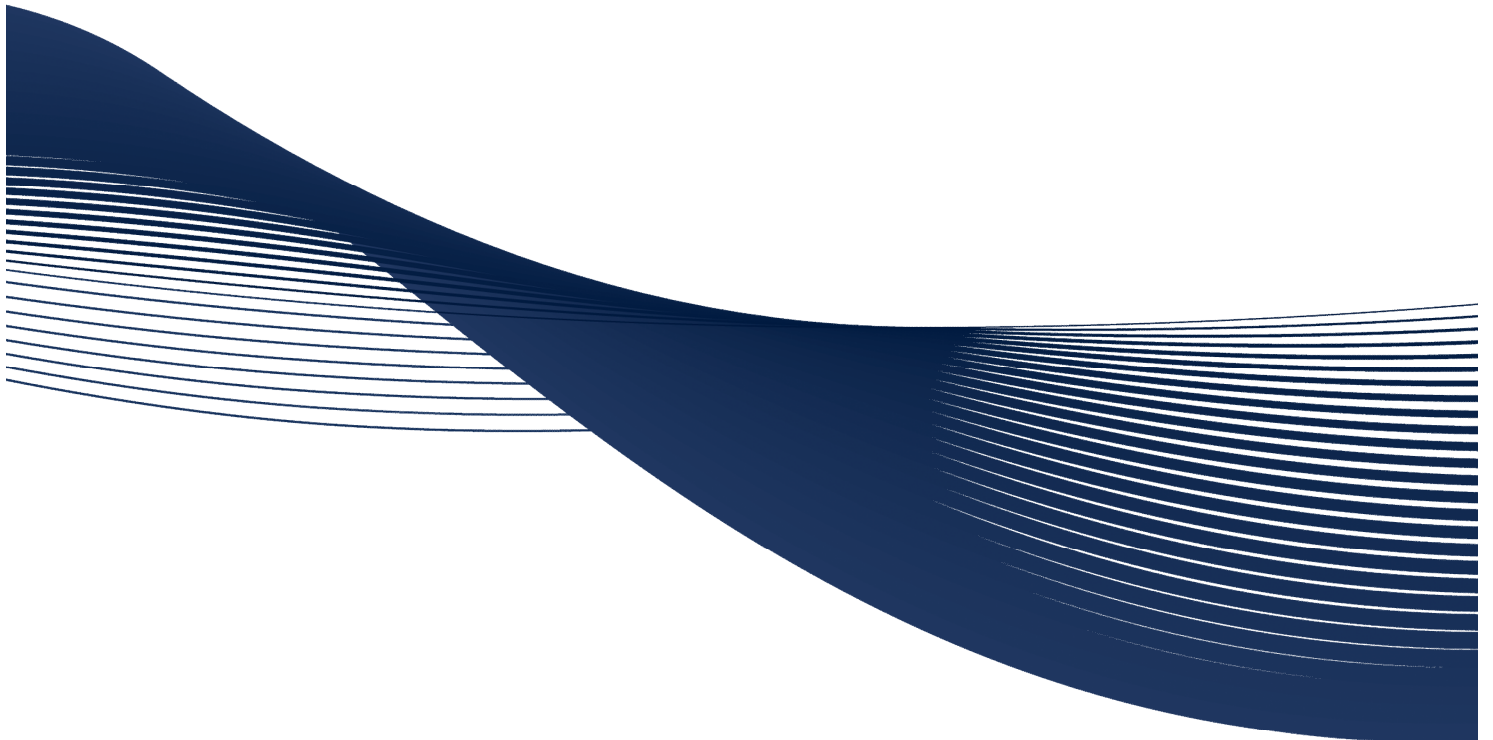


JAMES DICK CONSTRUCTION LIMITED

REVISED TRAFFIC IMPACT STUDY

Eramosa Quarry, Township of Guelph-Eramosa

Project No.:TR12-0013



AUGUST 2015

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August 20, 2015
Our Ref: TR12-0013

James Dick Construction Limited
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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), the Town of Halton Hills and R.J. Burnside. The study finds that the development, while assessed with a conservative truck volume of 26 two-way trips per hour, 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.

Joseph E. Gowrie, P.Eng.
Project Manager, Traffic



Encl.

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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 6th Line in the Township of Guelph-Eramosa (the “Township”), County of Wellington (the “County”). The general site location is provided in **Figure 1-1**.

