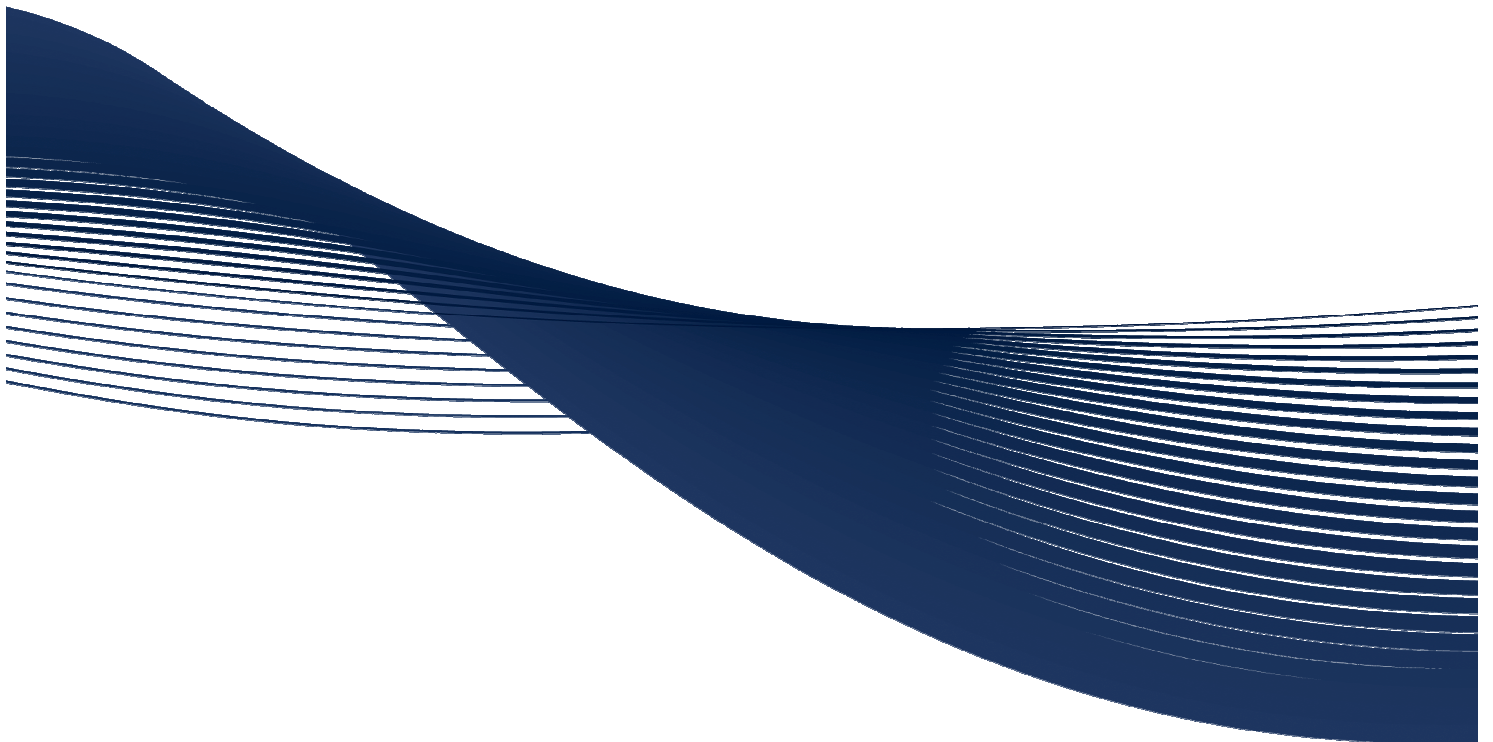


# JAMES DICK CONSTRUCTION LIMITED

REVISED TRAFFIC IMPACT STUDY

Eramosa Quarry, Township of Guelph-Eramosa

Project No. TR12-0013



NOVEMBER 2013

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November 1, 2013  
Our Ref: TR12-0013

James Dick Construction Limited  
P.O. Box 470  
Bolton, ON L7E 5T4

**Attention: Mr. Greg Sweetnam, B.Sc.**  
**Vice President, Resources**

Dear Mr. Sweetnam:

**Re: Revised Traffic Impact Study**  
**Eramosa Quarry**  
**Township of Guelph-Eramosa**

Cole Engineering Group Ltd. is pleased to submit this revised Traffic Impact Study in support of the proposed Eramosa Quarry, addressing comments received from the Ministry of Transportation (MTO), dated May 28, 2013 and September 30, 2013. The study finds that the development is anticipated to generate 26 two-way trips per hour and is expected to have no significant impact to the surrounding road network. The study also finds that the recommended access location is sufficient to serve the proposed development.

Yours truly,

**COLE ENGINEERING GROUP LTD.**



Kim Nystrom, L.E.L.  
Principal



Joseph E. Gowrie, P.Eng.  
Transportation Engineer

JG:dps

Encl.

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**Issues and Revisions Registry**

| Identification               | Date             | Description of issued and/or revision |
|------------------------------|------------------|---------------------------------------|
| Traffic Impact Study         | April 23, 2012   | For Submission                        |
| Revised Traffic Impact Study | July 31, 2013    | For Submission                        |
| Revised Traffic Impact Study | November 1, 2013 | For Submission                        |
|                              |                  |                                       |
|                              |                  |                                       |

### **Statement of Conditions**

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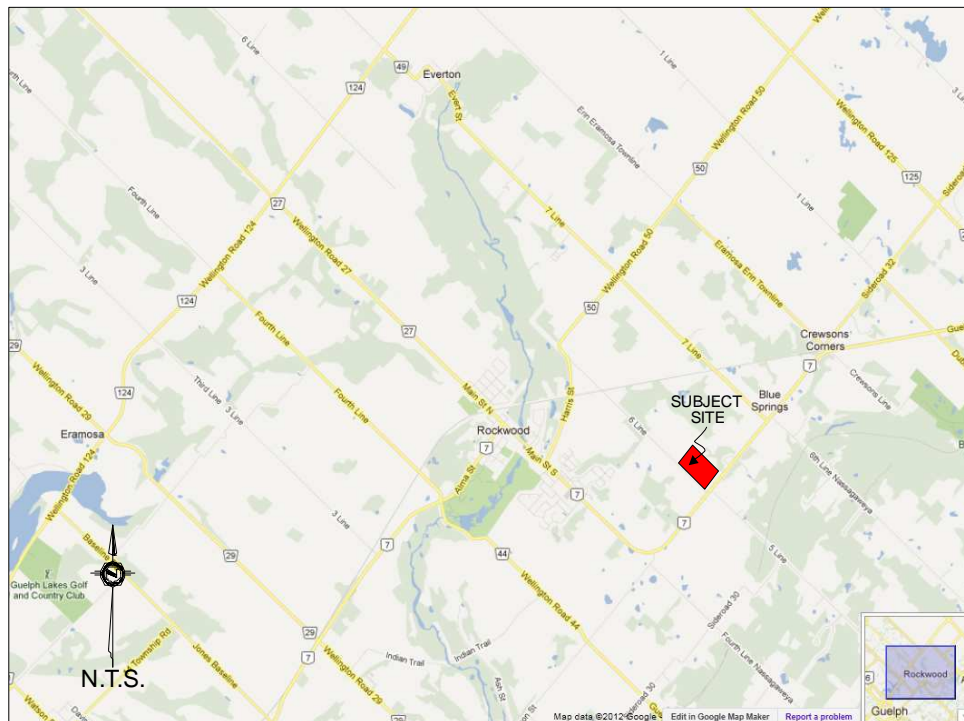
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## 1.0 Study Background and Purpose

Cole Engineering Group Ltd. (Cole Engineering) was retained by James Dick Construction Limited (the "Owner") to undertake a Traffic Impact Study for the proposed Eramosa Quarry, dated April 23, 2012. Comments from the Ministry of Transportation (MTO) were received and this revised report addresses these comments. The subject lands are approximately 39.4 hectares (97 acres) in area and are generally located on the northeast quadrant of Highway 7 and 6<sup>th</sup> Line in the Township of Guelph-Eramosa (the "Township"), County of Wellington (the "County"). The general site location is provided in **Figure 1-1**.



**Figure 1-1 Proposed Site Location**

James Dick Construction Limited has owned this property on the north side of Highway 7 for approximately 25 years. Currently, the site is comprised of vegetation, several old gravel pits, and a small pond / wetland. The current zoning for the site is Agricultural and Hazard. Along the southern portion of the site, there is a house currently occupied by a tenant. Lands to the south are zoned Rural and Industrial. The lands to the east are zoned Industrial and Agricultural. Some industrial development is evident along Highway 7. There are no buildings or structures within the proposed extraction boundaries. The site will be serviced via a full movement access onto 6<sup>th</sup> Line. The proposed site plan is provided in **Figure 1-2**.

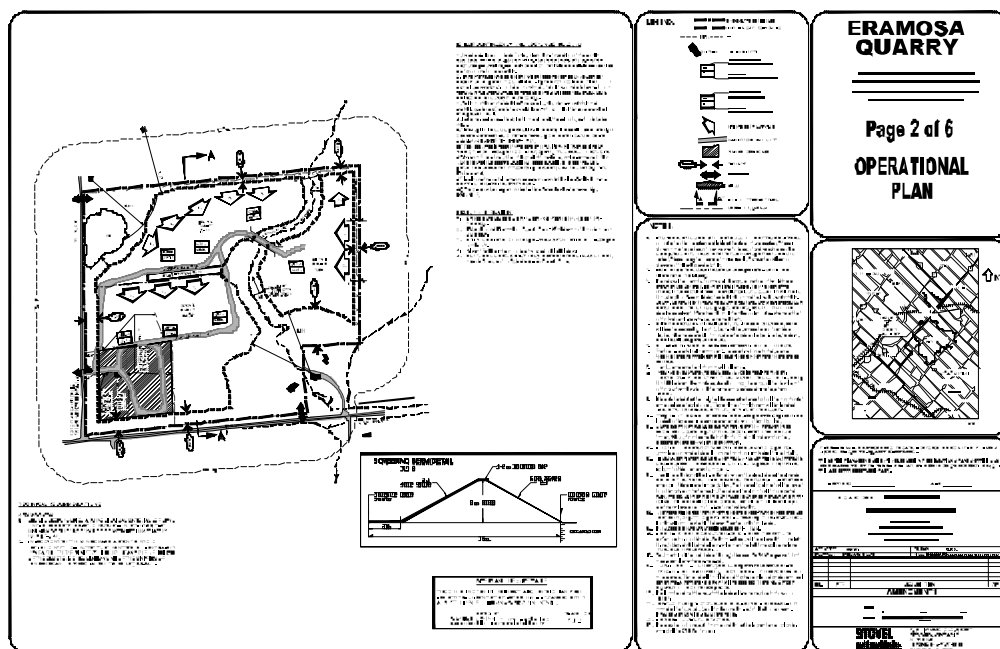


Figure 1-2 Proposed Site Plan

The purpose of the Study is to:

- Estimate the traffic generated by the proposed quarry;
- Confirm the operations at the proposed access;
- Confirm the sufficiency of the sight line distances; and,
- Identify operational traffic deficiencies and recommend mitigation measures to remedy the conditions such as road, intersection, and geometric improvements.

## 2.0 Study Approach

### 2.1. Study Area

Based on the review of the site plan and the surrounding area, the study area intersections for this analysis and includes the following:

- Highway 7 / 6<sup>th</sup> Line (existing);
- Highway 7 / 5<sup>th</sup> Line (existing); and,
- 6<sup>th</sup> Line / Proposed Site Access (future).

### 2.2. Horizon Year

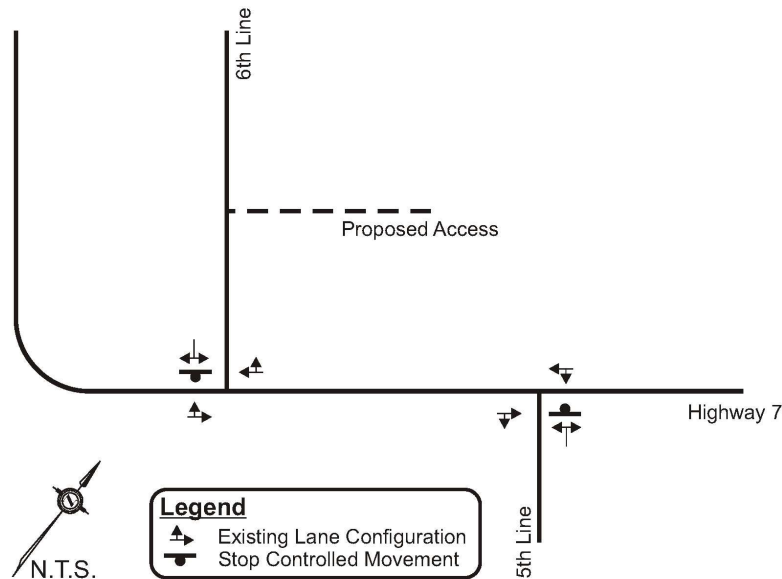
A five (5)-year horizon was selected to represent future traffic conditions. A conservative growth rate of 2.5% per year was applied to all traffic movements within the study area as per discussions with Township staff.



### 3.0 Existing Traffic Conditions

#### 3.1. Existing Road Network

As previously mentioned, the site is located north on the northeast quadrant of Highway 7 and 6<sup>th</sup> Line. The existing lane configurations are illustrated in **Figure 3-1**.



**Figure 3-1 Existing Lane Configurations**

The road network is detailed as follows:

**Highway 7** is a two (2)-lane east-west provincial highway within the vicinity of the subject site and is under the jurisdiction of the Ministry of Transportation of Ontario (MTO).

**6<sup>th</sup> Line** is a two (2)-lane north-south gravel roadway under the jurisdiction of the Township of Guelph-Eramosa.

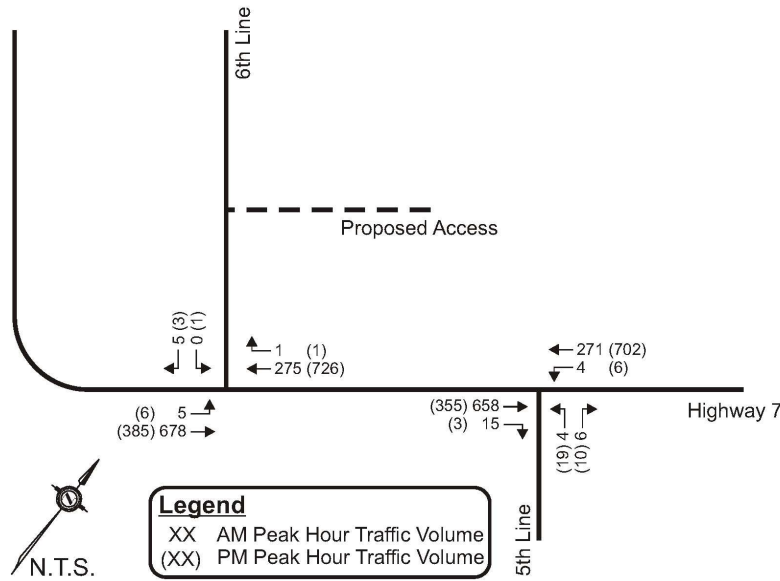
**5<sup>th</sup> Line** is a two (2)-lane north-south paved roadway under the jurisdiction of the Town of Milton.

#### 3.2. Existing Traffic Assessment

The existing traffic volumes at the intersection of Hwy 7/6<sup>th</sup> Line was undertaken by Accu-Traffic Inc. (ATI) on behalf of Cole Engineering during the weekday morning peak period (7:00 a.m. – 9:00 a.m.) and weekday afternoon peak period (4:00 p.m. – 6:00 p.m.) on Tuesday, February 14, 2012. Existing traffic data is provided in **Appendix A** for reference. It should be noted that within the study area, Highway 7 is classified as an urban commuter road, which has higher traffic volumes during the summer than the winter. As such, the counted through traffic volumes along Highway 7 have been prorated by a summer seasonal peak hour factor of 1.33, based on MTO's *2008 Seasonal Variation Curves*.

### 3.3. Existing Traffic Conditions – Level of Service Analysis

Existing traffic volumes were analyzed using Synchro 6.0 software and are provided in **Figure 3-2**.



**Figure 3-2 Existing Traffic Volumes**

The results are summarized in **Table 3.1** and while detailed calculations are provided in **Appendix B**.

**Table 3.1 – Existing Traffic Conditions – Levels of Service**

| Intersection                                    | Key Movements   | AM Peak Hour |                                       | PM Peak Hour |                                       |
|---|-----------------|--------------|---------------------------------------|--------------|---------------------------------------|
|   |                 | LOS (v/c)    | 95 <sup>th</sup> Percentile Queue (m) | LOS (v/c)    | 95 <sup>th</sup> Percentile Queue (m) |
| Highway 7 / 6 <sup>th</sup> Line (Unsignalized) | EB left-through | A (0.01)     | 0.1                                   | A (0.01)     | 0.2                                   |
|   | SB left-right   | B (0.01)     | 0.3                                   | C (0.02)     | 0.5                                   |
| Highway 7 / 5 <sup>th</sup> Line (Unsignalized) | WB left-through | A (<0.01)    | 0.1                                   | A (0.01)     | 0.1                                   |
|   | NB left-right   | C (0.03)     | 0.7                                   | C (0.10)     | 2.5                                   |

The results of the analysis indicates that all movements operate at good levels of service (LOS) during the weekday a.m. and p.m. peak periods with no movement nearing capacity. Under existing conditions, minimal queuing occurs within the study area intersections.

## 4.0 Site Generated Traffic

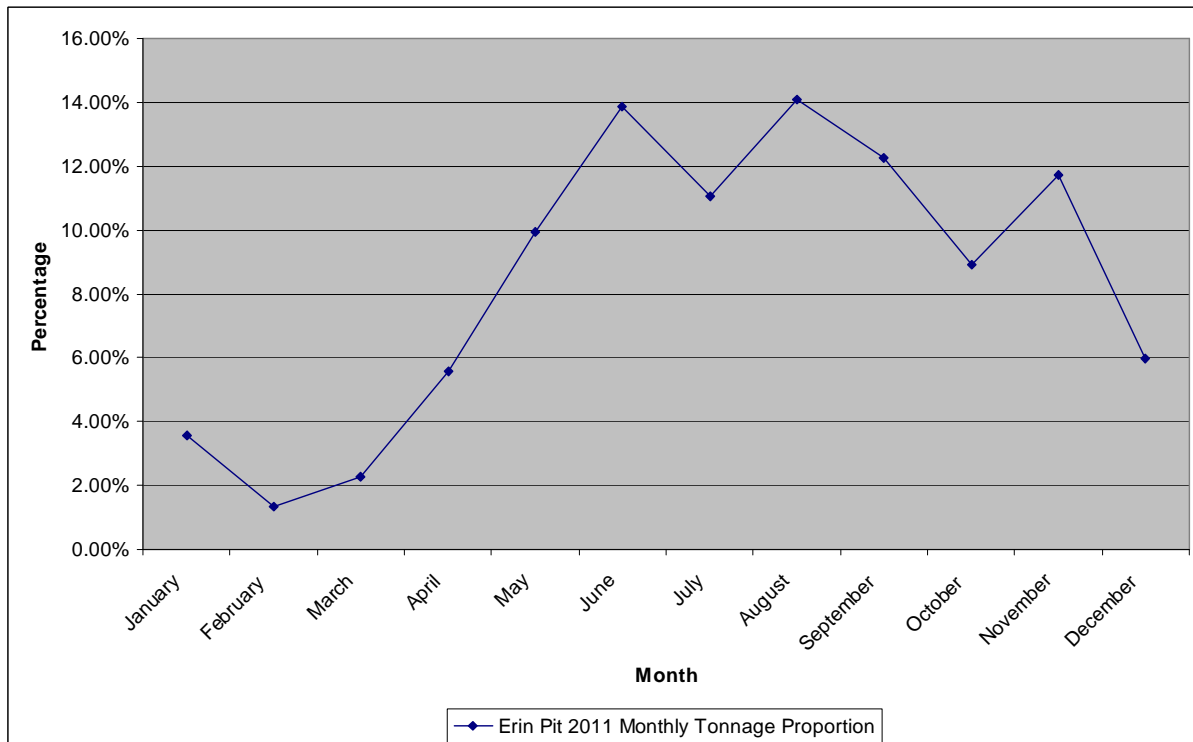
### 4.1. Development Proposal

The proposed Eramosa Quarry is approximately 39.4 hectares (97 acres) in area and is proposed to be licensed to produce a maximum of 700,000 tonnes of aggregate per annum. The site will be serviced via a full movement access onto 6<sup>th</sup> Line.

### 4.2. Site Generated Traffic

Trip generation for the proposed Eramosa Quarry was estimated using a first principles assessment using information from other James Dick Construction facilities and represents a worst-case traffic assessment. The proposed quarry will supply a maximum of 700,000 tonnes of aggregate per year. It was assumed that based on the fleet of vehicles of the Owners, the average load of each truck will be approximately 33 tonnes or 21,213 trucks per year. The proposed quarry is to operate from Monday to Saturday excluding public holidays. The facility is also to operate from 6:00 a.m. to 6:00 p.m.

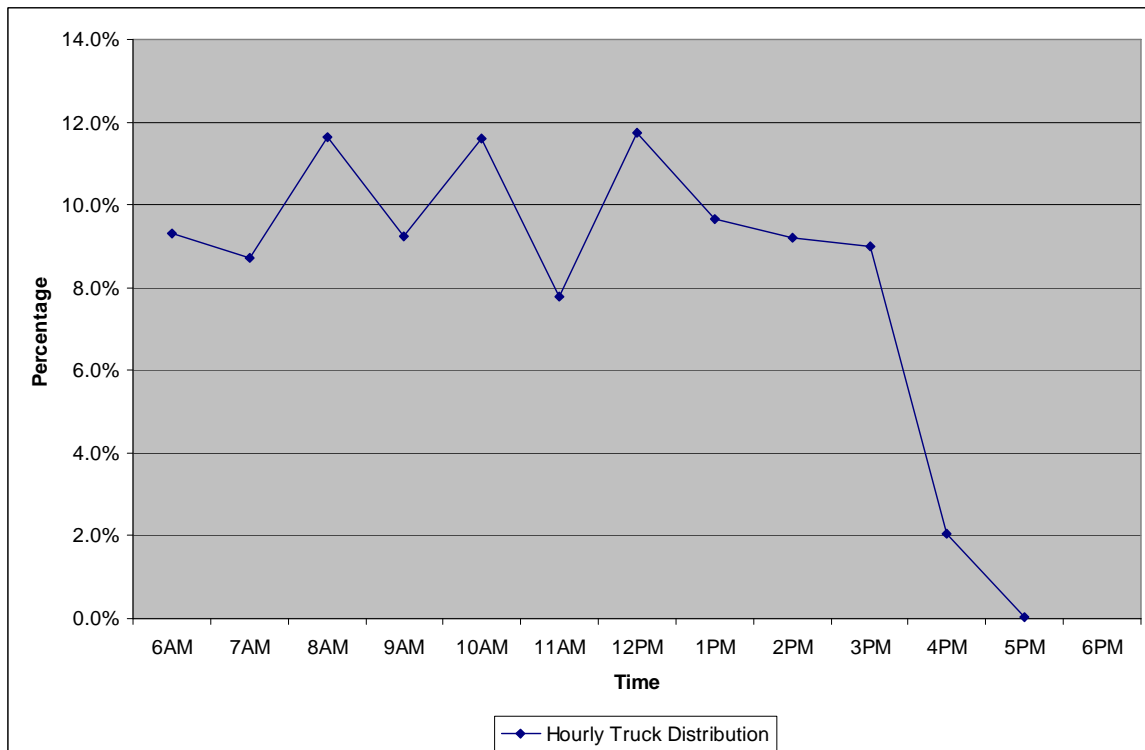
The site generated traffic of this study was estimated using data from the Erin Pit which produces 723,000 tonnes of aggregate per year which makes it a suitable proxy site for the Eramosa Quarry. A summary of trips for the Erin Gravel Pit is provided in **Appendix C** for reference. Based on the data presented in **Figure 4-1**, the busiest month of operations is August.



**Figure 4-1 Erin Pit 2011 Monthly Tonnage Proportion**

Applying the annual distribution of traffic as presented in **Figure 4-1** to the Eramosa Quarry, results in a peak of 107 trucks per day.

During the peak month, the trips to the site were further broken down to an hourly distribution using the information provided in **Figure 4-2**.



**Figure 4-2 Hourly Truck Distribution**

It is anticipated that the daily distribution of trucks arriving at the facility to be loaded will vary during certain hours of the day. For example, the first hour is anticipated to be the busiest hour of the day. This is because all trucks are arriving for the first load of the day. As the day wears on, trucks will become spread out as they service jobs that are varying distances from the quarry and the hourly trips will tend to even out. This trip generation pattern has been observed at other existing James Dick aggregate sites. It is anticipated that the morning peak hour, from 6:00 a.m. to 7:00 a.m., will involve approximately ten percent (10%) of daily trips. Thus, in the peak hour, approximately ten (10) trucks will be shipped on an average day. It has been observed that the hour from 7:00 a.m. to 8:00 a.m. is one of the lowest volume hours of the day. This is because the trucks loaded the previous peak hour are on their way to various job sites around the GTA. As such, it is anticipated that approximately five (5) to nine (9) percent of daily trips will be generated during this hour or approximately five (5) to nine (9) trucks arriving on an average day.

In the late afternoon, shipping drops off significantly, such that, trip generation is not significant during the p.m. peak. Most material has left the quarry prior to 4:00 p.m. due to the fact that it must arrive at the jobsite before the jobs shut down at 5:00 p.m. The last hour of the day sees only from one percent (1%) to 2.5% of the daily shipping taking place, or one (1) to three (3) trucks. On very busy days, this hourly peaking factor tends to even out and is less pronounced.

