0	29.0	
Total Split (%)	10.0%	52.0%		10.0%	52.0%		9.0%	29.0%		9.0%	29.0%	
Maximum Green (s)	6.0	47.0		6.0	47.0		5.0	24.0		5.0	24.0	
Yellow Time (s)	4.0	3.0		4.0	3.0		4.0	3.0		4.0	3.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Walk Time (s)		5.0			5.0			5.0			5.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effect Green (s)	54.0	47.0		54.0	47.0		30.0	24.0		30.0	24.0	
Actuated g/C Ratio	0.54	0.47		0.54	0.47		0.30	0.24		0.30	0.24	
v/c Ratio	0.13	0.24		0.03	0.34		0.05	0.20		0.17	0.30	
Control Delay	10.0	15.7		16.1	28.0		22.6	25.3		24.3	16.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	10.0	15.7		16.1	28.0		22.6	25.3		24.3	16.1	
LOS	A	B		B	C		C	C		C	B	
Approach Delay		14.1			27.1			24.8			19.0	
Approach LOS		B			C			C			B	

Lanes, Volumes, Timings

3: Stone Street South

15/10/2013

	↖	→	↘	↙	←	↖	↙	↘	↗	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (m)	5.9	20.4		2.8	43.5		2.3	9.9		9.3	7.9	
Queue Length 95th (m)	12.1	35.0		m8.1	70.2		7.2	22.3		19.3	23.3	
Internal Link Dist (m)		72.1			176.4			504.8			29.5	
Turn Bay Length (m)		30.0			35.0			30.0			35.0	
Base Capacity (vph)	539	788		635	774		352	405		388	410	
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	0.13	0.24		0.03	0.34		0.05	0.20		0.17	0.30	

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100
Offset:	87 (87%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	100
Control Type:	Pretimed
Maximum v/c Ratio:	0.34
Intersection Signal Delay:	20.9
Intersection LOS:	C
Intersection Capacity Utilization:	58.3%
ICU Level of Service:	B
Analysis Period (min):	15
m	Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Stone Street South



Lanes, Volumes, Timings

4: King Street

15/10/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔			↔	
Volume (vph)	7	224	10	11	236	80	10	27	17	71	20	19
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	60.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00		1.00	0.99			0.99			0.99	
Frt		0.994			0.962			0.958			0.976	
Fit Protected		0.998		0.950				0.991			0.969	
Satd. Flow (prot)	0	1735	0	1569	1652	0	0	1662	0	0	1660	0
Fit Permitted		0.990		0.608				0.948			0.780	
Satd. Flow (perm)	0	1721	0	999	1652	0	0	1585	0	0	1328	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			36			18			10	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		200.4			204.6			117.4			55.1	
Travel Time (s)		14.4			14.7			8.5			4.0	
Confl. Peds. (#/hr)	11		4	4		11	9		5	5		9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	0%	9%	4%	3%	0%	0%	6%	0%	10%	0%
Adj. Flow (vph)	8	243	11	12	257	87	11	29	18	77	22	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	262	0	12	344	0	0	58	0	0	120	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Minimum Split (s)	71.0	71.0		71.0	71.0		29.0	29.0		29.0	29.0	
Total Split (s)	71.0	71.0		71.0	71.0		29.0	29.0		29.0	29.0	
Total Split (%)	71.0%	71.0%		71.0%	71.0%		29.0%	29.0%		29.0%	29.0%	
Maximum Green (s)	66.0	66.0		66.0	66.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)		5.0		5.0	5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	11.0	11.0		11.0	11.0		8.0	8.0		8.0	8.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		66.0		66.0	66.0			24.0			24.0	
Actuated g/C Ratio		0.66		0.66	0.66			0.24			0.24	
v/c Ratio		0.23		0.02	0.31			0.15			0.37	
Control Delay		8.4		4.6	4.8			23.6			32.8	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		8.4		4.6	4.8			23.6			32.8	
LOS		A		A	A			C			C	
Approach Delay		8.4			4.8			23.6			32.8	
Approach LOS		A			A			C			C	

Lanes, Volumes, Timings

4: King Street

15/10/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (m)		25.9		0.5	12.9			6.4			18.7	
Queue Length 95th (m)		40.2		m1.8	19.4			16.9			35.7	
Internal Link Dist (m)		176.4			180.6			93.4			31.1	
Turn Bay Length (m)				60.0								
Base Capacity (vph)		1137		659	1102			394			326	
Starvation Cap Reductn		0		0	0			0			0	
Spillback Cap Reductn		0		0	0			0			0	
Storage Cap Reductn		0		0	0			0			0	
Reduced v/c Ratio		0.23		0.02	0.31			0.15			0.37	
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	100											
Actuated Cycle Length:	100											
Offset:	20 (20%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green											
Natural Cycle:	100											
Control Type:	Pretimed											
Maximum v/c Ratio:	0.37											
Intersection Signal Delay:	11.6											
Intersection LOS:	B											
Intersection Capacity Utilization:	50.8%											
ICU Level of Service:	A											
Analysis Period (min):	15											
m	Volume for 95th percentile queue is metered by upstream signal.											

Splits and Phases: 4: King Street



Lanes, Volumes, Timings

5: King Street

15/10/2013

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↘		↖	↘			↖	↘		↖	↘
Volume (vph)	5	291	18	39	307	22	23	19	30	40	18	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	85.0		0.0	25.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	1.00			0.96			0.96	
Frt		0.991			0.990			0.944			0.983	
Fit Protected	0.950			0.950				0.984			0.971	
Satd. Flow (prot)	1425	1742	0	1583	1729	0	0	1551	0	0	1685	0
Fit Permitted	0.519			0.535				0.906			0.811	
Satd. Flow (perm)	771	1742	0	887	1729	0	0	1426	0	0	1361	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			8			33			7	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		204.6			68.0			118.0			53.5	
Travel Time (s)		14.7			4.9			8.5			3.9	
Confl. Peds. (#/hr)	10		5	5		10	2		28	28		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	20%	2%	6%	8%	3%	0%	9%	0%	3%	0%	6%	0%
Adj. Flow (vph)	5	316	20	42	334	24	25	21	33	43	20	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	336	0	42	358	0	0	79	0	0	72	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Minimum Split (s)	71.0	71.0		71.0	71.0		29.0	29.0		29.0	29.0	
Total Split (s)	71.0	71.0		71.0	71.0		29.0	29.0		29.0	29.0	
Total Split (%)	71.0%	71.0%		71.0%	71.0%		29.0%	29.0%		29.0%	29.0%	
Maximum Green (s)	66.0	66.0		66.0	66.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	16.0	16.0		16.0	16.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)	66.0	66.0		66.0	66.0		24.0	24.0		24.0	24.0	
Actuated g/C Ratio	0.66	0.66		0.66	0.66		0.24	0.24		0.24	0.24	
v/c Ratio	0.01	0.29		0.07	0.31		0.22	0.22		0.22	0.22	
Control Delay	3.8	5.1		6.5	8.0		20.9	20.9		29.6	29.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	3.8	5.1		6.5	8.0		20.9	20.9		29.6	29.6	
LOS	A	A		A	A		C	C		C	C	
Approach Delay		5.1			7.8			20.9			29.6	
Approach LOS		A			A			C			C	

Lanes, Volumes, Timings

5: King Street

15/10/2013

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (m)	0.3	20.7		2.7	27.3			7.4			10.6	
Queue Length 95th (m)	m0.9	30.1		6.6	41.9			19.9			22.9	
Internal Link Dist (m)		180.6			44.0			94.0			29.5	
Turn Bay Length (m)	85.0			25.0								
Base Capacity (vph)	508	1152		585	1143			367			331	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.01	0.29		0.07	0.31			0.22			0.22	
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	100											
Actuated Cycle Length:	100											
Offset:	20 (20%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green											
Natural Cycle:	100											
Control Type:	Pretimed											
Maximum v/c Ratio:	0.31											
Intersection Signal Delay:	9.7											
Intersection LOS:	A											
Intersection Capacity Utilization:	60.9%											
ICU Level of Service:	B											
Analysis Period (min):	15											
m	Volume for 95th percentile queue is metered by upstream signal.											

