

**CLARENCE STREET
DEVELOPMENTS INC.**

Engineering Report
35970

Riverstone Development Traffic Impact Study



Prepared for Clarence Street Developments Inc.
by IBI Group

March 17, 2014

ENGINEERING REPORT
RIVERSTONE DEVELOPMENT TRAFFIC IMPACT STUDY
Prepared for Clarence Street Developments Inc.

Document Control Page

| | |
|--------------------------|--|
| CLIENT: | Clarence Street Developments Inc. |
| PROJECT NAME: | TIS Gananoque |
| REPORT TITLE: | Riverstone Development Traffic Impact Study |
| IBI REFERENCE: | 35970 |
| VERSION: | |
| DIGITAL MASTER: | J:\35970_TISGAN\10.0 Reports\CTR_35970_TIS_Gan.Report.docx |
| ORIGINATOR: | Nino Alvarez, Evan Mook E.I.T. |
| REVIEWER: | Scott Johnston, P. Eng. |
| AUTHORIZATION: | |
| CIRCULATION LIST: | |
| HISTORY: | |
| | |

Table of Contents

| | | |
|----------|---|-----------|
| 1 | INTRODUCTION | 1 |
| 1.1 | Purpose and Scope | 1 |
| 1.2 | Site Statistics | 2 |
| 2 | EXISTING CONDITIONS | 1 |
| 2.1 | Area Road Network..... | 1 |
| 2.2 | Traffic Volumes | 1 |
| 2.3 | Traffic Operations | 3 |
| 3 | FUTURE BACKGROUND CONDITIONS | 4 |
| 4 | FUTURE TOTAL CONDITIONS | 5 |
| 4.1 | Trip Generation and Distribution..... | 5 |
| 4.2 | Traffic Operations | 6 |
| 5 | Parking..... | 7 |
| 6 | Active Transportation..... | 8 |
| 7 | Summary..... | 8 |
| | APPENDIX A | 9 |
| | APPENDIX B | 10 |

Table of Figures

| | |
|---|---|
| Exhibit 1: Study Area and Development Site..... | 1 |
| Exhibit 2: Building Statistics..... | 2 |
| Exhibit 3: Conceptual Site Plan..... | 1 |
| Exhibit 4: Baseline Traffic Volumes AM (PM)..... | 2 |
| Exhibit 5: Projected Summer Background Traffic Volumes AM (PM)..... | 3 |
| Exhibit 6: Intersection Level of Service for Unsignalized Intersection (2000 HCM)..... | 3 |
| Exhibit 7: Existing Conditions Performance, King St @ Main St (unsignalized)..... | 4 |
| Exhibit 8: Summer Conditions Performance, King St @ Main St (unsignalized)..... | 4 |
| Exhibit 9: Future Background Summer Traffic Volumes AM (PM)..... | 5 |
| Exhibit 10: ITE Rates for Proposed Development Components..... | 5 |
| Exhibit 11: Trips Generated by the Proposed Development..... | 5 |
| Exhibit 12: Site Generated Traffic AM (PM)..... | 6 |
| Exhibit 13: Future Total Traffic Volumes AM (PM)..... | 6 |
| Exhibit 14: Future Total Conditions Performance for King St @ Main St (unsignalized)..... | 7 |
| Exhibit 15: Proposed Parking Allocation..... | 7 |

1 INTRODUCTION

1.1 Purpose and Scope

This report presents a traffic impact study of the proposed Riverstone Development by Clarence Street Developments Inc. near the intersection of Clarence Street and Mill Street in the Town of Gananoque, Ontario.

The study base year is 2014 and this report provides an analysis of a five year horizon beyond the estimated development completion year (2016) to the year 2021. Traffic analysis focuses on intersection operations with and without the proposed development in order to facilitate a clear idea of the effects of site traffic. Analysis time periods are weekday AM and PM peak hours. As outlined in the Town of Gananoque's "Scope of Work for Traffic Impact Studies", the study period will represent the traffic scenario that occurs during the peak summer tourist season.

Exhibit 1: Study Area and Development Site



1.2 Site Statistics

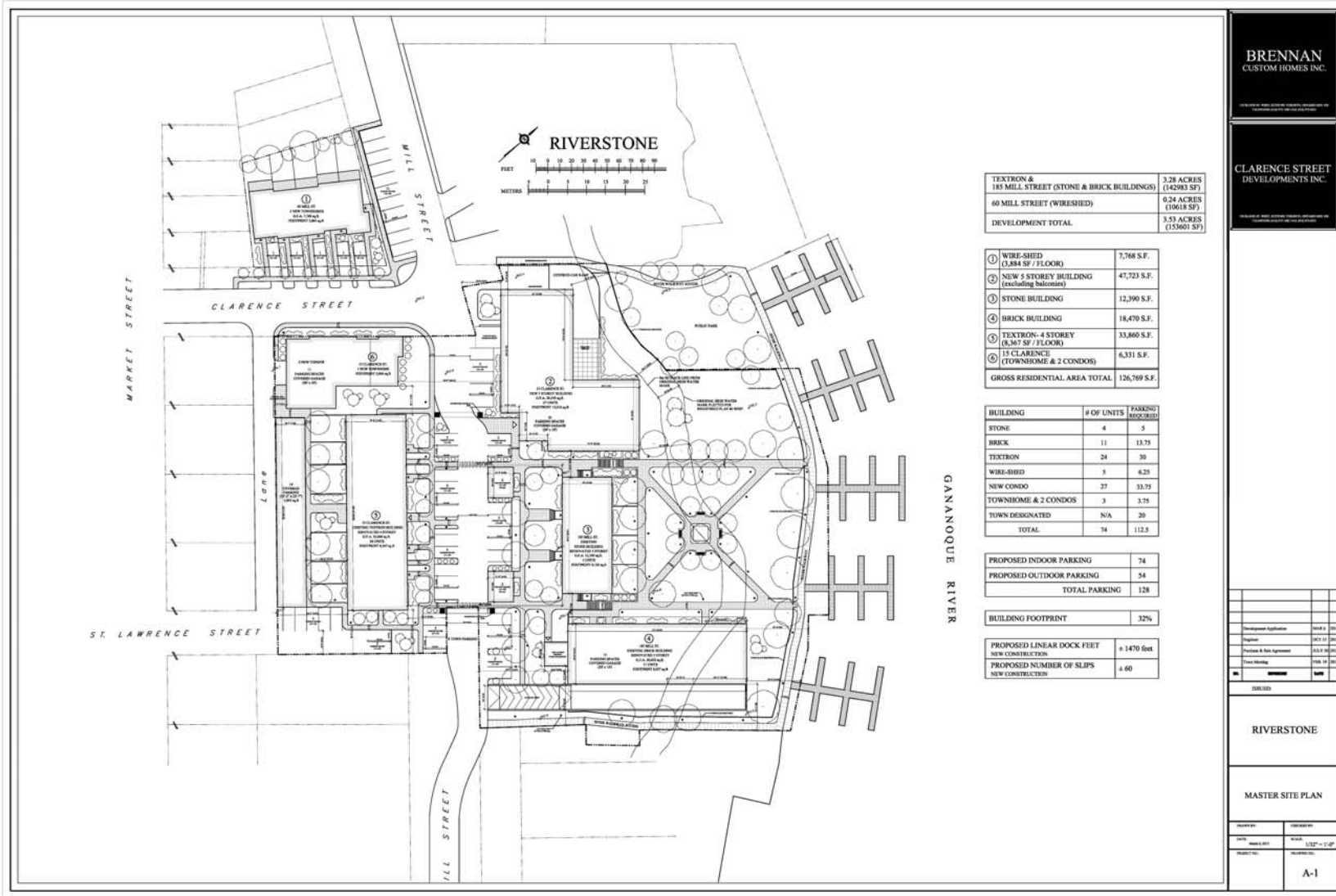
This is a residential development with six proposed separate buildings including low rise apartments and townhouses that will have a total of 74 separate dwelling units. The conceptual site plan for the development can be found below as Exhibit 3. The table below summarizes the individual building statistics.