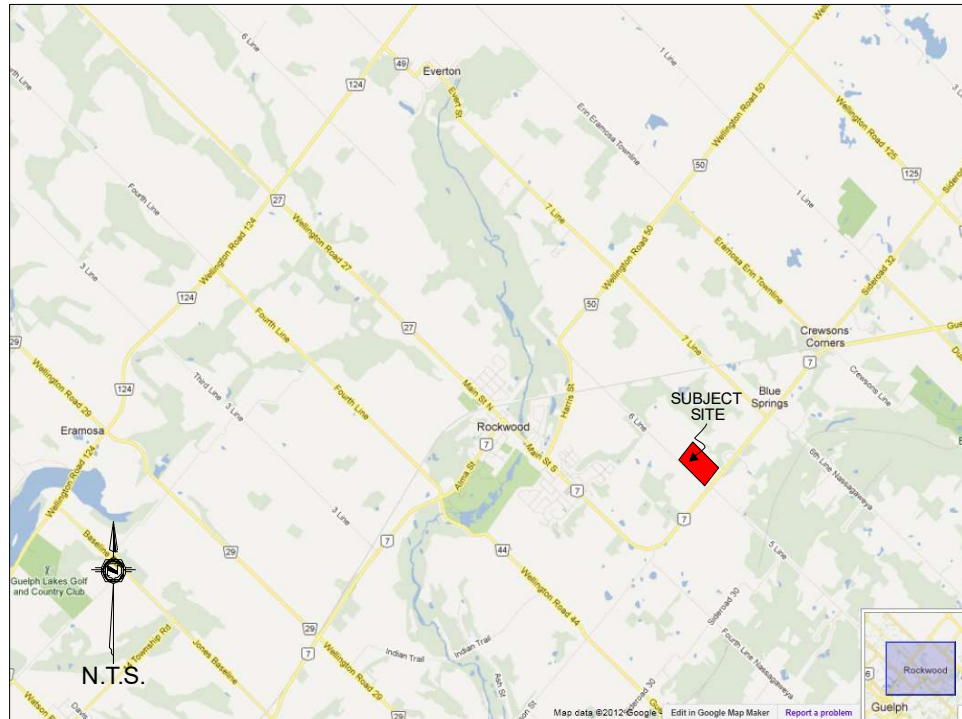


Figure 1-1 Proposed Site Location

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 6th Line. The proposed site plan is provided in **Figure 1-2**.

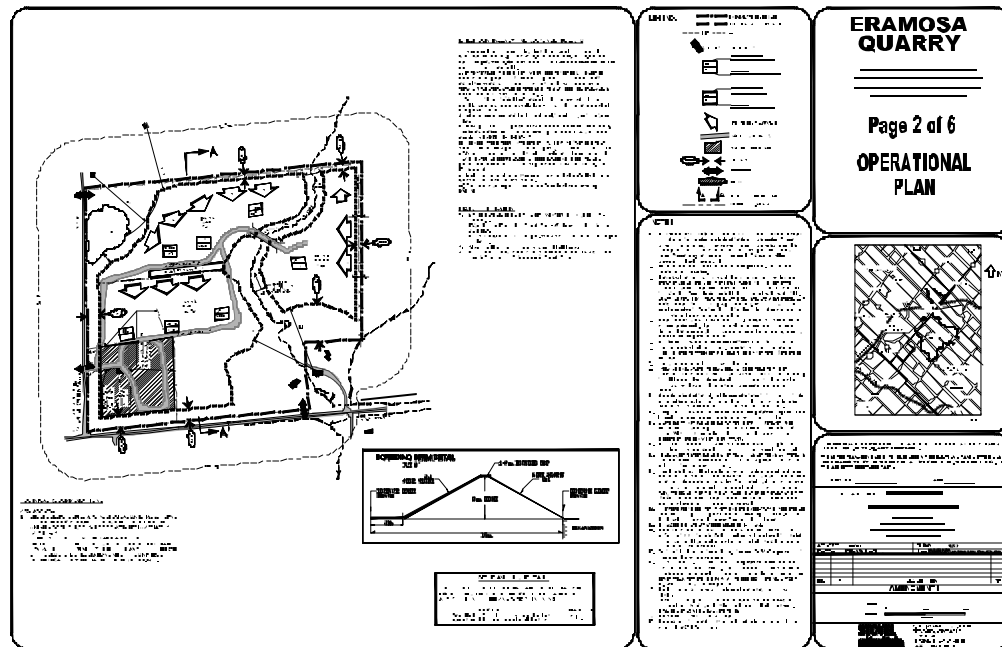


Figure 1-2 Proposed Site Plan

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

2.2. Horizon Year

A 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 6th Line. The existing lane configurations are illustrated in **Figure 3-1**.

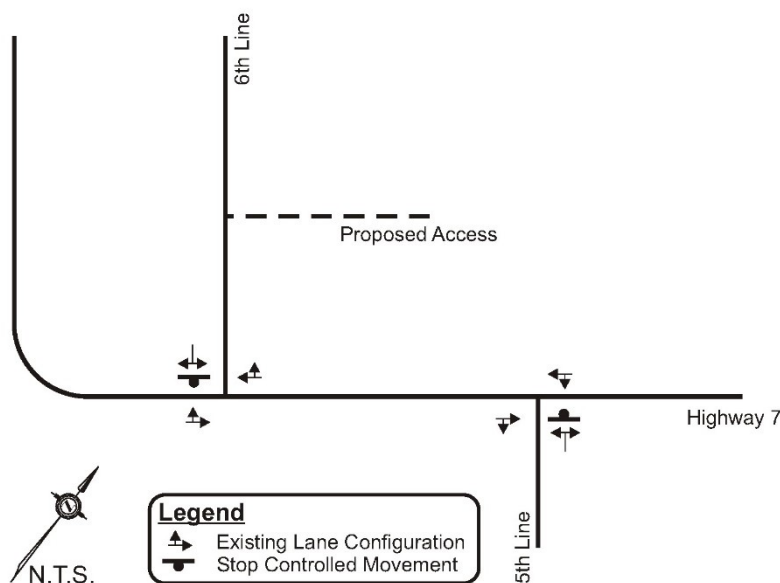


Figure 3-1 Existing Lane Configurations

The road network is detailed as follows:

Highway 7 is a 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).