Splits and Phases: 5: King Street



HCM Unsignalized Intersection Capacity Analysis

1:

15/10/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↕	↔	↔
Volume (veh/h)	0	15	0	0	13	0
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	16	0	0	14	0
Pedestrians			1		10	
Lane Width (m)			3.6		3.6	
Walking Speed (m/s)			1.2		1.2	
Percent Blockage			0		1	
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	29	10			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	29	10			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			99	
cM capacity (veh/h)	981	1068			1636	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	16	0	14			
Volume Left	0	0	14			
Volume Right	16	0	0			
cSH	1068	1700	1636			
Volume to Capacity	0.02	0.00	0.01			
Queue Length 95th (m)	0.4	0.0	0.2			
Control Delay (s)	8.4	0.0	7.2			
Lane LOS	A		A			
Approach Delay (s)	8.4	0.0	7.2			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			7.9			
Intersection Capacity Utilization			16.2%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

2: Stone Street South

15/10/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↕	↔	↔	↔	↔	↕	↕	↔	↔	↔
Volume (veh/h)	24	0	10	2	3	5	10	15	0	0	11	24
Sign Control		Stop			Stop			Free			Free	
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)	26	0	11	2	3	5	11	16	0	0	12	26
Pedestrians			10		5			6			4	
Lane Width (m)			3.6		3.6			3.6			3.6	
Walking Speed (m/s)			1.2		1.2			1.2			1.2	
Percent Blockage			1		0			1			0	
Right turn flare (veh)												
Median type							None				None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	84	78	41	85	91	25	48			21		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	84	78	41	85	91	25	48			21		
tC, single (s)	7.1	6.5	6.2	7.6	6.5	6.4	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	4.0	4.0	3.5	2.2			2.2		
p0 queue free %	97	100	99	100	100	99	99			100		
cM capacity (veh/h)	867	800	1022	771	787	994	1559			1601		
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>								
Volume Total	37	11	27	38								
Volume Left	26	2	11	0								
Volume Right	11	5	0	26								
cSH	907	874	1559	1700								
Volume to Capacity	0.04	0.01	0.01	0.02								
Queue Length 95th (m)	1.0	0.3	0.2	0.0								
Control Delay (s)	9.1	9.2	3.0	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	9.1	9.2	3.0	0.0								
Approach LOS	A	A										
<b>Intersection Summary</b>												
Average Delay				4.6								
Intersection Capacity Utilization				Err%	ICU Level of Service	H						
Analysis Period (min)				15								



Lanes, Volumes, Timings

3: Stone Street South

15/10/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	82	262	34	27	241	107	25	49	47	102	47	70
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	35.0		0.0	30.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.97	0.99		0.97	0.95		0.93	0.96	
Frt		0.983			0.954			0.926			0.910	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	1694	0	1644	1642	0	1583	1569	0	1676	1571	0
Fit Permitted	0.433			0.487			0.654			0.690		
Satd. Flow (perm)	759	1694	0	815	1642	0	1054	1569	0	1132	1571	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			30			46				71
Link Speed (k/h)		50			50			50				50
Link Distance (m)		96.1			200.4			528.8				53.5
Travel Time (s)		6.9			14.4			38.1				3.9
Confl. Peds. (#/hr)	8		32	32		8	19		39	39		19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	0%	4%	5%	0%	8%	2%	0%	2%	0%	1%
Adj. Flow (vph)	89	285	37	29	262	116	27	53	51	111	51	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	322	0	29	378	0	27	104	0	111	127	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Minimum Split (s)	10.0	52.0		10.0	52.0		9.0	29.0		9.0	29.0	
Total Split (s)	10.0	52.0		10.0	52.0		9.0	29.0		9.0	29.0	
Total Split (%)	10.0%	52.0%		10.0%	52.0%		9.0%	29.0%		9.0%	29.0%	
Maximum Green (s)	6.0	47.0		6.0	47.0		5.0	24.0		5.0	24.0	
Yellow Time (s)	4.0	3.0		4.0	3.0		4.0	3.0		4.0	3.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Walk Time (s)		13.0			13.0			7.0			7.0	
Flash Dont Walk (s)		14.0			14.0			17.0			17.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effect Green (s)	54.0	47.0		54.0	47.0		30.0	24.0		30.0	24.0	
Actuated g/C Ratio	0.54	0.47		0.54	0.47		0.30	0.24		0.30	0.24	
v/c Ratio	0.19	0.40		0.06	0.48		0.08	0.25		0.30	0.29	
Control Delay	10.5	18.7		12.7	21.2		23.0	19.9		26.7	16.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	10.5	18.7		12.7	21.2		23.0	19.9		26.7	16.9	
LOS	B	B		B	C		C	B		C	B	
Approach Delay		16.9			20.6			20.5			21.5	
Approach LOS		B			C			C			C	

Lanes, Volumes, Timings

3: Stone Street South

15/10/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (m)	7.5	40.2		2.3	38.2		3.7	9.4		15.9	9.0	
Queue Length 95th (m)	14.6	62.4		m7.9	66.7		9.8	23.8		29.3	24.7	
Internal Link Dist (m)		72.1			176.4			504.8			29.5	
Turn Bay Length (m)		30.0			35.0			30.0			35.0	
Base Capacity (vph)	464	800		489	787		342	411		366	431	
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	0.19	0.40		0.06	0.48		0.08	0.25		0.30	0.29	

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100
Offset:	20 (20%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	100
Control Type:	Pretimed
Maximum v/c Ratio:	0.48
Intersection Signal Delay:	19.5
Intersection LOS:	B
Intersection Capacity Utilization:	59.2%
ICU Level of Service:	B
Analysis Period (min):	15
m	Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Stone Street South



Lanes, Volumes, Timings

4: King Street

15/10/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔			↔	
Volume (vph)	18	363	30	24	331	60	8	13	18	125	21	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	60.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99		0.95	1.00			0.96			0.95	
Frt		0.990			0.977			0.937			0.976	
Fit Protected		0.998		0.950				0.990			0.966	
Satd. Flow (prot)	0	1712	0	1710	1702	0	0	1542	0	0	1642	0
Fit Permitted		0.975		0.491				0.936			0.763	
Satd. Flow (perm)	0	1672	0	837	1702	0	0	1433	0	0	1263	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			19			20			10	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		200.4			204.6			117.4			55.1	
Travel Time (s)		14.4			14.7			8.5			4.0	
Confl. Peds. (#/hr)	6		60	60		6	61		19	19		61
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	3%	0%	0%	3%	2%	13%	8%	0%	1%	0%	0%
Adj. Flow (vph)	20	395	33	26	360	65	9	14	20	136	23	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	448	0	26	425	0	0	43	0	0	193	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Minimum Split (s)	71.0	71.0		71.0	71.0		29.0	29.0		29.0	29.0	
Total Split (s)	71.0	71.0		71.0	71.0		29.0	29.0		29.0	29.0	
Total Split (%)	71.0%	71.0%		71.0%	71.0%		29.0%	29.0%		29.0%	29.0%	
Maximum Green (s)	66.0	66.0		66.0	66.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)		5.0		5.0	5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	11.0	11.0		11.0	11.0		8.0	8.0		8.0	8.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		66.0		66.0	66.0			24.0			24.0	
Actuated g/C Ratio		0.66		0.66	0.66			0.24			0.24	
v/c Ratio		0.41		0.05	0.38			0.12			0.62	
Control Delay		6.2		2.3	5.0			19.9			42.2	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		6.2		2.3	5.0			19.9			42.2	
LOS		A		A	A			B			D	
Approach Delay		6.2			4.9			19.9			42.2	
Approach LOS		A			A			B			D	

Lanes, Volumes, Timings

4: King Street

15/10/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (m)		47.7		0.5	42.2			3.6			33.4	
Queue Length 95th (m)		66.6		m1.5	56.1			12.7			58.2	
Internal Link Dist (m)		176.4			180.6			93.4			31.1	
Turn Bay Length (m)				60.0								
Base Capacity (vph)		1106		552	1129			359			310	
Starvation Cap Reductn		0		0	0			0			0	
Spillback Cap Reductn		0		0	0			0			0	
Storage Cap Reductn		0		0	0			0			0	
Reduced v/c Ratio		0.41		0.05	0.38			0.12			0.62	

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100
Offset:	42 (42%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	100
Control Type:	Pretimed
Maximum v/c Ratio:	0.62
Intersection Signal Delay:	12.3
Intersection LOS:	B
Intersection Capacity Utilization:	66.3%
ICU Level of Service:	C
Analysis Period (min):	15
m	Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: King Street