Exhibit 2: Building Statistics

| BUILDING ID | TYPE | #UNITS |
|---------------|--------------------|-----------|
| 1 | Apartments | 5 |
| 2 | Apartments | 27 |
| 3 | Townhomes | 4 |
| 4 | Apartments | 11 |
| 5 | Apartments | 24 |
| 6 | Townhomes & Condos | 3 |
| Total: | | 74 |

ENGINEERING REPORT
 RIVERSTONE DEVELOPMENT TRAFFIC IMPACT STUDY
 Prepared for Clarence Street Developments Inc.

Exhibit 3: Conceptual Site Plan



2 EXISTING CONDITIONS

This section provides the analysis of the current traffic conditions within the study area. Existing traffic volumes are listed in Section 2.2 and the Synchro analysis results are summarized in Section 2.3.

2.1 Area Road Network

King Street is an east-west major collector that runs through the entire town and turns into Highway 2 at the east and west boundaries. In the vicinity of the development, King Street has one lane of traffic in either direction and has a total pavement width of 8.0m.

Water Street is an east-west local road that runs along the shoreline of Lake Ontario and has a one lane bridge over the Gananoque River. Water Street has a total pavement width of 8.0m.

Main Street is a north-south local road that connects King Street to Water Street. It has one lane in either direction and has a total pavement width of 10.0m with on-street parking on both sides.

Clarence Street is an east-west local road that is parallel to, and in between King Street and Water Street. It has one lane in either direction and has a total pavement width of 7.0m.

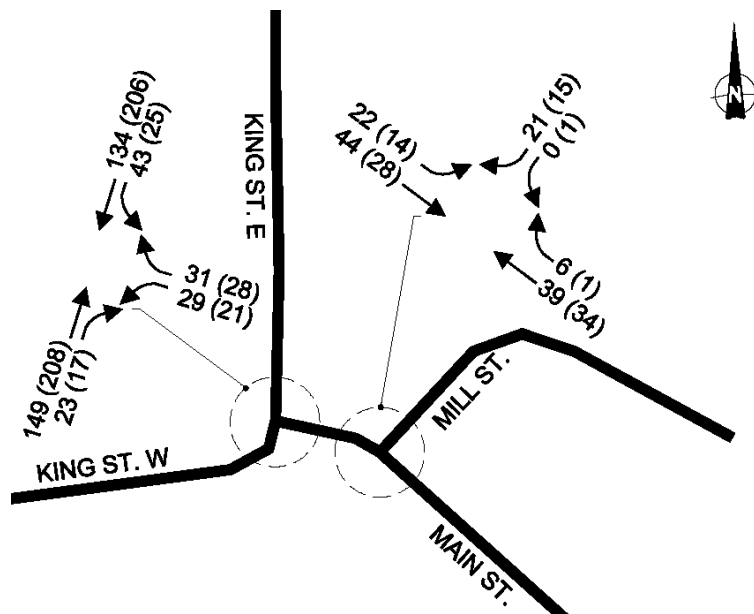
Mill Street is a north-south local road that runs parallel to Main Street and ends at Clarence Street. It has one lane in either direction and has a total pavement width of 7.0m.

The critical intersection of this study will be King Street at Main Street. This is a three-legged intersection with a stop condition for Mill Street at King Street. King Street has free through movements at this intersection.

2.2 Traffic Volumes

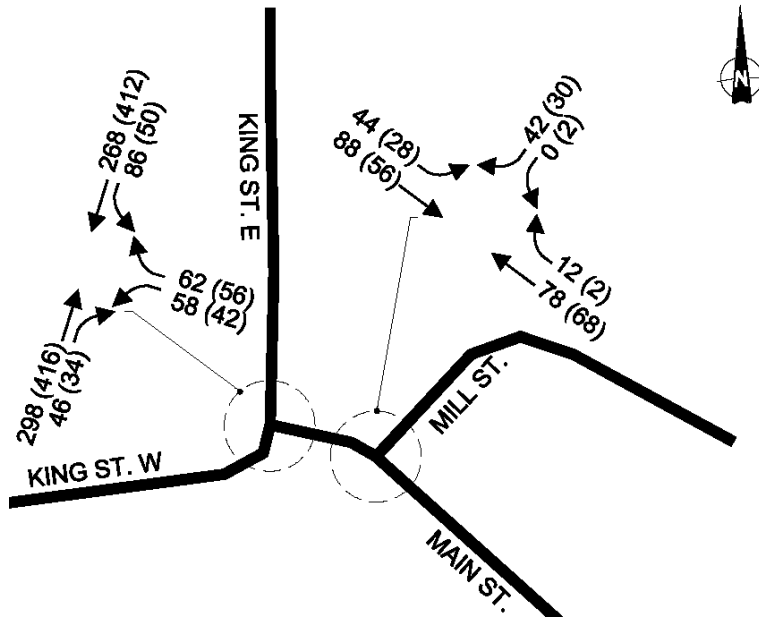
Relevant existing traffic data was not available from the Town of Gananoque so IBI Group has completed traffic counts. Traffic counts were taken from 4:00-6:00pm on March 5, 2014 and from 8:00-10:00am on March 6, 2014 for the intersection of King Street and Main Street and Main Street and Mill Street. From these counts, peak hour (AM & PM) turning movement volumes were determined as a baseline for the study. The baseline traffic volumes derived from the IBI Group traffic count are summarized in the figure below.