6th Line is a 2-lane north-south gravel roadway under the jurisdiction of the Township of Guelph-Eramosa.

5th Line is a 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 / 6th 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**.

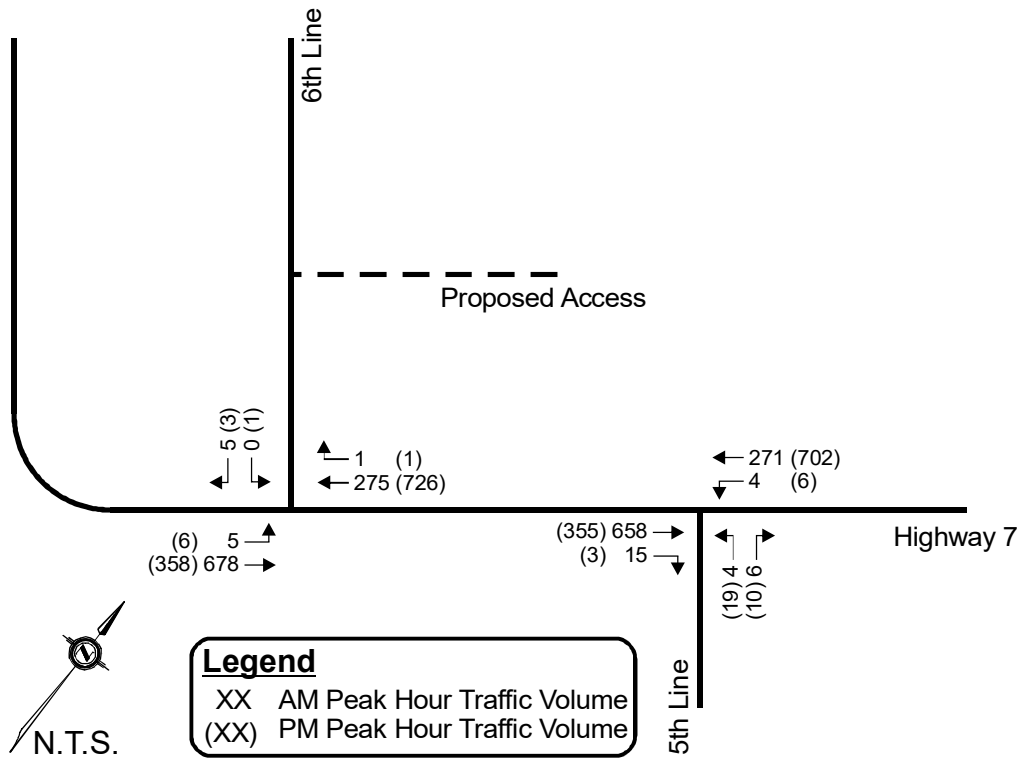


Figure 3-2 Existing Traffic Volumes

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 th Percentile Queue (m) | LOS (v/c) | 95 th Percentile Queue (m) |
| Highway 7 / 6 th Line (Unsignalized) | EB left-through SB left-right | A (0.01) B (0.01) | 0.1 0.3 | A (0.01) C (0.02) | 0.2 0.5 |
| Highway 7 / 5 th Line (Unsignalized) | WB left-through NB left-right | A (<0.01) C (0.03) | 0.1 0.7 | A (0.01) C (0.10) | 0.1 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 6th Line.

4.2. Site Generated Traffic

4.2.1. Load Sizes

The number of trips forecasted in the analysis was derived using the James Dick Construction Ltd.'s fleet size. The information related to James Dick Construction Ltd.'s fleet is provided in **Table 4.1**.

Table 4.1 – Fleet Size

| Vehicle Type | Payload | Number of Units |
|-------------------------------|--------------------|-----------------|
| Tri-Axle Straight Truck | 22.7 Tonnes | 21 |
| Tri-Axle Tractor Trailer | 35.1 Tonnes | 18 |
| Quad-Axle Tractor Trailer | 39.1 Tonnes | 16 |
| Tri-Axel Pony Pup Combination | 41.4 Tonnes | 30 |
| Total | 35.0 Tonnes | 85 |

There is a fleet size of 85 vehicles with an average fleet size of 35 tonnes. To be conservative, a load size of 33 tonnes per truck was assumed in calculations.

4.2.2. Forecasted Traffic

The proposed quarry is applying for a license of 700,000 tonnes of aggregate and has a life expectancy of 20 years. Based on the fleet operated by James Dick Construction, each load will be approximately 33 tonnes resulting in a total of 21,213 trucks per year in a pit that will only be operated from 6:00 a.m. to 6:00 p.m. Monday to Saturday, excluding public holidays, or an average of 69 trucks per day. It is important to note that the distribution of truck traffic varies throughout the year based on construction projects.