Lanes, Volumes, Timings

5: King Street

15/10/2013

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↘		↖	↘			↖	↘		↖	↘
Volume (vph)	10	480	15	32	406	34	18	29	73	58	21	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	85.0		0.0	25.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.98	1.00			0.94			0.96	
Frt		0.996			0.988			0.919			0.983	
Fit Protected	0.950			0.950				0.992			0.969	
Satd. Flow (prot)	1710	1739	0	1710	1739	0	0	1528	0	0	1705	0
Fit Permitted	0.436			0.397				0.951			0.761	
Satd. Flow (perm)	774	1739	0	702	1739	0	0	1460	0	0	1291	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			9			72			7	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		204.6			68.0			118.0			53.5	
Travel Time (s)		14.7			4.9			8.5			3.9	
Confl. Peds. (#/hr)	18		25	25		18	11		33	33		11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	0%	0%	2%	0%	0%	3%	1%	0%	0%	0%
Adj. Flow (vph)	11	522	16	35	441	37	20	32	79	63	23	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	538	0	35	478	0	0	131	0	0	98	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Minimum Split (s)	71.0	71.0		71.0	71.0		29.0	29.0		29.0	29.0	
Total Split (s)	71.0	71.0		71.0	71.0		29.0	29.0		29.0	29.0	
Total Split (%)	71.0%	71.0%		71.0%	71.0%		29.0%	29.0%		29.0%	29.0%	
Maximum Green (s)	66.0	66.0		66.0	66.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	16.0	16.0		16.0	16.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)	66.0	66.0		66.0	66.0		24.0	24.0		24.0	24.0	
Actuated g/C Ratio	0.66	0.66		0.66	0.66		0.24	0.24		0.24	0.24	
v/c Ratio	0.02	0.47		0.08	0.42		0.32	0.31		0.31	0.31	
Control Delay	4.2	6.6		6.6	9.1		17.6	17.6		17.6	32.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	4.2	6.6		6.6	9.1		17.6	17.6		17.6	32.2	
LOS	A	A		A	A		B	B		B	C	
Approach Delay		6.6			9.0			17.6			32.2	
Approach LOS		A			A			B			C	

Lanes, Volumes, Timings

5: King Street

15/10/2013

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (m)	0.6	32.0		2.3	40.2			9.6			15.2	
Queue Length 95th (m)	m1.1	41.7		6.0	59.8			26.0			30.4	
Internal Link Dist (m)		180.6			44.0			94.0			29.5	
Turn Bay Length (m)		85.0			25.0							
Base Capacity (vph)	510	1148		463	1150			405			315	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.02	0.47		0.08	0.42			0.32			0.31	

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100
Offset:	20 (20%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	100
Control Type:	Pretimed
Maximum v/c Ratio:	0.47
Intersection Signal Delay:	10.6
Intersection LOS:	B
Intersection Capacity Utilization:	54.7%
ICU Level of Service:	A
Analysis Period (min):	15
m	Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: King Street



HCM Unsignalized Intersection Capacity Analysis

1:

15/10/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (veh/h)	0	17	3	1	33	4
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	18	3	1	36	4
Pedestrians	8				4	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.2				1.2	
Percent Blockage	1				0	
Right turn flare (veh)						
Median type		None			None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	88	16			12	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	88	16			12	
tC, single (s)	6.4	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	100	98			98	
cM capacity (veh/h)	891	1041			1609	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	18	4	40			
Volume Left	0	0	36			
Volume Right	18	1	0			
cSH	1041	1700	1609			
Volume to Capacity	0.02	0.00	0.02			
Queue Length 95th (m)	0.4	0.0	0.5			
Control Delay (s)	8.5	0.0	6.5			
Lane LOS	A		A			
Approach Delay (s)	8.5	0.0	6.5			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			6.7			
Intersection Capacity Utilization			20.1%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

2: Stone Street South

15/10/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Volume (veh/h)	36	0	20	0	2	2	13	20	0	0	29	19
Sign Control		Stop			Stop			Free			Free	
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)	39	0	22	0	2	2	14	22	0	0	32	21
Pedestrians		17			7			5			3	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type							None				None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	115	116	64	126	126	32	69				29	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	115	116	64	126	126	32	69				29	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.7	4.2				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.8	2.3				2.2	
p0 queue free %	95	100	98	100	100	100	99				100	
cM capacity (veh/h)	829	755	988	807	746	912	1473				1588	
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>								
Volume Total	61	4	36	52								
Volume Left	39	0	14	0								
Volume Right	22	2	0	21								
cSH	880	821	1473	1700								
Volume to Capacity	0.07	0.01	0.01	0.03								
Queue Length 95th (m)	1.8	0.1	0.2	0.0								
Control Delay (s)	9.4	9.4	3.0	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	9.4	9.4	3.0	0.0								
Approach LOS	A	A										
<b>Intersection Summary</b>												
Average Delay				4.7								
Intersection Capacity Utilization				Err%	ICU Level of Service	H						
Analysis Period (min)				15								

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***APPENDIX D***

***Intersection Capacity Analysis  
Future Background Conditions***

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Lanes, Volumes, Timings

3: Stone Street South

15/10/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	67	151	30	20	174	77	17	54	21	65	46	72
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	35.0		0.0	30.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98	0.99		0.99	0.99		0.97	0.99		0.98	0.97	
Frt		0.975			0.954			0.958			0.909	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1629	1662	0	1710	1614	0	1613	1632	0	1676	1476	0
Fit Permitted	0.535			0.614			0.652			0.704		
Satd. Flow (perm)	902	1662	0	1095	1614	0	1073	1632	0	1215	1476	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			30			18			74	
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	96.1			200.4			528.8			53.5		
Travel Time (s)		6.9			14.4			38.1			3.9	
Confl. Peds. (#/hr)	9		4	4		9	12		8	8		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	6%	0%	0%	7%	0%	6%	6%	0%	2%	7%	7%
Adj. Flow (vph)	73	164	33	22	189	84	18	59	23	71	50	78
Shared Lane Traffic (%)												
Lane Group Flow (vph)	73	197	0	22	273	0	18	82	0	71	128	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Minimum Split (s)	10.0	52.0		10.0	52.0		9.0	29.0		9.0	29.0	
Total Split (s)	10.0	52.0		10.0	52.0		9.0	29.0		9.0	29.0	
Total Split (%)	10.0%	52.0%		10.0%	52.0%		9.0%	29.0%		9.0%	29.0%	
Maximum Green (s)	6.0	47.0		6.0	47.0		5.0	24.0		5.0	24.0	
Yellow Time (s)	4.0	3.0		4.0	3.0		4.0	3.0		4.0	3.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Walk Time (s)		5.0			5.0			5.0			5.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effect Green (s)	54.0	47.0		54.0	47.0		30.0	24.0		30.0	24.0	
Actuated g/C Ratio	0.54	0.47		0.54	0.47		0.30	0.24		0.30	0.24	
v/c Ratio	0.14	0.25		0.04	0.35		0.05	0.20		0.18	0.31	
Control Delay	10.0	15.8		16.1	28.3		22.6	25.6		24.4	16.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	10.0	15.8		16.1	28.3		22.6	25.6		24.4	16.7	
LOS	B	B		B	C		C	C		C	B	
Approach Delay		14.2			27.4			25.0			19.5	
Approach LOS		B			C			C			B	

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Synchro 8 Report  
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Lanes, Volumes, Timings

3: Stone Street South

15/10/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (m)	6.1	21.5		2.9	45.8		2.4	10.4		9.9	8.7	
Queue Length 95th (m)	12.4	36.6		m8.3	72.8		7.4	23.1		20.2	24.7	
Internal Link Dist (m)		72.1			176.4			504.8			29.5	
Turn Bay Length (m)		30.0			35.0			30.0			35.0	
Base Capacity (vph)	530	788		628	774		348	405		387	410	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.14	0.25		0.04	0.35		0.05	0.20		0.18	0.31	

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100
Offset:	87 (87%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	100
Control Type:	Pretimed
Maximum v/c Ratio:	0.35
Intersection Signal Delay:	21.2
Intersection LOS:	C
Intersection Capacity Utilization:	58.3%
ICU Level of Service:	B
Analysis Period (min):	15
m	Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Stone Street South



30/09/2013 FB AM

Synchro 8 Report  
Page 2

Lanes, Volumes, Timings

4: King Street

15/10/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔			↔	
Volume (vph)	8	233	11	12	245	84	11	29	18	74	21	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	60.0			0.0	0.0		0.0	0.0	0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00		1.00	0.99			0.99			0.99	
Frt		0.994			0.962			0.958			0.976	
Fit Protected		0.998		0.950				0.991			0.969	
Satd. Flow (prot)	0	1735	0	1569	1652	0	0	1662	0	0	1660	0
Fit Permitted		0.988		0.600				0.946			0.775	
Satd. Flow (perm)	0	1717	0	986	1652	0	0	1582	0	0	1320	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			36			20			10	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		200.4			204.6			117.4			55.1	
Travel Time (s)		14.4			14.7			8.5			4.0	
Confl. Peds. (#/hr)	11		4	4		11	9		5	5		9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	0%	9%	4%	3%	0%	0%	6%	0%	10%	0%
Adj. Flow (vph)	9	253	12	13	266	91	12	32	20	80	23	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	274	0	13	357	0	0	64	0	0	125	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Minimum Split (s)	71.0	71.0		71.0	71.0		29.0	29.0		29.0	29.0	
Total Split (s)	71.0	71.0		71.0	71.0		29.0	29.0		29.0	29.0	
Total Split (%)	71.0%	71.0%		71.0%	71.0%		29.0%	29.0%		29.0%	29.0%	
Maximum Green (s)	66.0	66.0		66.0	66.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)		5.0		5.0	5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	11.0	11.0		11.0	11.0		8.0	8.0		8.0	8.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		66.0		66.0	66.0			24.0			24.0	
Actuated g/C Ratio		0.66		0.66	0.66			0.24			0.24	
v/c Ratio		0.24		0.02	0.32			0.16			0.39	
Control Delay		8.5		4.7	4.9			23.5			33.4	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		8.5		4.7	4.9			23.5			33.4	
LOS		A		A	A			C			C	
Approach Delay		8.5			4.9			23.5			33.4	
Approach LOS		A			A			C			C	