During the busiest hour of the day, 11.7% of the trucks, or 13 trucks, are expected to arrive at the facility. It is assumed that each truck loading interval is short in duration, therefore each truck trip will result in a total of two (2) trips per hour (one (1) inbound and one (1) outbound). Therefore, the proposed site will have 26 two-way (13 inbound and 13 outbound) trips during each of the analyzed peak hours. It is important to understand that this level of shipping is rarely likely to ever take place, but it provides a prudent upper limit to this analysis.

Because of the operating hours of the proposed facility, it is anticipated that the staff will arrive outside of the roadway peak hours.

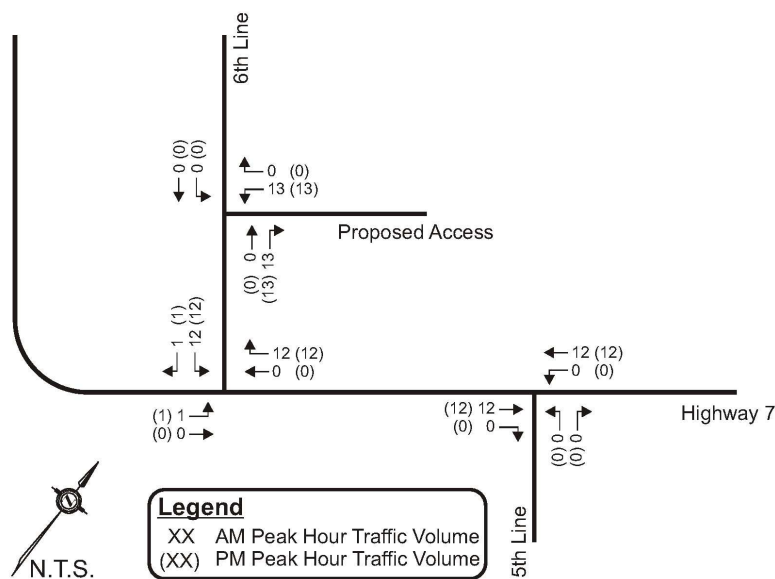
### 4.3. Trip Distribution

Based on review of the available haul routes and the anticipated destinations of the materials, the trip distribution for the proposed development is provided in **Table 4.1**.

**Table 4.1 – Trip Distribution**

| Direction (to / from) | Via                               | Distribution |
|-----------------------|-----------------------------------|--------------|
| North                 | Highway 7<br>6 <sup>th</sup> Line | 5%<br>0%     |
| South                 | 5 <sup>th</sup> Line              | 0%           |
| East                  | Highway 7                         | 95%          |
| West                  | --                                | --           |
| <b>Total</b>          |                                   | <b>100%</b>  |

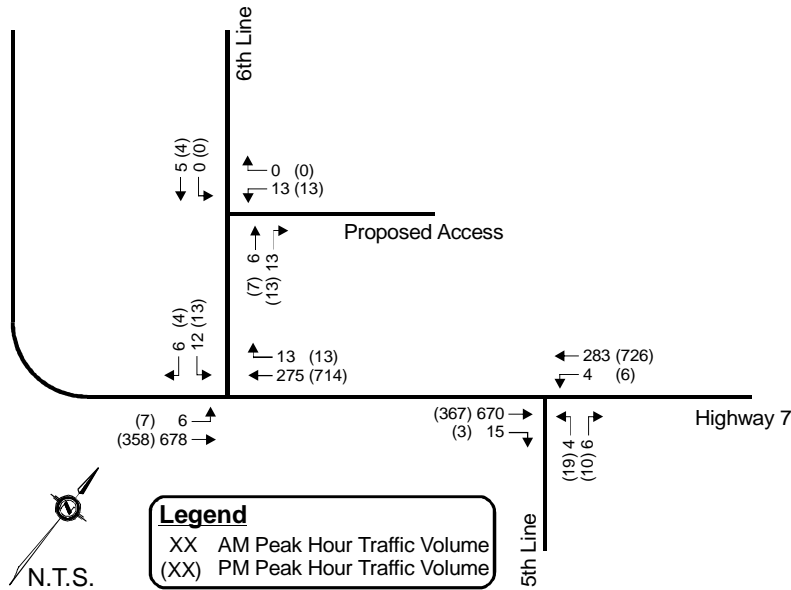
The site traffic was assigned based on the above trip distribution and is illustrated in **Figure 4-3**.



**Figure 4-3 Site Traffic Volumes**

#### 4.4. Existing Plus Site-Related Traffic

The proposed development is anticipated to begin its operations in the 2013 horizon and as such an existing plus site related traffic condition was investigated. Existing plus site related traffic is illustrated in **Figure 4-4** and was assessed using *Synchro 6.0* software.



**Figure 4-4 Existing Plus Site-Related Traffic Volumes**

The detailed calculations are provided in **Appendix D** while summarized in **Table 4.2**.

**Table 4.2 – Existing Plus Site-Related Traffic Conditions – Levels of Service**

| Intersection   | Key Movements   | AM Peak Hour |                                       | PM Peak Hour |                                       |
|--|-----------------|--------------|---------------------------------------|--------------|---------------------------------------|
|  |                 | LOS (v/c)    | 95 <sup>th</sup> Percentile Queue (m) | LOS (v/c)    | 95 <sup>th</sup> Percentile Queue (m) |
| Highway 7 / 6 <sup>th</sup> Line<br>(Unsignalized)       | EB left-through | A (0.01)     | 0.2                                   | A (0.01)     | 0.2                                   |
|  | SB left-right   | D (0.14)     | 3.6                                   | D (0.18)     | 4.7                                   |
| Highway 7 / 5 <sup>th</sup> Line<br>(Unsignalized)       | WB left-through | A (<0.01)    | 0.1                                   | A (0.01)     | 0.1                                   |
|  | NB left-right   | C (0.03)     | 0.8                                   | C (0.10)     | 2.6                                   |
| 6 <sup>th</sup> Line / Proposed Access<br>(Unsignalized) | WB left-right   | A (0.03)     | 0.6                                   | A (0.03)     | 0.6                                   |

In the existing plus site-related traffic condition, the study area is expected to operate at good LOS with no movements nearing capacity. Under existing plus site-related traffic conditions, minimal queuing occurs within the study area intersections.

## 5.0 Traffic Growth

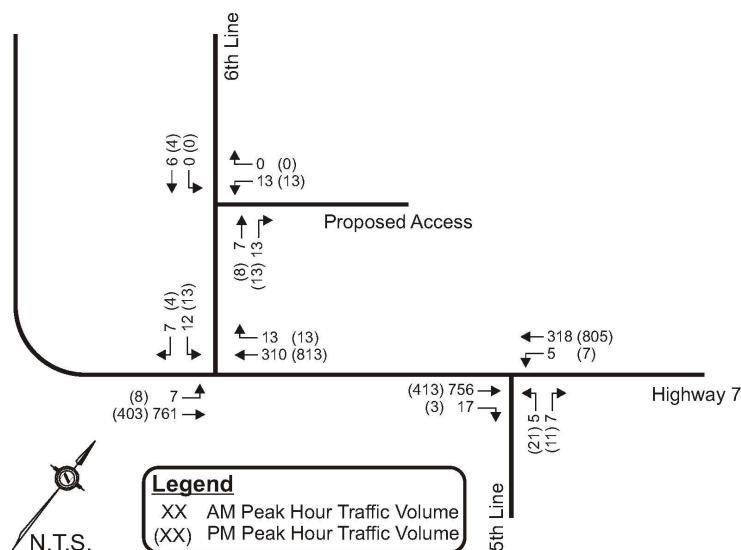
Traffic growth within the study area consists of two (2) components: traffic generated due to other developments within / near the study area; and traffic growth outside of the study area. No major background developments were identified within the vicinity of the subject site. In addition, there is a 2.5% per annum growth rate applied to all movements within the study area which represents traffic growth from outside the study area.

## 6.0 Future Total Traffic Conditions

Future total traffic consists of traffic growth plus site-related traffic.

### 6.1. Future (2018) Total Traffic Conditions

Future (2018) total traffic is illustrated in **Figure 6-1** and was analyzed using *Synchro 6.0* software.



**Figure 6-1 Future (2018) Total Traffic Volumes**

The detailed calculations are provided in **Appendix E** and summarized in **Table 6.1**.

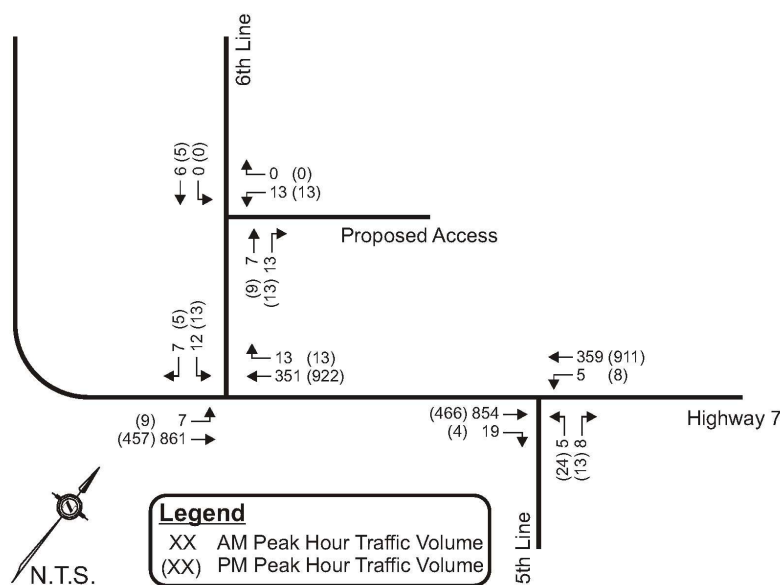
**Table 6.1 – Future (2018) Traffic Conditions – Levels of Service**

| Intersection   | Key Movements                    | AM Peak Hour         |                                       | PM Peak Hour         |                                       |
|--|----------------------------------|----------------------|---------------------------------------|----------------------|---------------------------------------|
|  |                                  | LOS (v/c)            | 95 <sup>th</sup> Percentile Queue (m) | LOS (v/c)            | 95 <sup>th</sup> Percentile Queue (m) |
| Highway 7 / 6 <sup>th</sup> Line<br>(Unsignalized)       | EB left-through<br>SB left-right | A (0.01)<br>D (0.17) | 0.2<br>4.6                            | A (0.01)<br>E (0.22) | 0.3<br>6.0                            |
| Highway 7 / 5 <sup>th</sup> Line<br>(Unsignalized)       | WB left-through<br>NB left-right | A (0.01)<br>C (0.05) | 0.2<br>1.1                            | A (0.01)<br>C (0.13) | 0.1<br>3.5                            |
| 6 <sup>th</sup> Line / Proposed Access<br>(Unsignalized) | WB left-right                    | A (0.03)             | 0.6                                   | A (0.03)             | 0.6                                   |

In the future (2018) total traffic condition, the study area intersections are all anticipated to continue to operate at good LOS with no movement operating near capacity. Under future (2018) total traffic conditions, minimal queuing occurs within the study area intersections, with the longest queue expected to be the southbound left-right queue at the highway 7 / 6<sup>th</sup> Line intersection. The 95<sup>th</sup> percentile queuing extends 6.0 meters, and experiences a delay of approximately 40.3 seconds during the p.m. peak period.

## 6.2. Future (2023) Total Traffic Conditions

Future (2023) total traffic volumes are illustrated in **Figure 6-2** and were analyzed with and without a left turn lane.



**Figure 6-2 Future (2023) Total Traffic Volumes**

### 6.2.1. Without Left Turn Lane

The future (2023) total traffic volumes were analysed without an exclusive eastbound left turn lane at the Highway 7 / 6<sup>th</sup> Line intersection using *Synchro 6.0* software. The detailed calculations are provided in **Appendix F** and are summarized **Table 6.2**.



**Table 6.2 – Future (2023) Total Traffic Conditions – Levels of Service**

| Intersection   | Key Movements                    | AM Peak Hour         |                                       | PM Peak Hour         |                                       |
|--|----------------------------------|----------------------|---------------------------------------|----------------------|---------------------------------------|
|  |                                  | LOS (v/c)            | 95 <sup>th</sup> Percentile Queue (m) | LOS (v/c)            | 95 <sup>th</sup> Percentile Queue (m) |
| Highway 7 / 6 <sup>th</sup> Line<br>(Unsignalized)       | EB left-through<br>SB left-right | A (0.01)<br>E (0.22) | 0.2<br>6.1                            | A (0.01)<br>F (0.29) | 0.3<br>8.4                            |
| Highway 7 / 5 <sup>th</sup> Line<br>(Unsignalized)       | WB left-through<br>NB left-right | A (0.01)<br>C (0.06) | 0.2<br>1.4                            | A (0.01)<br>D (0.19) | 0.2<br>5.2                            |
| 6 <sup>th</sup> Line / Proposed Access<br>(Unsignalized) | WB left-right<br>SB left-through | A (0.03)             | 0.6                                   | A (0.03)             | 0.7                                   |

In the future (2023) total traffic condition, the study area intersections are expected to continue to operate at good LOS with no movements operating near capacity. Under future (2018) total traffic conditions, minimal queuing occurs within the study area intersections, with the southbound left-right queue at the highway 7 / 6<sup>th</sup> Line intersection having a modest increase in queue length. The 95<sup>th</sup> percentile queuing extends 6.1 meters and 8.4 meters, and experiences delays of approximately 39.5 and 54.1 seconds during the a.m. and p.m. peak periods, respectively.

In addition to the Synchro analysis, a queuing analysis was also undertaken using *SimTraffic* software. The results of the SimTraffic queuing assessment are summarized in **Table 6.3** and detailed calculations are provided in **Appendix G**.

**Table 6.3 - Future (2023) Total Traffic without Left Turn Lane SimTraffic Queuing Analysis**

| Intersection   | Key Movements                    | AM Peak Hour                 |                  |              | PM Peak Hour                 |                  |              |
|--|----------------------------------|------------------------------|------------------|--------------|------------------------------|------------------|--------------|
|  |                                  | Percentile Queue Lengths (m) |                  |              | Percentile Queue Lengths (m) |                  |              |
|  |                                  | 50 <sup>th</sup>             | 95 <sup>th</sup> | Max.         | 50 <sup>th</sup>             | 95 <sup>th</sup> | Max.         |
| Highway 7 / 6 <sup>th</sup> Line<br>(Unsignalized)       | EB left-through<br>SB left-right | 0.9<br>9.6                   | 6.1<br>24.1      | 12.8<br>30.5 | 1.1<br>10.6                  | 7.0<br>25.6      | 16.0<br>34.5 |
| Highway 7 / 5 <sup>th</sup> Line<br>(Unsignalized)       | WB left-through<br>NB left-right | 2.6<br>3.3                   | 15.9<br>9.8      | 34.6<br>8.6  | 2.1<br>7.5                   | 11.5<br>15.6     | 21.9<br>19.4 |
| 6 <sup>th</sup> Line / Proposed Access<br>(Unsignalized) | WB left-right                    | 7.5                          | 15.0             | 19.6         | 7.5                          | 19.6             | 15.0         |

The SimTraffic analysis shows 95<sup>th</sup> percentile queue lengths of approximately one (1) vehicle for the eastbound left turn movement at the Highway 7 / 6<sup>th</sup> Line intersection.

### 6.2.2. With Left Turn Lane

A left turn warrant analysis was undertaken at the intersection of Highway 7 and 6<sup>th</sup> Line. A factor of two (2) and three (3) was applied to empty trucks and loaded trucks, respectively to convert those vehicles to passenger car equivalents, resulting in left turn percentages of one percent (1%) and two percent (2%) during the a.m. and p.m. peak hours, respectively. Based on a design speed of 100 km/hr, the *Geometric Design Standards for Ontario Highway* published by the MTO suggests that a left turn lane with a storage length of 25 meters is warranted which will require a deceleration taper and parallel of 160 meters and 70 meters, respectively. The design charts are provided in **Appendix H**.

It should be noted that there is a minimal amount of left turning traffic expected from Highway 7 onto 6<sup>th</sup> Line. The left turn lane is warranted primarily as a result of background traffic turning onto 6<sup>th</sup> Line, as well as the high design speed along Highway 7.

The future (2023) total traffic analysis is also assessed with an exclusive left turn lane at the Highway 7 / 6<sup>th</sup> Line intersection using *Synchro 6.0* software. The results are summarized in **Table 6.4** and calculation sheets provided in **Appendix I**.

**Table 6.4 – Future (2023) Total Traffic Conditions with Left Turn Lane– Levels of Service**

| Intersection   | Key Movements                    | AM Peak Hour |                                       | PM Peak Hour |                                       |
|--|----------------------------------|--------------|---------------------------------------|--------------|---------------------------------------|
|  |                                  | LOS (v/c)    | 95 <sup>th</sup> Percentile Queue (m) | LOS (v/c)    | 95 <sup>th</sup> Percentile Queue (m) |
| Highway 7 / 6 <sup>th</sup> Line<br>(Unsignalized)       | EB left                          | A (0.01)     | 0.2                                   | B (0.01)     | 0.3                                   |
|  | EB through                       | -- (0.58)    | --                                    | -- (0.29)    | --                                    |
|  | SB left-right                    | E (0.22)     | 6.1                                   | F (0.29)     | 8.4                                   |
| Highway 7 / 5 <sup>th</sup> Line<br>(Unsignalized)       | WB left-through                  | A (0.01)     | 0.2                                   | A (0.01)     | 0.2                                   |
|  | NB left-right                    | C (0.06)     | 1.4                                   | D (0.19)     | 5.2                                   |
| 6 <sup>th</sup> Line / Proposed Access<br>(Unsignalized) | WB left-right<br>SB left-through | A (0.03)     | 0.6                                   | A (0.03)     | 0.7                                   |

With the exclusive eastbound left turn left turn lane at the Highway 7 / 6<sup>th</sup> Line intersection, the study area intersections are expected to operate at very similar levels of service the scenario without the exclusive left turn lane.

The *SimTraffic* queuing analysis is repeated in the future (2023) total traffic condition with the exclusive left turn lane in place for the eastbound left turning movement. The analysis results are summarized in **Table 6.5** and the detailed analysis sheets provided in **Appendix J**.

**Table 6.5 – Future (2023) Total Traffic with Left Turn Lane SimTraffic Queuing Analysis**

| Intersection   | Key Movements   | AM Peak Hour                 |                  |      | PM Peak Hour                 |                  |      |
|--|-----------------|------------------------------|------------------|------|------------------------------|------------------|------|
|  |                 | Percentile Queue Lengths (m) |                  |      | Percentile Queue Lengths (m) |                  |      |
|  |                 | 50 <sup>th</sup>             | 95 <sup>th</sup> | Max. | 50 <sup>th</sup>             | 95 <sup>th</sup> | Max. |
| Highway 7 / 6 <sup>th</sup> Line<br>(Unsignalized)       | EB left         | 1.1                          | 6.2              | 13.1 | 1.0                          | 5.4              | 9.5  |
|  | SB left-right   | 10.2                         | 25.3             | 34.7 | 11.1                         | 2.3              | 34.7 |
| Highway 7 / 5 <sup>th</sup> Line<br>(Unsignalized)       | WB left-through | 2.8                          | 16.5             | 34.7 | 2.1                          | 11.3             | 19.2 |
|  | NB left-right   | 3.3                          | 9.9              | 10.5 | 7.3                          | 15.2             | 21.9 |
| 6 <sup>th</sup> Line / Proposed Access<br>(Unsignalized) | WB left-right   | 7.5                          | 19.6             | 15.0 | 7.5                          | 19.6             | 15.0 |

The *SimTraffic* analysis with the exclusive left turn lane at the Highway 7 / 6<sup>th</sup> Line intersection forecasts queues of similar length to that scenario without the exclusive left turn lane. The *SimTraffic* analysis also confirms that a storage length of 25 meters is sufficient to serve the movement.

## 7.0 Access Analysis

The site access is proposed to be located on the east side of 6<sup>th</sup> Line in the Township of Guelph-Eramosa. 6<sup>th</sup> Line is currently a rolling and unpaved gravelled roadway with a no exit sign posted at Highway 7.

### 7.1. Site Access Location and Sight Distance

A sight line assessment was undertaken to determine the preferred location of the site access. The required minimum Stopping Sight Distance (SSD) was determined based on the information provided in the *Geometric Design Manual for Ontario Highways* published by MTO. A design speed of 100 km/h (unposted speed of 80 km/h) was assumed for the unpaved gravelled roadway which requires a minimum stopping sight distance of 185 meters.

At present, there are ongoing discussions with the Town to modify the profile of 6<sup>th</sup> Line in the vicinity of the site access. The crest will be lowered to improve sight distance as well as reduce the grade on approach to the Highway 7 / 6<sup>th</sup> Line intersection, thereby improving safety on approach to the intersection, particularly during the winter months.

### 7.2. Safety Consideration

Along Highway 7 at the 6<sup>th</sup> Line intersection, there is a right turn taper of approximately 25 meters. In order to avoid the reduction in the capacity for the westbound through traffic due to slow moving westbound right turn truck traffic at this intersection, a westbound deceleration lane (taper 80m and parallel 85m), in the form of a taper and parallel lane should be provided. Moreover, as a precaution for the safety of drivers along Highway 7, it is recommended that truck entrance signs be provided approximately 335 meters from 6<sup>th</sup> Line. These signs will be provided based on a 80 km/h posted speed limit as per guidelines from the *Ontario Traffic Manual, Book 6; Warning Signs*. An oversized truck warning sign (Wc-108) is recommended. The eastbound traffic shall have a Wc-108L sign while the westbound traffic shall have a Wc-108R sign indicating that the truck entrance will be on the north side of Highway 7.

Similarly, truck entrance warning sign should be provided for through traffic on 6<sup>th</sup> Line for traffic approaching the proposed access. The truck entrance warning signs are classified as ‘C’ warning signage and the required advance placement for Highway 7 and 6<sup>th</sup> Line is based on the Ontario Traffic Manual’s (OTM) posted road speed, as shown in **Table 7.1**.

**Table 7.1 – OTM’s Minimum Advanced Placement of Condition B and C Warning Signs for Stopping**

| Posted (Initial) Speed (km/h) | 30 | 40  | 50  | 60  | 70  | 80  | 90  | 100 |
|-------------------------------|----|-----|-----|-----|-----|-----|-----|-----|
| Minimum Advance Distance (m)  | 70 | 100 | 140 | 225 | 275 | 335 | 395 | 465 |

The minimum advance warning signage for the truck entrance along Highway 7 should be placed approximately 335 meters in advance of the 6<sup>th</sup> Line junction. Similarly, the minimum advance warning signage for the proposed access along 6<sup>th</sup> Line should be placed approximately 335 meters in advance of the proposed access.

## 8.0 Conclusions

From the analysis undertaken, our findings and conclusions are as follows:

- Existing traffic within the study area operates at good levels of service with no movements nearing capacity;
- The gravel pit is expected to generate 26 truck trips (13 truck trips in / 13 truck trips out) during each of the analyzed peak periods;
- Employees of the future gravel pit are anticipated to arrive and depart outside of the roadway peak hours;
- The proposed gravel pit is anticipated to have no significant impact on the surrounding road network;
- The study area intersections are expected to operate at good levels of service in the existing plus site, future (2018) total traffic and future (2023) total traffic conditions;
- It is recommended that the crest be lowered to improve sight distance, as well as reduce the grade on approach to the Highway 7 / 6<sup>th</sup> Line intersection;
- It is recommended that a westbound deceleration lane along Highway 7 at the 6<sup>th</sup> Line intersection be provided with an 80 meter taper and 85 meter parallel;
- It is recommended that oversized truck entrance signs be placed along Highway 7 in approach to 6<sup>th</sup> Line while standard truck entrance signs be placed on 6<sup>th</sup> Line; and,
- At the intersection of Highway 7 and 6<sup>th</sup> Line, a left turn lane of 25 meters with a deceleration tape of 160 meters and parallel of 70 meters is warranted due to background conditions.