Operation of the Hidden Quarry is expected to be similar to the Erin Pit which has a license for 723,000 tonnes per annum. This is a good comparison due to its proximity as well as the similar license size to the Hidden Quarry. Using the data provided by James Dick Construction Ltd., the annual distribution of truck traffic for the Hidden Quarry is provided in **Figure 4-1**.

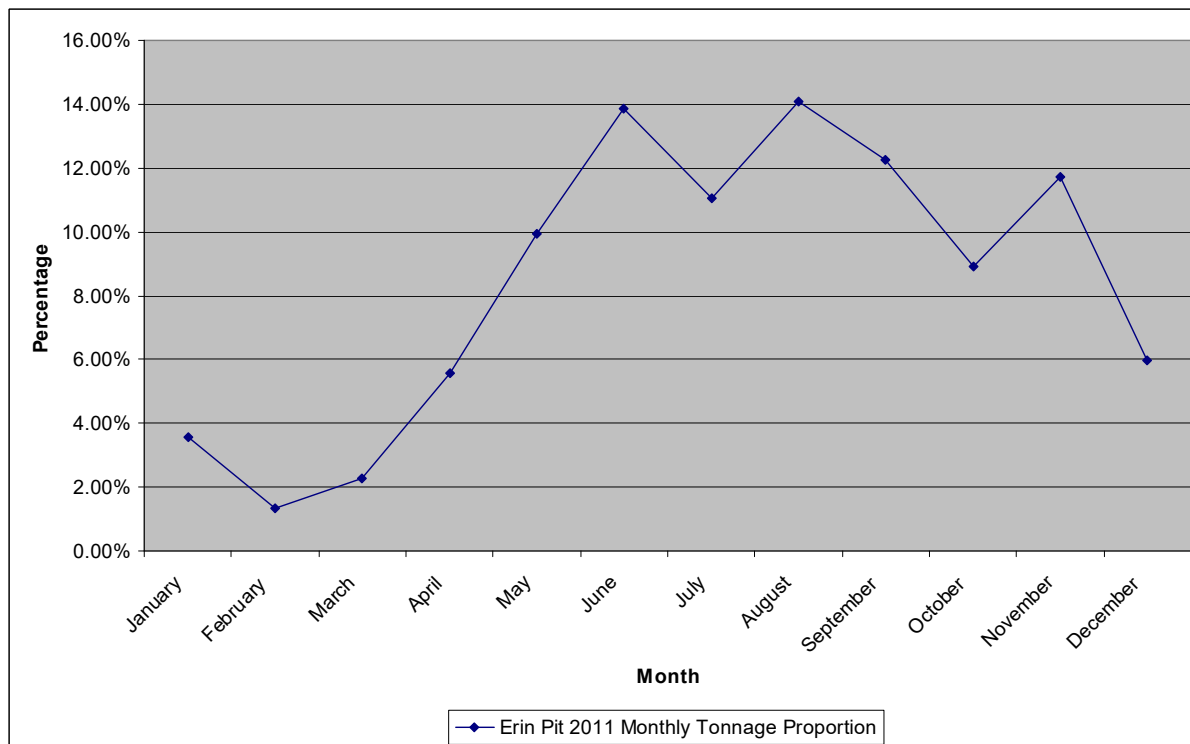


Figure 4-1 2011 Erin Pit Monthly Distribution

Based on the monthly variation of traffic, the quarry is expected to have an approximate total of 12 trucks (24 trips) in the month of February to an approximate total of 115 trucks in the month of August. The expected number of trucks per day by month is provided in **Table 4.2**.

Table 4.2 – Expected Monthly Distribution of Trucks

| Month | Monthly Proportion of Truck Traffic | Trucks Per Month | Working Days Per Month | Trucks Per Day |
|-----------|-------------------------------------|------------------|------------------------|----------------|
| January | 3.50% | 742 | 25 | 30 |
| February | 1.33% | 282 | 23 | 12 |
| March | 2.20% | 467 | 27 | 17 |
| April | 5.50% | 1167 | 25 | 47 |
| May | 9.90% | 2100 | 25 | 84 |
| June | 13.86% | 2940 | 26 | 113 |
| July | 11.00% | 2333 | 25 | 93 |
| August | 14.09% | 2989 | 26 | 115 |
| September | 12.27% | 2603 | 25 | 104 |
| October | 8.80% | 1867 | 25 | 75 |
| November | 11.70% | 2482 | 25 | 99 |
| December | 5.85% | 1241 | 26 | 48 |

In reviewing the trucking information, the expected proportion of trucks by day of the week is provided in **Figure 4-2**.