Lanes, Volumes, Timings

4: King Street

15/10/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (m)		27.1		0.6	13.5			7.1			19.6	
Queue Length 95th (m)		41.3		m1.9	20.4			18.2			37.3	
Internal Link Dist (m)		176.4			180.6			93.4			31.1	
Turn Bay Length (m)				60.0								
Base Capacity (vph)		1134		650	1102			394			324	
Starvation Cap Reductn		0		0	0			0			0	
Spillback Cap Reductn		0		0	0			0			0	
Storage Cap Reductn		0		0	0			0			0	
Reduced v/c Ratio		0.24		0.02	0.32			0.16			0.39	

Intersection Summary

Area Type: Other  
 Cycle Length: 100  
 Actuated Cycle Length: 100  
 Offset: 20 (20%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 100  
 Control Type: Pretimed  
 Maximum v/c Ratio: 0.39  
 Intersection Signal Delay: 11.8  
 Intersection LOS: B  
 Intersection Capacity Utilization 50.8%  
 ICU Level of Service A  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: King Street



Lanes, Volumes, Timings

5: King Street

15/10/2013

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↘		↖	↘			↖	↘		↖	↘
Volume (vph)	6	303	19	41	319	23	24	20	32	42	19	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	85.0		0.0	25.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	1.00			0.96			0.96	
Frt		0.991			0.990			0.943			0.982	
Fit Protected	0.950			0.950				0.985			0.971	
Satd. Flow (prot)	1425	1742	0	1583	1729	0	0	1551	0	0	1683	0
Fit Permitted	0.509			0.524				0.905			0.806	
Satd. Flow (perm)	756	1742	0	869	1729	0	0	1423	0	0	1352	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			8			35			7	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		204.6			68.0			118.0			53.5	
Travel Time (s)		14.7			4.9			8.5			3.9	
Confl. Peds. (#/hr)	10		5	5		10	2		28	28		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	20%	2%	6%	8%	3%	0%	9%	0%	3%	0%	6%	0%
Adj. Flow (vph)	7	329	21	45	347	25	26	22	35	46	21	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	350	0	45	372	0	0	83	0	0	77	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Minimum Split (s)	71.0	71.0		71.0	71.0		29.0	29.0		29.0	29.0	
Total Split (s)	71.0	71.0		71.0	71.0		29.0	29.0		29.0	29.0	
Total Split (%)	71.0%	71.0%		71.0%	71.0%		29.0%	29.0%		29.0%	29.0%	
Maximum Green (s)	66.0	66.0		66.0	66.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	16.0	16.0		16.0	16.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)	66.0	66.0		66.0	66.0		24.0	24.0		24.0	24.0	
Actuated g/C Ratio	0.66	0.66		0.66	0.66		0.24	0.24		0.24	0.24	
v/c Ratio	0.01	0.30		0.08	0.33		0.23	0.23		0.23	0.23	
Control Delay	3.7	5.2		6.6	8.1		20.9	20.9		30.0	30.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	3.7	5.2		6.6	8.1		20.9	20.9		30.0	30.0	
LOS	A	A		A	A		C	C		C	C	
Approach Delay		5.2			7.9			20.9			30.0	
Approach LOS		A			A			C			C	

Lanes, Volumes, Timings

5: King Street

15/10/2013

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (m)	0.4	21.8		3.0	28.8			7.7			11.5	
Queue Length 95th (m)	m1.3	31.5		7.0	43.7			20.6			24.6	
Internal Link Dist (m)		180.6			44.0			94.0			29.5	
Turn Bay Length (m)	85.0			25.0								
Base Capacity (vph)	498	1152		573	1143			368			329	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.01	0.30		0.08	0.33			0.23			0.23	
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	100											
Actuated Cycle Length:	100											
Offset:	20 (20%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green											
Natural Cycle:	100											
Control Type:	Pretimed											
Maximum v/c Ratio:	0.33											
Intersection Signal Delay:	9.8											
Intersection LOS:	A											
Intersection Capacity Utilization:	62.6%											
ICU Level of Service:	B											
Analysis Period (min):	15											
m	Volume for 95th percentile queue is metered by upstream signal.											

Splits and Phases: 5: King Street





### HCM Unsignalized Intersection Capacity Analysis

1:

15/10/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↕	↔	↔
Volume (veh/h)	0	16	0	0	14	0
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	17	0	0	15	0
Pedestrians			1		10	
Lane Width (m)			3.6		3.6	
Walking Speed (m/s)			1.2		1.2	
Percent Blockage			0		1	
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	31	10			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	31	10			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			99	
cM capacity (veh/h)	978	1068			1636	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	17	0	15			
Volume Left	0	0	15			
Volume Right	17	0	0			
cSH	1068	1700	1636			
Volume to Capacity	0.02	0.00	0.01			
Queue Length 95th (m)	0.4	0.0	0.2			
Control Delay (s)	8.4	0.0	7.2			
Lane LOS	A		A			
Approach Delay (s)	8.4	0.0	7.2			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			7.9			
Intersection Capacity Utilization			16.2%	ICU Level of Service	A	
Analysis Period (min)			15			

### HCM Unsignalized Intersection Capacity Analysis

2: Stone Street South

15/10/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↕	↔	↔	↔	↔	↕	↕	↔	↔	↔
Volume (veh/h)	25	0	11	3	4	6	11	16	0	0	12	25
Sign Control		Stop			Stop			Free			Free	
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	0	12	3	4	7	12	17	0	0	13	27
Pedestrians		10			5			6			4	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			0			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	91	83	43	91	97	26	50				22	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	91	83	43	91	97	26	50				22	
tC, single (s)	7.1	6.5	6.2	7.6	6.5	6.4	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	4.0	4.0	3.5	2.2				2.2	
p0 queue free %	97	100	99	100	99	99	99				100	
cM capacity (veh/h)	856	795	1020	762	781	992	1556				1599	
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>								
Volume Total	39	14	29	40								
Volume Left	27	3	12	0								
Volume Right	12	7	0	27								
cSH	900	861	1556	1700								
Volume to Capacity	0.04	0.02	0.01	0.02								
Queue Length 95th (m)	1.1	0.4	0.2	0.0								
Control Delay (s)	9.2	9.3	3.0	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	9.2	9.3	3.0	0.0								
Approach LOS	A	A										
<b>Intersection Summary</b>												
Average Delay				4.7								
Intersection Capacity Utilization				Err%	ICU Level of Service	H						
Analysis Period (min)				15								

Lanes, Volumes, Timings

3: Stone Street South

15/10/2013

	↖	→	↘	↙	←	↖	↙	↘	↗	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖
Volume (vph)	86	272	36	29	251	112	26	51	49	106	49	73
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	35.0		0.0	30.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.97	0.99		0.97	0.95		0.93	0.96	
Frt		0.983			0.954			0.926			0.910	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	1693	0	1644	1642	0	1583	1569	0	1676	1571	0
Fit Permitted	0.417			0.474			0.644			0.687		
Satd. Flow (perm)	731	1693	0	794	1642	0	1039	1569	0	1128	1571	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			30			46				71
Link Speed (k/h)		50			50			50				50
Link Distance (m)		96.1			200.4			528.8				53.5
Travel Time (s)		6.9			14.4			38.1				3.9
Confl. Peds. (#/hr)	8		32	32		8	19		39	39		19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	0%	4%	5%	0%	8%	2%	0%	2%	0%	1%
Adj. Flow (vph)	93	296	39	32	273	122	28	55	53	115	53	79
Shared Lane Traffic (%)												
Lane Group Flow (vph)	93	335	0	32	395	0	28	108	0	115	132	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Minimum Split (s)	10.0	52.0		10.0	52.0		9.0	29.0		9.0	29.0	
Total Split (s)	10.0	52.0		10.0	52.0		9.0	29.0		9.0	29.0	
Total Split (%)	10.0%	52.0%		10.0%	52.0%		9.0%	29.0%		9.0%	29.0%	
Maximum Green (s)	6.0	47.0		6.0	47.0		5.0	24.0		5.0	24.0	
Yellow Time (s)	4.0	3.0		4.0	3.0		4.0	3.0		4.0	3.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Walk Time (s)		13.0			13.0			7.0			7.0	
Flash Dont Walk (s)		14.0			14.0			17.0			17.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effect Green (s)	54.0	47.0		54.0	47.0		30.0	24.0		30.0	24.0	
Actuated g/C Ratio	0.54	0.47		0.54	0.47		0.30	0.24		0.30	0.24	
v/c Ratio	0.21	0.42		0.07	0.50		0.08	0.26		0.32	0.31	
Control Delay	10.6	19.0		13.0	22.1		23.0	20.4		26.9	17.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	10.6	19.0		13.0	22.1		23.0	20.4		26.9	17.5	
LOS	B	B		B	C		C	C		C	B	
Approach Delay		17.2			21.4			20.9			21.9	
Approach LOS		B			C			C			C	