**APPENDIX A**  
**Existing Traffic Data**

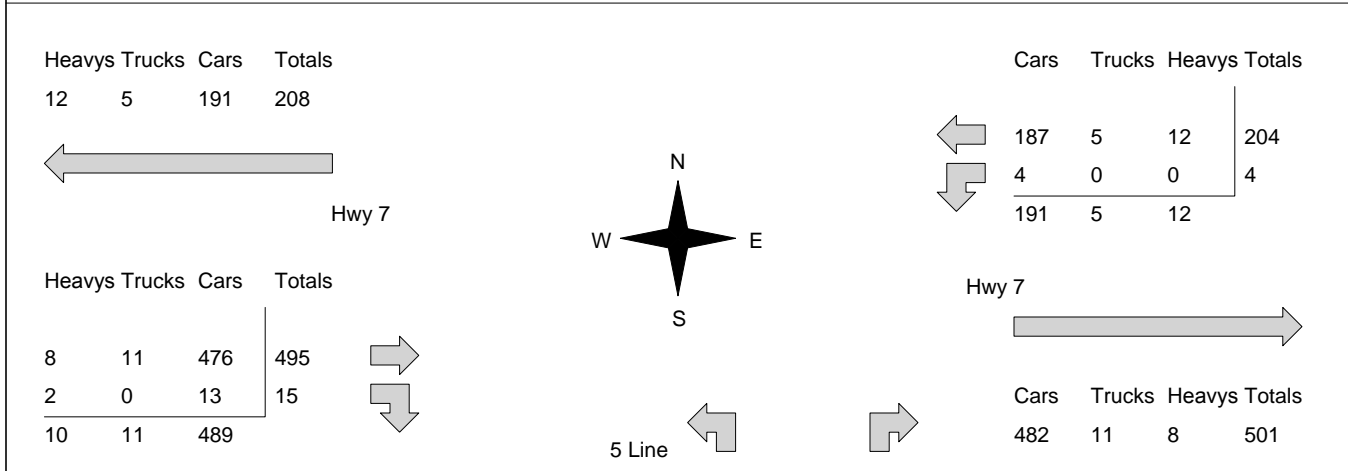
# Accu-Traffic Inc.

|                             |   |  |
|-----------------------------|---|--|
| <b>Morning Peak Diagram</b> | <b>Specified Period</b><br><b>From:</b> 7:00:00<br><b>To:</b> 9:00:00 | <b>One Hour Peak</b><br><b>From:</b> 7:15:00<br><b>To:</b> 8:15:00 |
|-----------------------------|---|--|

|  |   |
|--|---|
| <b>Municipality:</b> Eramosa<br><b>Site #:</b> 1202400002<br><b>Intersection:</b> Hwy 7 & 5 Line<br><b>TFR File #:</b> 5<br><b>Count date:</b> 17-Feb-12 | <b>Weather conditions:</b><br><br><b>Person(s) who counted:</b> |
|--|---|

|  |                                   |
|--|-----------------------------------|
| <b>** Non-Signalized Intersection **</b> | <b>Major Road:</b> Hwy 7 runs W/E |
|--|-----------------------------------|

|  |  |
|--|--|
|  | East Leg Total: 709<br>East Entering: 208<br>East Peds: 0<br>Peds Cross: ∅ |
|--|--|



|  |   |      |    |        |   |        |   |        |    |   |      |   |   |    |        |   |   |   |        |   |   |   |        |   |   |  |   |
|--|---|------|----|--------|---|--------|---|--------|----|---|------|---|---|----|--------|---|---|---|--------|---|---|---|--------|---|---|--|---|
| Peds Cross: ∅<br>West Peds: 0<br>West Entering: 510<br>West Leg Total: 718 | <table style="width: 100%;"> <tr><td>Cars</td><td>17</td></tr> <tr><td>Trucks</td><td>0</td></tr> <tr><td>Heavys</td><td>2</td></tr> <tr><td>Totals</td><td>19</td></tr> </table> | Cars | 17 | Trucks | 0 | Heavys | 2 | Totals | 19 | <table style="width: 100%;"> <tr><td>Cars</td><td>4</td><td>6</td><td>10</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Heavys</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Totals</td><td>4</td><td>6</td><td></td></tr> </table> | Cars | 4 | 6 | 10 | Trucks | 0 | 0 | 0 | Heavys | 0 | 0 | 0 | Totals | 4 | 6 |  | Peds Cross: ∅<br>South Peds: 0<br>South Entering: 10<br>South Leg Total: 29 |
| Cars   | 17  |      |    |        |   |        |   |        |    |   |      |   |   |    |        |   |   |   |        |   |   |   |        |   |   |  |   |
| Trucks   | 0   |      |    |        |   |        |   |        |    |   |      |   |   |    |        |   |   |   |        |   |   |   |        |   |   |  |   |
| Heavys   | 2   |      |    |        |   |        |   |        |    |   |      |   |   |    |        |   |   |   |        |   |   |   |        |   |   |  |   |
| Totals   | 19  |      |    |        |   |        |   |        |    |   |      |   |   |    |        |   |   |   |        |   |   |   |        |   |   |  |   |
| Cars   | 4   | 6    | 10 |        |   |        |   |        |    |   |      |   |   |    |        |   |   |   |        |   |   |   |        |   |   |  |   |
| Trucks   | 0   | 0    | 0  |        |   |        |   |        |    |   |      |   |   |    |        |   |   |   |        |   |   |   |        |   |   |  |   |
| Heavys   | 0   | 0    | 0  |        |   |        |   |        |    |   |      |   |   |    |        |   |   |   |        |   |   |   |        |   |   |  |   |
| Totals   | 4   | 6    |    |        |   |        |   |        |    |   |      |   |   |    |        |   |   |   |        |   |   |   |        |   |   |  |   |

Comments

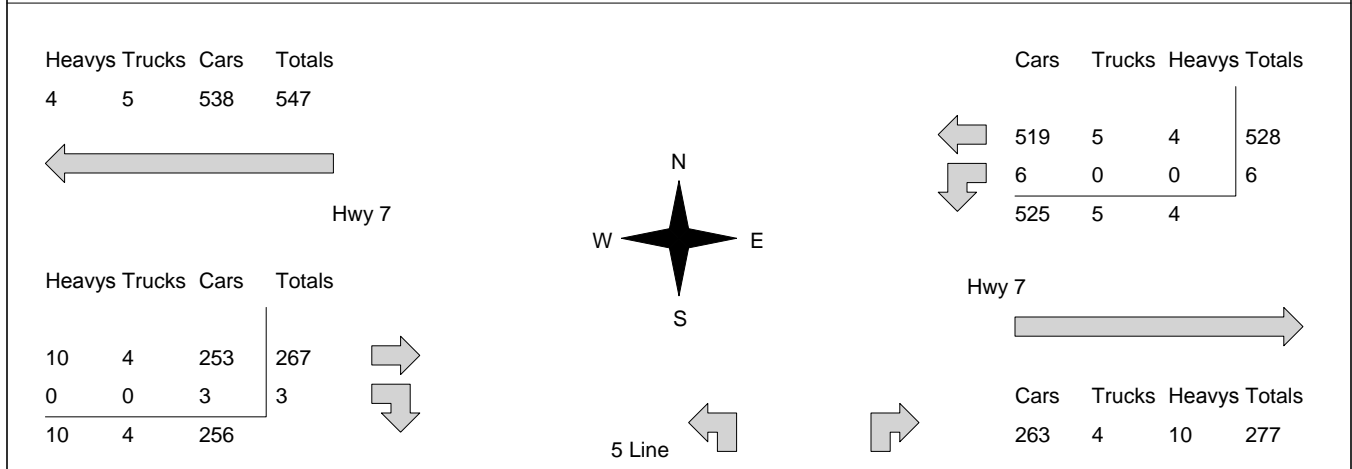
# Accu-Traffic Inc.

|                               |   |  |
|-------------------------------|---|--|
| <b>Afternoon Peak Diagram</b> | <b>Specified Period</b><br><b>From:</b> 16:00:00<br><b>To:</b> 18:00:00 | <b>One Hour Peak</b><br><b>From:</b> 16:45:00<br><b>To:</b> 17:45:00 |
|-------------------------------|---|--|

|  |   |
|--|---|
| <b>Municipality:</b> Eramosa<br><b>Site #:</b> 1202400002<br><b>Intersection:</b> Hwy 7 & 5 Line<br><b>TFR File #:</b> 5<br><b>Count date:</b> 17-Feb-12 | <b>Weather conditions:</b><br><br><b>Person(s) who counted:</b> |
|--|---|

|  |                                   |
|--|-----------------------------------|
| <b>** Non-Signalized Intersection **</b> | <b>Major Road:</b> Hwy 7 runs W/E |
|--|-----------------------------------|

|  |  |
|--|--|
|  | East Leg Total: 811<br>East Entering: 534<br>East Peds: 0<br>Peds Cross: ∞ |
|--|--|



|  |  |  |   |
|--|--|--|---|
| Peds Cross: ∞<br>West Peds: 0<br>West Entering: 270<br>West Leg Total: 817 | Cars 9<br>Trucks 0<br>Heavys 0<br>Totals 9 | Cars 19<br>Trucks 0<br>Heavys 0<br>Totals 19 | Peds Cross: ∞<br>South Peds: 0<br>South Entering: 29<br>South Leg Total: 38 |
|--|--|--|---|

**Comments**

# Accu-Traffic Inc.

## Total Count Diagram

**Municipality:** Eramosa  
**Site #:** 1202400002  
**Intersection:** Hwy 7 & 5 Line  
**TFR File #:** 5  
**Count date:** 17-Feb-12

**Weather conditions:**  
**Person(s) who counted:**

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

**Major Road:** Hwy 7 runs W/E

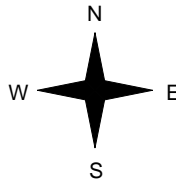
East Leg Total: 2875  
East Entering: 1419  
East Peds: 0  
Peds Cross: ∞

| Heavys | Trucks | Cars | Totals |
|--------|--------|------|--------|
| 35     | 18     | 1377 | 1430   |



Hwy 7

| Heavys | Trucks | Cars | Totals |
|--------|--------|------|--------|
| 36     | 21     | 1370 | 1427   |
| 3      | 0      | 40   | 43     |
| 39     | 21     | 1410 |        |



5 Line



|               |           |
|---------------|-----------|
| Cars          | 65        |
| Trucks        | 1         |
| Heavys        | 9         |
| <b>Totals</b> | <b>75</b> |

|               |           |           |    |
|---------------|-----------|-----------|----|
| Cars          | 42        | 26        | 68 |
| Trucks        | 0         | 1         | 1  |
| Heavys        | 1         | 2         | 3  |
| <b>Totals</b> | <b>43</b> | <b>29</b> |    |

| Cars | Trucks | Heavys | Totals |
|------|--------|--------|--------|
| 1335 | 18     | 34     | 1387   |
| 25   | 1      | 6      | 32     |
| 1360 | 19     | 40     |        |



Hwy 7



| Cars | Trucks | Heavys | Totals |
|------|--------|--------|--------|
| 1396 | 22     | 38     | 1456   |

Peds Cross: ∞  
West Peds: 0  
West Entering: 1470  
West Leg Total: 2900

Peds Cross: ∞  
South Peds: 1  
South Entering: 72  
South Leg Total: 147

### Comments



# Accu-Traffic Inc. Traffic Count Summary

| Intersection: Hwy 7 & 5 Line                        |                                 |             |          |                |               | Count Date: 17-Feb-12              |                       | Municipality: Eramosa           |             |           |                |               |  |
|---|---------------------------------|-------------|----------|----------------|---------------|------------------------------------|-----------------------|---------------------------------|-------------|-----------|----------------|---------------|--|
| North Approach Totals                               |                                 |             |          |                |               | North/South<br>Total<br>Approaches | South Approach Totals |                                 |             |           |                |               |  |
| Hour<br>Ending                                      | Includes Cars, Trucks, & Heavys |             |          |                | Total<br>Peds |                                    | Hour<br>Ending        | Includes Cars, Trucks, & Heavys |             |           |                | Total<br>Peds |  |
|   | Left                            | Thru        | Right    | Grand<br>Total |               |                                    |                       | Left                            | Thru        | Right     | Grand<br>Total |               |  |
| 7:00:00   | 0                               | 0           | 0        | 0              | 0             | 0                                  | 7:00:00               | 0                               | 0           | 0         | 0              | 0             |  |
| 8:00:00   | 0                               | 0           | 0        | 0              | 0             | 12                                 | 8:00:00               | 3                               | 0           | 9         | 12             | 0             |  |
| 9:00:00   | 0                               | 0           | 0        | 0              | 0             | 11                                 | 9:00:00               | 5                               | 0           | 6         | 11             | 1             |  |
| 16:00:00  | 0                               | 0           | 0        | 0              | 0             | 0                                  | 16:00:00              | 0                               | 0           | 0         | 0              | 0             |  |
| 17:00:00  | 0                               | 0           | 0        | 0              | 0             | 27                                 | 17:00:00              | 19                              | 0           | 8         | 27             | 0             |  |
| 18:00:00  | 0                               | 0           | 0        | 0              | 0             | 22                                 | 18:00:00              | 16                              | 0           | 6         | 22             | 0             |  |
| <b>Totals:</b>                                      | <b>0</b>                        | <b>0</b>    | <b>0</b> | <b>0</b>       | <b>0</b>      | <b>72</b>                          |                       | <b>43</b>                       | <b>0</b>    | <b>29</b> | <b>72</b>      | <b>1</b>      |  |
| East Approach Totals                                |                                 |             |          |                |               | East/West<br>Total<br>Approaches   | West Approach Totals  |                                 |             |           |                |               |  |
| Hour<br>Ending                                      | Includes Cars, Trucks, & Heavys |             |          |                | Total<br>Peds |                                    | Hour<br>Ending        | Includes Cars, Trucks, & Heavys |             |           |                | Total<br>Peds |  |
|   | Left                            | Thru        | Right    | Grand<br>Total |               |                                    |                       | Left                            | Thru        | Right     | Grand<br>Total |               |  |
| 7:00:00   | 0                               | 0           | 0        | 0              | 0             | 0                                  | 7:00:00               | 0                               | 0           | 0         | 0              | 0             |  |
| 8:00:00   | 5                               | 185         | 0        | 190            | 0             | 696                                | 8:00:00               | 0                               | 493         | 13        | 506            | 0             |  |
| 9:00:00   | 9                               | 207         | 0        | 216            | 0             | 653                                | 9:00:00               | 0                               | 420         | 17        | 437            | 0             |  |
| 16:00:00  | 0                               | 1           | 0        | 1              | 0             | 2                                  | 16:00:00              | 0                               | 1           | 0         | 1              | 0             |  |
| 17:00:00  | 11                              | 478         | 0        | 489            | 0             | 746                                | 17:00:00              | 0                               | 247         | 10        | 257            | 0             |  |
| 18:00:00  | 7                               | 516         | 0        | 523            | 0             | 792                                | 18:00:00              | 0                               | 266         | 3         | 269            | 0             |  |
| <b>Totals:</b>                                      | <b>32</b>                       | <b>1387</b> | <b>0</b> | <b>1419</b>    | <b>0</b>      | <b>2889</b>                        |                       | <b>0</b>                        | <b>1427</b> | <b>43</b> | <b>1470</b>    | <b>0</b>      |  |
| Calculated Values for Traffic Crossing Major Street |                                 |             |          |                |               |                                    |                       |                                 |             |           |                |               |  |
| Hours Ending:                                       | 7:00                            | 8:00        | 9:00     | 16:00          |               | 17:00                              | 18:00                 | 18:00                           | 18:00       | 18:00     |                |               |  |
| Crossing Values:                                    | 0                               | 3           | 5        | 0              |               | 19                                 | 16                    | 16                              | 16          |           |                |               |  |










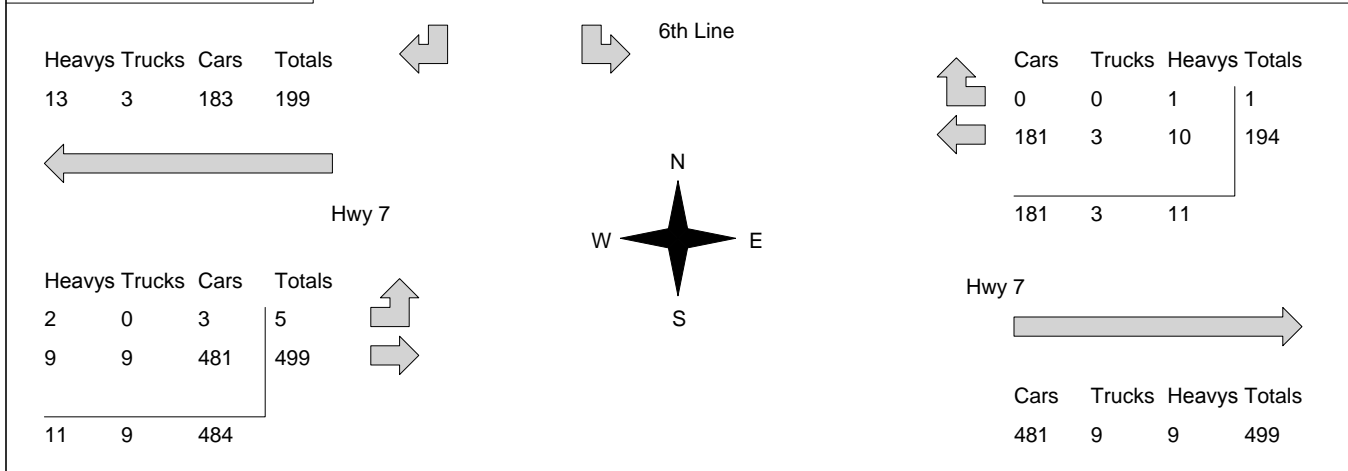
# Accu-Traffic Inc.

|                             |   |  |
|-----------------------------|---|--|
| <b>Morning Peak Diagram</b> | <b>Specified Period</b><br><b>From:</b> 7:00:00<br><b>To:</b> 9:00:00 | <b>One Hour Peak</b><br><b>From:</b> 7:15:00<br><b>To:</b> 8:15:00 |
|-----------------------------|---|--|

|  |   |
|--|---|
| <b>Municipality:</b> Eramosa<br><b>Site #:</b> 1202400001<br><b>Intersection:</b> Hwy 7 & 6th Line<br><b>TFR File #:</b> 3<br><b>Count date:</b> 14-Feb-12 | <b>Weather conditions:</b><br><br><b>Person(s) who counted:</b> |
|--|---|

|  |                                   |
|--|-----------------------------------|
| <b>** Non-Signalized Intersection **</b> | <b>Major Road:</b> Hwy 7 runs W/E |
|--|-----------------------------------|

|  |  |        |   |   |   |        |   |   |   |      |   |   |   |        |   |   |  |   |   |        |   |        |   |      |   |        |   |  |
|--|--|--------|---|---|---|--------|---|---|---|------|---|---|---|--------|---|---|--|---|---|--------|---|--------|---|------|---|--------|---|--|
| North Leg Total: 11<br>North Entering: 5<br>North Peds: 0<br>Peds Cross: ☒ | <table style="border-collapse: collapse;"> <tr><td>Heavys</td><td>3</td><td>0</td><td>3</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Cars</td><td>2</td><td>0</td><td>2</td></tr> <tr><td>Totals</td><td>5</td><td>0</td><td></td></tr> </table> | Heavys | 3 | 0 | 3 | Trucks | 0 | 0 | 0 | Cars | 2 | 0 | 2 | Totals | 5 | 0 |  |  | <table style="border-collapse: collapse;"> <tr><td>Heavys</td><td>3</td></tr> <tr><td>Trucks</td><td>0</td></tr> <tr><td>Cars</td><td>3</td></tr> <tr><td>Totals</td><td>6</td></tr> </table> | Heavys | 3 | Trucks | 0 | Cars | 3 | Totals | 6 | East Leg Total: 694<br>East Entering: 195<br>East Peds: 0<br>Peds Cross: ☒ |
| Heavys   | 3  | 0      | 3 |   |   |        |   |   |   |      |   |   |   |        |   |   |  |   |   |        |   |        |   |      |   |        |   |  |
| Trucks   | 0  | 0      | 0 |   |   |        |   |   |   |      |   |   |   |        |   |   |  |   |   |        |   |        |   |      |   |        |   |  |
| Cars   | 2  | 0      | 2 |   |   |        |   |   |   |      |   |   |   |        |   |   |  |   |   |        |   |        |   |      |   |        |   |  |
| Totals   | 5  | 0      |   |   |   |        |   |   |   |      |   |   |   |        |   |   |  |   |   |        |   |        |   |      |   |        |   |  |
| Heavys   | 3  |        |   |   |   |        |   |   |   |      |   |   |   |        |   |   |  |   |   |        |   |        |   |      |   |        |   |  |
| Trucks   | 0  |        |   |   |   |        |   |   |   |      |   |   |   |        |   |   |  |   |   |        |   |        |   |      |   |        |   |  |
| Cars   | 3  |        |   |   |   |        |   |   |   |      |   |   |   |        |   |   |  |   |   |        |   |        |   |      |   |        |   |  |
| Totals   | 6  |        |   |   |   |        |   |   |   |      |   |   |   |        |   |   |  |   |   |        |   |        |   |      |   |        |   |  |



|  |  |
|--|--|
| Peds Cross: ☒<br>West Peds: 0<br>West Entering: 504<br>West Leg Total: 703 |  |
|--|--|


**Comments**

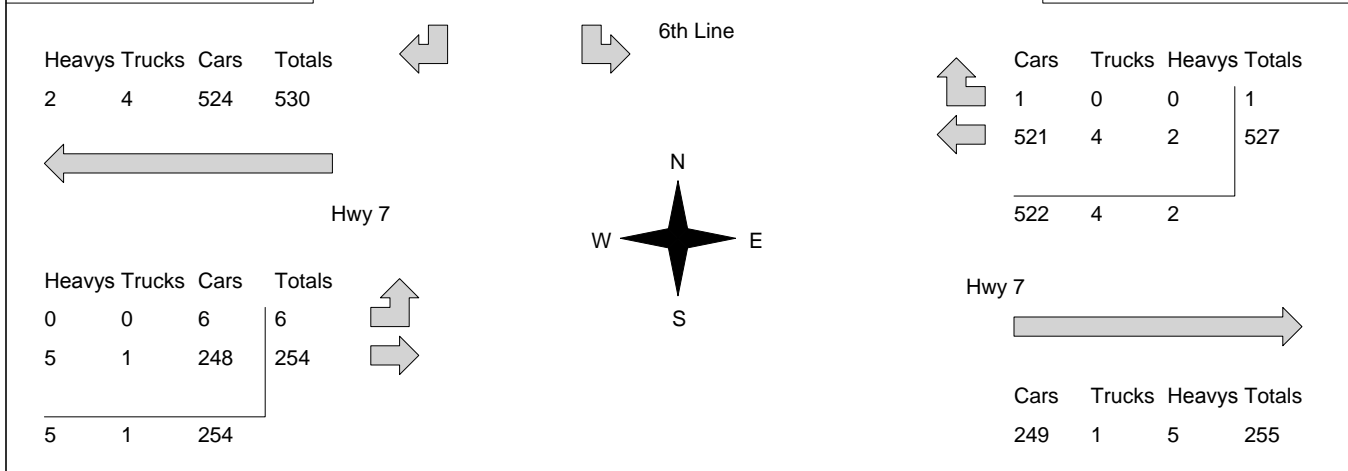
# Accu-Traffic Inc.

|                               |   |  |
|-------------------------------|---|--|
| <b>Afternoon Peak Diagram</b> | <b>Specified Period</b><br><b>From:</b> 16:00:00<br><b>To:</b> 18:00:00 | <b>One Hour Peak</b><br><b>From:</b> 16:45:00<br><b>To:</b> 17:45:00 |
|-------------------------------|---|--|

|  |   |
|--|---|
| <b>Municipality:</b> Eramosa<br><b>Site #:</b> 1202400001<br><b>Intersection:</b> Hwy 7 & 6th Line<br><b>TFR File #:</b> 3<br><b>Count date:</b> 14-Feb-12 | <b>Weather conditions:</b><br><br><b>Person(s) who counted:</b> |
|--|---|

|  |                                   |
|--|-----------------------------------|
| <b>** Non-Signalized Intersection **</b> | <b>Major Road:</b> Hwy 7 runs W/E |
|--|-----------------------------------|

|  |  |        |   |   |   |        |   |   |   |      |   |   |   |        |   |   |  |   |   |        |   |        |   |      |   |        |   |  |
|--|--|--------|---|---|---|--------|---|---|---|------|---|---|---|--------|---|---|--|---|---|--------|---|--------|---|------|---|--------|---|--|
| North Leg Total: 11<br>North Entering: 4<br>North Peds: 0<br>Peds Cross: ☒ | <table style="border-collapse: collapse;"> <tr><td>Heavys</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Cars</td><td>3</td><td>1</td><td>4</td></tr> <tr><td>Totals</td><td>3</td><td>1</td><td></td></tr> </table> | Heavys | 0 | 0 | 0 | Trucks | 0 | 0 | 0 | Cars | 3 | 1 | 4 | Totals | 3 | 1 |  |  | <table style="border-collapse: collapse;"> <tr><td>Heavys</td><td>0</td></tr> <tr><td>Trucks</td><td>0</td></tr> <tr><td>Cars</td><td>7</td></tr> <tr><td>Totals</td><td>7</td></tr> </table> | Heavys | 0 | Trucks | 0 | Cars | 7 | Totals | 7 | East Leg Total: 783<br>East Entering: 528<br>East Peds: 0<br>Peds Cross: ☒ |
| Heavys   | 0  | 0      | 0 |   |   |        |   |   |   |      |   |   |   |        |   |   |  |   |   |        |   |        |   |      |   |        |   |  |
| Trucks   | 0  | 0      | 0 |   |   |        |   |   |   |      |   |   |   |        |   |   |  |   |   |        |   |        |   |      |   |        |   |  |
| Cars   | 3  | 1      | 4 |   |   |        |   |   |   |      |   |   |   |        |   |   |  |   |   |        |   |        |   |      |   |        |   |  |
| Totals   | 3  | 1      |   |   |   |        |   |   |   |      |   |   |   |        |   |   |  |   |   |        |   |        |   |      |   |        |   |  |
| Heavys   | 0  |        |   |   |   |        |   |   |   |      |   |   |   |        |   |   |  |   |   |        |   |        |   |      |   |        |   |  |
| Trucks   | 0  |        |   |   |   |        |   |   |   |      |   |   |   |        |   |   |  |   |   |        |   |        |   |      |   |        |   |  |
| Cars   | 7  |        |   |   |   |        |   |   |   |      |   |   |   |        |   |   |  |   |   |        |   |        |   |      |   |        |   |  |
| Totals   | 7  |        |   |   |   |        |   |   |   |      |   |   |   |        |   |   |  |   |   |        |   |        |   |      |   |        |   |  |



|  |  |
|--|--|
| Peds Cross: ☒<br>West Peds: 0<br>West Entering: 260<br>West Leg Total: 790 |  |
|--|--|

Comments

# Accu-Traffic Inc.

## Total Count Diagram

**Municipality:** Eramosa  
**Site #:** 1202400001  
**Intersection:** Hwy 7 & 6th Line  
**TFR File #:** 3  
**Count date:** 14-Feb-12