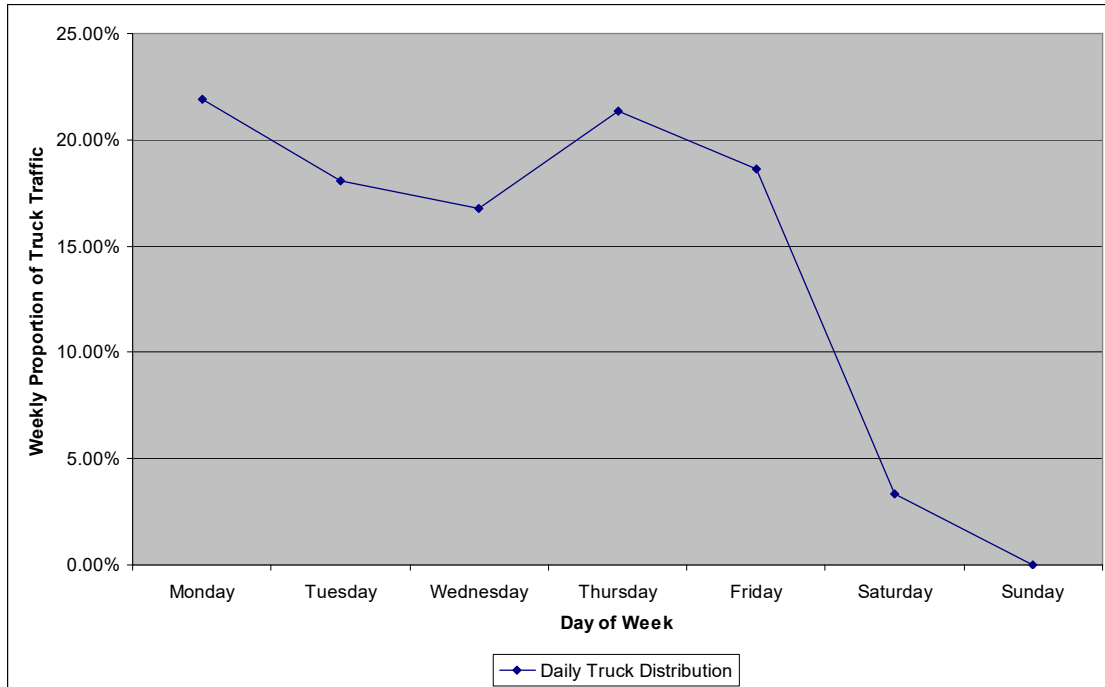


Figure 4-2 Weekly Truck Distribution

This is further refined based on historical truck arrivals at the Erin Pit to derive an hourly breakdown of expected traffic. The hourly distribution of trucks is provided in **Figure 4-3**.

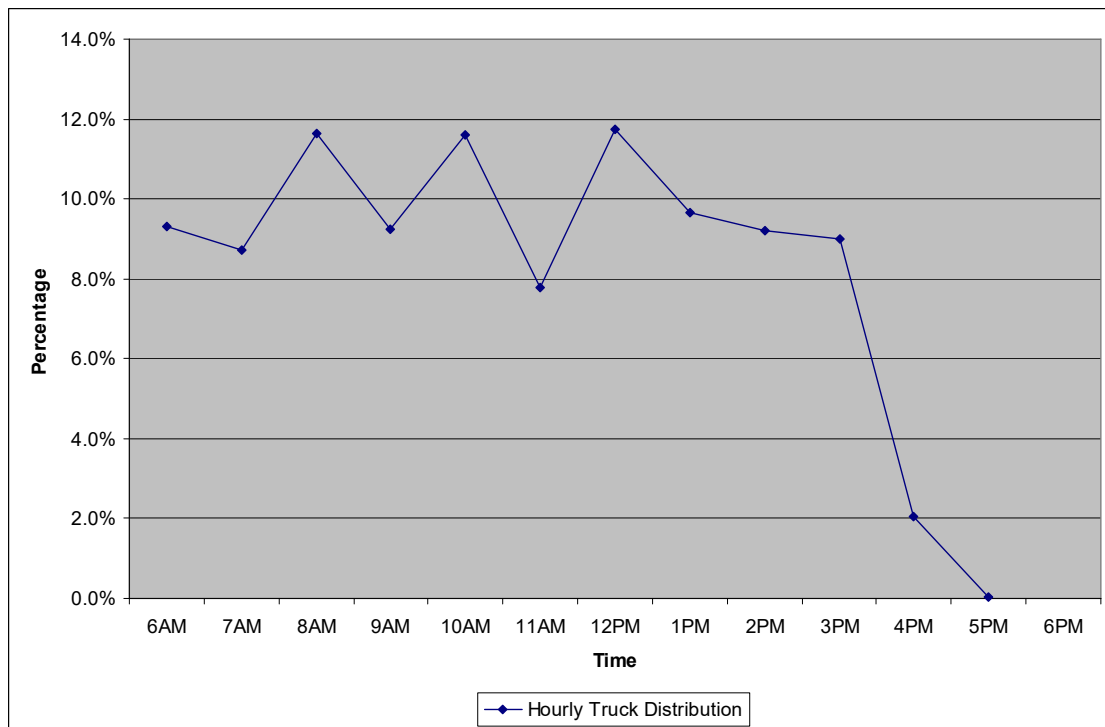


Figure 4-3 Hourly Distribution of Trucks

Based on this distribution, the expected number of truck arrivals per hour is estimated in **Table 4.3**.