Exhibit 4: Baseline Traffic Volumes AM (PM)



In order to best represent the peak summer and tourist traffic, we have applied a factor of 2.0 to the baseline volume data. This factor has been selected from the MTO 2010 Seasonal Variation Graphs (Appendix B) and represents the worst case scenario presented in these graphs (High Tourist, June). The projected summer background traffic volumes are summarized in the figure below.

Exhibit 5: Projected Summer Background Traffic Volumes AM (PM)



2.3 Traffic Operations

The traffic operations were modelled using Synchro7 software. The correspondence between level of service and delay is provided in the following table.

Exhibit 6: Intersection Level of Service for Unsignalized Intersection (2000 HCM)

| LOS | CONTROL DELAY PER VEHICLE (SECONDS) |
|-----|-------------------------------------|
| A | ≤10 |
| B | >10 and ≤15 |
| C | >15 and ≤25 |
| D | >25 and ≤35 |
| E | >35 and ≤50 |
| F | >50 |

The analysis of the results is summarized in the following tables and the full result output can be viewed in Appendix A.

The existing conditions performance was determined using the traffic volumes observed in the field and the results are summarized in the table below.

Exhibit 7: Existing Conditions Performance, King St @ Main St (unsignalized)

| Movement | LOS | | V/C Ratio | | 95 th Percentile Queue (m) | |
|----------|-------|-------|-----------|-------|---------------------------------------|-------|
| | AM PK | PM PK | AM PK | PM PK | AM PK | PM PK |
| EBTR | - | - | 0.11 | 0.14 | - | - |
| WBT | - | - | 0.09 | 0.13 | - | - |
| WBL | A | A | 0.03 | 0.02 | 0.8 | 0.5 |
| NBL | B | B | 0.05 | 0.04 | 1.3 | 1.1 |
| NBR | A | A | 0.04 | 0.04 | 0.9 | 0.9 |

A factor of 2.0 was applied to the baseline traffic volumes to produce a scenario that best represents the busy summer tourist season. The existing summer performance is summarized in the table below.

Exhibit 8: Summer Conditions Performance, King St @ Main St (unsignalized)

| Movement | LOS | | V/C Ratio | | 95 th Percentile Queue (m) | |
|----------|-------|-------|-----------|-------|---------------------------------------|-------|
| | AM PK | PM PK | AM PK | PM PK | AM PK | PM PK |
| EBTR | - | - | 0.22 | 0.29 | - | - |
| WBT | - | - | 0.17 | 0.26 | - | - |
| WBL | A | A | 0.08 | 0.05 | 1.9 | 1.2 |
| NBL | C | C | 0.20 | 0.19 | 5.6 | 5.0 |
| NBR | B | B | 0.10 | 0.10 | 2.4 | 2.6 |

All of the movements for the existing summer projection operate within a reasonable level of service (LOS) and volume to capacity ratio. There will be some minor queue's for the movements from Main Street to King Street.

3 FUTURE BACKGROUND CONDITIONS

This section provides the analysis of the future projected traffic without the subject development. It is anticipated that the development will be completed by 2016, so the 5-year post-completion horizon will be taken as 2021. For future projections, a suggested growth rate for Gananoque is not included in the "Scope of Work for Traffic Impact Studies", therefore growth rates have been applied to the existing projected summer volumes to reflect a 1.3% linear (non-compounded) growth per year (from City of Kingston Guidelines).

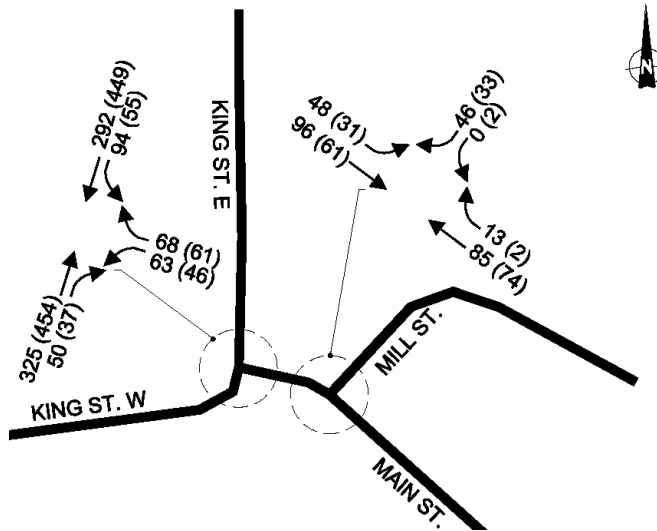
For projecting traffic from 2014 (year of baseline count data) to 2021 the growth factor can be calculated:

$$GF = 1 + 0.013 * 7$$

$$= 1.091$$

The future (2021) background summer traffic volumes are represented in the figure below.

Exhibit 9: Future Background Summer Traffic Volumes AM (PM)



4 FUTURE TOTAL CONDITIONS

4.1 Trip Generation and Distribution

The proposed development consists of various residential buildings consisting of low rise apartments and townhouses and a total of 74 separate dwelling units. To determine the peak hour trips generated by such a development, standard trip rates from the ITE Trip Generation Manual, 8th Edition were used. The assumed land use for the site is considered to be low rise residential condominiums and townhouses (use #231). The rates used are summarized below and are applied to the number of dwelling units.