**Weather conditions:**  
**Person(s) who counted:**

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

**Major Road:** Hwy 7 runs W/E

North Leg Total: 35  
North Entering: 17  
North Peds: 0  
Peds Cross:  $\times$

|        |    |   |    |
|--------|----|---|----|
| Heavys | 4  | 1 | 5  |
| Trucks | 0  | 0 | 0  |
| Cars   | 10 | 2 | 12 |
| Totals | 14 | 3 |    |



|        |    |
|--------|----|
| Heavys | 5  |
| Trucks | 0  |
| Cars   | 13 |
| Totals | 18 |

East Leg Total: 2787  
East Entering: 1364  
East Peds: 0  
Peds Cross:  $\times$

|        |        |      |        |
|--------|--------|------|--------|
| Heavys | Trucks | Cars | Totals |
| 33     | 11     | 1330 | 1374   |



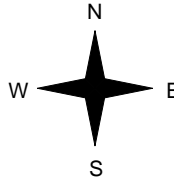
6th Line



|      |        |        |        |
|------|--------|--------|--------|
| Cars | Trucks | Heavys | Totals |
| 3    | 0      | 1      | 4      |
| 1320 | 11     | 29     | 1360   |
| 1323 | 11     | 30     |        |



Hwy 7



Hwy 7



|        |        |      |        |
|--------|--------|------|--------|
| Heavys | Trucks | Cars | Totals |
| 4      | 0      | 10   | 14     |
| 35     | 14     | 1371 | 1420   |
| 39     | 14     | 1381 |        |



|      |        |        |        |
|------|--------|--------|--------|
| Cars | Trucks | Heavys | Totals |
| 1373 | 14     | 36     | 1423   |

Peds Cross:  $\times$   
West Peds: 0  
West Entering: 1434  
West Leg Total: 2808

### Comments



# Accu-Traffic Inc.

## Traffic Count Summary

| Intersection: Hwy 7 & 6th Line                      |                                 |             |           |             |            | Count Date: 14-Feb-12        |             | Municipality: Eramosa           |             |          |             |            |  |
|---|---------------------------------|-------------|-----------|-------------|------------|------------------------------|-------------|---------------------------------|-------------|----------|-------------|------------|--|
| North Approach Totals                               |                                 |             |           |             |            | South Approach Totals        |             |                                 |             |          |             |            |  |
| Hour Ending   | Includes Cars, Trucks, & Heavys |             |           |             | Total Peds | North/South Total Approaches | Hour Ending | Includes Cars, Trucks, & Heavys |             |          |             | Total Peds |  |
|   | Left                            | Thru        | Right     | Grand Total |            |                              |             | Left                            | Thru        | Right    | Grand Total |            |  |
| 7:00:00   | 0                               | 0           | 0         | 0           | 0          | 0                            | 7:00:00     | 0                               | 0           | 0        | 0           | 0          |  |
| 8:00:00   | 0                               | 0           | 4         | 4           | 0          | 4                            | 8:00:00     | 0                               | 0           | 0        | 0           | 0          |  |
| 9:00:00   | 0                               | 0           | 4         | 4           | 0          | 4                            | 9:00:00     | 0                               | 0           | 0        | 0           | 0          |  |
| 16:00:00  | 0                               | 0           | 0         | 0           | 0          | 0                            | 16:00:00    | 0                               | 0           | 0        | 0           | 0          |  |
| 17:00:00  | 1                               | 0           | 4         | 5           | 0          | 5                            | 17:00:00    | 0                               | 0           | 0        | 0           | 0          |  |
| 18:00:00  | 2                               | 0           | 2         | 4           | 0          | 4                            | 18:00:00    | 0                               | 0           | 0        | 0           | 0          |  |
| <b>Totals:</b>                                      | <b>3</b>                        | <b>0</b>    | <b>14</b> | <b>17</b>   | <b>0</b>   | <b>17</b>                    |             | <b>0</b>                        | <b>0</b>    | <b>0</b> | <b>0</b>    | <b>0</b>   |  |
| East Approach Totals                                |                                 |             |           |             |            | West Approach Totals         |             |                                 |             |          |             |            |  |
| Hour Ending   | Includes Cars, Trucks, & Heavys |             |           |             | Total Peds | East/West Total Approaches   | Hour Ending | Includes Cars, Trucks, & Heavys |             |          |             | Total Peds |  |
|   | Left                            | Thru        | Right     | Grand Total |            |                              |             | Left                            | Thru        | Right    | Grand Total |            |  |
| 7:00:00   | 0                               | 0           | 0         | 0           | 0          | 2                            | 7:00:00     | 0                               | 2           | 0        | 2           | 0          |  |
| 8:00:00   | 0                               | 181         | 1         | 182         | 0          | 694                          | 8:00:00     | 3                               | 509         | 0        | 512         | 0          |  |
| 9:00:00   | 0                               | 186         | 0         | 186         | 0          | 602                          | 9:00:00     | 2                               | 414         | 0        | 416         | 0          |  |
| 16:00:00  | 0                               | 1           | 0         | 1           | 0          | 4                            | 16:00:00    | 1                               | 2           | 0        | 3           | 0          |  |
| 17:00:00  | 0                               | 476         | 2         | 478         | 0          | 732                          | 17:00:00    | 3                               | 251         | 0        | 254         | 0          |  |
| 18:00:00  | 0                               | 515         | 1         | 516         | 0          | 763                          | 18:00:00    | 5                               | 242         | 0        | 247         | 0          |  |
| <b>Totals:</b>                                      | <b>0</b>                        | <b>1359</b> | <b>4</b>  | <b>1363</b> | <b>0</b>   | <b>2797</b>                  |             | <b>14</b>                       | <b>1420</b> | <b>0</b> | <b>1434</b> | <b>0</b>   |  |
| Calculated Values for Traffic Crossing Major Street |                                 |             |           |             |            |                              |             |                                 |             |          |             |            |  |
| Hours Ending:                                       | 7:00                            | 8:00        | 9:00      | 16:00       |            | 17:00                        | 18:00       | 18:00                           | 18:00       | 18:00    |             |            |  |
| Crossing Values:                                    | 0                               | 0           | 0         | 0           |            | 1                            | 2           | 2                               | 2           |          |             |            |  |









**APPENDIX B**  
**Existing Traffic**  
Level Of Service Calculations

HCM Unsignalized Intersection Capacity Analysis  
 1: Highway 7 & 6th Line

Existing Traffic AM



| Movement                          | EBL         | EBT         | WBT         | WBR                  | SBL  | SBR  |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Lane Configurations               |             | ↕           | ↕           |                      | ↕    |      |
| Sign Control                      |             | Free        | Free        |                      | Stop |      |
| Grade                             |             | 0%          | 0%          |                      | 0%   |      |
| Volume (veh/h)                    | 5           | 678         | 275         | 1                    | 0    | 5    |
| Peak Hour Factor                  | 0.87        | 0.87        | 0.87        | 0.87                 | 0.65 | 0.65 |
| Hourly flow rate (vph)            | 6           | 779         | 316         | 1                    | 0    | 8    |
| Pedestrians                       |             |             |             |                      |      |      |
| Lane Width (m)                    |             |             |             |                      |      |      |
| Walking Speed (m/s)               |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       |             |             |             |                      | None |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (m)               |             |             |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      |      |      |
| vC, conflicting volume            | 317         |             |             |                      | 1107 | 317  |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                | 317         |             |             |                      | 1107 | 317  |
| tC, single (s)                    | 4.5         |             |             |                      | 6.4  | 6.8  |
| tC, 2 stage (s)                   |             |             |             |                      |      |      |
| tF (s)                            | 2.6         |             |             |                      | 3.5  | 3.8  |
| p0 queue free %                   | 99          |             |             |                      | 100  | 99   |
| cM capacity (veh/h)               | 1057        |             |             |                      | 231  | 607  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>SB 1</b> |                      |      |      |
| Volume Total                      | 785         | 317         | 8           |                      |      |      |
| Volume Left                       | 6           | 0           | 0           |                      |      |      |
| Volume Right                      | 0           | 1           | 8           |                      |      |      |
| cSH                               | 1057        | 1700        | 607         |                      |      |      |
| Volume to Capacity                | 0.01        | 0.19        | 0.01        |                      |      |      |
| Queue Length 95th (m)             | 0.1         | 0.0         | 0.3         |                      |      |      |
| Control Delay (s)                 | 0.1         | 0.0         | 11.0        |                      |      |      |
| Lane LOS                          | A           |             | B           |                      |      |      |
| Approach Delay (s)                | 0.1         | 0.0         | 11.0        |                      |      |      |
| Approach LOS                      |             |             | B           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 0.2         |                      |      |      |
| Intersection Capacity Utilization |             | 51.9%       |             | ICU Level of Service |      | A    |
| Analysis Period (min)             |             |             | 15          |                      |      |      |

HCM Unsignalized Intersection Capacity Analysis  
2: Highway 7 & 5th Line










Existing Traffic AM

|                                   | →           | ↘           | ↙           | ←                    | ↖    | ↗    |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Movement                          | EBT         | EBR         | WBL         | WBT                  | NBL  | NBR  |
| Lane Configurations               | ↗           |             |             | ↖                    | ↗    | ↘    |
| Sign Control                      | Free        |             |             | Free                 | Stop |      |
| Grade                             | 0%          |             |             | 0%                   | 0%   |      |
| Volume (veh/h)                    | 658         | 15          | 4           | 271                  | 4    | 6    |
| Peak Hour Factor                  | 0.93        | 0.93        | 0.93        | 0.93                 | 0.93 | 0.93 |
| Hourly flow rate (vph)            | 708         | 16          | 4           | 291                  | 4    | 6    |
| Pedestrians                       |             |             |             |                      |      |      |
| Lane Width (m)                    |             |             |             |                      |      |      |
| Walking Speed (m/s)               |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       | None        |             |             |                      |      |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (m)               |             |             |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      |      |      |
| vC, conflicting volume            |             |             | 724         |                      | 1016 | 716  |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                |             |             | 724         |                      | 1016 | 716  |
| 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         |                      | 98   | 99   |
| cM capacity (veh/h)               |             |             | 888         |                      | 265  | 434  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>NB 1</b> |                      |      |      |
| Volume Total                      | 724         | 296         | 11          |                      |      |      |
| Volume Left                       | 0           | 4           | 4           |                      |      |      |
| Volume Right                      | 16          | 0           | 6           |                      |      |      |
| cSH                               | 1700        | 888         | 346         |                      |      |      |
| Volume to Capacity                | 0.43        | 0.00        | 0.03        |                      |      |      |
| Queue Length 95th (m)             | 0.0         | 0.1         | 0.7         |                      |      |      |
| Control Delay (s)                 | 0.0         | 0.2         | 15.8        |                      |      |      |
| Lane LOS                          |             | A           | C           |                      |      |      |
| Approach Delay (s)                | 0.0         | 0.2         | 15.8        |                      |      |      |
| Approach LOS                      |             |             | C           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 0.2         |                      |      |      |
| Intersection Capacity Utilization |             |             | 47.5%       | ICU Level of Service | A    |      |
| Analysis Period (min)             |             |             | 15          |                      |      |      |



HCM Unsignalized Intersection Capacity Analysis  
 3: Proposed Access & 6th Line

Existing Traffic AM

|                                   |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement                          | WBL   | WBR   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |  |   |  |   |   |  |
| Sign Control                      | Stop  |   | Free  |   |   | Free  |
| Grade                             | 0%  |   | 0%  |   |   | 0%  |
| Volume (veh/h)                    | 0   | 0   | 6   | 0   | 0   | 5   |
| Peak Hour Factor                  | 0.65  | 0.65  | 0.65  | 0.65  | 0.65  | 0.65  |
| Hourly flow rate (vph)            | 0   | 0   | 9   | 0   | 0   | 8   |
| Pedestrians                       |   |   |   |   |   |   |
| Lane Width (m)                    |   |   |   |   |   |   |
| Walking Speed (m/s)               |   |   |   |   |   |   |
| Percent Blockage                  |   |   |   |   |   |   |
| Right turn flare (veh)            |   |   |   |   |   |   |
| Median type                       | None  |   |   |   |   |   |
| Median storage (veh)              |   |   |   |   |   |   |
| Upstream signal (m)               |   |   |   |   |   |   |
| pX, platoon unblocked             |   |   |   |   |   |   |
| vC, conflicting volume            | 17  | 9   |   |   | 9   |   |
| vC1, stage 1 conf vol             |   |   |   |   |   |   |
| vC2, stage 2 conf vol             |   |   |   |   |   |   |
| vCu, unblocked vol                | 17  | 9   |   |   | 9   |   |
| 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   | 100   |   |   | 100   |   |
| cM capacity (veh/h)               | 1001  | 1072  |   |   | 1611  |   |
| Direction, Lane #                 | WB 1  | NB 1  | SB 1  |   |   |   |
| Volume Total                      | 0   | 9   | 8   |   |   |   |
| Volume Left                       | 0   | 0   | 0   |   |   |   |
| Volume Right                      | 0   | 0   | 0   |   |   |   |
| cSH                               | 1700  | 1700  | 1611  |   |   |   |
| Volume to Capacity                | 0.00  | 0.01  | 0.00  |   |   |   |
| Queue Length 95th (m)             | 0.0   | 0.0   | 0.0   |   |   |   |
| Control Delay (s)                 | 0.0   | 0.0   | 0.0   |   |   |   |
| Lane LOS                          | A   |   |   |   |   |   |
| Approach Delay (s)                | 0.0   | 0.0   | 0.0   |   |   |   |
| Approach LOS                      | A   |   |   |   |   |   |
| Intersection Summary              |   |   |   |   |   |   |
| Average Delay                     |   |   | 0.0   |   |   |   |
| Intersection Capacity Utilization |   |   | 6.7%  | ICU Level of Service  | A   |   |
| Analysis Period (min)             |   |   | 15  |   |   |   |

HCM Unsignalized Intersection Capacity Analysis  
 1: Highway 7 & 6th Line

Existing Traffic PM



| Movement                          | EBL         | EBT         | WBT         | WBR                  | SBL  | SBR  |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Lane Configurations               |             | ↕           | ↕           |                      | ↕    |      |
| Sign Control                      |             | Free        | Free        |                      | Stop |      |
| Grade                             |             | 0%          | 0%          |                      | 0%   |      |
| Volume (veh/h)                    | 6           | 358         | 726         | 1                    | 1    | 3    |
| Peak Hour Factor                  | 0.93        | 0.93        | 0.93        | 0.93                 | 0.60 | 0.60 |
| Hourly flow rate (vph)            | 6           | 385         | 781         | 1                    | 2    | 5    |
| Pedestrians                       |             |             |             |                      |      |      |
| Lane Width (m)                    |             |             |             |                      |      |      |
| Walking Speed (m/s)               |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       |             |             |             |                      | None |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (m)               |             |             |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      |      |      |
| vC, conflicting volume            | 782         |             |             |                      | 1179 | 781  |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                | 782         |             |             |                      | 1179 | 781  |
| 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          |             |             |                      | 99   | 99   |
| cM capacity (veh/h)               | 845         |             |             |                      | 211  | 398  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>SB 1</b> |                      |      |      |
| Volume Total                      | 391         | 782         | 7           |                      |      |      |
| Volume Left                       | 6           | 0           | 2           |                      |      |      |
| Volume Right                      | 0           | 1           | 5           |                      |      |      |
| cSH                               | 845         | 1700        | 326         |                      |      |      |
| Volume to Capacity                | 0.01        | 0.46        | 0.02        |                      |      |      |
| Queue Length 95th (m)             | 0.2         | 0.0         | 0.5         |                      |      |      |
| Control Delay (s)                 | 0.2         | 0.0         | 16.3        |                      |      |      |
| Lane LOS                          | A           |             | C           |                      |      |      |
| Approach Delay (s)                | 0.2         | 0.0         | 16.3        |                      |      |      |
| Approach LOS                      |             |             | C           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 0.2         |                      |      |      |
| Intersection Capacity Utilization |             | 50.4%       |             | ICU Level of Service |      | A    |
| Analysis Period (min)             |             |             | 15          |                      |      |      |










HCM Unsignalized Intersection Capacity Analysis  
2: Highway 7 & 5th Line

Existing Traffic PM

|                                   | →           | ↘           | ↙           | ←                    | ↖    | ↗    |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Movement                          | EBT         | EBR         | WBL         | WBT                  | NBL  | NBR  |
| Lane Configurations               | ↶           |             |             | ↷                    | ↶    | ↷    |
| Sign Control                      | Free        |             |             | Free                 | Stop |      |
| Grade                             | 0%          |             |             | 0%                   | 0%   |      |
| Volume (veh/h)                    | 355         | 3           | 6           | 702                  | 19   | 10   |
| Peak Hour Factor                  | 0.97        | 0.97        | 0.97        | 0.97                 | 0.97 | 0.97 |
| Hourly flow rate (vph)            | 366         | 3           | 6           | 724                  | 20   | 10   |
| Pedestrians                       |             |             |             |                      |      |      |
| Lane Width (m)                    |             |             |             |                      |      |      |
| Walking Speed (m/s)               |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       | None        |             |             |                      |      |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (m)               |             |             |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      |      |      |
| vC, conflicting volume            |             |             | 369         |                      | 1104 | 368  |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                |             |             | 369         |                      | 1104 | 368  |
| 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          |                      | 92   | 98   |
| cM capacity (veh/h)               |             |             | 1201        |                      | 235  | 682  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>NB 1</b> |                      |      |      |
| Volume Total                      | 369         | 730         | 30          |                      |      |      |
| Volume Left                       | 0           | 6           | 20          |                      |      |      |
| Volume Right                      | 3           | 0           | 10          |                      |      |      |
| cSH                               | 1700        | 1201        | 303         |                      |      |      |
| Volume to Capacity                | 0.22        | 0.01        | 0.10        |                      |      |      |
| Queue Length 95th (m)             | 0.0         | 0.1         | 2.5         |                      |      |      |
| Control Delay (s)                 | 0.0         | 0.1         | 18.2        |                      |      |      |
| Lane LOS                          |             | A           | C           |                      |      |      |
| Approach Delay (s)                | 0.0         | 0.1         | 18.2        |                      |      |      |
| Approach LOS                      |             |             | C           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 0.6         |                      |      |      |
| Intersection Capacity Utilization |             |             | 54.0%       | ICU Level of Service | A    |      |
| Analysis Period (min)             |             |             | 15          |                      |      |      |

HCM Unsignalized Intersection Capacity Analysis  
 3: Proposed Access & 6th Line

Existing Traffic PM

|                                   |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement                          | WBL   | WBR   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |  |   |  |   |   |  |
| Sign Control                      | Stop  |   | Free  |   |   | Free  |
| Grade                             | 0%  |   | 0%  |   |   | 0%  |
| Volume (veh/h)                    | 0   | 0   | 7   | 0   | 0   | 4   |
| Peak Hour Factor                  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  |
| Hourly flow rate (vph)            | 0   | 0   | 12  | 0   | 0   | 7   |
| Pedestrians                       |   |   |   |   |   |   |
| Lane Width (m)                    |   |   |   |   |   |   |
| Walking Speed (m/s)               |   |   |   |   |   |   |
| Percent Blockage                  |   |   |   |   |   |   |
| Right turn flare (veh)            |   |   |   |   |   |   |
| Median type                       | None  |   |   |   |   |   |
| Median storage (veh)              |   |   |   |   |   |   |
| Upstream signal (m)               |   |   |   |   |   |   |
| pX, platoon unblocked             |   |   |   |   |   |   |
| vC, conflicting volume            | 18  | 12  |   |   | 12  |   |
| vC1, stage 1 conf vol             |   |   |   |   |   |   |
| vC2, stage 2 conf vol             |   |   |   |   |   |   |
| vCu, unblocked vol                | 18  | 12  |   |   | 12  |   |
| 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   | 100   |   |   | 100   |   |
| cM capacity (veh/h)               | 999   | 1069  |   |   | 1607  |   |
| Direction, Lane #                 | WB 1  | NB 1  | SB 1  |   |   |   |
| Volume Total                      | 0   | 12  | 7   |   |   |   |
| Volume Left                       | 0   | 0   | 0   |   |   |   |
| Volume Right                      | 0   | 0   | 0   |   |   |   |
| cSH                               | 1700  | 1700  | 1607  |   |   |   |
| Volume to Capacity                | 0.00  | 0.01  | 0.00  |   |   |   |
| Queue Length 95th (m)             | 0.0   | 0.0   | 0.0   |   |   |   |
| Control Delay (s)                 | 0.0   | 0.0   | 0.0   |   |   |   |
| Lane LOS                          | A   |   |   |   |   |   |
| Approach Delay (s)                | 0.0   | 0.0   | 0.0   |   |   |   |
| Approach LOS                      | A   |   |   |   |   |   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |
| Average Delay                     |   |   | 0.0   |   |   |   |
| Intersection Capacity Utilization |   |   | 6.7%  |   | ICU Level of Service  | A   |
| Analysis Period (min)             |   |   | 15  |   |   |   |

**APPENDIX C**  
**Erin Gravel Pit Truck Trip Generation**

### James Dick Erin Pit August 2011 Busiest Month Shipping by Hour of the Day

| DATE         | 6AM         | 7AM         | 8AM          | 9AM         | 10AM         | 11AM        | 12PM         | 1PM         | 2PM         | 3PM         | 4PM         | 5PM         | 6PM | TOTAL       |
|--------------|-------------|-------------|--------------|-------------|--------------|-------------|--------------|-------------|-------------|-------------|-------------|-------------|-----|-------------|
| 02-Aug       | 13          | 20          | 19           | 11          | 19           | 15          | 15           | 19          | 8           | 16          | 2           |             |     | 158         |
| 03-Aug       | 9           | 4           | 7            | 5           | 5            | 4           | 7            | 5           | 9           | 6           | 1           |             |     | 62          |
| 04-Aug       | 11          | 13          | 11           | 15          | 15           | 11          | 18           | 15          | 21          | 13          | 2           |             |     | 145         |
| 05-Aug       | 9           | 11          | 12           | 16          | 12           | 8           | 16           | 11          | 9           | 10          | 0           |             |     | 114         |
| 08-Aug       | 11          | 8           | 11           | 9           | 15           | 5           | 21           | 11          | 16          | 12          | 1           |             |     | 123         |
| 09-Aug       | 8           | 13          | 12           | 9           | 5            | 4           | 7            | 5           | 5           | 1           | 1           |             |     | 71          |
| 10-Aug       | 6           | 12          | 12           | 7           | 16           | 7           | 12           | 8           | 10          | 10          | 0           |             |     | 100         |
| 11-Aug       | 5           | 14          | 7            | 17          | 13           | 9           | 11           | 10          | 5           | 3           | 2           |             |     | 96          |
| 12-Aug       | 12          | 14          | 13           | 12          | 19           | 7           | 16           | 8           | 11          | 8           | 2           |             |     | 122         |
| 13-Aug       | 6           | 2           | 5            | 4           | 2            | 3           | 0            | 0           | 0           | 0           | 0           |             |     | 22          |
| 15-Aug       | 12          | 7           | 23           | 16          | 20           | 13          | 21           | 13          | 17          | 18          | 1           |             |     | 162         |
| 16-Aug       | 10          | 8           | 10           | 8           | 23           | 6           | 14           | 16          | 10          | 13          | 1           |             |     | 119         |
| 17-Aug       | 16          | 13          | 18           | 12          | 21           | 15          | 15           | 16          | 14          | 17          | 5           |             |     | 162         |
| 18-Aug       | 20          | 15          | 22           | 17          | 11           | 16          | 18           | 19          | 15          | 19          | 2           |             |     | 174         |
| 19-Aug       | 11          | 13          | 16           | 14          | 10           | 5           | 18           | 11          | 12          | 15          | 2           |             |     | 122         |
| 22-Aug       | 12          | 12          | 21           | 12          | 21           | 8           | 22           | 17          | 19          | 16          | 4           | 1           |     | 170         |
| 23-Aug       | 9           | 9           | 11           | 9           | 10           | 4           | 15           | 5           | 11          | 5           | 6           |             |     | 94          |
| 24-Aug       | 8           | 11          | 14           | 9           | 7            | 16          | 10           | 21          | 12          | 12          | 8           |             |     | 128         |
| 25-Aug       | 18          | 11          | 19           | 13          | 23           | 14          | 20           | 10          | 14          | 9           | 1           |             |     | 152         |
| 26-Aug       | 12          | 9           | 18           | 11          | 14           | 8           | 17           | 11          | 12          | 12          | 7           |             |     | 131         |
| 29-Aug       | 15          | 11          | 12           | 13          | 14           | 13          | 13           | 12          | 14          | 11          | 7           |             |     | 135         |
| 30-Aug       | 15          | 11          | 19           | 12          | 21           | 17          | 15           | 18          | 9           | 20          | 2           |             |     | 159         |
| 31-Aug       | 15          | 5           | 16           | 10          | 11           | 11          | 10           | 11          | 7           | 8           | 1           |             |     | 105         |
| <b>TOTAL</b> | <b>263</b>  | <b>246</b>  | <b>328</b>   | <b>261</b>  | <b>327</b>   | <b>219</b>  | <b>331</b>   | <b>272</b>  | <b>260</b>  | <b>254</b>  | <b>58</b>   | <b>1</b>    |     | <b>2826</b> |
| <b>%</b>     | <b>9.3%</b> | <b>8.7%</b> | <b>11.6%</b> | <b>9.2%</b> | <b>11.6%</b> | <b>7.7%</b> | <b>11.7%</b> | <b>9.6%</b> | <b>9.2%</b> | <b>9.0%</b> | <b>2.1%</b> | <b>0.0%</b> |     | <b>100%</b> |