Table 4.3 – Expected Hourly Distribution of Truck Trips by Month

| Month | 6AM | 7AM | 8AM | 9AM | 10AM | 11AM | 12PM | 1PM | 2PM | 3PM | 4PM | 5PM |
|----------------|--------------|--------------|--------------|-------------|-------------|-------------|-------------|--------------|-------------|-------------|-------------|------------|
| January | 6 | 6 | 6 | 6 | 6 | 4 | 8 | 6 | 6 | 6 | 2 | 0 |
| February | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 0 |
| March | 4 | 2 | 4 | 4 | 4 | 2 | 4 | 4 | 4 | 4 | 0 | 0 |
| April | 8 | 8 | 10 | 8 | 10 | 8 | 12 | 10 | 8 | 8 | 2 | 0 |
| May | 16 | 14 | 20 | 16 | 20 | 14 | 20 | 16 | 16 | 16 | 4 | 0 |
| June | 22 | 20 | 26 | 20 | 26 | 18 | 26 | 22 | 20 | 20 | 4 | 0 |
| July | 18 | 16 | 22 | 18 | 22 | 14 | 22 | 18 | 18 | 16 | 4 | 0 |
| August | 22 | 20 | 26 | 22 | 26 | 18 | 26 | 22 | 22 | 20 | 4 | 0 |
| September | 20 | 18 | 24 | 20 | 24 | 16 | 24 | 20 | 20 | 18 | 4 | 0 |
| October | 14 | 14 | 18 | 14 | 18 | 12 | 18 | 14 | 14 | 14 | 4 | 0 |
| November | 18 | 18 | 24 | 18 | 22 | 16 | 24 | 20 | 18 | 18 | 4 | 0 |
| December | 8 | 8 | 12 | 8 | 12 | 8 | 12 | 10 | 8 | 8 | 2 | 0 |
| Average | 13.17 | 12.17 | 16.17 | 13.0 | 16.0 | 11.0 | 16.5 | 13.67 | 13.0 | 12.5 | 2.83 | 0.0 |

During the roadway peak hours (between 7:15 and 8:15 and 16:45 and 17:45), we are anticipating the Hidden Quarry to have approximately 14 two-way trips (seven (7) trucks) during the morning roadway peak period and less than two (2) two-way trips (one (1) truck) during the afternoon roadway peak period. However, for the purpose of the analysis, the heaviest volume expected during the life of the pit is 26 two-way (13 inbound and 13 outbound) trips per hour and is used to conduct a conservative assessment.

Operation of the pit is expected to remain constant until shutdown of the quarry when the material is exhausted.

4.3. Trip Distribution

As the proposed quarry is going to replace an existing quarry, the catchment area is already known. Based on the existing market for James Dick Construction, the material is expected to go to the following locations as identified in **Table 4.4**.

Table 4.4 – Aggregate Destination Areas

| Location | Proportion |
|--|------------|
| Local Industry | 5% |
| Local Delivery / Halton Region | 5% |
| Wellington / Caledon | 25% |
| Acton / Georgetown / Brampton | 10% |
| Milton / Mississauga / Brampton /Toronto | 55% |
| Total | 100% |

Using the information provided in **Table 4.4**, the trip distribution for the proposed development is provided in **Table 4.5**.

Table 4.5 – Trip Distribution

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

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

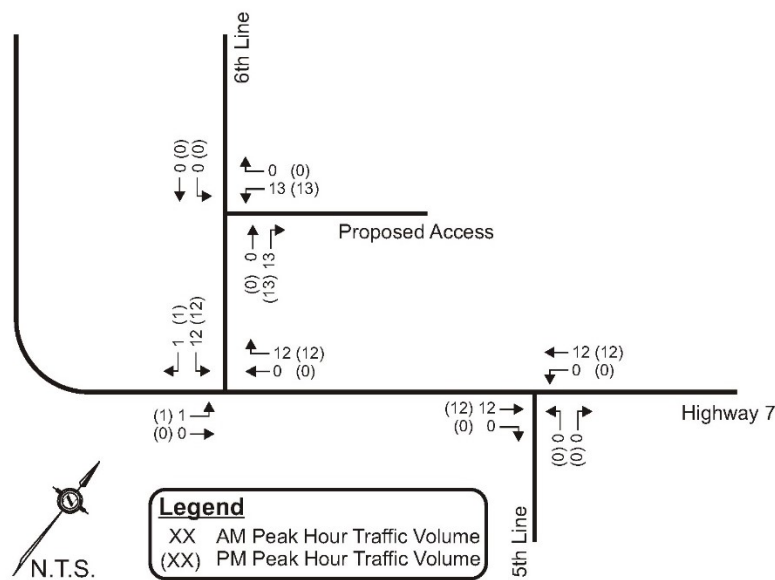


Figure 4-4 Site Traffic Volumes

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 4-5** and was assessed using *Synchro 6.0* software.