Lanes, Volumes, Timings

3: Stone Street South

15/10/2013

	↖	→	↘	↙	←	↖	↙	↘	↗	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (m)	7.9	42.3		2.7	41.4		3.8	10.1		16.5	9.9	
Queue Length 95th (m)	15.0	65.4		m8.5	71.4		10.1	24.8		30.1	26.1	
Internal Link Dist (m)		72.1			176.4			504.8			29.5	
Turn Bay Length (m)		30.0			35.0			30.0			35.0	
Base Capacity (vph)	451	800		479	787		338	411		365	431	
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	0.21	0.42		0.07	0.50		0.08	0.26		0.32	0.31	

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100
Offset:	20 (20%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	100
Control Type:	Pretimed
Maximum v/c Ratio:	0.50
Intersection Signal Delay:	20.0
Intersection LOS:	B
Intersection Capacity Utilization:	62.0%
ICU Level of Service:	B
Analysis Period (min):	15
m	Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Stone Street South



Lanes, Volumes, Timings

4: King Street

15/10/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔			↔	
Volume (vph)	19	377	32	25	344	63	9	14	19	130	22	33
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	60.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99		0.95	1.00			0.96			0.95	
Frt		0.990			0.977			0.938			0.976	
Fit Protected		0.998		0.950				0.989			0.966	
Satd. Flow (prot)	0	1711	0	1710	1702	0	0	1541	0	0	1642	0
Fit Permitted		0.973		0.482				0.930			0.762	
Satd. Flow (perm)	0	1668	0	823	1702	0	0	1425	0	0	1261	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			19			21			10	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		200.4			204.6			117.4			55.1	
Travel Time (s)		14.4			14.7			8.5			4.0	
Confl. Peds. (#/hr)	6		60	60		6	61		19	19		61
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	3%	0%	0%	3%	2%	13%	8%	0%	1%	0%	0%
Adj. Flow (vph)	21	410	35	27	374	68	10	15	21	141	24	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	466	0	27	442	0	0	46	0	0	201	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Minimum Split (s)	71.0	71.0		71.0	71.0		29.0	29.0		29.0	29.0	
Total Split (s)	71.0	71.0		71.0	71.0		29.0	29.0		29.0	29.0	
Total Split (%)	71.0%	71.0%		71.0%	71.0%		29.0%	29.0%		29.0%	29.0%	
Maximum Green (s)	66.0	66.0		66.0	66.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)		5.0		5.0	5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	11.0	11.0		11.0	11.0		8.0	8.0		8.0	8.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		66.0		66.0	66.0			24.0			24.0	
Actuated g/C Ratio		0.66		0.66	0.66			0.24			0.24	
v/c Ratio		0.42		0.05	0.39			0.13			0.65	
Control Delay		6.4		2.4	5.2			20.1			43.5	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		6.4		2.4	5.2			20.1			43.5	
LOS		A		A	A			C			D	
Approach Delay		6.4			5.0			20.1			43.5	
Approach LOS		A			A			C			D	

Lanes, Volumes, Timings

4: King Street

15/10/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (m)		50.0		0.5	45.2			4.0			35.2	
Queue Length 95th (m)		69.9		m1.5	58.7			13.4			60.9	
Internal Link Dist (m)		176.4			180.6			93.4			31.1	
Turn Bay Length (m)				60.0								
Base Capacity (vph)		1103		543	1129			357			310	
Starvation Cap Reductn		0		0	0			0			0	
Spillback Cap Reductn		0		0	0			0			0	
Storage Cap Reductn		0		0	0			0			0	
Reduced v/c Ratio		0.42		0.05	0.39			0.13			0.65	

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100
Offset:	42 (42%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	100
Control Type:	Pretimed
Maximum v/c Ratio:	0.65
Intersection Signal Delay:	12.7
Intersection LOS:	B
Intersection Capacity Utilization:	68.1%
ICU Level of Service:	C
Analysis Period (min):	15
m	Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: King Street



Lanes, Volumes, Timings

5: King Street

15/10/2013

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖		↖	↖			↖	↖		↖	↖
Volume (vph)	11	499	16	34	422	36	19	31	76	61	22	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	85.0		0.0	25.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.98	1.00			0.94				0.96
Frt		0.995			0.988			0.919				0.983
Fit Protected	0.950			0.950				0.992				0.969
Satd. Flow (prot)	1710	1737	0	1710	1739	0	0	1528	0	0	1705	0
Fit Permitted	0.423			0.384				0.950				0.744
Satd. Flow (perm)	751	1737	0	680	1739	0	0	1459	0	0	1263	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			9			71				7
Link Speed (k/h)		50			50			50				50
Link Distance (m)		204.6			68.0			118.0				53.5
Travel Time (s)		14.7			4.9			8.5				3.9
Confl. Peds. (#/hr)	18		25	25		18	11		33	33		11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	0%	0%	2%	0%	0%	3%	1%	0%	0%	0%
Adj. Flow (vph)	12	542	17	37	459	39	21	34	83	66	24	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	559	0	37	498	0	0	138	0	0	103	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2			6			8			4		
Minimum Split (s)	71.0	71.0		71.0	71.0		29.0	29.0		29.0	29.0	
Total Split (s)	71.0	71.0		71.0	71.0		29.0	29.0		29.0	29.0	
Total Split (%)	71.0%	71.0%		71.0%	71.0%		29.0%	29.0%		29.0%	29.0%	
Maximum Green (s)	66.0	66.0		66.0	66.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	16.0	16.0		16.0	16.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)	66.0	66.0		66.0	66.0		24.0	24.0		24.0	24.0	
Actuated g/C Ratio	0.66	0.66		0.66	0.66		0.24	0.24		0.24	0.24	
v/c Ratio	0.02	0.49		0.08	0.43		0.34	0.33		0.33	0.33	
Control Delay	4.1	6.7		6.7	9.3		18.6	18.6		32.9	32.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	4.1	6.7		6.7	9.3		18.6	18.6		32.9	32.9	
LOS	A	A		A	A		B	B		C	C	
Approach Delay		6.7			9.2			18.6			32.9	
Approach LOS		A			A			B			C	

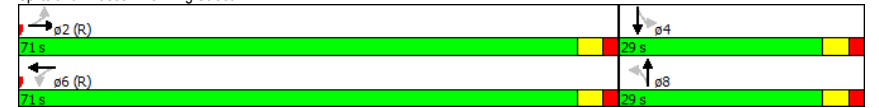
Lanes, Volumes, Timings

5: King Street

15/10/2013

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (m)	0.7	33.3		2.4	42.4			10.9				16.2
Queue Length 95th (m)	m1.3	43.2		6.2	63.0			28.0				31.9
Internal Link Dist (m)		180.6			44.0			94.0				29.5
Turn Bay Length (m)	85.0			25.0								
Base Capacity (vph)	495	1147		448	1150			404				308
Starvation Cap Reductn	0	0		0	0			0				0
Spillback Cap Reductn	0	0		0	0			0				0
Storage Cap Reductn	0	0		0	0			0				0
Reduced v/c Ratio	0.02	0.49		0.08	0.43			0.34				0.33
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	100											
Actuated Cycle Length:	100											
Offset: 20 (20%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green												
Natural Cycle:	100											
Control Type:	Pretimed											
Maximum v/c Ratio:	0.49											
Intersection Signal Delay:	10.9						Intersection LOS: B					
Intersection Capacity Utilization:	56.5%						ICU Level of Service B					
Analysis Period (min)	15											
m	Volume for 95th percentile queue is metered by upstream signal.											