Busiest Hour: 23-Aug  
 % of Monthly Shipping: 23/2826 = 0.814%  
 23 Trucks Shipped in one hour

## Total Monthly Tonnage Percentage for Erin Pit 2011

|        |        |               |
|--------|--------|---------------|
| Jan-11 | 3.55%  |               |
| Feb-11 | 1.34%  |               |
| Mar-11 | 2.29%  |               |
| Apr-11 | 5.56%  |               |
| May-11 | 9.44%  |               |
| Jun-11 | 13.86% |               |
| Jul-11 | 11.05% |               |
| Aug-11 | 14.09% | Busiest Month |
| Sep-11 | 12.27% |               |
| 11-Oct | 8.90%  |               |
| Nov-11 | 11.70% |               |
| Dec-11 | 5.95%  |               |
| Total  |        |               |

**APPENDIX D**  
**Existing Plus Site Related Traffic**  
Level Of Service Calculations



HCM Unsignalized Intersection Capacity Analysis  
 1: Highway 7 & 6th Line

Existing + Site Traffic AM



| Movement                          | EBL         | EBT         | WBT         | WBR                  | SBL  | SBR  |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Lane Configurations               |             | ↕           | ↕           |                      | ↕    |      |
| Sign Control                      |             | Free        | Free        |                      | Stop |      |
| Grade                             |             | 0%          | 0%          |                      | 0%   |      |
| Volume (veh/h)                    | 6           | 678         | 275         | 13                   | 12   | 6    |
| Peak Hour Factor                  | 0.87        | 0.87        | 0.87        | 0.87                 | 0.65 | 0.65 |
| Hourly flow rate (vph)            | 7           | 779         | 316         | 15                   | 18   | 9    |
| Pedestrians                       |             |             |             |                      |      |      |
| Lane Width (m)                    |             |             |             |                      |      |      |
| Walking Speed (m/s)               |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       |             |             |             |                      | None |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (m)               |             |             |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      |      |      |
| vC, conflicting volume            | 331         |             |             |                      | 1117 | 324  |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                | 331         |             |             |                      | 1117 | 324  |
| tC, single (s)                    | 4.6         |             |             |                      | 7.4  | 6.9  |
| tC, 2 stage (s)                   |             |             |             |                      |      |      |
| tF (s)                            | 2.7         |             |             |                      | 4.4  | 3.9  |
| p0 queue free %                   | 99          |             |             |                      | 88   | 98   |
| cM capacity (veh/h)               | 1003        |             |             |                      | 150  | 590  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>SB 1</b> |                      |      |      |
| Volume Total                      | 786         | 331         | 28          |                      |      |      |
| Volume Left                       | 7           | 0           | 18          |                      |      |      |
| Volume Right                      | 0           | 15          | 9           |                      |      |      |
| cSH                               | 1003        | 1700        | 200         |                      |      |      |
| Volume to Capacity                | 0.01        | 0.19        | 0.14        |                      |      |      |
| Queue Length 95th (m)             | 0.2         | 0.0         | 3.6         |                      |      |      |
| Control Delay (s)                 | 0.2         | 0.0         | 25.9        |                      |      |      |
| Lane LOS                          | A           |             | D           |                      |      |      |
| Approach Delay (s)                | 0.2         | 0.0         | 25.9        |                      |      |      |
| Approach LOS                      |             |             | D           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 0.8         |                      |      |      |
| Intersection Capacity Utilization |             | 52.7%       |             | ICU Level of Service |      | A    |
| Analysis Period (min)             |             |             | 15          |                      |      |      |










HCM Unsignalized Intersection Capacity Analysis  
2: Highway 7 & 5th Line

Existing + Site Traffic AM

|                                   | →           | ↘           | ↙           | ←                    | ↖    | ↗    |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Movement                          | EBT         | EBR         | WBL         | WBT                  | NBL  | NBR  |
| Lane Configurations               | ↶           |             |             | ↷                    | ↶    | ↷    |
| Sign Control                      | Free        |             |             | Free                 | Stop |      |
| Grade                             | 0%          |             |             | 0%                   | 0%   |      |
| Volume (veh/h)                    | 670         | 15          | 4           | 283                  | 4    | 6    |
| Peak Hour Factor                  | 0.93        | 0.93        | 0.93        | 0.93                 | 0.93 | 0.93 |
| Hourly flow rate (vph)            | 720         | 16          | 4           | 304                  | 4    | 6    |
| Pedestrians                       |             |             |             |                      |      |      |
| Lane Width (m)                    |             |             |             |                      |      |      |
| Walking Speed (m/s)               |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       |             |             |             |                      | None |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (m)               |             |             |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      |      |      |
| vC, conflicting volume            |             |             | 737         |                      | 1041 | 728  |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                |             |             | 737         |                      | 1041 | 728  |
| 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         |                      | 98   | 98   |
| cM capacity (veh/h)               |             |             | 878         |                      | 256  | 426  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>NB 1</b> |                      |      |      |
| Volume Total                      | 737         | 309         | 11          |                      |      |      |
| Volume Left                       | 0           | 4           | 4           |                      |      |      |
| Volume Right                      | 16          | 0           | 6           |                      |      |      |
| cSH                               | 1700        | 878         | 336         |                      |      |      |
| Volume to Capacity                | 0.43        | 0.00        | 0.03        |                      |      |      |
| Queue Length 95th (m)             | 0.0         | 0.1         | 0.8         |                      |      |      |
| Control Delay (s)                 | 0.0         | 0.2         | 16.1        |                      |      |      |
| Lane LOS                          |             | A           | C           |                      |      |      |
| Approach Delay (s)                | 0.0         | 0.2         | 16.1        |                      |      |      |
| Approach LOS                      |             |             | C           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 0.2         |                      |      |      |
| Intersection Capacity Utilization |             | 48.2%       |             | ICU Level of Service |      | A    |
| Analysis Period (min)             |             |             | 15          |                      |      |      |

HCM Unsignalized Intersection Capacity Analysis  
 3: Proposed Access & 6th Line

Existing + Site Traffic AM

|                                   |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement                          | WBL   | WBR   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |  |   |  |   |   |  |
| Sign Control                      | Stop  |   | Free  |   |   | Free  |
| Grade                             | 0%  |   | 0%  |   |   | 0%  |
| Volume (veh/h)                    | 13  | 0   | 6   | 13  | 0   | 5   |
| Peak Hour Factor                  | 0.65  | 0.65  | 0.65  | 0.65  | 0.65  | 0.65  |
| Hourly flow rate (vph)            | 20  | 0   | 9   | 20  | 0   | 8   |
| Pedestrians                       |   |   |   |   |   |   |
| Lane Width (m)                    |   |   |   |   |   |   |
| Walking Speed (m/s)               |   |   |   |   |   |   |
| Percent Blockage                  |   |   |   |   |   |   |
| Right turn flare (veh)            |   |   |   |   |   |   |
| Median type                       | None  |   |   |   |   |   |
| Median storage (veh)              |   |   |   |   |   |   |
| Upstream signal (m)               |   |   |   |   |   |   |
| pX, platoon unblocked             |   |   |   |   |   |   |
| vC, conflicting volume            | 27  | 19  |   |   | 29  |   |
| vC1, stage 1 conf vol             |   |   |   |   |   |   |
| vC2, stage 2 conf vol             |   |   |   |   |   |   |
| vCu, unblocked vol                | 27  | 19  |   |   | 29  |   |
| tC, single (s)                    | 7.4   | 6.2   |   |   | 4.1   |   |
| tC, 2 stage (s)                   |   |   |   |   |   |   |
| tF (s)                            | 4.4   | 3.3   |   |   | 2.2   |   |
| p0 queue free %                   | 97  | 100   |   |   | 100   |   |
| cM capacity (veh/h)               | 787   | 1059  |   |   | 1584  |   |
| <b>Direction, Lane #</b>          | <b>WB 1</b>   | <b>NB 1</b>   | <b>SB 1</b>   |   |   |   |
| Volume Total                      | 20  | 29  | 8   |   |   |   |
| Volume Left                       | 20  | 0   | 0   |   |   |   |
| Volume Right                      | 0   | 20  | 0   |   |   |   |
| cSH                               | 787   | 1700  | 1584  |   |   |   |
| Volume to Capacity                | 0.03  | 0.02  | 0.00  |   |   |   |
| Queue Length 95th (m)             | 0.6   | 0.0   | 0.0   |   |   |   |
| Control Delay (s)                 | 9.7   | 0.0   | 0.0   |   |   |   |
| Lane LOS                          | A   |   |   |   |   |   |
| Approach Delay (s)                | 9.7   | 0.0   | 0.0   |   |   |   |
| Approach LOS                      | A   |   |   |   |   |   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |
| Average Delay                     |   |   | 3.4   |   |   |   |
| Intersection Capacity Utilization |   | 13.3%   |   | ICU Level of Service  |   | A   |
| Analysis Period (min)             |   |   | 15  |   |   |   |

HCM Unsignalized Intersection Capacity Analysis  
 1: Highway 7 & 6th Line

Existing + Site Traffic PM



| Movement                          | EBL         | EBT         | WBT         | WBR                  | SBL  | SBR  |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Lane Configurations               |             | ↕           | ↕           |                      | ↕    |      |
| Sign Control                      |             | Free        | Free        |                      | Stop |      |
| Grade                             |             | 0%          | 0%          |                      | 0%   |      |
| Volume (veh/h)                    | 7           | 358         | 726         | 13                   | 13   | 4    |
| Peak Hour Factor                  | 0.93        | 0.93        | 0.93        | 0.93                 | 0.60 | 0.60 |
| Hourly flow rate (vph)            | 8           | 385         | 781         | 14                   | 22   | 7    |
| Pedestrians                       |             |             |             |                      |      |      |
| Lane Width (m)                    |             |             |             |                      |      |      |
| Walking Speed (m/s)               |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       |             |             |             |                      | None |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (m)               |             |             |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      |      |      |
| vC, conflicting volume            | 795         |             |             |                      | 1188 | 788  |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                | 795         |             |             |                      | 1188 | 788  |
| tC, single (s)                    | 4.2         |             |             |                      | 7.3  | 6.5  |
| tC, 2 stage (s)                   |             |             |             |                      |      |      |
| tF (s)                            | 2.3         |             |             |                      | 4.3  | 3.5  |
| p0 queue free %                   | 99          |             |             |                      | 84   | 98   |
| cM capacity (veh/h)               | 776         |             |             |                      | 138  | 357  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>SB 1</b> |                      |      |      |
| Volume Total                      | 392         | 795         | 28          |                      |      |      |
| Volume Left                       | 8           | 0           | 22          |                      |      |      |
| Volume Right                      | 0           | 14          | 7           |                      |      |      |
| cSH                               | 776         | 1700        | 162         |                      |      |      |
| Volume to Capacity                | 0.01        | 0.47        | 0.18        |                      |      |      |
| Queue Length 95th (m)             | 0.2         | 0.0         | 4.7         |                      |      |      |
| Control Delay (s)                 | 0.3         | 0.0         | 32.0        |                      |      |      |
| Lane LOS                          | A           |             | D           |                      |      |      |
| Approach Delay (s)                | 0.3         | 0.0         | 32.0        |                      |      |      |
| Approach LOS                      |             |             | D           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 0.8         |                      |      |      |
| Intersection Capacity Utilization |             | 51.2%       |             | ICU Level of Service |      | A    |
| Analysis Period (min)             |             |             | 15          |                      |      |      |










HCM Unsignalized Intersection Capacity Analysis  
2: Highway 7 & 5th Line

Existing + Site Traffic PM

|                                   | →           | ↘           | ↙           | ←                    | ↖    | ↗    |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Movement                          | EBT         | EBR         | WBL         | WBT                  | NBL  | NBR  |
| Lane Configurations               | ↶           |             |             | ↷                    | ↶    | ↷    |
| Sign Control                      | Free        |             |             | Free                 | Stop |      |
| Grade                             | 0%          |             |             | 0%                   | 0%   |      |
| Volume (veh/h)                    | 367         | 3           | 6           | 714                  | 19   | 10   |
| Peak Hour Factor                  | 0.97        | 0.97        | 0.97        | 0.97                 | 0.97 | 0.97 |
| Hourly flow rate (vph)            | 378         | 3           | 6           | 736                  | 20   | 10   |
| Pedestrians                       |             |             |             |                      |      |      |
| Lane Width (m)                    |             |             |             |                      |      |      |
| Walking Speed (m/s)               |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       | None        |             |             |                      |      |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (m)               |             |             |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      |      |      |
| vC, conflicting volume            |             |             | 381         |                      | 1128 | 380  |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                |             |             | 381         |                      | 1128 | 380  |
| 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          |                      | 91   | 98   |
| cM capacity (veh/h)               |             |             | 1188        |                      | 227  | 672  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>NB 1</b> |                      |      |      |
| Volume Total                      | 381         | 742         | 30          |                      |      |      |
| Volume Left                       | 0           | 6           | 20          |                      |      |      |
| Volume Right                      | 3           | 0           | 10          |                      |      |      |
| cSH                               | 1700        | 1188        | 294         |                      |      |      |
| Volume to Capacity                | 0.22        | 0.01        | 0.10        |                      |      |      |
| Queue Length 95th (m)             | 0.0         | 0.1         | 2.6         |                      |      |      |
| Control Delay (s)                 | 0.0         | 0.1         | 18.6        |                      |      |      |
| Lane LOS                          |             | A           | C           |                      |      |      |
| Approach Delay (s)                | 0.0         | 0.1         | 18.6        |                      |      |      |
| Approach LOS                      |             |             | C           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 0.6         |                      |      |      |
| Intersection Capacity Utilization |             |             | 54.7%       | ICU Level of Service | A    |      |
| Analysis Period (min)             |             |             | 15          |                      |      |      |

HCM Unsignalized Intersection Capacity Analysis  
 3: Proposed Access & 6th Line

Existing + Site Traffic PM

|                                   |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement                          | WBL   | WBR   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |  |   |  |   |   |  |
| Sign Control                      | Stop  |   | Free  |   |   | Free  |
| Grade                             | 0%  |   | 0%  |   |   | 0%  |
| Volume (veh/h)                    | 13  | 0   | 7   | 13  | 0   | 4   |
| Peak Hour Factor                  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  |
| Hourly flow rate (vph)            | 22  | 0   | 12  | 22  | 0   | 7   |
| Pedestrians                       |   |   |   |   |   |   |
| Lane Width (m)                    |   |   |   |   |   |   |
| Walking Speed (m/s)               |   |   |   |   |   |   |
| Percent Blockage                  |   |   |   |   |   |   |
| Right turn flare (veh)            |   |   |   |   |   |   |
| Median type                       | None  |   |   |   |   |   |
| Median storage (veh)              |   |   |   |   |   |   |
| Upstream signal (m)               |   |   |   |   |   |   |
| pX, platoon unblocked             |   |   |   |   |   |   |
| vC, conflicting volume            | 29  | 22  |   |   | 33  |   |
| vC1, stage 1 conf vol             |   |   |   |   |   |   |
| vC2, stage 2 conf vol             |   |   |   |   |   |   |
| vCu, unblocked vol                | 29  | 22  |   |   | 33  |   |
| tC, single (s)                    | 7.4   | 6.2   |   |   | 4.1   |   |
| tC, 2 stage (s)                   |   |   |   |   |   |   |
| tF (s)                            | 4.4   | 3.3   |   |   | 2.2   |   |
| p0 queue free %                   | 97  | 100   |   |   | 100   |   |
| cM capacity (veh/h)               | 784   | 1054  |   |   | 1578  |   |
| Direction, Lane #                 | WB 1  | NB 1  | SB 1  |   |   |   |
| Volume Total                      | 22  | 33  | 7   |   |   |   |
| Volume Left                       | 22  | 0   | 0   |   |   |   |
| Volume Right                      | 0   | 22  | 0   |   |   |   |
| cSH                               | 784   | 1700  | 1578  |   |   |   |
| Volume to Capacity                | 0.03  | 0.02  | 0.00  |   |   |   |
| Queue Length 95th (m)             | 0.6   | 0.0   | 0.0   |   |   |   |
| Control Delay (s)                 | 9.7   | 0.0   | 0.0   |   |   |   |
| Lane LOS                          | A   |   |   |   |   |   |
| Approach Delay (s)                | 9.7   | 0.0   | 0.0   |   |   |   |
| Approach LOS                      | A   |   |   |   |   |   |
| Intersection Summary              |   |   |   |   |   |   |
| Average Delay                     |   |   | 3.4   |   |   |   |
| Intersection Capacity Utilization |   | 13.3%   |   | ICU Level of Service  |   | A   |
| Analysis Period (min)             |   |   | 15  |   |   |   |

**APPENDIX E**  
**Future (2018) Total Traffic**  
Level Of Service Calculations

HCM Unsignalized Intersection Capacity Analysis  
 1: Highway 7 & 6th Line

Future Total Traffic AM  
 2017



| Movement                          | EBL         | EBT         | WBT         | WBR                  | SBL  | SBR  |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Lane Configurations               |             | ↕           | ↕           |                      | ↕    |      |
| Sign Control                      |             | Free        | Free        |                      | Stop |      |
| Grade                             |             | 0%          | 0%          |                      | 0%   |      |
| Volume (veh/h)                    | 7           | 761         | 310         | 13                   | 12   | 7    |
| Peak Hour Factor                  | 0.87        | 0.87        | 0.87        | 0.87                 | 0.65 | 0.65 |
| Hourly flow rate (vph)            | 8           | 875         | 356         | 15                   | 18   | 11   |
| Pedestrians                       |             |             |             |                      |      |      |
| Lane Width (m)                    |             |             |             |                      |      |      |
| Walking Speed (m/s)               |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       |             |             |             |                      | None |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (m)               |             |             |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      |      |      |
| vC, conflicting volume            | 371         |             |             |                      | 1255 | 364  |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                | 371         |             |             |                      | 1255 | 364  |
| tC, single (s)                    | 4.5         |             |             |                      | 7.4  | 6.9  |
| tC, 2 stage (s)                   |             |             |             |                      |      |      |
| tF (s)                            | 2.6         |             |             |                      | 4.4  | 3.9  |
| p0 queue free %                   | 99          |             |             |                      | 85   | 98   |
| cM capacity (veh/h)               | 994         |             |             |                      | 120  | 551  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>SB 1</b> |                      |      |      |
| Volume Total                      | 883         | 371         | 29          |                      |      |      |
| Volume Left                       | 8           | 0           | 18          |                      |      |      |
| Volume Right                      | 0           | 15          | 11          |                      |      |      |
| cSH                               | 994         | 1700        | 169         |                      |      |      |
| Volume to Capacity                | 0.01        | 0.22        | 0.17        |                      |      |      |
| Queue Length 95th (m)             | 0.2         | 0.0         | 4.6         |                      |      |      |
| Control Delay (s)                 | 0.2         | 0.0         | 30.7        |                      |      |      |
| Lane LOS                          | A           |             | D           |                      |      |      |
| Approach Delay (s)                | 0.2         | 0.0         | 30.7        |                      |      |      |
| Approach LOS                      |             |             | D           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 0.9         |                      |      |      |
| Intersection Capacity Utilization |             | 58.2%       |             | ICU Level of Service |      | B    |
| Analysis Period (min)             |             |             | 15          |                      |      |      |












HCM Unsignalized Intersection Capacity Analysis  
2: Highway 7 & 5th Line

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|                                   | →           | ↘           | ↙           | ←                    | ↖    | ↗    |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Movement                          | EBT         | EBR         | WBL         | WBT                  | NBL  | NBR  |
| Lane Configurations               | ↶           |             |             | ↷                    | ↶    | ↷    |
| Sign Control                      | Free        |             |             | Free                 | Stop |      |
| Grade                             | 0%          |             |             | 0%                   | 0%   |      |
| Volume (veh/h)                    | 756         | 17          | 5           | 318                  | 5    | 7    |
| Peak Hour Factor                  | 0.93        | 0.93        | 0.93        | 0.93                 | 0.93 | 0.93 |
| Hourly flow rate (vph)            | 813         | 18          | 5           | 342                  | 5    | 8    |
| Pedestrians                       |             |             |             |                      |      |      |
| Lane Width (m)                    |             |             |             |                      |      |      |
| Walking Speed (m/s)               |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       | None        |             |             |                      |      |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (m)               |             |             |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      |      |      |
| vC, conflicting volume            |             |             | 831         |                      | 1175 | 822  |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                |             |             | 831         |                      | 1175 | 822  |
| 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          |                      | 97   | 98   |
| cM capacity (veh/h)               |             |             | 810         |                      | 212  | 377  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>NB 1</b> |                      |      |      |
| Volume Total                      | 831         | 347         | 13          |                      |      |      |
| Volume Left                       | 0           | 5           | 5           |                      |      |      |
| Volume Right                      | 18          | 0           | 8           |                      |      |      |
| cSH                               | 1700        | 810         | 285         |                      |      |      |
| Volume to Capacity                | 0.49        | 0.01        | 0.05        |                      |      |      |
| Queue Length 95th (m)             | 0.0         | 0.2         | 1.1         |                      |      |      |
| Control Delay (s)                 | 0.0         | 0.2         | 18.2        |                      |      |      |
| Lane LOS                          |             | A           | C           |                      |      |      |
| Approach Delay (s)                | 0.0         | 0.2         | 18.2        |                      |      |      |
| Approach LOS                      |             |             | C           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 0.3         |                      |      |      |
| Intersection Capacity Utilization |             |             | 53.1%       | ICU Level of Service | A    |      |
| Analysis Period (min)             |             |             | 15          |                      |      |      |

HCM Unsignalized Intersection Capacity Analysis  
 3: Proposed Access & 6th Line

Future Total Traffic AM  
 2017

|                                   |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement                          | WBL   | WBR   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |  |   |  |   |   |  |
| Sign Control                      | Stop  |   | Free  |   |   | Free  |
| Grade                             | 0%  |   | 0%  |   |   | 0%  |
| Volume (veh/h)                    | 13  | 0   | 7   | 13  | 0   | 6   |
| Peak Hour Factor                  | 0.65  | 0.65  | 0.65  | 0.65  | 0.65  | 0.65  |
| Hourly flow rate (vph)            | 20  | 0   | 11  | 20  | 0   | 9   |
| Pedestrians                       |   |   |   |   |   |   |
| Lane Width (m)                    |   |   |   |   |   |   |
| Walking Speed (m/s)               |   |   |   |   |   |   |
| Percent Blockage                  |   |   |   |   |   |   |
| Right turn flare (veh)            |   |   |   |   |   |   |
| Median type                       | None  |   |   |   |   |   |
| Median storage (veh)              |   |   |   |   |   |   |
| Upstream signal (m)               |   |   |   |   |   |   |
| pX, platoon unblocked             |   |   |   |   |   |   |
| vC, conflicting volume            | 30  | 21  |   |   | 31  |   |
| vC1, stage 1 conf vol             |   |   |   |   |   |   |
| vC2, stage 2 conf vol             |   |   |   |   |   |   |
| vCu, unblocked vol                | 30  | 21  |   |   | 31  |   |
| tC, single (s)                    | 7.4   | 6.2   |   |   | 4.1   |   |
| tC, 2 stage (s)                   |   |   |   |   |   |   |
| tF (s)                            | 4.4   | 3.3   |   |   | 2.2   |   |
| p0 queue free %                   | 97  | 100   |   |   | 100   |   |
| cM capacity (veh/h)               | 783   | 1057  |   |   | 1582  |   |
| Direction, Lane #                 | WB 1  | NB 1  | SB 1  |   |   |   |
| Volume Total                      | 20  | 31  | 9   |   |   |   |
| Volume Left                       | 20  | 0   | 0   |   |   |   |
| Volume Right                      | 0   | 20  | 0   |   |   |   |
| cSH                               | 783   | 1700  | 1582  |   |   |   |
| Volume to Capacity                | 0.03  | 0.02  | 0.00  |   |   |   |
| Queue Length 95th (m)             | 0.6   | 0.0   | 0.0   |   |   |   |
| Control Delay (s)                 | 9.7   | 0.0   | 0.0   |   |   |   |
| Lane LOS                          | A   |   |   |   |   |   |
| Approach Delay (s)                | 9.7   | 0.0   | 0.0   |   |   |   |
| Approach LOS                      | A   |   |   |   |   |   |
| Intersection Summary              |   |   |   |   |   |   |
| Average Delay                     |   |   | 3.2   |   |   |   |
| Intersection Capacity Utilization |   | 13.3%   |   | ICU Level of Service  |   | A   |
| Analysis Period (min)             |   |   | 15  |   |   |   |