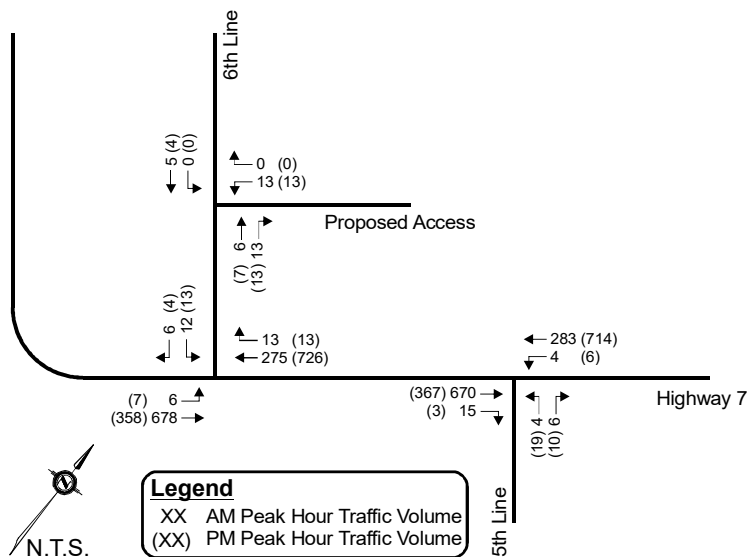


Figure 4-5 Existing Plus Site-Related Traffic Volumes

The detailed calculations are provided in **Appendix D** while summarized in **Table 4.6**.

Table 4.6 – Existing Plus Site-Related Traffic Conditions – Levels of Service

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

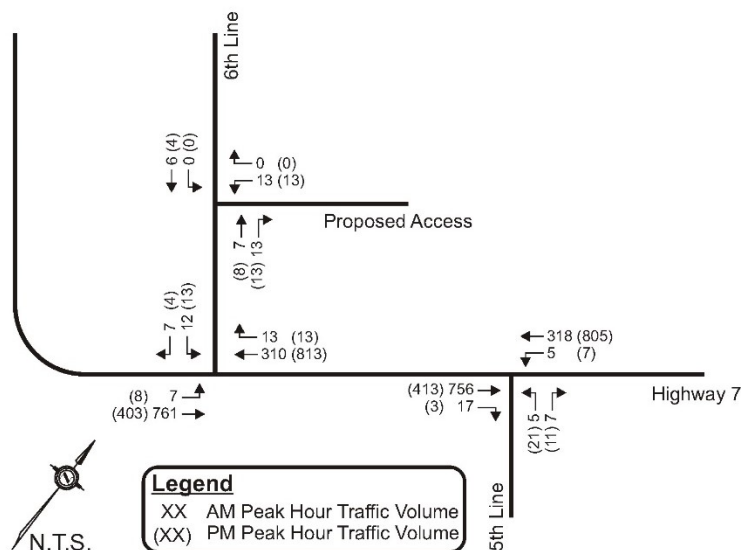


Figure 6-1 Future (2018) Total Traffic Volumes

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 th Percentile Queue (m) | LOS (v/c) | 95 th Percentile Queue (m) |
| Highway 7 / 6 th Line (Unsignalized) | EB left-through SB left-right | A (0.01) D (0.17) | 0.2 4.6 | A (0.01) E (0.22) | 0.3 6.0 |
| Highway 7 / 5 th Line (Unsignalized) | WB left-through NB left-right | A (0.01) C (0.05) | 0.2 1.1 | A (0.01) C (0.13) | 0.1 3.5 |
| 6 th Line / Proposed Access (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 / 6th Line intersection. The 95th 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.