Splits and Phases: 5: King Street



HCM Unsignalized Intersection Capacity Analysis

1:

15/10/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	18	4	2	35	5
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	20	4	2	38	5
Pedestrians	8					4
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	95	17			15	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	95	17			15	
tC, single (s)	6.4	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	100	98			98	
cM capacity (veh/h)	882	1039			1606	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	20	7	43			
Volume Left	0	0	38			
Volume Right	20	2	0			
cSH	1039	1700	1606			
Volume to Capacity	0.02	0.00	0.02			
Queue Length 95th (m)	0.5	0.0	0.6			
Control Delay (s)	8.5	0.0	6.4			
Lane LOS	A		A			
Approach Delay (s)	8.5	0.0	6.4			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			6.4			
Intersection Capacity Utilization			20.2%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

2: Stone Street South

15/10/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	38	0	21	0	3	3	14	21	0	0	31	20
Sign Control		Stop			Stop			Free				Free
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	0	23	0	3	3	15	23	0	0	34	22
Pedestrians		17			7			5				3
Lane Width (m)		3.6			3.6			3.6				3.6
Walking Speed (m/s)		1.2			1.2			1.2				1.2
Percent Blockage		1			1			0				0
Right turn flare (veh)												
Median type								None				None
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	123	122	67	133	133	33	72				30	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	123	122	67	133	133	33	72				30	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.7	4.2				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.8	2.3				2.2	
p0 queue free %	95	100	98	100	100	100	99				100	
cM capacity (veh/h)	817	749	984	797	739	911	1469				1587	
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>								
Volume Total	64	7	38	55								
Volume Left	41	0	15	0								
Volume Right	23	3	0	22								
cSH	870	816	1469	1700								
Volume to Capacity	0.07	0.01	0.01	0.03								
Queue Length 95th (m)	1.9	0.2	0.3	0.0								
Control Delay (s)	9.5	9.4	3.0	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	9.5	9.4	3.0	0.0								
Approach LOS	A	A										
<b>Intersection Summary</b>												
Average Delay				4.8								
Intersection Capacity Utilization				Err%	ICU Level of Service	H						
Analysis Period (min)				15								

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**APPENDIX E**

***Intersection Capacity Analysis  
Total Future Traffic Conditions***

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Lanes, Volumes, Timings

3: Stone Street South

15/10/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	67	151	34	29	174	77	33	66	62	65	49	72
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	35.0		0.0	30.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98	0.99		0.99	0.99		0.97	0.98		0.98	0.97	
Frt		0.972			0.954			0.928			0.911	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1629	1658	0	1710	1614	0	1613	1585	0	1676	1481	0
Fit Permitted	0.535			0.609			0.646			0.630		
Satd. Flow (perm)	902	1658	0	1086	1614	0	1064	1585	0	1090	1481	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			30			44			70	
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	96.1			200.4			528.8			53.5		
Travel Time (s)		6.9			14.4			38.1			3.9	
Confl. Peds. (#/hr)	9		4	4		9	12		8	8		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	6%	0%	0%	7%	0%	6%	6%	0%	2%	7%	7%
Adj. Flow (vph)	73	164	37	32	189	84	36	72	67	71	53	78
Shared Lane Traffic (%)												
Lane Group Flow (vph)	73	201	0	32	273	0	36	139	0	71	131	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Minimum Split (s)	10.0	52.0		10.0	52.0		9.0	29.0		9.0	29.0	
Total Split (s)	10.0	52.0		10.0	52.0		9.0	29.0		9.0	29.0	
Total Split (%)	10.0%	52.0%		10.0%	52.0%		9.0%	29.0%		9.0%	29.0%	
Maximum Green (s)	6.0	47.0		6.0	47.0		5.0	24.0		5.0	24.0	
Yellow Time (s)	4.0	3.0		4.0	3.0		4.0	3.0		4.0	3.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Walk Time (s)		5.0			5.0			5.0			5.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effect Green (s)	54.0	47.0		54.0	47.0		30.0	24.0		30.0	24.0	
Actuated g/C Ratio	0.54	0.47		0.54	0.47		0.30	0.24		0.30	0.24	
v/c Ratio	0.14	0.26		0.05	0.35		0.10	0.34		0.20	0.32	
Control Delay	10.0	15.8		16.2	28.3		23.3	23.9		24.7	17.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	10.0	15.8		16.2	28.3		23.3	23.9		24.7	17.9	
LOS	B	B		B	C		C	C		C	B	
Approach Delay		14.2			27.0			23.7			20.3	
Approach LOS		B			C			C			C	

Lanes, Volumes, Timings

3: Stone Street South

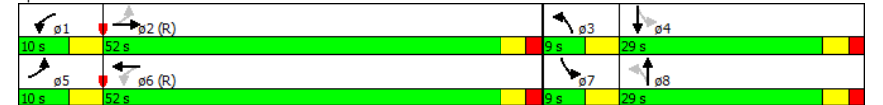
15/10/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (m)	6.1	21.9		4.3	45.7		4.9	15.7		9.9	9.9	
Queue Length 95th (m)	12.4	37.2		11.1	72.3		12.1	33.2		20.2	26.4	
Internal Link Dist (m)		72.1			176.4			504.8			29.5	
Turn Bay Length (m)		30.0			35.0			30.0			35.0	
Base Capacity (vph)	530	787		623	774		346	413		356	408	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.14	0.26		0.05	0.35		0.10	0.34		0.20	0.32	

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100
Offset:	87 (87%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	100
Control Type:	Pretimed
Maximum v/c Ratio:	0.35
Intersection Signal Delay:	21.3
Intersection LOS:	C
Intersection Capacity Utilization:	65.8%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 3: Stone Street South



Lanes, Volumes, Timings

4: King Street

15/10/2013

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕			↕	
Volume (vph)	15	264	14	12	252	84	11	29	18	74	21	22
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	60.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00		1.00	0.99			0.99			0.99	
Frt		0.994			0.963			0.958			0.974	
Fit Protected		0.997		0.950				0.991			0.969	
Satd. Flow (prot)	0	1735	0	1569	1654	0	0	1662	0	0	1657	0
Fit Permitted		0.977		0.570				0.946			0.778	
Satd. Flow (perm)	0	1699	0	937	1654	0	0	1582	0	0	1322	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			35			20			11	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		200.4			204.6			117.4			55.1	
Travel Time (s)		14.4			14.7			8.5			4.0	
Confl. Peds. (#/hr)	11		4	4		11	9		5	5		9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	0%	9%	4%	3%	0%	0%	6%	0%	10%	0%
Adj. Flow (vph)	16	287	15	13	274	91	12	32	20	80	23	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	318	0	13	365	0	0	64	0	0	127	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases		2			6			8			4	
Minimum Split (s)	71.0	71.0		71.0	71.0		29.0	29.0		29.0	29.0	
Total Split (s)	71.0	71.0		71.0	71.0		29.0	29.0		29.0	29.0	
Total Split (%)	71.0%	71.0%		71.0%	71.0%		29.0%	29.0%		29.0%	29.0%	
Maximum Green (s)	66.0	66.0		66.0	66.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)		5.0		5.0	5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	11.0	11.0		11.0	11.0		8.0	8.0		8.0	8.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		66.0		66.0	66.0			24.0			24.0	
Actuated g/C Ratio		0.66		0.66	0.66			0.24			0.24	
v/c Ratio		0.28		0.02	0.33			0.16			0.39	
Control Delay		7.9		4.6	5.0			23.5			33.2	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		7.9		4.6	5.0			23.5			33.2	
LOS		A		A	A			C			C	
Approach Delay		7.9			5.0			23.5			33.2	
Approach LOS		A			A			C			C	

Lanes, Volumes, Timings

4: King Street

15/10/2013

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (m)		28.5		0.6	13.9			7.1			19.8	
Queue Length 95th (m)		41.6		m1.8	20.9			18.2			37.6	
Internal Link Dist (m)		176.4			180.6			93.4			31.1	
Turn Bay Length (m)				60.0								
Base Capacity (vph)		1123		618	1103			394			325	
Starvation Cap Reductn		0		0	0			0			0	
Spillback Cap Reductn		0		0	0			0			0	
Storage Cap Reductn		0		0	0			0			0	
Reduced v/c Ratio		0.28		0.02	0.33			0.16			0.39	
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	100											
Actuated Cycle Length:	100											
Offset:	20 (20%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green											
Natural Cycle:	100											
Control Type:	Pretimed											
Maximum v/c Ratio:	0.39											
Intersection Signal Delay:	11.4											
Intersection LOS:	B											
Intersection Capacity Utilization:	56.9%											
ICU Level of Service:	B											
Analysis Period (min):	15											
m	Volume for 95th percentile queue is metered by upstream signal.											