HCM Unsignalized Intersection Capacity Analysis  
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| Movement                          | EBL         | EBT         | WBT         | WBR                  | SBL  | SBR  |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Lane Configurations               |             | ↶           | ↷           |                      | ↶    | ↷    |
| Sign Control                      |             | Free        | Free        |                      | Stop |      |
| Grade                             |             | 0%          | 0%          |                      | 0%   |      |
| Volume (veh/h)                    | 8           | 403         | 813         | 13                   | 13   | 4    |
| Peak Hour Factor                  | 0.93        | 0.93        | 0.93        | 0.93                 | 0.60 | 0.60 |
| Hourly flow rate (vph)            | 9           | 433         | 874         | 14                   | 22   | 7    |
| Pedestrians                       |             |             |             |                      |      |      |
| Lane Width (m)                    |             |             |             |                      |      |      |
| Walking Speed (m/s)               |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       |             |             |             |                      | None |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (m)               |             |             |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      |      |      |
| vC, conflicting volume            | 888         |             |             |                      | 1332 | 881  |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                | 888         |             |             |                      | 1332 | 881  |
| tC, single (s)                    | 4.2         |             |             |                      | 7.3  | 6.5  |
| tC, 2 stage (s)                   |             |             |             |                      |      |      |
| tF (s)                            | 2.3         |             |             |                      | 4.3  | 3.5  |
| p0 queue free %                   | 99          |             |             |                      | 80   | 98   |
| cM capacity (veh/h)               | 718         |             |             |                      | 110  | 314  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>SB 1</b> |                      |      |      |
| Volume Total                      | 442         | 888         | 28          |                      |      |      |
| Volume Left                       | 9           | 0           | 22          |                      |      |      |
| Volume Right                      | 0           | 14          | 7           |                      |      |      |
| cSH                               | 718         | 1700        | 130         |                      |      |      |
| Volume to Capacity                | 0.01        | 0.52        | 0.22        |                      |      |      |
| Queue Length 95th (m)             | 0.3         | 0.0         | 6.0         |                      |      |      |
| Control Delay (s)                 | 0.4         | 0.0         | 40.3        |                      |      |      |
| Lane LOS                          | A           |             | E           |                      |      |      |
| Approach Delay (s)                | 0.4         | 0.0         | 40.3        |                      |      |      |
| Approach LOS                      |             |             | E           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 1.0         |                      |      |      |
| Intersection Capacity Utilization |             | 56.0%       |             | ICU Level of Service |      | B    |
| Analysis Period (min)             |             |             | 15          |                      |      |      |










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|                                   | →           | ↘           | ↙           | ←                    | ↖    | ↗    |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Movement                          | EBT         | EBR         | WBL         | WBT                  | NBL  | NBR  |
| Lane Configurations               | ↗           |             |             | ↖                    | ↗    | ↘    |
| Sign Control                      | Free        |             |             | Free                 | Stop |      |
| Grade                             | 0%          |             |             | 0%                   | 0%   |      |
| Volume (veh/h)                    | 413         | 3           | 7           | 805                  | 21   | 11   |
| Peak Hour Factor                  | 0.97        | 0.97        | 0.97        | 0.97                 | 0.97 | 0.97 |
| Hourly flow rate (vph)            | 426         | 3           | 7           | 830                  | 22   | 11   |
| Pedestrians                       |             |             |             |                      |      |      |
| Lane Width (m)                    |             |             |             |                      |      |      |
| Walking Speed (m/s)               |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       |             |             |             |                      | None |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (m)               |             |             |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      |      |      |
| vC, conflicting volume            |             |             | 429         |                      | 1272 | 427  |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                |             |             | 429         |                      | 1272 | 427  |
| 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          |                      | 88   | 98   |
| cM capacity (veh/h)               |             |             | 1141        |                      | 186  | 632  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>NB 1</b> |                      |      |      |
| Volume Total                      | 429         | 837         | 33          |                      |      |      |
| Volume Left                       | 0           | 7           | 22          |                      |      |      |
| Volume Right                      | 3           | 0           | 11          |                      |      |      |
| cSH                               | 1700        | 1141        | 245         |                      |      |      |
| Volume to Capacity                | 0.25        | 0.01        | 0.13        |                      |      |      |
| Queue Length 95th (m)             | 0.0         | 0.1         | 3.5         |                      |      |      |
| Control Delay (s)                 | 0.0         | 0.2         | 22.0        |                      |      |      |
| Lane LOS                          |             | A           | C           |                      |      |      |
| Approach Delay (s)                | 0.0         | 0.2         | 22.0        |                      |      |      |
| Approach LOS                      |             |             | C           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 0.7         |                      |      |      |
| Intersection Capacity Utilization |             | 60.6%       |             | ICU Level of Service |      | B    |
| Analysis Period (min)             |             |             | 15          |                      |      |      |

HCM Unsignalized Intersection Capacity Analysis  
 3: Proposed Access & 6th Line

Future Total Traffic PM  
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|                                   |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement                          | WBL   | WBR   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |  |   |  |   |   |  |
| Sign Control                      | Stop  |   | Free  |   |   | Free  |
| Grade                             | 0%  |   | 0%  |   |   | 0%  |
| Volume (veh/h)                    | 13  | 0   | 8   | 13  | 0   | 4   |
| Peak Hour Factor                  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  |
| Hourly flow rate (vph)            | 22  | 0   | 13  | 22  | 0   | 7   |
| Pedestrians                       |   |   |   |   |   |   |
| Lane Width (m)                    |   |   |   |   |   |   |
| Walking Speed (m/s)               |   |   |   |   |   |   |
| Percent Blockage                  |   |   |   |   |   |   |
| Right turn flare (veh)            |   |   |   |   |   |   |
| Median type                       | None  |   |   |   |   |   |
| Median storage (veh)              |   |   |   |   |   |   |
| Upstream signal (m)               |   |   |   |   |   |   |
| pX, platoon unblocked             |   |   |   |   |   |   |
| vC, conflicting volume            | 31  | 24  |   |   | 35  |   |
| vC1, stage 1 conf vol             |   |   |   |   |   |   |
| vC2, stage 2 conf vol             |   |   |   |   |   |   |
| vCu, unblocked vol                | 31  | 24  |   |   | 35  |   |
| tC, single (s)                    | 7.4   | 6.2   |   |   | 4.1   |   |
| tC, 2 stage (s)                   |   |   |   |   |   |   |
| tF (s)                            | 4.4   | 3.3   |   |   | 2.2   |   |
| p0 queue free %                   | 97  | 100   |   |   | 100   |   |
| cM capacity (veh/h)               | 782   | 1052  |   |   | 1576  |   |
| Direction, Lane #                 | WB 1  | NB 1  | SB 1  |   |   |   |
| Volume Total                      | 22  | 35  | 7   |   |   |   |
| Volume Left                       | 22  | 0   | 0   |   |   |   |
| Volume Right                      | 0   | 22  | 0   |   |   |   |
| cSH                               | 782   | 1700  | 1576  |   |   |   |
| Volume to Capacity                | 0.03  | 0.02  | 0.00  |   |   |   |
| Queue Length 95th (m)             | 0.6   | 0.0   | 0.0   |   |   |   |
| Control Delay (s)                 | 9.7   | 0.0   | 0.0   |   |   |   |
| Lane LOS                          | A   |   |   |   |   |   |
| Approach Delay (s)                | 9.7   | 0.0   | 0.0   |   |   |   |
| Approach LOS                      | A   |   |   |   |   |   |
| Intersection Summary              |   |   |   |   |   |   |
| Average Delay                     |   |   | 3.3   |   |   |   |
| Intersection Capacity Utilization |   | 13.3%   |   | ICU Level of Service  |   | A   |
| Analysis Period (min)             |   |   | 15  |   |   |   |

**APPENDIX F**  
**Future (2023) Total Traffic**  
Level Of Service Calculations

HCM Unsignalized Intersection Capacity Analysis  
 1: Highway 7 & 6th Line

Future Total Traffic AM  
 2022



| Movement                          | EBL         | EBT         | WBT         | WBR                  | SBL  | SBR  |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Lane Configurations               |             | ↕           | ↕           |                      | ↕    |      |
| Sign Control                      |             | Free        | Free        |                      | Stop |      |
| Grade                             |             | 0%          | 0%          |                      | 0%   |      |
| Volume (veh/h)                    | 7           | 861         | 351         | 13                   | 12   | 7    |
| Peak Hour Factor                  | 0.87        | 0.87        | 0.87        | 0.87                 | 0.65 | 0.65 |
| Hourly flow rate (vph)            | 8           | 990         | 403         | 15                   | 18   | 11   |
| Pedestrians                       |             |             |             |                      |      |      |
| Lane Width (m)                    |             |             |             |                      |      |      |
| Walking Speed (m/s)               |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       |             |             |             |                      | None |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (m)               |             |             |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      |      |      |
| vC, conflicting volume            | 418         |             |             |                      | 1417 | 411  |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                | 418         |             |             |                      | 1417 | 411  |
| tC, single (s)                    | 4.5         |             |             |                      | 7.4  | 6.9  |
| tC, 2 stage (s)                   |             |             |             |                      |      |      |
| tF (s)                            | 2.6         |             |             |                      | 4.4  | 3.9  |
| p0 queue free %                   | 99          |             |             |                      | 80   | 98   |
| cM capacity (veh/h)               | 952         |             |             |                      | 93   | 516  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>SB 1</b> |                      |      |      |
| Volume Total                      | 998         | 418         | 29          |                      |      |      |
| Volume Left                       | 8           | 0           | 18          |                      |      |      |
| Volume Right                      | 0           | 15          | 11          |                      |      |      |
| cSH                               | 952         | 1700        | 133         |                      |      |      |
| Volume to Capacity                | 0.01        | 0.25        | 0.22        |                      |      |      |
| Queue Length 95th (m)             | 0.2         | 0.0         | 6.1         |                      |      |      |
| Control Delay (s)                 | 0.2         | 0.0         | 39.5        |                      |      |      |
| Lane LOS                          | A           |             | E           |                      |      |      |
| Approach Delay (s)                | 0.2         | 0.0         | 39.5        |                      |      |      |
| Approach LOS                      |             |             | E           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 1.0         |                      |      |      |
| Intersection Capacity Utilization |             | 63.7%       |             | ICU Level of Service |      | B    |
| Analysis Period (min)             |             |             | 15          |                      |      |      |

HCM Unsignalized Intersection Capacity Analysis  
2: Highway 7 & 5th Line










Future Total Traffic AM  
2022

|                                   | →           | ↘           | ↙           | ←                    | ↖    | ↗    |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Movement                          | EBT         | EBR         | WBL         | WBT                  | NBL  | NBR  |
| Lane Configurations               | ↶           |             |             | ↷                    | ↶    | ↷    |
| Sign Control                      | Free        |             |             | Free                 | Stop |      |
| Grade                             | 0%          |             |             | 0%                   | 0%   |      |
| Volume (veh/h)                    | 854         | 19          | 5           | 359                  | 5    | 8    |
| Peak Hour Factor                  | 0.93        | 0.93        | 0.93        | 0.93                 | 0.93 | 0.93 |
| Hourly flow rate (vph)            | 918         | 20          | 5           | 386                  | 5    | 9    |
| Pedestrians                       |             |             |             |                      |      |      |
| Lane Width (m)                    |             |             |             |                      |      |      |
| Walking Speed (m/s)               |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       |             |             |             |                      | None |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (m)               |             |             |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      |      |      |
| vC, conflicting volume            |             |             | 939         |                      | 1325 | 928  |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                |             |             | 939         |                      | 1325 | 928  |
| 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          |                      | 97   | 97   |
| cM capacity (veh/h)               |             |             | 738         |                      | 172  | 327  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>NB 1</b> |                      |      |      |
| Volume Total                      | 939         | 391         | 14          |                      |      |      |
| Volume Left                       | 0           | 5           | 5           |                      |      |      |
| Volume Right                      | 20          | 0           | 9           |                      |      |      |
| cSH                               | 1700        | 738         | 243         |                      |      |      |
| Volume to Capacity                | 0.55        | 0.01        | 0.06        |                      |      |      |
| Queue Length 95th (m)             | 0.0         | 0.2         | 1.4         |                      |      |      |
| Control Delay (s)                 | 0.0         | 0.2         | 20.7        |                      |      |      |
| Lane LOS                          |             | A           | C           |                      |      |      |
| Approach Delay (s)                | 0.0         | 0.2         | 20.7        |                      |      |      |
| Approach LOS                      |             |             | C           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 0.3         |                      |      |      |
| Intersection Capacity Utilization |             | 58.7%       |             | ICU Level of Service |      | B    |
| Analysis Period (min)             |             |             | 15          |                      |      |      |



HCM Unsignalized Intersection Capacity Analysis  
3: Proposed Access & 6th Line

Future Total Traffic AM  
2022

|                                   |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement                          | WBL   | WBR   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |  |   |  |   |   |  |
| Sign Control                      | Stop  |   | Free  |   |   | Free  |
| Grade                             | 0%  |   | 0%  |   |   | 0%  |
| Volume (veh/h)                    | 13  | 0   | 7   | 13  | 0   | 6   |
| Peak Hour Factor                  | 0.65  | 0.65  | 0.65  | 0.65  | 0.65  | 0.65  |
| Hourly flow rate (vph)            | 20  | 0   | 11  | 20  | 0   | 9   |
| Pedestrians                       |   |   |   |   |   |   |
| Lane Width (m)                    |   |   |   |   |   |   |
| Walking Speed (m/s)               |   |   |   |   |   |   |
| Percent Blockage                  |   |   |   |   |   |   |
| Right turn flare (veh)            |   |   |   |   |   |   |
| Median type                       | None  |   |   |   |   |   |
| Median storage (veh)              |   |   |   |   |   |   |
| Upstream signal (m)               |   |   |   |   |   |   |
| pX, platoon unblocked             |   |   |   |   |   |   |
| vC, conflicting volume            | 30  | 21  |   |   | 31  |   |
| vC1, stage 1 conf vol             |   |   |   |   |   |   |
| vC2, stage 2 conf vol             |   |   |   |   |   |   |
| vCu, unblocked vol                | 30  | 21  |   |   | 31  |   |
| tC, single (s)                    | 7.4   | 6.2   |   |   | 4.1   |   |
| tC, 2 stage (s)                   |   |   |   |   |   |   |
| tF (s)                            | 4.4   | 3.3   |   |   | 2.2   |   |
| p0 queue free %                   | 97  | 100   |   |   | 100   |   |
| cM capacity (veh/h)               | 783   | 1057  |   |   | 1582  |   |
| Direction, Lane #                 | WB 1  | NB 1  | SB 1  |   |   |   |
| Volume Total                      | 20  | 31  | 9   |   |   |   |
| Volume Left                       | 20  | 0   | 0   |   |   |   |
| Volume Right                      | 0   | 20  | 0   |   |   |   |
| cSH                               | 783   | 1700  | 1582  |   |   |   |
| Volume to Capacity                | 0.03  | 0.02  | 0.00  |   |   |   |
| Queue Length 95th (m)             | 0.6   | 0.0   | 0.0   |   |   |   |
| Control Delay (s)                 | 9.7   | 0.0   | 0.0   |   |   |   |
| Lane LOS                          | A   |   |   |   |   |   |
| Approach Delay (s)                | 9.7   | 0.0   | 0.0   |   |   |   |
| Approach LOS                      | A   |   |   |   |   |   |
| Intersection Summary              |   |   |   |   |   |   |
| Average Delay                     |   |   | 3.2   |   |   |   |
| Intersection Capacity Utilization |   | 13.3%   |   | ICU Level of Service  |   | A   |
| Analysis Period (min)             |   |   | 15  |   |   |   |

HCM Unsignalized Intersection Capacity Analysis  
 1: Highway 7 & 6th Line

Future Total Traffic PM  
 2022



| Movement                          | EBL         | EBT         | WBT         | WBR                  | SBL  | SBR  |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Lane Configurations               |             | ↕           | ↕           |                      | ↕    |      |
| Sign Control                      |             | Free        | Free        |                      | Stop |      |
| Grade                             |             | 0%          | 0%          |                      | 0%   |      |
| Volume (veh/h)                    | 9           | 457         | 922         | 13                   | 13   | 5    |
| Peak Hour Factor                  | 0.93        | 0.93        | 0.93        | 0.93                 | 0.60 | 0.60 |
| Hourly flow rate (vph)            | 10          | 491         | 991         | 14                   | 22   | 8    |
| Pedestrians                       |             |             |             |                      |      |      |
| Lane Width (m)                    |             |             |             |                      |      |      |
| Walking Speed (m/s)               |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       |             |             |             |                      | None |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (m)               |             |             |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      |      |      |
| vC, conflicting volume            | 1005        |             |             |                      | 1509 | 998  |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                | 1005        |             |             |                      | 1509 | 998  |
| tC, single (s)                    | 4.2         |             |             |                      | 7.3  | 6.4  |
| tC, 2 stage (s)                   |             |             |             |                      |      |      |
| tF (s)                            | 2.3         |             |             |                      | 4.3  | 3.5  |
| p0 queue free %                   | 99          |             |             |                      | 74   | 97   |
| cM capacity (veh/h)               | 655         |             |             |                      | 83   | 273  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>SB 1</b> |                      |      |      |
| Volume Total                      | 501         | 1005        | 30          |                      |      |      |
| Volume Left                       | 10          | 0           | 22          |                      |      |      |
| Volume Right                      | 0           | 14          | 8           |                      |      |      |
| cSH                               | 655         | 1700        | 102         |                      |      |      |
| Volume to Capacity                | 0.01        | 0.59        | 0.29        |                      |      |      |
| Queue Length 95th (m)             | 0.3         | 0.0         | 8.4         |                      |      |      |
| Control Delay (s)                 | 0.4         | 0.0         | 54.1        |                      |      |      |
| Lane LOS                          | A           |             | F           |                      |      |      |
| Approach Delay (s)                | 0.4         | 0.0         | 54.1        |                      |      |      |
| Approach LOS                      |             |             | F           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 1.2         |                      |      |      |
| Intersection Capacity Utilization |             | 62.1%       |             | ICU Level of Service |      | B    |
| Analysis Period (min)             |             |             | 15          |                      |      |      |










HCM Unsignalized Intersection Capacity Analysis  
2: Highway 7 & 5th Line

Future Total Traffic PM  
2022

|                                   | →           | ↘           | ↙           | ←                    | ↖    | ↗    |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Movement                          | EBT         | EBR         | WBL         | WBT                  | NBL  | NBR  |
| Lane Configurations               | ↗           |             |             | ↖                    | ↗    | ↘    |
| Sign Control                      | Free        |             |             | Free                 | Stop |      |
| Grade                             | 0%          |             |             | 0%                   | 0%   |      |
| Volume (veh/h)                    | 466         | 4           | 8           | 911                  | 24   | 13   |
| Peak Hour Factor                  | 0.97        | 0.97        | 0.97        | 0.97                 | 0.97 | 0.97 |
| Hourly flow rate (vph)            | 480         | 4           | 8           | 939                  | 25   | 13   |
| Pedestrians                       |             |             |             |                      |      |      |
| Lane Width (m)                    |             |             |             |                      |      |      |
| Walking Speed (m/s)               |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       | None        |             |             |                      |      |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (m)               |             |             |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      |      |      |
| vC, conflicting volume            |             |             | 485         |                      | 1438 | 482  |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                |             |             | 485         |                      | 1438 | 482  |
| 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          |                      | 83   | 98   |
| cM capacity (veh/h)               |             |             | 1089        |                      | 147  | 588  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>NB 1</b> |                      |      |      |
| Volume Total                      | 485         | 947         | 38          |                      |      |      |
| Volume Left                       | 0           | 8           | 25          |                      |      |      |
| Volume Right                      | 4           | 0           | 13          |                      |      |      |
| cSH                               | 1700        | 1089        | 200         |                      |      |      |
| Volume to Capacity                | 0.29        | 0.01        | 0.19        |                      |      |      |
| Queue Length 95th (m)             | 0.0         | 0.2         | 5.2         |                      |      |      |
| Control Delay (s)                 | 0.0         | 0.2         | 27.2        |                      |      |      |
| Lane LOS                          |             | A           | D           |                      |      |      |
| Approach Delay (s)                | 0.0         | 0.2         | 27.2        |                      |      |      |
| Approach LOS                      |             |             | D           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 0.8         |                      |      |      |
| Intersection Capacity Utilization |             |             | 67.3%       | ICU Level of Service | C    |      |
| Analysis Period (min)             |             |             | 15          |                      |      |      |

HCM Unsignalized Intersection Capacity Analysis  
3: Proposed Access & 6th Line

Future Total Traffic PM  
2022

|                                   |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement                          | WBL   | WBR   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |  |   |  |   |   |  |
| Sign Control                      | Stop  |   | Free  |   |   | Free  |
| Grade                             | 0%  |   | 0%  |   |   | 0%  |
| Volume (veh/h)                    | 13  | 0   | 9   | 13  | 0   | 5   |
| Peak Hour Factor                  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  |
| Hourly flow rate (vph)            | 22  | 0   | 15  | 22  | 0   | 8   |
| Pedestrians                       |   |   |   |   |   |   |
| Lane Width (m)                    |   |   |   |   |   |   |
| Walking Speed (m/s)               |   |   |   |   |   |   |
| Percent Blockage                  |   |   |   |   |   |   |
| Right turn flare (veh)            |   |   |   |   |   |   |
| Median type                       | None  |   |   |   |   |   |
| Median storage (veh)              |   |   |   |   |   |   |
| Upstream signal (m)               |   |   |   |   |   |   |
| pX, platoon unblocked             |   |   |   |   |   |   |
| vC, conflicting volume            | 34  | 26  |   |   | 37  |   |
| vC1, stage 1 conf vol             |   |   |   |   |   |   |
| vC2, stage 2 conf vol             |   |   |   |   |   |   |
| vCu, unblocked vol                | 34  | 26  |   |   | 37  |   |
| tC, single (s)                    | 7.4   | 6.2   |   |   | 4.1   |   |
| tC, 2 stage (s)                   |   |   |   |   |   |   |
| tF (s)                            | 4.4   | 3.3   |   |   | 2.2   |   |
| p0 queue free %                   | 97  | 100   |   |   | 100   |   |
| cM capacity (veh/h)               | 779   | 1050  |   |   | 1574  |   |
| Direction, Lane #                 | WB 1  | NB 1  | SB 1  |   |   |   |
| Volume Total                      | 22  | 37  | 8   |   |   |   |
| Volume Left                       | 22  | 0   | 0   |   |   |   |
| Volume Right                      | 0   | 22  | 0   |   |   |   |
| cSH                               | 779   | 1700  | 1574  |   |   |   |
| Volume to Capacity                | 0.03  | 0.02  | 0.00  |   |   |   |
| Queue Length 95th (m)             | 0.7   | 0.0   | 0.0   |   |   |   |
| Control Delay (s)                 | 9.8   | 0.0   | 0.0   |   |   |   |
| Lane LOS                          | A   |   |   |   |   |   |
| Approach Delay (s)                | 9.8   | 0.0   | 0.0   |   |   |   |
| Approach LOS                      | A   |   |   |   |   |   |
| Intersection Summary              |   |   |   |   |   |   |
| Average Delay                     |   |   | 3.2   |   |   |   |
| Intersection Capacity Utilization |   | 13.3%   |   | ICU Level of Service  |   | A   |
| Analysis Period (min)             |   |   | 15  |   |   |   |

**APPENDIX G**  
**2023 SimTraffic Analysis Calculations**

Summary of All Intervals

| Run Number           | 1     | 2     | 3     | Avg   |
|----------------------|-------|-------|-------|-------|
| Start Time           | 7:20  | 7:20  | 7:20  | 7:20  |
| End Time             | 8:30  | 8:30  | 8:30  | 8:30  |
| Total Time (min)     | 70    | 70    | 70    | 70    |
| Time Recorded (min)  | 60    | 60    | 60    | 60    |
| # of Intervals       | 2     | 2     | 2     | 2     |
| # of Recorded Intvls | 1     | 1     | 1     | 1     |
| Vehs Entered         | 1413  | 1509  | 1442  | 1456  |
| Vehs Exited          | 1417  | 1523  | 1453  | 1464  |
| Starting Vehs        | 54    | 49    | 41    | 45    |
| Ending Vehs          | 50    | 35    | 30    | 37    |
| Denied Entry Before  | 1     | 0     | 0     | 0     |
| Denied Entry After   | 2     | 1     | 0     | 1     |
| Travel Distance (km) | 2376  | 2541  | 2431  | 2449  |
| Travel Time (hr)     | 38.0  | 40.9  | 39.2  | 39.3  |
| Total Delay (hr)     | 5.3   | 6.1   | 5.7   | 5.7   |
| Total Stops          | 79    | 66    | 73    | 72    |
| Fuel Used (l)        | 536.4 | 531.6 | 533.8 | 534.0 |

Interval #0 Information Seeding

|  |      |
|--|------|
| Start Time                               | 7:20 |
| End Time                                 | 7:30 |
| Total Time (min)                         | 10   |
| Volumes adjusted by PHF, Growth Factors. |      |
| No data recorded this interval.          |      |

Interval #1 Information Recording

|  |      |
|--|------|
| Start Time                               | 7:30 |
| End Time                                 | 8:30 |
| Total Time (min)                         | 60   |
| Volumes adjusted by PHF, Growth Factors. |      |

| Run Number           | 1     | 2     | 3     | Avg   |
|----------------------|-------|-------|-------|-------|
| Vehs Entered         | 1413  | 1509  | 1442  | 1456  |
| Vehs Exited          | 1417  | 1523  | 1453  | 1464  |
| Starting Vehs        | 54    | 49    | 41    | 45    |
| Ending Vehs          | 50    | 35    | 30    | 37    |
| Denied Entry Before  | 1     | 0     | 0     | 0     |
| Denied Entry After   | 2     | 1     | 0     | 1     |
| Travel Distance (km) | 2376  | 2541  | 2431  | 2449  |
| Travel Time (hr)     | 38.0  | 40.9  | 39.2  | 39.3  |
| Total Delay (hr)     | 5.3   | 6.1   | 5.7   | 5.7   |
| Total Stops          | 79    | 66    | 73    | 72    |
| Fuel Used (l)        | 536.4 | 531.6 | 533.8 | 534.0 |

1: Highway 7 & 6th Line Performance by movement

| Movement         | EBL | EBT   | WBT  | WBR | SBL  | SBR | All   |
|------------------|-----|-------|------|-----|------|-----|-------|
| Total Delay (hr) | 0.0 | 1.7   | 0.1  | 0.0 | 0.1  | 0.0 | 2.0   |
| Delay / Veh (s)  | 5.5 | 6.4   | 1.0  | 0.0 | 25.2 | 9.1 | 5.0   |
| Travel Dist (km) | 5.0 | 614.3 | 33.5 | 1.0 | 2.9  | 1.5 | 658.1 |
| Travel Time (hr) | 0.1 | 10.7  | 0.6  | 0.0 | 0.2  | 0.1 | 11.7  |
| Avg Speed (kph)  | 54  | 59    | 63   | 41  | 15   | 23  | 58    |