Exhibit 10: ITE Rates for Proposed Development Components

| Type | Code | Rate Type | AM | | | PM | | |
|---------------------------|------|-------------|-------|-------|------|-------|-------|------|
| | | | total | enter | exit | total | enter | exit |
| Low-Rise Condo/Townhouses | 231 | PKHR ADJ | 0.67 | 0.25 | 0.75 | 0.78 | 0.58 | 0.42 |

Using the above rates multiplied by the total number of dwelling units for the development, the number of peak hour trips generated by the proposed development are calculated below.

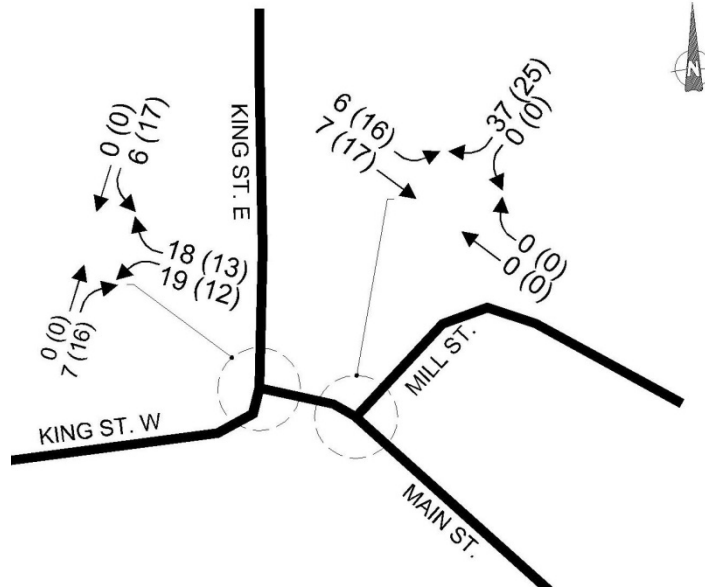
Exhibit 11: Trips Generated by the Proposed Development

| Type | #Units | AM PEAK | | PM PEAK | |
|---------------------------|--------|---------|-----|---------|-----|
| | | in | out | in | out |
| Low-Rise Condo/Townhouses | 74 | 13 | 37 | 33 | 25 |

For this study, it is assumed that all of site generated traffic will be directed to (or coming from) the intersection of King Street & Main Street. The distribution beyond that will follow the existing trends on King Street which is approximately a 50/50 split in east/west traffic. This development may produce the odd vehicle trip towards the Water Street bridge to the south, however the

number of trips to this direction is expected to be minimal due to lack of traffic generators or attractions in that area (east of Gananoque River). The site generated traffic distribution is summarized in the figure below.

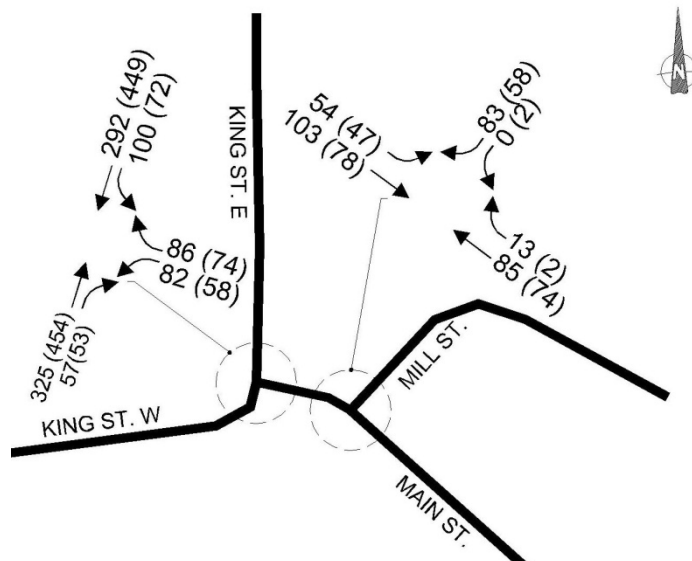
Exhibit 12: Site Generated Traffic AM (PM)



4.2 Traffic Operations

The future total conditions reflect the traffic levels in the year 2021 in the summer tourist season with the background growth as well as the additional traffic produced by the new development. The future total summer projected traffic volumes are summarized below.

Exhibit 13: Future Total Traffic Volumes AM (PM)



The analysis of the results of the future total summer conditions in 2021 are summarized below. The entire results can be found in Appendix A.

Exhibit 14: Future Total Conditions Performance for King St @ Main St (unsignalized)

| Movement | LOS | | V/C Ratio | | 95 th Percentile Queue (m) | |
|----------|-------|-------|-----------|-------|---------------------------------------|-------|
| | AM PK | PM PK | AM PK | PM PK | AM PK | PM PK |
| EBTR | - | - | 0.24 | 0.32 | - | - |
| WBT | - | - | 0.19 | 0.29 | - | - |
| WBL | A | A | 0.10 | 0.08 | 2.4 | 1.9 |
| NBL | C | D | 0.33 | 0.32 | 10.5 | 9.9 |
| NBR | B | B | 0.14 | 0.15 | 3.7 | 3.8 |

The analysis indicates that the northbound left turn from Main Street onto King Street is expected to deteriorate to level-of-service ‘D’ during the PM peak time, indicating delays of 32 seconds. The 95th percentile queue length of 10.5m for this movement will remain in the 15m designated left turn lane on Main Street. The intersection of Main Street and Mill Street is set back approximately 20m from the stop bar on Main Street at King Street, therefore the queue’s of the northbound movements of Main Street are not anticipated to interfere with this adjacent intersection. This level of service is acceptable considering it represents future ‘worst-case’ conditions.

5 Parking

The following table summarizes the required parking. The Town has requested that the development provides an additional 20 parking spaces to the requirement. The development has satisfied the Town of Gananoque’s residential parking requirements by providing 74 indoor spaces and 54 outdoor spaces, for a total of 128 spaces.

Exhibit 15: Proposed Parking Allocation

| BUILDING ID | # UNITS | #PARKING SPOTS REQUIRED |
|-----------------|-----------|-------------------------|
| 1 | 5 | 6.25 |
| 2 | 27 | 33.75 |
| 3 | 4 | 5 |
| 4 | 11 | 13.75 |
| 5 | 24 | 30 |
| 6 | 3 | 3.75 |
| Town Additional | - | 20 |
| Total: | 74 | 112.5 |

6 Active Transportation

The proposed development will be close to the downtown core of Gananoque. The surrounding area and Town itself is generally compact with many resources and activities within walking distance. The anticipated pedestrian route to the downtown core is serviced by sidewalks. The shoreline of Lake Ontario is only 100m from the development site and the Gananoque Boat Lines are nearby as well.