Splits and Phases: 4: King Street





Lanes, Volumes, Timings

5: King Street

15/10/2013

	↖	→	↘	↙	←	↖	↙	↘	↗	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↘		↖	↘			↖	↘		↖	↘
Volume (vph)	9	326	24	41	325	23	24	20	32	42	19	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	85.0		0.0	25.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		1.00	1.00			0.96				0.96
Frt		0.990			0.990			0.943				0.981
Fit Protected	0.950			0.950				0.985				0.971
Satd. Flow (prot)	1425	1739	0	1583	1729	0	0	1551	0	0	1682	0
Fit Permitted	0.504			0.503				0.904				0.808
Satd. Flow (perm)	749	1739	0	834	1729	0	0	1421	0	0	1355	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			7			35				8
Link Speed (k/h)		50			50			50				50
Link Distance (m)		204.6			68.0			118.0				53.5
Travel Time (s)		14.7			4.9			8.5				3.9
Confl. Peds. (#/hr)	10		5	5		10	2		28	28		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	20%	2%	6%	8%	3%	0%	9%	0%	3%	0%	6%	0%
Adj. Flow (vph)	10	354	26	45	353	25	26	22	35	46	21	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	380	0	45	378	0	0	83	0	0	78	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2			6			8			4		
Minimum Split (s)	71.0	71.0		71.0	71.0		29.0	29.0		29.0	29.0	
Total Split (s)	71.0	71.0		71.0	71.0		29.0	29.0		29.0	29.0	
Total Split (%)	71.0%	71.0%		71.0%	71.0%		29.0%	29.0%		29.0%	29.0%	
Maximum Green (s)	66.0	66.0		66.0	66.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	16.0	16.0		16.0	16.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)	66.0	66.0		66.0	66.0		24.0	24.0		24.0	24.0	
Actuated g/C Ratio	0.66	0.66		0.66	0.66		0.24	0.24		0.24	0.24	
v/c Ratio	0.02	0.33		0.08	0.33		0.23	0.23		0.24	0.24	
Control Delay	4.0	5.5		6.6	8.2		20.9	20.9		29.7	29.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	4.0	5.5		6.6	8.2		20.9	20.9		29.7	29.7	
LOS	A	A		A	A		C	C		C	C	
Approach Delay		5.4			8.0			20.9			29.7	
Approach LOS		A			A			C			C	

Lanes, Volumes, Timings

5: King Street

15/10/2013

	↖	→	↘	↙	←	↖	↙	↘	↗	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (m)	0.6	22.6		3.0	29.5			7.7				11.5
Queue Length 95th (m)	m1.6	34.1		7.1	44.7			20.6				24.5
Internal Link Dist (m)		180.6			44.0			94.0				29.5
Turn Bay Length (m)		85.0			25.0							
Base Capacity (vph)	494	1150		550	1143			367				331
Starvation Cap Reductn	0	0		0	0			0				0
Spillback Cap Reductn	0	0		0	0			0				0
Storage Cap Reductn	0	0		0	0			0				0
Reduced v/c Ratio	0.02	0.33		0.08	0.33			0.23				0.24
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	100											
Actuated Cycle Length:	100											
Offset:	20 (20%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green											
Natural Cycle:	100											
Control Type:	Pretimed											
Maximum v/c Ratio:	0.33											
Intersection Signal Delay:	9.8						Intersection LOS: A					
Intersection Capacity Utilization:	62.6%						ICU Level of Service B					
Analysis Period (min)	15											
m	Volume for 95th percentile queue is metered by upstream signal.											

Splits and Phases: 5: King Street



HCM Unsignalized Intersection Capacity Analysis

1:

15/10/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↕	↔	↔
Volume (veh/h)	0	87	0	0	31	0
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	95	0	0	34	0
Pedestrians			1			10
Lane Width (m)			3.6			3.6
Walking Speed (m/s)			1.2			1.2
Percent Blockage			0			1
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	68	10			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	68	10			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	91			98	
cM capacity (veh/h)	921	1068			1636	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	95	0	34			
Volume Left	0	0	34			
Volume Right	95	0	0			
cSH	1068	1700	1636			
Volume to Capacity	0.09	0.00	0.02			
Queue Length 95th (m)	2.3	0.0	0.5			
Control Delay (s)	8.7	0.0	7.2			
Lane LOS	A		A			
Approach Delay (s)	8.7	0.0	7.2			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			8.3			
Intersection Capacity Utilization			18.6%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

2: Stone Street South

15/10/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↕	↔	↔	↔	↔	↕	↕	↔	↔	↔
Volume (veh/h)	25	0	12	3	4	6	13	85	0	0	28	25
Sign Control		Stop			Stop			Free			Free	
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	0	13	3	4	7	14	92	0	0	30	27
Pedestrians			10		5			6			4	
Lane Width (m)			3.6		3.6			3.6			3.6	
Walking Speed (m/s)			1.2		1.2			1.2			1.2	
Percent Blockage			1		0			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	187	180	60	189	193	101	68			97		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	187	180	60	189	193	101	68			97		
tC, single (s)	7.1	6.5	6.2	7.6	6.5	6.4	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	4.0	4.0	3.5	2.2			2.2		
p0 queue free %	96	100	99	99	99	99	99			100		
cM capacity (veh/h)	738	702	998	652	690	900	1534			1502		
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>								
Volume Total	40	14	107	58								
Volume Left	27	3	14	0								
Volume Right	13	7	0	27								
cSH	806	762	1534	1700								
Volume to Capacity	0.05	0.02	0.01	0.03								
Queue Length 95th (m)	1.3	0.5	0.2	0.0								
Control Delay (s)	9.7	9.8	1.0	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	9.7	9.8	1.0	0.0								
Approach LOS	A	A										
<b>Intersection Summary</b>												
Average Delay				2.9								
Intersection Capacity Utilization				Err%	ICU Level of Service	H						
Analysis Period (min)				15								

Lanes, Volumes, Timings

3: Stone Street South

15/10/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	86	272	54	63	251	112	34	57	72	106	59	73
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	35.0		0.0	30.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.97	0.99		0.97	0.94		0.94	0.97	
Frt		0.975			0.954			0.916			0.917	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	1676	0	1644	1642	0	1583	1544	0	1676	1588	0
Fit Permitted	0.417			0.455			0.623			0.628		
Satd. Flow (perm)	731	1676	0	763	1642	0	1006	1544	0	1036	1588	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			30			60				58
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	96.1			200.4			528.8			53.5		
Travel Time (s)		6.9			14.4			38.1				3.9
Confl. Peds. (#/hr)	8		32	32		8	19		39	39		19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	0%	4%	5%	0%	8%	2%	0%	2%	0%	1%
Adj. Flow (vph)	93	296	59	68	273	122	37	62	78	115	64	79
Shared Lane Traffic (%)												
Lane Group Flow (vph)	93	355	0	68	395	0	37	140	0	115	143	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Minimum Split (s)	10.0	52.0		10.0	52.0		9.0	29.0		9.0	29.0	
Total Split (s)	10.0	52.0		10.0	52.0		9.0	29.0		9.0	29.0	
Total Split (%)	10.0%	52.0%		10.0%	52.0%		9.0%	29.0%		9.0%	29.0%	
Maximum Green (s)	6.0	47.0		6.0	47.0		5.0	24.0		5.0	24.0	
Yellow Time (s)	4.0	3.0		4.0	3.0		4.0	3.0		4.0	3.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Walk Time (s)		13.0			13.0			7.0			7.0	
Flash Dont Walk (s)		14.0			14.0			17.0			17.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effect Green (s)	54.0	47.0		54.0	47.0		30.0	24.0		30.0	24.0	
Actuated g/C Ratio	0.54	0.47		0.54	0.47		0.30	0.24		0.30	0.24	
v/c Ratio	0.21	0.45		0.15	0.50		0.11	0.34		0.34	0.34	
Control Delay	10.6	19.2		13.9	22.9		23.4	20.7		27.4	21.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	10.6	19.2		13.9	22.9		23.4	20.7		27.4	21.2	
LOS	B	B		B	C		C	C		C	C	
Approach Delay		17.5			21.6			21.3			24.0	
Approach LOS		B			C			C			C	

Lanes, Volumes, Timings

3: Stone Street South

15/10/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (m)	7.9	44.9		6.1	43.1		5.1	13.1		16.5	14.0	
Queue Length 95th (m)	15.0	69.4		m15.6	72.5		12.3	30.4		30.1	31.4	
Internal Link Dist (m)		72.1			176.4			504.8			29.5	
Turn Bay Length (m)		30.0			35.0			30.0			35.0	
Base Capacity (vph)	451	795		464	787		330	416		342	425	
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	0.21	0.45		0.15	0.50		0.11	0.34		0.34	0.34	

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100
Offset:	20 (20%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	100
Control Type:	Pretimed
Maximum v/c Ratio:	0.50
Intersection Signal Delay:	20.6
Intersection LOS:	C
Intersection Capacity Utilization:	68.7%
ICU Level of Service:	C
Analysis Period (min):	15
m	Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Stone Street South