2: Highway 7 & 5th Line Performance by movement

| Movement         | EBT  | EBR | WBL  | WBT   | NBL  | NBR | All   |
|------------------|------|-----|------|-------|------|-----|-------|
| Total Delay (hr) | 0.3  | 0.0 | 0.0  | 0.5   | 0.0  | 0.0 | 0.8   |
| Delay / Veh (s)  | 1.1  | 0.1 | 10.0 | 4.4   | 10.2 | 6.3 | 2.1   |
| Travel Dist (km) | 78.9 | 1.6 | 4.6  | 417.0 | 1.9  | 4.2 | 508.2 |
| Travel Time (hr) | 1.3  | 0.0 | 0.1  | 6.3   | 0.1  | 0.1 | 7.9   |
| Avg Speed (kph)  | 60   | 35  | 57   | 67    | 31   | 35  | 64    |

3: Proposed Access & 6th Line Performance by movement

| Movement         | WBL | NBT | NBR | SBT | All  |
|------------------|-----|-----|-----|-----|------|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  |
| Delay / Veh (s)  | 4.0 | 0.4 | 0.4 | 0.1 | 1.7  |
| Travel Dist (km) | 3.0 | 1.8 | 2.2 | 5.2 | 12.2 |
| Travel Time (hr) | 0.1 | 0.0 | 0.1 | 0.1 | 0.3  |
| Avg Speed (kph)  | 26  | 41  | 29  | 53  | 37   |

Total Network Performance

|                  |        |
|------------------|--------|
| Total Delay (hr) | 5.7    |
| Delay / Veh (s)  | 14.0   |
| Travel Dist (km) | 2449.1 |
| Travel Time (hr) | 39.3   |
| Avg Speed (kph)  | 63     |

Intersection: 1: Highway 7 & 6th Line

| Movement              | EB    | SB    |
|-----------------------|-------|-------|
| Directions Served     | LT    | LR    |
| Maximum Queue (m)     | 12.8  | 30.5  |
| Average Queue (m)     | 0.9   | 9.6   |
| 95th Queue (m)        | 6.1   | 24.1  |
| Link Distance (m)     | 628.6 | 152.4 |
| Upstream Blk Time (%) |       |       |
| Queuing Penalty (veh) |       |       |
| Storage Bay Dist (m)  |       |       |
| Storage Blk Time (%)  |       |       |
| Queuing Penalty (veh) |       |       |

Intersection: 2: Highway 7 & 5th Line

| Movement              | WB     | NB    |
|-----------------------|--------|-------|
| Directions Served     | LT     | LR    |
| Maximum Queue (m)     | 34.6   | 8.6   |
| Average Queue (m)     | 2.6    | 3.3   |
| 95th Queue (m)        | 15.9   | 9.8   |
| Link Distance (m)     | 1056.2 | 405.2 |
| Upstream Blk Time (%) |        |       |
| Queuing Penalty (veh) |        |       |
| Storage Bay Dist (m)  |        |       |
| Storage Blk Time (%)  |        |       |
| Queuing Penalty (veh) |        |       |

Intersection: 3: Proposed Access & 6th Line

| Movement              | WB    |
|-----------------------|-------|
| Directions Served     | LR    |
| Maximum Queue (m)     | 15.0  |
| Average Queue (m)     | 7.5   |
| 95th Queue (m)        | 19.6  |
| Link Distance (m)     | 149.8 |
| Upstream Blk Time (%) |       |
| Queuing Penalty (veh) |       |
| Storage Bay Dist (m)  |       |
| Storage Blk Time (%)  |       |
| Queuing Penalty (veh) |       |

Network Summary

Network wide Queuing Penalty: 0



Summary of All Intervals

| Run Number           | 1     | 2     | 3     | Avg   |
|----------------------|-------|-------|-------|-------|
| Start Time           | 4:20  | 4:20  | 4:20  | 4:20  |
| End Time             | 5:30  | 5:30  | 5:30  | 5:30  |
| Total Time (min)     | 70    | 70    | 70    | 70    |
| Time Recorded (min)  | 60    | 60    | 60    | 60    |
| # of Intervals       | 2     | 2     | 2     | 2     |
| # of Recorded Intvls | 1     | 1     | 1     | 1     |
| Vehs Entered         | 1637  | 1565  | 1619  | 1608  |
| Vehs Exited          | 1632  | 1555  | 1620  | 1603  |
| Starting Vehs        | 43    | 34    | 46    | 41    |
| Ending Vehs          | 48    | 44    | 45    | 46    |
| Denied Entry Before  | 0     | 0     | 4     | 1     |
| Denied Entry After   | 0     | 0     | 3     | 1     |
| Travel Distance (km) | 2779  | 2652  | 2737  | 2723  |
| Travel Time (hr)     | 45.1  | 43.2  | 44.5  | 44.3  |
| Total Delay (hr)     | 7.0   | 6.5   | 7.1   | 6.9   |
| Total Stops          | 89    | 124   | 100   | 103   |
| Fuel Used (l)        | 499.8 | 534.9 | 504.6 | 513.1 |

Interval #0 Information Seeding

|  |      |
|--|------|
| Start Time                               | 4:20 |
| End Time                                 | 4:30 |
| Total Time (min)                         | 10   |
| Volumes adjusted by PHF, Growth Factors. |      |
| No data recorded this interval.          |      |

Interval #1 Information Recording

|  |      |
|--|------|
| Start Time                               | 4:30 |
| End Time                                 | 5:30 |
| Total Time (min)                         | 60   |
| Volumes adjusted by PHF, Growth Factors. |      |

| Run Number           | 1     | 2     | 3     | Avg   |
|----------------------|-------|-------|-------|-------|
| Vehs Entered         | 1637  | 1565  | 1619  | 1608  |
| Vehs Exited          | 1632  | 1555  | 1620  | 1603  |
| Starting Vehs        | 43    | 34    | 46    | 41    |
| Ending Vehs          | 48    | 44    | 45    | 46    |
| Denied Entry Before  | 0     | 0     | 4     | 1     |
| Denied Entry After   | 0     | 0     | 3     | 1     |
| Travel Distance (km) | 2779  | 2652  | 2737  | 2723  |
| Travel Time (hr)     | 45.1  | 43.2  | 44.5  | 44.3  |
| Total Delay (hr)     | 7.0   | 6.5   | 7.1   | 6.9   |
| Total Stops          | 89    | 124   | 100   | 103   |
| Fuel Used (l)        | 499.8 | 534.9 | 504.6 | 513.1 |

1: Highway 7 & 6th Line Performance by movement

| Movement         | EBL | EBT   | WBT  | WBR | SBL  | SBR  | All   |
|------------------|-----|-------|------|-----|------|------|-------|
| Total Delay (hr) | 0.0 | 0.4   | 0.5  | 0.0 | 0.2  | 0.0  | 1.2   |
| Delay / Veh (s)  | 5.7 | 3.0   | 1.9  | 4.6 | 32.5 | 12.7 | 2.8   |
| Travel Dist (km) | 3.3 | 316.1 | 82.6 | 1.1 | 3.7  | 1.4  | 408.2 |
| Travel Time (hr) | 0.1 | 5.1   | 1.7  | 0.1 | 0.3  | 0.1  | 7.2   |
| Avg Speed (kph)  | 53  | 63    | 56   | 31  | 12   | 22   | 59    |

2: Highway 7 & 5th Line Performance by movement

| Movement         | EBT  | EBR | WBL  | WBT    | NBL  | NBR | All    |
|------------------|------|-----|------|--------|------|-----|--------|
| Total Delay (hr) | 0.1  | 0.0 | 0.0  | 2.7    | 0.1  | 0.0 | 3.0    |
| Delay / Veh (s)  | 0.6  | 0.1 | 10.0 | 10.1   | 17.7 | 6.4 | 7.0    |
| Travel Dist (km) | 42.3 | 0.6 | 9.5  | 1014.8 | 10.5 | 5.4 | 1083.1 |
| Travel Time (hr) | 0.7  | 0.0 | 0.2  | 16.8   | 0.4  | 0.2 | 18.1   |
| Avg Speed (kph)  | 64   | 36  | 58   | 62     | 29   | 36  | 61     |

3: Proposed Access & 6th Line Performance by movement

| Movement         | WBL | NBT | NBR | SBT | All  |
|------------------|-----|-----|-----|-----|------|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  |
| Delay / Veh (s)  | 4.0 | 0.6 | 0.4 | 0.1 | 1.6  |
| Travel Dist (km) | 3.4 | 1.4 | 3.5 | 6.7 | 15.1 |
| Travel Time (hr) | 0.1 | 0.0 | 0.1 | 0.1 | 0.4  |
| Avg Speed (kph)  | 27  | 41  | 28  | 57  | 37   |

Total Network Performance

|                  |        |
|------------------|--------|
| Total Delay (hr) | 6.9    |
| Delay / Veh (s)  | 15.4   |
| Travel Dist (km) | 2722.6 |
| Travel Time (hr) | 44.3   |
| Avg Speed (kph)  | 62     |

Intersection: 1: Highway 7 & 6th Line

| Movement              | EB    | SB    |
|-----------------------|-------|-------|
| Directions Served     | LT    | LR    |
| Maximum Queue (m)     | 16.0  | 34.5  |
| Average Queue (m)     | 1.1   | 10.6  |
| 95th Queue (m)        | 7.0   | 25.6  |
| Link Distance (m)     | 628.6 | 152.4 |
| Upstream Blk Time (%) |       |       |
| Queuing Penalty (veh) |       |       |
| Storage Bay Dist (m)  |       |       |
| Storage Blk Time (%)  |       |       |
| Queuing Penalty (veh) |       |       |

Intersection: 2: Highway 7 & 5th Line

| Movement              | WB     | NB    |
|-----------------------|--------|-------|
| Directions Served     | LT     | LR    |
| Maximum Queue (m)     | 21.9   | 19.4  |
| Average Queue (m)     | 2.1    | 7.5   |
| 95th Queue (m)        | 11.5   | 15.6  |
| Link Distance (m)     | 1056.2 | 405.2 |
| Upstream Blk Time (%) |        |       |
| Queuing Penalty (veh) |        |       |
| Storage Bay Dist (m)  |        |       |
| Storage Blk Time (%)  |        |       |
| Queuing Penalty (veh) |        |       |

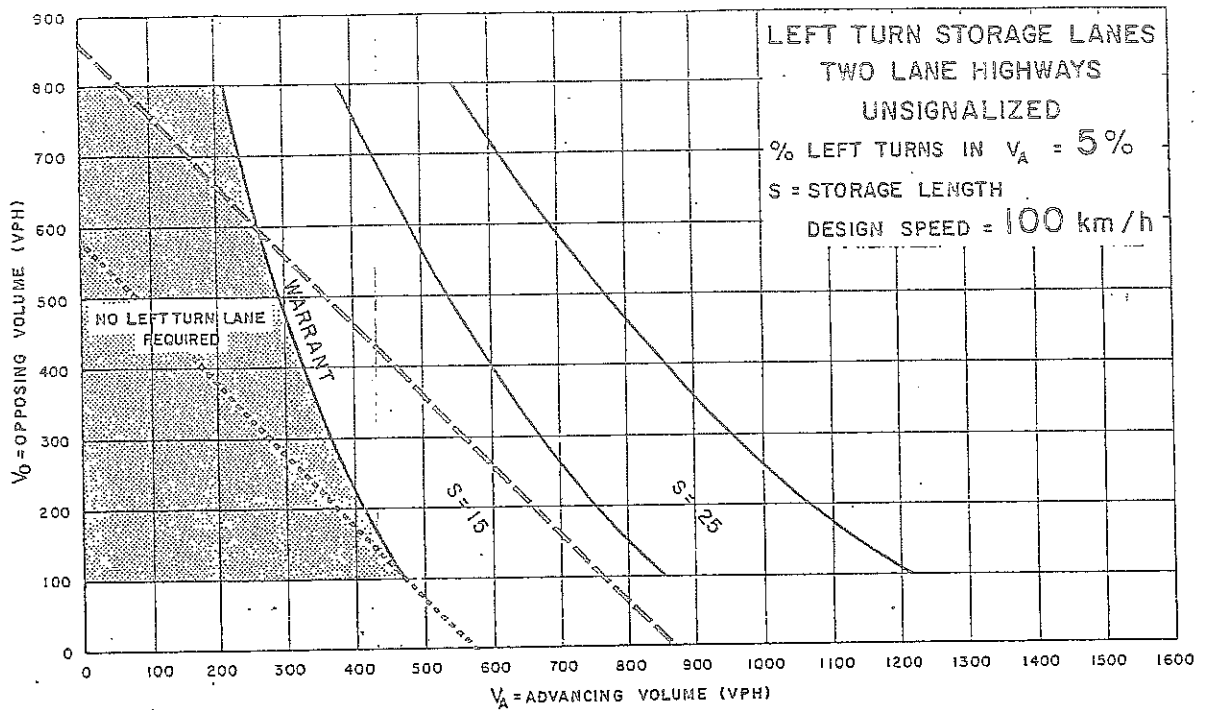
Intersection: 3: Proposed Access & 6th Line

| Movement              | WB    |
|-----------------------|-------|
| Directions Served     | LR    |
| Maximum Queue (m)     | 15.0  |
| Average Queue (m)     | 7.5   |
| 95th Queue (m)        | 19.6  |
| Link Distance (m)     | 149.8 |
| Upstream Blk Time (%) |       |
| Queuing Penalty (veh) |       |
| Storage Bay Dist (m)  |       |
| Storage Blk Time (%)  |       |
| Queuing Penalty (veh) |       |

Network Summary

Network wide Queuing Penalty: 0

**APPENDIX H**  
**MTO Geometric Design Standards Manual Left Turn**  
**Warrant Design Charts**



----- TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

..... TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

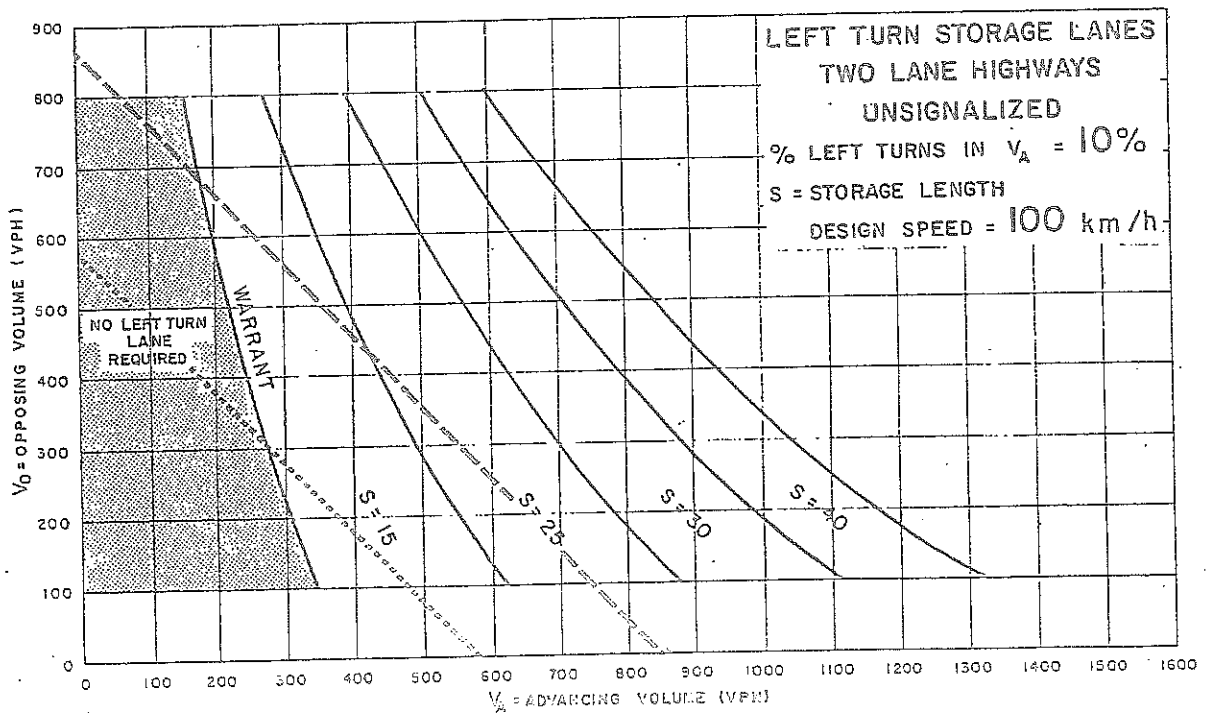
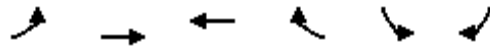


Figure EA-22

## **APPENDIX I**

# **2023 SimTraffic Analysis With Left Turn Lane Calculations**

# HCM Unsignalized Intersection Capacity Analysis (2023) Total Traffic AM - with Left Turn Lane 1: Highway 7 & 6th Line



| Movement               | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
|------------------------|------|------|------|------|------|------|
| Lane Configurations    | ↙    | ↑    | ↗    |      | ↙    | ↘    |
| Sign Control           |      | Free | Free |      | Stop |      |
| Grade                  |      | 0%   | 0%   |      | 0%   |      |
| Volume (veh/h)         | 7    | 861  | 351  | 13   | 12   | 7    |
| Peak Hour Factor       | 0.87 | 0.87 | 0.87 | 0.87 | 0.65 | 0.65 |
| Hourly flow rate (vph) | 8    | 990  | 403  | 15   | 18   | 11   |
| Pedestrians            |      |      |      |      |      |      |
| Lane Width (m)         |      |      |      |      |      |      |
| Walking Speed (m/s)    |      |      |      |      |      |      |
| Percent Blockage       |      |      |      |      |      |      |
| Right turn flare (veh) |      |      |      |      |      |      |
| Median type            |      |      |      |      | None |      |
| Median storage (veh)   |      |      |      |      |      |      |
| Upstream signal (m)    |      |      |      |      |      |      |
| pX, platoon unblocked  |      |      |      |      |      |      |
| vC, conflicting volume | 418  |      |      |      | 1417 | 411  |
| vC1, stage 1 conf vol  |      |      |      |      |      |      |
| vC2, stage 2 conf vol  |      |      |      |      |      |      |
| vCu, unblocked vol     | 418  |      |      |      | 1417 | 411  |
| tC, single (s)         | 4.5  |      |      |      | 7.4  | 6.9  |
| tC, 2 stage (s)        |      |      |      |      |      |      |
| tF (s)                 | 2.6  |      |      |      | 4.4  | 3.9  |
| p0 queue free %        | 99   |      |      |      | 80   | 98   |
| cM capacity (veh/h)    | 952  |      |      |      | 93   | 516  |

| Direction, Lane #     | EB 1 | EB 2 | WB 1 | SB 1 |
|-----------------------|------|------|------|------|
| Volume Total          | 8    | 990  | 418  | 29   |
| Volume Left           | 8    | 0    | 0    | 18   |
| Volume Right          | 0    | 0    | 15   | 11   |
| cSH                   | 952  | 1700 | 1700 | 133  |
| Volume to Capacity    | 0.01 | 0.58 | 0.25 | 0.22 |
| Queue Length 95th (m) | 0.2  | 0.0  | 0.0  | 6.1  |
| Control Delay (s)     | 8.8  | 0.0  | 0.0  | 39.5 |
| Lane LOS              | A    |      |      | E    |
| Approach Delay (s)    | 0.1  |      | 0.0  | 39.5 |
| Approach LOS          |      |      |      | E    |










| Intersection Summary              |  |       |                        |
|-----------------------------------|--|-------|------------------------|
| Average Delay                     |  | 0.8   |                        |
| Intersection Capacity Utilization |  | 57.8% | ICU Level of Service B |
| Analysis Period (min)             |  | 15    |                        |

## HCM Unsignalized Intersection Capacity Analysis (2023) Total Traffic AM - with Left Turn Lane 2: Highway 7 & 5th Line

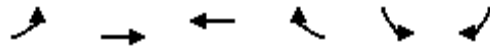
|                                   | →           | ↘           | ↙           | ←                    | ↖    | ↗    |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Movement                          | EBT         | EBR         | WBL         | WBT                  | NBL  | NBR  |
| Lane Configurations               | ↶           |             |             | ↷                    | ↶    | ↷    |
| Sign Control                      | Free        |             |             | Free                 | Stop |      |
| Grade                             | 0%          |             |             | 0%                   | 0%   |      |
| Volume (veh/h)                    | 854         | 19          | 5           | 359                  | 5    | 8    |
| Peak Hour Factor                  | 0.93        | 0.93        | 0.93        | 0.93                 | 0.93 | 0.93 |
| Hourly flow rate (vph)            | 918         | 20          | 5           | 386                  | 5    | 9    |
| Pedestrians                       |             |             |             |                      |      |      |
| Lane Width (m)                    |             |             |             |                      |      |      |
| Walking Speed (m/s)               |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       | None        |             |             |                      |      |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (m)               |             |             |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      |      |      |
| vC, conflicting volume            |             |             | 939         |                      | 1325 | 928  |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                |             |             | 939         |                      | 1325 | 928  |
| 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          |                      | 97   | 97   |
| cM capacity (veh/h)               |             |             | 738         |                      | 172  | 327  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>NB 1</b> |                      |      |      |
| Volume Total                      | 939         | 391         | 14          |                      |      |      |
| Volume Left                       | 0           | 5           | 5           |                      |      |      |
| Volume Right                      | 20          | 0           | 9           |                      |      |      |
| cSH                               | 1700        | 738         | 243         |                      |      |      |
| Volume to Capacity                | 0.55        | 0.01        | 0.06        |                      |      |      |
| Queue Length 95th (m)             | 0.0         | 0.2         | 1.4         |                      |      |      |
| Control Delay (s)                 | 0.0         | 0.2         | 20.7        |                      |      |      |
| Lane LOS                          |             | A           | C           |                      |      |      |
| Approach Delay (s)                | 0.0         | 0.2         | 20.7        |                      |      |      |
| Approach LOS                      |             |             | C           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 0.3         |                      |      |      |
| Intersection Capacity Utilization |             |             | 58.7%       | ICU Level of Service | B    |      |
| Analysis Period (min)             |             |             | 15          |                      |      |      |



### HCM Unsignalized Intersection Capacity Analysis (2023) Total Traffic AM - with Left Turn Lane 3: Proposed Access & 6th Line

|                                   |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement                          | WBL   | WBR   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |  |   |  |   |   |  |
| Sign Control                      | Stop  |   | Free  |   |   | Free  |
| Grade                             | 0%  |   | 0%  |   |   | 0%  |
| Volume (veh/h)                    | 13  | 0   | 7   | 13  | 0   | 6   |
| Peak Hour Factor                  | 0.65  | 0.65  | 0.65  | 0.65  | 0.65  | 0.65  |
| Hourly flow rate (vph)            | 20  | 0   | 11  | 20  | 0   | 9   |
| Pedestrians                       |   |   |   |   |   |   |
| Lane Width (m)                    |   |   |   |   |   |   |
| Walking Speed (m/s)               |   |   |   |   |   |   |
| Percent Blockage                  |   |   |   |   |   |   |
| Right turn flare (veh)            |   |   |   |   |   |   |
| Median type                       | None  |   |   |   |   |   |
| Median storage (veh)              |   |   |   |   |   |   |
| Upstream signal (m)               |   |   |   |   |   |   |
| pX, platoon unblocked             |   |   |   |   |   |   |
| vC, conflicting volume            | 30  | 21  |   |   | 31  |   |
| vC1, stage 1 conf vol             |   |   |   |   |   |   |
| vC2, stage 2 conf vol             |   |   |   |   |   |   |
| vCu, unblocked vol                | 30  | 21  |   |   | 31  |   |
| tC, single (s)                    | 7.4   | 6.2   |   |   | 4.1   |   |
| tC, 2 stage (s)                   |   |   |   |   |   |   |
| tF (s)                            | 4.4   | 3.3   |   |   | 2.2   |   |
| p0 queue free %                   | 97  | 100   |   |   | 100   |   |
| cM capacity (veh/h)               | 783   | 1057  |   |   | 1582  |   |
| Direction, Lane #                 | WB 1  | NB 1  | SB 1  |   |   |   |
| Volume Total                      | 20  | 31  | 9   |   |   |   |
| Volume Left                       | 20  | 0   | 0   |   |   |   |
| Volume Right                      | 0   | 20  | 0   |   |   |   |
| cSH                               | 783   | 1700  | 1582  |   |   |   |
| Volume to Capacity                | 0.03  | 0.02  | 0.00  |   |   |   |
| Queue Length 95th (m)             | 0.6   | 0.0   | 0.0   |   |   |   |
| Control Delay (s)                 | 9.7   | 0.0   | 0.0   |   |   |   |
| Lane LOS                          | A   |   |   |   |   |   |
| Approach Delay (s)                | 9.7   | 0.0   | 0.0   |   |   |   |
| Approach LOS                      | A   |   |   |   |   |   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |
| Average Delay                     |   |   | 3.2   |   |   |   |
| Intersection Capacity Utilization |   | 13.3%   |   | ICU Level of Service  |   | A   |
| Analysis Period (min)             |   |   | 15  |   |   |   |