7 Summary

Based on the analysis carried out for this report, the development will have a small impact on the operation of the intersection of King Street & Main Street but is not significant enough to warrant any upgrades to the intersection. The LOS of the anticipated movements in the future total summer scenario remain the same as the existing projected summer scenario except for the northbound left turn from Main Street to King Street. This movement has been downgraded to a LOS 'D' for the PM peak hour, which is still acceptable under the current conditions.

The intersection of Mill Street and Main Street currently operates at LOS A and will continue to do so for the future summer (2021) scenario, 5 years after the projected development is completed.

The development is anticipated to produce minimal amounts of vehicle trips towards the Water Street bridge and is not expected to have an impact on peak hour traffic operations in this area.

Assessment prepared by:

Reviewed by:



Evan Mook, E.I.T.

Scott Johnston, P.Eng
Associate

ENGINEERING REPORT
RIVERSTONE DEVELOPMENT TRAFFIC IMPACT STUDY
Prepared for Clarence Street Developments Inc.

APPENDIX A

Synchro7 Output (Intersection Performances Evaluation using HCM Methodology)

HCM Unsignalized Intersection Capacity Analysis

1: Main St & King St W

3/6/2014



| Movement | NWL | NWR | NET | NER | SWL | SWT |
|-----------------------------------|------|------|-------|------|----------------------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 29 | 31 | 149 | 23 | 43 | 134 |
| 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) | 32 | 34 | 162 | 25 | 47 | 146 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 414 | 174 | | | 187 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 414 | 174 | | | 187 | |
| tC, single (s) | 6.4 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 95 | 96 | | | 97 | |
| cM capacity (veh/h) | 575 | 869 | | | 1387 | |
| Direction, Lane # | NW 1 | NW 2 | NE 1 | SW 1 | SW 2 | |
| Volume Total | 32 | 34 | 187 | 47 | 146 | |
| Volume Left | 32 | 0 | 0 | 47 | 0 | |
| Volume Right | 0 | 34 | 25 | 0 | 0 | |
| cSH | 575 | 869 | 1700 | 1387 | 1700 | |
| Volume to Capacity | 0.05 | 0.04 | 0.11 | 0.03 | 0.09 | |
| Queue Length 95th (m) | 1.3 | 0.9 | 0.0 | 0.8 | 0.0 | |
| Control Delay (s) | 11.6 | 9.3 | 0.0 | 7.7 | 0.0 | |
| Lane LOS | B | A | | A | | |
| Approach Delay (s) | 10.4 | | 0.0 | 1.9 | | |
| Approach LOS | B | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 2.3 | | | |
| Intersection Capacity Utilization | | | 25.9% | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis

6: Main St & Mill St

3/6/2014



| Movement | SEL | SET | NWT | NWR | SWL | SWR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↑ | ↔ | | ↔ | |
| Volume (veh/h) | 0 | 66 | 39 | 6 | 0 | 21 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 72 | 42 | 7 | 0 | 23 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage veh | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 49 | | | | 117 | 46 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 49 | | | | 117 | 46 |
| tC, single (s) | 4.1 | | | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 100 | | | | 100 | 98 |
| cM capacity (veh/h) | 1558 | | | | 879 | 1024 |

| Direction, Lane # | SE 1 | NW 1 | SW 1 |
|-----------------------|------|------|------|
| Volume Total | 72 | 49 | 23 |
| Volume Left | 0 | 0 | 0 |
| Volume Right | 0 | 7 | 23 |
| cSH | 1700 | 1700 | 1024 |
| Volume to Capacity | 0.04 | 0.03 | 0.02 |
| Queue Length 95th (m) | 0.0 | 0.0 | 0.5 |
| Control Delay (s) | 0.0 | 0.0 | 8.6 |
| Lane LOS | | | A |
| Approach Delay (s) | 0.0 | 0.0 | 8.6 |
| Approach LOS | | | A |

| Intersection Summary | | | |
|-----------------------------------|--|-------|----------------------|
| Average Delay | | 1.4 | |
| Intersection Capacity Utilization | | 13.5% | ICU Level of Service |
| Analysis Period (min) | | 15 | A |

HCM Unsignalized Intersection Capacity Analysis

1: Main St & King St W

3/6/2014



| Movement | NWL | NWR | NET | NER | SWL | SWT |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 21 | 28 | 208 | 17 | 25 | 206 |
| 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) | 23 | 30 | 226 | 18 | 27 | 224 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 514 | 235 | | | 245 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 514 | 235 | | | 245 | |
| tC, single (s) | 6.4 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 96 | 96 | | | 98 | |
| cM capacity (veh/h) | 510 | 804 | | | 1322 | |

| Direction, Lane # | NW 1 | NW 2 | NE 1 | SW 1 | SW 2 |
|-----------------------|------|------|------|------|------|
| Volume Total | 23 | 30 | 245 | 27 | 224 |
| Volume Left | 23 | 0 | 0 | 27 | 0 |
| Volume Right | 0 | 30 | 18 | 0 | 0 |
| cSH | 510 | 804 | 1700 | 1322 | 1700 |
| Volume to Capacity | 0.04 | 0.04 | 0.14 | 0.02 | 0.13 |
| Queue Length 95th (m) | 1.1 | 0.9 | 0.0 | 0.5 | 0.0 |
| Control Delay (s) | 12.4 | 9.7 | 0.0 | 7.8 | 0.0 |
| Lane LOS | B | A | | A | |
| Approach Delay (s) | 10.8 | | 0.0 | 0.8 | |
| Approach LOS | B | | | | |

| Intersection Summary | | | | | |
|-----------------------------------|--|--|-------|----------------------|---|
| Average Delay | | | 1.4 | | |
| Intersection Capacity Utilization | | | 28.6% | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | |

HCM Unsignalized Intersection Capacity Analysis

6: Main St & Mill St

3/6/2014



| Movement | SEL | SET | NWT | NWR | SWL | SWR |
|-----------------------------------|-------------|-------------|-------------|------|----------------------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 14 | 28 | 34 | 1 | 1 | 15 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 15 | 30 | 37 | 1 | 1 | 16 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage veh | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 38 | | | | 98 | 38 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 38 | | | | 98 | 38 |
| tC, single (s) | 4.1 | | | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 99 | | | | 100 | 98 |
| cM capacity (veh/h) | 1572 | | | | 892 | 1035 |
| Direction, Lane # | SE 1 | NW 1 | SW 1 | | | |
| Volume Total | 46 | 38 | 17 | | | |
| Volume Left | 15 | 0 | 1 | | | |
| Volume Right | 0 | 1 | 16 | | | |
| cSH | 1572 | 1700 | 1024 | | | |
| Volume to Capacity | 0.01 | 0.02 | 0.02 | | | |
| Queue Length 95th (m) | 0.2 | 0.0 | 0.4 | | | |
| Control Delay (s) | 2.5 | 0.0 | 8.6 | | | |
| Lane LOS | A | | A | | | |
| Approach Delay (s) | 2.5 | 0.0 | 8.6 | | | |
| Approach LOS | | | A | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 2.6 | | | |
| Intersection Capacity Utilization | | | 18.9% | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis

1: Main St & King St W

3/6/2014



| Movement | NWL | NWR | NET | NER | SWL | SWT |
|-----------------------------------|------|------|-------|------|----------------------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 58 | 62 | 298 | 46 | 86 | 268 |
| 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) | 63 | 67 | 324 | 50 | 93 | 291 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 827 | 349 | | | 374 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 827 | 349 | | | 374 | |
| tC, single (s) | 6.4 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 80 | 90 | | | 92 | |
| cM capacity (veh/h) | 314 | 694 | | | 1185 | |
| Direction, Lane # | NW 1 | NW 2 | NE 1 | SW 1 | SW 2 | |
| Volume Total | 63 | 67 | 374 | 93 | 291 | |
| Volume Left | 63 | 0 | 0 | 93 | 0 | |
| Volume Right | 0 | 67 | 50 | 0 | 0 | |
| cSH | 314 | 694 | 1700 | 1185 | 1700 | |
| Volume to Capacity | 0.20 | 0.10 | 0.22 | 0.08 | 0.17 | |
| Queue Length 95th (m) | 5.6 | 2.4 | 0.0 | 1.9 | 0.0 | |
| Control Delay (s) | 19.3 | 10.7 | 0.0 | 8.3 | 0.0 | |
| Lane LOS | C | B | | A | | |
| Approach Delay (s) | 14.9 | | 0.0 | 2.0 | | |
| Approach LOS | B | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 3.1 | | | |
| Intersection Capacity Utilization | | | 36.6% | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis

6: Main St & Mill St

3/6/2014



| Movement | SEL | SET | NWT | NWR | SWL | SWR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 44 | 88 | 78 | 12 | 0 | 42 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 48 | 96 | 85 | 13 | 0 | 46 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage veh | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 98 | | | | 283 | 91 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 98 | | | | 283 | 91 |
| tC, single (s) | 4.1 | | | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 97 | | | | 100 | 95 |
| cM capacity (veh/h) | 1495 | | | | 685 | 966 |

| Direction, Lane # | SE 1 | NW 1 | SW 1 |
|-----------------------|------|------|------|
| Volume Total | 143 | 98 | 46 |
| Volume Left | 48 | 0 | 0 |
| Volume Right | 0 | 13 | 46 |
| cSH | 1495 | 1700 | 966 |
| Volume to Capacity | 0.03 | 0.06 | 0.05 |
| Queue Length 95th (m) | 0.8 | 0.0 | 1.1 |
| Control Delay (s) | 2.7 | 0.0 | 8.9 |
| Lane LOS | A | | A |
| Approach Delay (s) | 2.7 | 0.0 | 8.9 |
| Approach LOS | | | A |

| Intersection Summary | | | |
|-----------------------------------|-------|-----|----------------------|
| Average Delay | | 2.8 | |
| Intersection Capacity Utilization | 23.7% | | ICU Level of Service |
| Analysis Period (min) | | 15 | A |

HCM Unsignalized Intersection Capacity Analysis

1: Main St & King St W

3/6/2014



| Movement | NWL | NWR | NET | NER | SWL | SWT |
|-----------------------------------|------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 42 | 56 | 416 | 34 | 50 | 412 |
| 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) | 46 | 61 | 452 | 37 | 54 | 448 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1027 | 471 | | | 489 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1027 | 471 | | | 489 | |
| tC, single (s) | 6.4 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 81 | 90 | | | 95 | |
| cM capacity (veh/h) | 246 | 593 | | | 1074 | |
| Direction, Lane # | NW 1 | NW 2 | NE 1 | SW 1 | SW 2 | |
| Volume Total | 46 | 61 | 489 | 54 | 448 | |
| Volume Left | 46 | 0 | 0 | 54 | 0 | |
| Volume Right | 0 | 61 | 37 | 0 | 0 | |
| cSH | 246 | 593 | 1700 | 1074 | 1700 | |
| Volume to Capacity | 0.19 | 0.10 | 0.29 | 0.05 | 0.26 | |
| Queue Length 95th (m) | 5.0 | 2.6 | 0.0 | 1.2 | 0.0 | |
| Control Delay (s) | 22.9 | 11.8 | 0.0 | 8.5 | 0.0 | |
| Lane LOS | C | B | | A | | |
| Approach Delay (s) | 16.5 | | 0.0 | 0.9 | | |
| Approach LOS | C | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 2.0 | | | |
| Intersection Capacity Utilization | | | 40.6% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis

6: Main St & Mill St

3/6/2014



| Movement | SEL | SET | NWT | NWR | SWL | SWR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 28 | 56 | 68 | 2 | 2 | 30 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 30 | 61 | 74 | 2 | 2 | 33 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage veh | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 76 | | | | 197 | 75 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 76 | | | | 197 | 75 |
| tC, single (s) | 4.1 | | | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 98 | | | | 100 | 97 |
| cM capacity (veh/h) | 1523 | | | | 776 | 986 |

| Direction, Lane # | SE 1 | NW 1 | SW 1 |
|-----------------------|------|------|------|
| Volume Total | 91 | 76 | 35 |
| Volume Left | 30 | 0 | 2 |
| Volume Right | 0 | 2 | 33 |
| cSH | 1523 | 1700 | 970 |
| Volume to Capacity | 0.02 | 0.04 | 0.04 |
| Queue Length 95th (m) | 0.5 | 0.0 | 0.8 |
| Control Delay (s) | 2.6 | 0.0 | 8.8 |
| Lane LOS | A | | A |
| Approach Delay (s) | 2.6 | 0.0 | 8.8 |
| Approach LOS | | | A |

| Intersection Summary | | | |
|-----------------------------------|--|-------|----------------------|
| Average Delay | | 2.7 | |
| Intersection Capacity Utilization | | 21.2% | ICU Level of Service |
| Analysis Period (min) | | 15 | A |

HCM Unsignalized Intersection Capacity Analysis

1: Main St & King St W

3/7/2014



| Movement | NWL | NWR | NET | NER | SWL | SWT |
|-----------------------------------|------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 63 | 68 | 325 | 50 | 94 | 292 |
| 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) | 68 | 74 | 353 | 54 | 102 | 317 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 902 | 380 | | | 408 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 902 | 380 | | | 408 | |
| tC, single (s) | 6.4 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 76 | 89 | | | 91 | |
| cM capacity (veh/h) | 281 | 667 | | | 1151 | |
| Direction, Lane # | NW 1 | NW 2 | NE 1 | SW 1 | SW 2 | |
| Volume Total | 68 | 74 | 408 | 102 | 317 | |
| Volume Left | 68 | 0 | 0 | 102 | 0 | |
| Volume Right | 0 | 74 | 54 | 0 | 0 | |
| cSH | 281 | 667 | 1700 | 1151 | 1700 | |
| Volume to Capacity | 0.24 | 0.11 | 0.24 | 0.09 | 0.19 | |
| Queue Length 95th (m) | 7.1 | 2.8 | 0.0 | 2.2 | 0.0 | |
| Control Delay (s) | 21.9 | 11.1 | 0.0 | 8.4 | 0.0 | |
| Lane LOS | C | B | | A | | |
| Approach Delay (s) | 16.3 | | 0.0 | 2.1 | | |
| Approach LOS | C | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 3.3 | | | |
| Intersection Capacity Utilization | | | 38.8% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis

6: Main St & Mill St

3/7/2014



| Movement | SEL | SET | NWT | NWR | SWL | SWR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 48 | 96 | 85 | 13 | 0 | 46 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 52 | 104 | 92 | 14 | 0 | 50 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage veh | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 107 | | | | 308 | 99 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 107 | | | | 308 | 99 |
| tC, single (s) | 4.1 | | | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 96 | | | | 100 | 95 |
| cM capacity (veh/h) | 1484 | | | | 660 | 956 |

| Direction, Lane # | SE 1 | NW 1 | SW 1 |
|-----------------------|------|------|------|
| Volume Total | 157 | 107 | 50 |
| Volume Left | 52 | 0 | 0 |
| Volume Right | 0 | 14 | 50 |
| cSH | 1484 | 1700 | 956 |
| Volume to Capacity | 0.04 | 0.06 | 0.05 |
| Queue Length 95th (m) | 0.8 | 0.0 | 1.3 |
| Control Delay (s) | 2.7 | 0.0 | 9.0 |
| Lane LOS | A | | A |
| Approach Delay (s) | 2.7 | 0.0 | 9.0 |
| Approach LOS | | | A |

| Intersection Summary | | | |
|-----------------------------------|-------|-----|------------------------|
| Average Delay | | 2.8 | |
| Intersection Capacity Utilization | 24.4% | | ICU Level of Service A |
| Analysis Period (min) | | 15 | |

HCM Unsignalized Intersection Capacity Analysis

1: Main St & King St W

3/7/2014



| Movement | NWL | NWR | NET | NER | SWL | SWT |
|-----------------------------------|------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 46 | 61 | 454 | 37 | 55 | 449 |
| 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) | 50 | 66 | 493 | 40 | 60 | 488 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1121 | 514 | | | 534 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1121 | 514 | | | 534 | |
| tC, single (s) | 6.4 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 77 | 88 | | | 94 | |
| cM capacity (veh/h) | 215 | 561 | | | 1034 | |
| Direction, Lane # | NW 1 | NW 2 | NE 1 | SW 1 | SW 2 | |
| Volume Total | 50 | 66 | 534 | 60 | 488 | |
| Volume Left | 50 | 0 | 0 | 60 | 0 | |
| Volume Right | 0 | 66 | 40 | 0 | 0 | |
| cSH | 215 | 561 | 1700 | 1034 | 1700 | |
| Volume to Capacity | 0.23 | 0.12 | 0.31 | 0.06 | 0.29 | |
| Queue Length 95th (m) | 6.6 | 3.0 | 0.0 | 1.4 | 0.0 | |
| Control Delay (s) | 26.8 | 12.3 | 0.0 | 8.7 | 0.0 | |
| Lane LOS | D | B | | A | | |
| Approach Delay (s) | 18.5 | | 0.0 | 0.9 | | |
| Approach LOS | C | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 2.2 | | | |
| Intersection Capacity Utilization | | | 42.8% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis

6: Main St & Mill St

3/7/2014



| Movement | SEL | SET | NWT | NWR | SWL | SWR |
|-----------------------------------|-------------|-------------|-------------|------|----------------------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 31 | 61 | 74 | 2 | 2 | 33 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 34 | 66 | 80 | 2 | 2 | 36 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage veh | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 83 | | | | 215 | 82 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 83 | | | | 215 | 82 |
| tC, single (s) | 4.1 | | | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 98 | | | | 100 | 96 |
| cM capacity (veh/h) | 1515 | | | | 756 | 978 |
| Direction, Lane # | SE 1 | NW 1 | SW 1 | | | |
| Volume Total | 100 | 83 | 38 | | | |
| Volume Left | 34 | 0 | 2 | | | |
| Volume Right | 0 | 2 | 36 | | | |
| cSH | 1515 | 1700 | 962 | | | |
| Volume to Capacity | 0.02 | 0.05 | 0.04 | | | |
| Queue Length 95th (m) | 0.5 | 0.0 | 0.9 | | | |
| Control Delay (s) | 2.6 | 0.0 | 8.9 | | | |
| Lane LOS | A | | A | | | |
| Approach Delay (s) | 2.6 | 0.0 | 8.9 | | | |
| Approach LOS | | | A | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 2.7 | | | |
| Intersection Capacity Utilization | | | 21.6% | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis

1: Main St & King St W

3/12/2014



| Movement | NWL | NWR | NET | NER | SWL | SWT |
|-----------------------------------|------|------|-------|------|----------------------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 82 | 86 | 325 | 57 | 100 | 292 |
| 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) | 89 | 93 | 353 | 62 | 109 | 317 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 919 | 384 | | | 415 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 919 | 384 | | | 415 | |
| tC, single (s) | 6.4 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 67 | 86 | | | 90 | |
| cM capacity (veh/h) | 273 | 663 | | | 1144 | |
| Direction, Lane # | NW 1 | NW 2 | NE 1 | SW 1 | SW 2 | |
| Volume Total | 89 | 93 | 415 | 109 | 317 | |
| Volume Left | 89 | 0 | 0 | 109 | 0 | |
| Volume Right | 0 | 93 | 62 | 0 | 0 | |
| cSH | 273 | 663 | 1700 | 1144 | 1700 | |
| Volume to Capacity | 0.33 | 0.14 | 0.24 | 0.10 | 0.19 | |
| Queue Length 95th (m) | 10.5 | 3.7 | 0.0 | 2.4 | 0.0 | |
| Control Delay (s) | 24.5 | 11.3 | 0.0 | 8.5 | 0.0 | |
| Lane LOS | C | B | | A | | |
| Approach Delay (s) | 17.8 | | 0.0 | 2.2 | | |
| Approach LOS | C | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 4.1 | | | |
| Intersection Capacity Utilization | | | 40.6% | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis

6: Main St & Mill St

3/12/2014



| Movement | SEL | SET | NWT | NWR | SWL | SWR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 54 | 103 | 85 | 13 | 0 | 83 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 59 | 112 | 92 | 14 | 0 | 90 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage veh | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 107 | | | | 329 | 99 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 107 | | | | 329 | 99 |
| tC, single (s) | 4.1 | | | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 96 | | | | 100 | 91 |
| cM capacity (veh/h) | 1484 | | | | 639 | 956 |

| Direction, Lane # | SE 1 | NW 1 | SW 1 |
|-----------------------|------|------|------|
| Volume Total | 171 | 107 | 90 |
| Volume Left | 59 | 0 | 0 |
| Volume Right | 0 | 14 | 90 |
| cSH | 1484 | 1700 | 956 |
| Volume to Capacity | 0.04 | 0.06 | 0.09 |
| Queue Length 95th (m) | 0.9 | 0.0 | 2.4 |
| Control Delay (s) | 2.8 | 0.0 | 9.2 |
| Lane LOS | A | | A |
| Approach Delay (s) | 2.8 | 0.0 | 9.2 |
| Approach LOS | | | A |

| Intersection Summary | | | |
|-----------------------------------|-------|-----|----------------------|
| Average Delay | | 3.5 | |
| Intersection Capacity Utilization | 26.9% | | ICU Level of Service |
| Analysis Period (min) | | 15 | A |

HCM Unsignalized Intersection Capacity Analysis

1: Main St & King St W

3/12/2014



| Movement | NWL | NWR | NET | NER | SWL | SWT |
|-----------------------------------|------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 58 | 74 | 454 | 53 | 72 | 449 |
| 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) | 63 | 80 | 493 | 58 | 78 | 488 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1167 | 522 | | | 551 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1167 | 522 | | | 551 | |
| tC, single (s) | 6.4 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 68 | 85 | | | 92 | |
| cM capacity (veh/h) | 198 | 554 | | | 1019 | |
| Direction, Lane # | NW 1 | NW 2 | NE 1 | SW 1 | SW 2 | |
| Volume Total | 63 | 80 | 551 | 78 | 488 | |
| Volume Left | 63 | 0 | 0 | 78 | 0 | |
| Volume Right | 0 | 80 | 58 | 0 | 0 | |
| cSH | 198 | 554 | 1700 | 1019 | 1700 | |
| Volume to Capacity | 0.32 | 0.15 | 0.32 | 0.08 | 0.29 | |
| Queue Length 95th (m) | 9.9 | 3.8 | 0.0 | 1.9 | 0.0 | |
| Control Delay (s) | 31.5 | 12.6 | 0.0 | 8.8 | 0.0 | |
| Lane LOS | D | B | | A | | |
| Approach Delay (s) | 20.9 | | 0.0 | 1.2 | | |
| Approach LOS | C | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 2.9 | | | |
| Intersection Capacity Utilization | | | 44.4% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis

6: Main St & Mill St

3/12/2014



| Movement | SEL | SET | NWT | NWR | SWL | SWR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 47 | 78 | 74 | 2 | 2 | 58 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 51 | 85 | 80 | 2 | 2 | 63 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage veh | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 83 | | | | 268 | 82 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 83 | | | | 268 | 82 |
| tC, single (s) | 4.1 | | | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 97 | | | | 100 | 94 |
| cM capacity (veh/h) | 1515 | | | | 696 | 978 |

| Direction, Lane # | SE 1 | NW 1 | SW 1 |
|-----------------------|------|------|------|
| Volume Total | 136 | 83 | 65 |
| Volume Left | 51 | 0 | 2 |
| Volume Right | 0 | 2 | 63 |
| cSH | 1515 | 1700 | 965 |
| Volume to Capacity | 0.03 | 0.05 | 0.07 |
| Queue Length 95th (m) | 0.8 | 0.0 | 1.6 |
| Control Delay (s) | 3.0 | 0.0 | 9.0 |
| Lane LOS | A | | A |
| Approach Delay (s) | 3.0 | 0.0 | 9.0 |
| Approach LOS | | | A |

| Intersection Summary | | | |
|-----------------------------------|-------|-----|----------------------|
| Average Delay | | 3.5 | |
| Intersection Capacity Utilization | 23.7% | | ICU Level of Service |
| Analysis Period (min) | 15 | | A |

APPENDIX B

MTO Seasonal Variation Graphs

2010 Seasonal Variation Graphs