Lanes, Volumes, Timings

4: King Street

15/10/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔			↔	
Volume (vph)	21	396	34	25	370	63	9	14	19	130	22	41
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	60.0			0.0	0.0		0.0	0.0	0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99		0.95	1.00			0.96			0.94	
Frt		0.990			0.978			0.938			0.971	
Fit Protected		0.998		0.950				0.989			0.968	
Satd. Flow (prot)	0	1711	0	1710	1704	0	0	1541	0	0	1629	0
Fit Permitted		0.970		0.469				0.929			0.770	
Satd. Flow (perm)	0	1663	0	802	1704	0	0	1424	0	0	1263	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			18			21			13	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		200.4			204.6			117.4			55.1	
Travel Time (s)		14.4			14.7			8.5			4.0	
Confl. Peds. (#/hr)	6		60	60		6	61		19	19		61
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	3%	0%	0%	3%	2%	13%	8%	0%	1%	0%	0%
Adj. Flow (vph)	23	430	37	27	402	68	10	15	21	141	24	45
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	490	0	27	470	0	0	46	0	0	210	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases		2			6			8			4	
Minimum Split (s)	71.0	71.0		71.0	71.0		29.0	29.0		29.0	29.0	
Total Split (s)	71.0	71.0		71.0	71.0		29.0	29.0		29.0	29.0	
Total Split (%)	71.0%	71.0%		71.0%	71.0%		29.0%	29.0%		29.0%	29.0%	
Maximum Green (s)	66.0	66.0		66.0	66.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)		5.0		5.0	5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	11.0	11.0		11.0	11.0		8.0	8.0		8.0	8.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		66.0		66.0	66.0			24.0			24.0	
Actuated g/C Ratio		0.66		0.66	0.66			0.24			0.24	
v/c Ratio		0.45		0.05	0.42			0.13			0.67	
Control Delay		6.5		2.4	5.5			20.1			44.2	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		6.5		2.4	5.5			20.1			44.2	
LOS		A		A	A			C			D	
Approach Delay		6.5			5.4			20.1			44.2	
Approach LOS		A			A			C			D	

Lanes, Volumes, Timings

4: King Street

15/10/2013

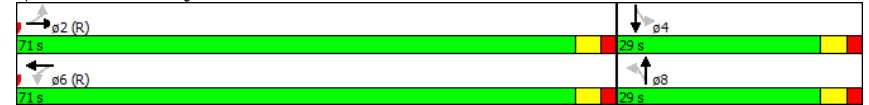


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (m)		51.4		0.6	49.8			4.0			36.6	
Queue Length 95th (m)		60.3		m1.4	65.4			13.4			#64.7	
Internal Link Dist (m)		176.4			180.6			93.4			31.1	
Turn Bay Length (m)				60.0								
Base Capacity (vph)		1100		529	1130			357			313	
Starvation Cap Reductn		0		0	0			0			0	
Spillback Cap Reductn		0		0	0			0			0	
Storage Cap Reductn		0		0	0			0			0	
Reduced v/c Ratio		0.45		0.05	0.42			0.13			0.67	

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100
Offset:	42 (42%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	100
Control Type:	Pretimed
Maximum v/c Ratio:	0.67
Intersection Signal Delay:	12.9
Intersection LOS:	B
Intersection Capacity Utilization:	71.1%
ICU Level of Service:	C
Analysis Period (min):	15
#	95th percentile volume exceeds capacity, queue may be longer.
	Queue shown is maximum after two cycles.
m	Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: King Street



Lanes, Volumes, Timings

5: King Street

15/10/2013

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↘		↖	↘			↖	↘		↖	↘
Volume (vph)	13	514	18	34	444	36	19	31	76	61	22	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	85.0		0.0	25.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.98	1.00			0.94				0.96
Frt		0.995			0.989			0.919				0.979
Fit Protected	0.950			0.950				0.992				0.970
Satd. Flow (prot)	1710	1737	0	1710	1741	0	0	1528	0	0	1697	0
Fit Permitted	0.407			0.371				0.949				0.751
Satd. Flow (perm)	723	1737	0	657	1741	0	0	1458	0	0	1270	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			9			71				9
Link Speed (k/h)		50			50			50				50
Link Distance (m)		204.6			68.0			118.0				53.5
Travel Time (s)		14.7			4.9			8.5				3.9
Confl. Peds. (#/hr)	18		25	25		18	11		33	33		11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	0%	0%	2%	0%	0%	3%	1%	0%	0%	0%
Adj. Flow (vph)	14	559	20	37	483	39	21	34	83	66	24	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	579	0	37	522	0	0	138	0	0	107	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2			6			8			4		
Minimum Split (s)	71.0	71.0		71.0	71.0		29.0	29.0		29.0	29.0	
Total Split (s)	71.0	71.0		71.0	71.0		29.0	29.0		29.0	29.0	
Total Split (%)	71.0%	71.0%		71.0%	71.0%		29.0%	29.0%		29.0%	29.0%	
Maximum Green (s)	66.0	66.0		66.0	66.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	16.0	16.0		16.0	16.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)	66.0	66.0		66.0	66.0		24.0	24.0		24.0	24.0	
Actuated g/C Ratio	0.66	0.66		0.66	0.66		0.24	0.24		0.24	0.24	
v/c Ratio	0.03	0.50		0.09	0.45		0.34	0.34		0.34	0.34	
Control Delay	4.2	7.1		6.8	9.6		18.6	18.6		32.5	32.5	
Queue Delay	0.0	0.1		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	4.2	7.3		6.8	9.6		18.6	18.6		32.5	32.5	
LOS	A	A		A	A		B	B		C	C	
Approach Delay		7.2			9.4			18.6			32.5	
Approach LOS		A			A			B			C	

Lanes, Volumes, Timings

5: King Street

15/10/2013

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (m)	0.8	36.5		2.4	45.4			10.9				16.6
Queue Length 95th (m)	m1.4	47.3		6.2	67.3			28.0				32.6
Internal Link Dist (m)		180.6			44.0			94.0				29.5
Turn Bay Length (m)		85.0			25.0							
Base Capacity (vph)	477	1147		433	1152			403				311
Starvation Cap Reductn	0	95		0	0			0				0
Spillback Cap Reductn	0	0		0	0			0				0
Storage Cap Reductn	0	0		0	0			0				0
Reduced v/c Ratio	0.03	0.55		0.09	0.45			0.34				0.34
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	100											
Actuated Cycle Length:	100											
Offset:	20 (20%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green											
Natural Cycle:	100											
Control Type:	Pretimed											
Maximum v/c Ratio:	0.50											
Intersection Signal Delay:	11.2											
Intersection LOS:	B											
Intersection Capacity Utilization:	56.5%											
ICU Level of Service:	B											
Analysis Period (min):	15											
m	Volume for 95th percentile queue is metered by upstream signal.											

Splits and Phases: 5: King Street



HCM Unsignalized Intersection Capacity Analysis

1:

15/10/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↕	↔	↕
Volume (veh/h)	0	56	4	2	100	5
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	61	4	2	109	5
Pedestrians	8				4	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.2				1.2	
Percent Blockage	1				0	
Right turn flare (veh)						
Median type		None			None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	236	17			15	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	236	17			15	
tC, single (s)	6.4	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	100	94			93	
cM capacity (veh/h)	700	1039			1606	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	61	7	114			
Volume Left	0	0	109			
Volume Right	61	2	0			
cSH	1039	1700	1606			
Volume to Capacity	0.06	0.00	0.07			
Queue Length 95th (m)	1.5	0.0	1.7			
Control Delay (s)	8.7	0.0	7.1			
Lane LOS	A		A			
Approach Delay (s)	8.7	0.0	7.1			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			7.4			
Intersection Capacity Utilization			24.7%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

2: Stone Street South

15/10/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↕	↔	↕	↔	↔	↕	↕	↔	↕	↕
Volume (veh/h)	38	0	24	0	3	3	15	58	0	0	93	20
Sign Control		Stop			Stop			Free			Free	
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	0	26	0	3	3	16	63	0	0	101	22
Pedestrians		17			7			5			3	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type							None				None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	232	232	134	246	242	73	140			70		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	232	232	134	246	242	73	140			70		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.7	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.8	2.3			2.2		
p0 queue free %	94	100	97	100	99	100	99			100		
cM capacity (veh/h)	692	651	904	668	642	863	1387			1534		
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>								
Volume Total	67	7	79	123								
Volume Left	41	0	16	0								
Volume Right	26	3	0	22								
cSH	761	736	1387	1700								
Volume to Capacity	0.09	0.01	0.01	0.07								
Queue Length 95th (m)	2.3	0.2	0.3	0.0								
Control Delay (s)	10.2	9.9	1.6	0.0								
Lane LOS	B	A	A									
Approach Delay (s)	10.2	9.9	1.6	0.0								
Approach LOS	B	A										
<b>Intersection Summary</b>												
Average Delay				3.2								
Intersection Capacity Utilization				Err%	ICU Level of Service	H						
Analysis Period (min)				15								