HCM Unsignalized Intersection Capacity Analysis (2023) Total Traffic PM - with Left Turn Lane  
 1: Highway 7 & 6th Line



| Movement               | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
|------------------------|------|------|------|------|------|------|
| Lane Configurations    | ↙    | ↑    | ↗    |      | ↘    | ↘    |
| Sign Control           |      | Free | Free |      | Stop |      |
| Grade                  |      | 0%   | 0%   |      | 0%   |      |
| Volume (veh/h)         | 9    | 457  | 922  | 13   | 13   | 5    |
| Peak Hour Factor       | 0.93 | 0.93 | 0.93 | 0.93 | 0.60 | 0.60 |
| Hourly flow rate (vph) | 10   | 491  | 991  | 14   | 22   | 8    |
| Pedestrians            |      |      |      |      |      |      |
| Lane Width (m)         |      |      |      |      |      |      |
| Walking Speed (m/s)    |      |      |      |      |      |      |
| Percent Blockage       |      |      |      |      |      |      |
| Right turn flare (veh) |      |      |      |      |      |      |
| Median type            |      |      |      |      | None |      |
| Median storage (veh)   |      |      |      |      |      |      |
| Upstream signal (m)    |      |      |      |      |      |      |
| pX, platoon unblocked  |      |      |      |      |      |      |
| vC, conflicting volume | 1005 |      |      |      | 1509 | 998  |
| vC1, stage 1 conf vol  |      |      |      |      |      |      |
| vC2, stage 2 conf vol  |      |      |      |      |      |      |
| vCu, unblocked vol     | 1005 |      |      |      | 1509 | 998  |
| tC, single (s)         | 4.2  |      |      |      | 7.3  | 6.4  |
| tC, 2 stage (s)        |      |      |      |      |      |      |
| tF (s)                 | 2.3  |      |      |      | 4.3  | 3.5  |
| p0 queue free %        | 99   |      |      |      | 74   | 97   |
| cM capacity (veh/h)    | 655  |      |      |      | 83   | 273  |










| Direction, Lane #     | EB 1 | EB 2 | WB 1 | SB 1 |
|-----------------------|------|------|------|------|
| Volume Total          | 10   | 491  | 1005 | 30   |
| Volume Left           | 10   | 0    | 0    | 22   |
| Volume Right          | 0    | 0    | 14   | 8    |
| cSH                   | 655  | 1700 | 1700 | 102  |
| Volume to Capacity    | 0.01 | 0.29 | 0.59 | 0.29 |
| Queue Length 95th (m) | 0.3  | 0.0  | 0.0  | 8.4  |
| Control Delay (s)     | 10.6 | 0.0  | 0.0  | 54.1 |
| Lane LOS              | B    |      |      | F    |
| Approach Delay (s)    | 0.2  |      | 0.0  | 54.1 |
| Approach LOS          |      |      |      | F    |

| Intersection Summary              |       |     |                        |
|-----------------------------------|-------|-----|------------------------|
| Average Delay                     |       | 1.1 |                        |
| Intersection Capacity Utilization | 62.1% |     | ICU Level of Service B |
| Analysis Period (min)             |       | 15  |                        |

## HCM Unsignalized Intersection Capacity Analysis (2023) Total Traffic PM - with Left Turn Lane 2: Highway 7 & 5th Line

|                                   | →           | ↘           | ↙           | ←                    | ↖    | ↗    |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Movement                          | EBT         | EBR         | WBL         | WBT                  | NBL  | NBR  |
| Lane Configurations               | ↗           |             |             | ↖                    | ↗    | ↘    |
| Sign Control                      | Free        |             |             | Free                 | Stop |      |
| Grade                             | 0%          |             |             | 0%                   | 0%   |      |
| Volume (veh/h)                    | 466         | 4           | 8           | 911                  | 24   | 13   |
| Peak Hour Factor                  | 0.97        | 0.97        | 0.97        | 0.97                 | 0.97 | 0.97 |
| Hourly flow rate (vph)            | 480         | 4           | 8           | 939                  | 25   | 13   |
| Pedestrians                       |             |             |             |                      |      |      |
| Lane Width (m)                    |             |             |             |                      |      |      |
| Walking Speed (m/s)               |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       | None        |             |             |                      |      |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (m)               |             |             |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      |      |      |
| vC, conflicting volume            |             |             | 485         |                      | 1438 | 482  |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                |             |             | 485         |                      | 1438 | 482  |
| 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          |                      | 83   | 98   |
| cM capacity (veh/h)               |             |             | 1089        |                      | 147  | 588  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>NB 1</b> |                      |      |      |
| Volume Total                      | 485         | 947         | 38          |                      |      |      |
| Volume Left                       | 0           | 8           | 25          |                      |      |      |
| Volume Right                      | 4           | 0           | 13          |                      |      |      |
| cSH                               | 1700        | 1089        | 200         |                      |      |      |
| Volume to Capacity                | 0.29        | 0.01        | 0.19        |                      |      |      |
| Queue Length 95th (m)             | 0.0         | 0.2         | 5.2         |                      |      |      |
| Control Delay (s)                 | 0.0         | 0.2         | 27.2        |                      |      |      |
| Lane LOS                          |             | A           | D           |                      |      |      |
| Approach Delay (s)                | 0.0         | 0.2         | 27.2        |                      |      |      |
| Approach LOS                      |             |             | D           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 0.8         |                      |      |      |
| Intersection Capacity Utilization |             |             | 67.3%       | ICU Level of Service | C    |      |
| Analysis Period (min)             |             |             | 15          |                      |      |      |

### HCM Unsignalized Intersection Capacity Analysis (2023) Total Traffic PM - with Left Turn Lane 3: Proposed Access & 6th Line

|                                   |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement                          | WBL   | WBR   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |  |   |  |   |   |  |
| Sign Control                      | Stop  |   | Free  |   |   | Free  |
| Grade                             | 0%  |   | 0%  |   |   | 0%  |
| Volume (veh/h)                    | 13  | 0   | 9   | 13  | 0   | 5   |
| Peak Hour Factor                  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  | 0.60  |
| Hourly flow rate (vph)            | 22  | 0   | 15  | 22  | 0   | 8   |
| Pedestrians                       |   |   |   |   |   |   |
| Lane Width (m)                    |   |   |   |   |   |   |
| Walking Speed (m/s)               |   |   |   |   |   |   |
| Percent Blockage                  |   |   |   |   |   |   |
| Right turn flare (veh)            |   |   |   |   |   |   |
| Median type                       | None  |   |   |   |   |   |
| Median storage (veh)              |   |   |   |   |   |   |
| Upstream signal (m)               |   |   |   |   |   |   |
| pX, platoon unblocked             |   |   |   |   |   |   |
| vC, conflicting volume            | 34  | 26  |   |   | 37  |   |
| vC1, stage 1 conf vol             |   |   |   |   |   |   |
| vC2, stage 2 conf vol             |   |   |   |   |   |   |
| vCu, unblocked vol                | 34  | 26  |   |   | 37  |   |
| tC, single (s)                    | 7.4   | 6.2   |   |   | 4.1   |   |
| tC, 2 stage (s)                   |   |   |   |   |   |   |
| tF (s)                            | 4.4   | 3.3   |   |   | 2.2   |   |
| p0 queue free %                   | 97  | 100   |   |   | 100   |   |
| cM capacity (veh/h)               | 779   | 1050  |   |   | 1574  |   |
| Direction, Lane #                 | WB 1  | NB 1  | SB 1  |   |   |   |
| Volume Total                      | 22  | 37  | 8   |   |   |   |
| Volume Left                       | 22  | 0   | 0   |   |   |   |
| Volume Right                      | 0   | 22  | 0   |   |   |   |
| cSH                               | 779   | 1700  | 1574  |   |   |   |
| Volume to Capacity                | 0.03  | 0.02  | 0.00  |   |   |   |
| Queue Length 95th (m)             | 0.7   | 0.0   | 0.0   |   |   |   |
| Control Delay (s)                 | 9.8   | 0.0   | 0.0   |   |   |   |
| Lane LOS                          | A   |   |   |   |   |   |
| Approach Delay (s)                | 9.8   | 0.0   | 0.0   |   |   |   |
| Approach LOS                      | A   |   |   |   |   |   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |
| Average Delay                     |   |   | 3.2   |   |   |   |
| Intersection Capacity Utilization |   | 13.3%   |   | ICU Level of Service  |   | A   |
| Analysis Period (min)             |   |   | 15  |   |   |   |

## **APPENDIX J**

### **Future (2023) Total Traffic With Left Turn Lane**

Level of Service Calculations

Summary of All Intervals

| Run Number           | 1     | 2     | 3     | Avg   |
|----------------------|-------|-------|-------|-------|
| Start Time           | 7:20  | 7:20  | 7:20  | 7:20  |
| End Time             | 8:30  | 8:30  | 8:30  | 8:30  |
| Total Time (min)     | 70    | 70    | 70    | 70    |
| Time Recorded (min)  | 60    | 60    | 60    | 60    |
| # of Intervals       | 2     | 2     | 2     | 2     |
| # of Recorded Intvls | 1     | 1     | 1     | 1     |
| Vehs Entered         | 1413  | 1509  | 1442  | 1456  |
| Vehs Exited          | 1417  | 1523  | 1453  | 1464  |
| Starting Vehs        | 54    | 49    | 41    | 45    |
| Ending Vehs          | 50    | 35    | 30    | 37    |
| Denied Entry Before  | 1     | 0     | 0     | 0     |
| Denied Entry After   | 2     | 1     | 0     | 1     |
| Travel Distance (km) | 2375  | 2541  | 2431  | 2449  |
| Travel Time (hr)     | 38.0  | 40.9  | 39.2  | 39.4  |
| Total Delay (hr)     | 5.3   | 6.1   | 5.7   | 5.7   |
| Total Stops          | 81    | 70    | 72    | 75    |
| Fuel Used (l)        | 533.8 | 531.2 | 528.2 | 531.1 |

Interval #0 Information Seeding

|  |      |
|--|------|
| Start Time                               | 7:20 |
| End Time                                 | 7:30 |
| Total Time (min)                         | 10   |
| Volumes adjusted by PHF, Growth Factors. |      |
| No data recorded this interval.          |      |

Interval #1 Information Recording

|  |      |
|--|------|
| Start Time                               | 7:30 |
| End Time                                 | 8:30 |
| Total Time (min)                         | 60   |
| Volumes adjusted by PHF, Growth Factors. |      |

| Run Number           | 1     | 2     | 3     | Avg   |
|----------------------|-------|-------|-------|-------|
| Vehs Entered         | 1413  | 1509  | 1442  | 1456  |
| Vehs Exited          | 1417  | 1523  | 1453  | 1464  |
| Starting Vehs        | 54    | 49    | 41    | 45    |
| Ending Vehs          | 50    | 35    | 30    | 37    |
| Denied Entry Before  | 1     | 0     | 0     | 0     |
| Denied Entry After   | 2     | 1     | 0     | 1     |
| Travel Distance (km) | 2375  | 2541  | 2431  | 2449  |
| Travel Time (hr)     | 38.0  | 40.9  | 39.2  | 39.4  |
| Total Delay (hr)     | 5.3   | 6.1   | 5.7   | 5.7   |
| Total Stops          | 81    | 70    | 72    | 75    |
| Fuel Used (l)        | 533.8 | 531.2 | 528.2 | 531.1 |

1: Highway 7 & 6th Line Performance by movement

| Movement         | EBL | EBT   | WBT  | WBR | SBL  | SBR | All   |
|------------------|-----|-------|------|-----|------|-----|-------|
| Total Delay (hr) | 0.0 | 1.7   | 0.1  | 0.0 | 0.1  | 0.0 | 2.0   |
| Delay / Veh (s)  | 6.9 | 6.4   | 1.0  | 0.0 | 30.4 | 9.2 | 5.1   |
| Travel Dist (km) | 5.0 | 614.4 | 33.5 | 1.0 | 2.8  | 1.5 | 658.2 |
| Travel Time (hr) | 0.1 | 10.7  | 0.6  | 0.0 | 0.2  | 0.1 | 11.7  |
| Avg Speed (kph)  | 56  | 59    | 63   | 41  | 13   | 23  | 58    |

2: Highway 7 & 5th Line Performance by movement

| Movement         | EBT  | EBR | WBL  | WBT   | NBL  | NBR | All   |
|------------------|------|-----|------|-------|------|-----|-------|
| Total Delay (hr) | 0.3  | 0.0 | 0.0  | 0.5   | 0.0  | 0.0 | 0.8   |
| Delay / Veh (s)  | 1.0  | 0.1 | 12.0 | 4.4   | 10.3 | 6.2 | 2.0   |
| Travel Dist (km) | 78.7 | 1.6 | 4.6  | 417.0 | 1.9  | 4.2 | 508.0 |
| Travel Time (hr) | 1.3  | 0.0 | 0.1  | 6.3   | 0.1  | 0.1 | 7.9   |
| Avg Speed (kph)  | 60   | 35  | 55   | 66    | 31   | 35  | 64    |

3: Proposed Access & 6th Line Performance by movement

| Movement         | WBL | NBT | NBR | SBT | All  |
|------------------|-----|-----|-----|-----|------|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  |
| Delay / Veh (s)  | 4.0 | 0.6 | 0.3 | 0.1 | 1.7  |
| Travel Dist (km) | 3.0 | 1.8 | 2.2 | 5.2 | 12.2 |
| Travel Time (hr) | 0.1 | 0.0 | 0.1 | 0.1 | 0.3  |
| Avg Speed (kph)  | 26  | 41  | 29  | 53  | 37   |

Total Network Performance

|                  |        |
|------------------|--------|
| Total Delay (hr) | 5.7    |
| Delay / Veh (s)  | 14.0   |
| Travel Dist (km) | 2449.0 |
| Travel Time (hr) | 39.4   |
| Avg Speed (kph)  | 63     |

Intersection: 1: Highway 7 & 6th Line

| Movement              | EB   | SB    |
|-----------------------|------|-------|
| Directions Served     | L    | LR    |
| Maximum Queue (m)     | 13.1 | 34.7  |
| Average Queue (m)     | 1.1  | 10.2  |
| 95th Queue (m)        | 6.2  | 25.3  |
| Link Distance (m)     |      | 150.8 |
| Upstream Blk Time (%) |      |       |
| Queuing Penalty (veh) |      |       |
| Storage Bay Dist (m)  | 25.0 |       |
| Storage Blk Time (%)  |      |       |
| Queuing Penalty (veh) |      |       |

Intersection: 2: Highway 7 & 5th Line

| Movement              | WB     | NB    |
|-----------------------|--------|-------|
| Directions Served     | LT     | LR    |
| Maximum Queue (m)     | 34.7   | 10.5  |
| Average Queue (m)     | 2.9    | 3.3   |
| 95th Queue (m)        | 16.5   | 9.9   |
| Link Distance (m)     | 1056.2 | 405.0 |
| Upstream Blk Time (%) |        |       |
| Queuing Penalty (veh) |        |       |
| Storage Bay Dist (m)  |        |       |
| Storage Blk Time (%)  |        |       |
| Queuing Penalty (veh) |        |       |

Intersection: 3: Proposed Access & 6th Line

| Movement              | WB    |
|-----------------------|-------|
| Directions Served     | LR    |
| Maximum Queue (m)     | 15.0  |
| Average Queue (m)     | 7.5   |
| 95th Queue (m)        | 19.6  |
| Link Distance (m)     | 149.8 |
| Upstream Blk Time (%) |       |
| Queuing Penalty (veh) |       |
| Storage Bay Dist (m)  |       |
| Storage Blk Time (%)  |       |
| Queuing Penalty (veh) |       |

Network Summary

Network wide Queuing Penalty: 0



Summary of All Intervals

| Run Number           | 1     | 2     | 3     | Avg   |
|----------------------|-------|-------|-------|-------|
| Start Time           | 4:20  | 4:20  | 4:20  | 4:20  |
| End Time             | 5:30  | 5:30  | 5:30  | 5:30  |
| Total Time (min)     | 70    | 70    | 70    | 70    |
| Time Recorded (min)  | 60    | 60    | 60    | 60    |
| # of Intervals       | 2     | 2     | 2     | 2     |
| # of Recorded Intvls | 1     | 1     | 1     | 1     |
| Vehs Entered         | 1637  | 1565  | 1619  | 1608  |
| Vehs Exited          | 1632  | 1555  | 1620  | 1603  |
| Starting Vehs        | 43    | 34    | 46    | 41    |
| Ending Vehs          | 48    | 44    | 45    | 46    |
| Denied Entry Before  | 0     | 0     | 4     | 1     |
| Denied Entry After   | 0     | 0     | 3     | 1     |
| Travel Distance (km) | 2779  | 2652  | 2737  | 2723  |
| Travel Time (hr)     | 45.1  | 43.3  | 44.5  | 44.3  |
| Total Delay (hr)     | 7.0   | 6.6   | 7.1   | 6.9   |
| Total Stops          | 88    | 127   | 97    | 104   |
| Fuel Used (l)        | 496.3 | 533.9 | 504.4 | 511.6 |

Interval #0 Information Seeding

|  |      |
|--|------|
| Start Time                               | 4:20 |
| End Time                                 | 4:30 |
| Total Time (min)                         | 10   |
| Volumes adjusted by PHF, Growth Factors. |      |
| No data recorded this interval.          |      |

Interval #1 Information Recording

|  |      |
|--|------|
| Start Time                               | 4:30 |
| End Time                                 | 5:30 |
| Total Time (min)                         | 60   |
| Volumes adjusted by PHF, Growth Factors. |      |

| Run Number           | 1     | 2     | 3     | Avg   |
|----------------------|-------|-------|-------|-------|
| Vehs Entered         | 1637  | 1565  | 1619  | 1608  |
| Vehs Exited          | 1632  | 1555  | 1620  | 1603  |
| Starting Vehs        | 43    | 34    | 46    | 41    |
| Ending Vehs          | 48    | 44    | 45    | 46    |
| Denied Entry Before  | 0     | 0     | 4     | 1     |
| Denied Entry After   | 0     | 0     | 3     | 1     |
| Travel Distance (km) | 2779  | 2652  | 2737  | 2723  |
| Travel Time (hr)     | 45.1  | 43.3  | 44.5  | 44.3  |
| Total Delay (hr)     | 7.0   | 6.6   | 7.1   | 6.9   |
| Total Stops          | 88    | 127   | 97    | 104   |
| Fuel Used (l)        | 496.3 | 533.9 | 504.4 | 511.6 |

1: Highway 7 & 6th Line Performance by movement

| Movement         | EBL  | EBT   | WBT  | WBR | SBL  | SBR  | All   |
|------------------|------|-------|------|-----|------|------|-------|
| Total Delay (hr) | 0.0  | 0.4   | 0.5  | 0.0 | 0.2  | 0.0  | 1.3   |
| Delay / Veh (s)  | 10.1 | 3.0   | 1.9  | 4.7 | 38.4 | 13.2 | 2.9   |
| Travel Dist (km) | 3.3  | 316.2 | 82.6 | 1.1 | 3.6  | 1.3  | 408.2 |
| Travel Time (hr) | 0.1  | 5.1   | 1.7  | 0.1 | 0.3  | 0.1  | 7.3   |
| Avg Speed (kph)  | 51   | 63    | 56   | 31  | 11   | 21   | 58    |

2: Highway 7 & 5th Line Performance by movement

| Movement         | EBT  | EBR | WBL  | WBT    | NBL  | NBR | All    |
|------------------|------|-----|------|--------|------|-----|--------|
| Total Delay (hr) | 0.1  | 0.0 | 0.0  | 2.7    | 0.1  | 0.0 | 3.0    |
| Delay / Veh (s)  | 0.6  | 0.1 | 10.1 | 10.1   | 18.0 | 6.5 | 7.0    |
| Travel Dist (km) | 42.2 | 0.6 | 9.5  | 1014.8 | 10.5 | 5.4 | 1083.0 |
| Travel Time (hr) | 0.7  | 0.0 | 0.2  | 16.8   | 0.4  | 0.2 | 18.1   |
| Avg Speed (kph)  | 64   | 37  | 58   | 62     | 29   | 35  | 61     |

3: Proposed Access & 6th Line Performance by movement

| Movement         | WBL | NBT | NBR | SBT | All  |
|------------------|-----|-----|-----|-----|------|
| Total Delay (hr) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  |
| Delay / Veh (s)  | 4.0 | 0.8 | 0.4 | 0.1 | 1.6  |
| Travel Dist (km) | 3.4 | 1.4 | 3.5 | 6.7 | 15.0 |
| Travel Time (hr) | 0.1 | 0.0 | 0.1 | 0.1 | 0.4  |
| Avg Speed (kph)  | 27  | 40  | 28  | 57  | 37   |

Total Network Performance

|                  |        |
|------------------|--------|
| Total Delay (hr) | 6.9    |
| Delay / Veh (s)  | 15.5   |
| Travel Dist (km) | 2722.5 |
| Travel Time (hr) | 44.3   |
| Avg Speed (kph)  | 62     |

**Intersection: 1: Highway 7 & 6th Line**

| Movement              | EB   | WB   | SB    |
|-----------------------|------|------|-------|
| Directions Served     | L    | TR   | LR    |
| Maximum Queue (m)     | 9.5  | 4.1  | 34.7  |
| Average Queue (m)     | 1.0  | 0.1  | 11.1  |
| 95th Queue (m)        | 5.4  | 2.3  | 26.6  |
| Link Distance (m)     |      | 66.3 | 150.8 |
| Upstream Blk Time (%) |      |      |       |
| Queuing Penalty (veh) |      |      |       |
| Storage Bay Dist (m)  | 25.0 |      |       |
| Storage Blk Time (%)  |      |      |       |
| Queuing Penalty (veh) |      |      |       |

**Intersection: 2: Highway 7 & 5th Line**

| Movement              | WB     | NB    |
|-----------------------|--------|-------|
| Directions Served     | LT     | LR    |
| Maximum Queue (m)     | 21.9   | 19.2  |
| Average Queue (m)     | 2.1    | 7.3   |
| 95th Queue (m)        | 11.3   | 15.2  |
| Link Distance (m)     | 1056.2 | 405.0 |
| Upstream Blk Time (%) |        |       |
| Queuing Penalty (veh) |        |       |
| Storage Bay Dist (m)  |        |       |
| Storage Blk Time (%)  |        |       |
| Queuing Penalty (veh) |        |       |

**Intersection: 3: Proposed Access & 6th Line**

| Movement              | WB    |
|-----------------------|-------|
| Directions Served     | LR    |
| Maximum Queue (m)     | 15.0  |
| Average Queue (m)     | 7.5   |
| 95th Queue (m)        | 19.6  |
| Link Distance (m)     | 149.8 |
| Upstream Blk Time (%) |       |
| Queuing Penalty (veh) |       |
| Storage Bay Dist (m)  |       |
| Storage Blk Time (%)  |       |
| Queuing Penalty (veh) |       |

**Network Summary**

Network wide Queuing Penalty: 0

## **APPENDIX K**

### **Statement Of Limiting Conditions And Assumptions**

## Statement of Limiting Conditions and Assumptions

1. This Report/Study (the “Work”) has been prepared at the request of, and for the exclusive use of, the Owner, and its affiliates (the “Intended Users”). No one other than the Intended Users has the right to use and rely on the Work without first obtaining the written authorization of Cole Engineering Group Ltd. (Cole Engineering) and its Owner.
2. Cole Engineering expressly excludes liability to any party except the Intended Users for any use of, and/or reliance upon, the Work.
3. Cole Engineering notes that the following assumptions were made in completing the Work:
  - a) the land use description(s) supplied to us are correct;
  - b) the surveys and data supplied to Cole Engineering by the Owner are accurate;
  - c) market timing, approval delivery and secondary source information is within the control of Parties other than Cole Engineering; and
  - d) there are no encroachments, leases, covenants, binding agreements, restrictions, pledges, charges, liens or special assessments outstanding, or encumbrances which would significantly affect the use or servicing.

Investigations have not been carried out to verify these assumptions. Cole Engineering deems the sources of data and statistical information contained herein to be reliable, but we extend no guarantee of accuracy in these respects.

4. Cole Engineering accepts no responsibility for legal interpretations, questions of survey, opinion of title, hidden or inconspicuous conditions of the property, toxic wastes or contaminated materials, soil or sub-soil conditions, environmental, engineering or other factual and technical matters disclosed by the Owner, the Client, or any public agency, which by their nature, may change the outcome of the Work. Such factors, beyond the scope of this Work, could affect the findings, conclusions and opinions rendered in the Work. We have made disclosure of related potential problems that have come to our attention. Responsibility for diligence with respect to all matters of fact reported herein rests with the Intended Users.
5. Cole Engineering practices engineering in the general areas of infrastructure and transportation. It is not qualified to and is not providing legal or planning advice in this Work.
6. The legal description of the property and the area of the site were based upon surveys and data supplied to us by the Owner. The plans, photographs, and sketches contained in this report are included solely to aide in visualizing the location of the property, the configuration and boundaries of the site, and the relative position of the improvements on the said lands.
7. We have made investigations from secondary sources as documented in the Work, but we have not checked for compliance with by-laws, codes, agency and governmental regulations, etc., unless specifically noted in the Work.
8. Because conditions, including capacity, allocation, economic, social, and political factors change rapidly and, on occasion, without notice or warning, the findings of the Work expressed herein, are as of the date of the Work and cannot necessarily be relied upon as of any other date without subsequent advice from Cole Engineering.
9. The value of proposed improvements should be applied only with regard to the purpose and function of the Work, as outlined in the body of this Work. Any cost estimates set out in the Work are based on construction averages and subject to change.
10. Neither possession of the Work, nor a copy of it, carries the right of publication. All copyright in the Work is reserved to Cole Engineering. The Work shall not be disclosed, produced or reproduced, quoted from, or referred to, in whole or in part, or published in any manner, without the express written consent of Cole Engineering and the Owner.
11. The Work is only valid if it bears the professional engineer’s seal and original signature of the author, and if considered in its entirety. Responsibility for unauthorized alteration to the Work is denied.