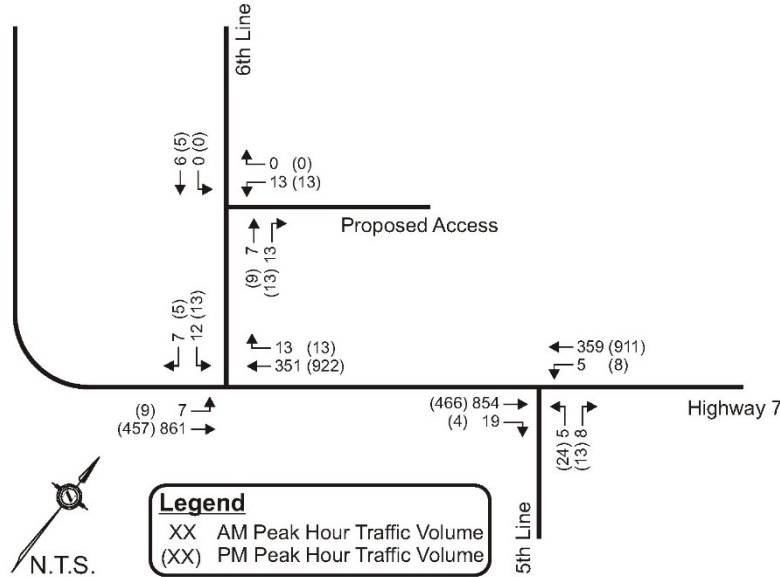


Figure 6-2 Future (2023) Total Traffic Volumes

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 / 6th 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 th Percentile Queue (m) | LOS (v/c) | 95 th Percentile Queue (m) |
| Highway 7 / 6th Line (Unsignalized) | EB left-through SB left-right | A (0.01) E (0.22) | 0.2 6.1 | A (0.01) F (0.29) | 0.3 8.4 |
| Highway 7 / 5th Line (Unsignalized) | WB left-through NB left-right | A (0.01) C (0.06) | 0.2 1.4 | A (0.01) D (0.19) | 0.2 5.2 |
| 6th Line / Proposed Access (Unsignalized) | WB left-right 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 / 6th Line intersection having a modest increase in queue length. The 95th 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 th | 95 th | Max. | 50 th | 95 th | Max. |
| Highway 7 / 6 th Line (Unsignalized) | EB left-through | 0.9 | 6.1 | 12.8 | 1.1 | 7.0 | 16.0 |
| | SB left-right | 9.6 | 24.1 | 30.5 | 10.6 | 25.6 | 34.5 |
| Highway 7 / 5 th Line (Unsignalized) | WB left-through | 2.6 | 15.9 | 34.6 | 2.1 | 11.5 | 21.9 |
| | NB left-right | 3.3 | 9.8 | 8.6 | 7.5 | 15.6 | 19.4 |
| 6 th Line / Proposed Access (Unsignalized) | WB left-right | 7.5 | 15.0 | 19.6 | 7.5 | 19.6 | 15.0 |

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

6.2.2. With Left Turn Lane

A left turn warrant analysis was undertaken at the 6th Line / Highway 7 and 5th Line / highway 7 intersection. 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 at the 6th Line / Highway 7 intersection. In addition, the 5th Line / Highway 7 intersection also requires a left turn lane with a storage length of approximately 25 meters. These left turn lanes 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 6th Line. The left turn lane is warranted primarily as a result of background traffic turning onto 6th Line, as well as the high design speed along Highway 7. While the left turn lane at the 5th Line / Highway 7 intersection is required exclusively due to background traffic.

The future (2023) total traffic analysis is also assessed with an exclusive left turn lanes at the Highway 7 / 6th Line intersection and Highway 7 / 5th Line intersections 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 th Percentile Queue (m) | LOS (v/c) | 95 th Percentile Queue (m) |
| Highway 7 / 6 th Line (Unsignalized) | EB left SB left-right | A (0.01) E (0.22) | 0.2 6.1 | B (0.01) F (0.29) | 0.3 8.4 |
| Highway 7 / 5 th Line (Unsignalized) | WB left NB left-right | A (0.01) C (0.06) | 0.2 1.4 | A (0.01) D (0.19) | 0.2 5.2 |
| 6 th Line / Proposed Access (Unsignalized) | WB left-right SB left-through | A (0.03) | 0.6 | A (0.03) | 0.7 |

With the exclusive eastbound left turn left turn lanes at the Highway 7 / 6th Line intersection and Highway 7 / 5th Line intersections, the study area is expected to operate at very similar levels of service to 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 lanes in place. 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 th | 95 th | Max. | 50 th | 95 th | Max. |
| Highway 7 / 6 th Line (Unsignalized) | EB left SB left-right | 0.4 6.9 | 6.9 19.3 | 9.6 22.8 | 1.0 5.6 | 5.2 17.3 | 7.8 21.5 |
| Highway 7 / 5 th Line (Unsignalized) | WB left NB left-right | 0.5 3.2 | 3.4 10.1 | 4.8 11.0 | 0.7 6.7 | 4.4 14.2 | 8.1 16.7 |
| 6 th Line / Proposed Access (Unsignalized) | WB left-right | 5.9 | 7.7 | 15.0 | 5.0 | 16.4 | 15.0 |

The *SimTraffic* analysis with the exclusive left turn lane at the Highway 7 / 6th 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.

The Highway 7 / 5th Line intersection is also expecting a maximum queue of 8.1 meters. As such, a storage length of 25 meters is sufficient to serve the westbound left turn lane.

The left turn lanes will require a runout lane which is the same length as the deceleration lane requirements. Due to the proximity of the 6th Line / Highway 7 intersection, the runout lanes from each intersection are expected to encroach. As a result, it is recommended that a center lane be maintained to facilitate the runout between each intersection.

7.0 Access Analysis

The site access is proposed to be located on the east side of 6th Line in the Township of Guelph-Eramosa. 6th 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 6th 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 / 6th Line intersection, thereby improving safety on approach to the intersection, particularly during the winter months.

7.2. Safety Consideration

Along Highway 7 at the 6th 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 80 m and parallel 85 m), 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 6th 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 6th 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 6th 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 6th Line junction. Similarly, the minimum advance warning signage for the proposed access along 6th 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 assessed with a conservative 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 / 6th Line intersection;
- It is recommended that a deceleration lanes along Highway 7 be provided with an 80 meter taper and 85 meter parallel;
- Due to the proximity of the 5th Line and 6th Line intersections, it is recommended that a continuous turning lane be provided between the two intersections to accommodate runout left turn lengths;
- It is recommended that oversized truck entrance signs be placed along Highway 7 in approach to 6th Line while standard truck entrance signs be placed on 6th Line; and,
- At the intersection of Highway 7 and 6th 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

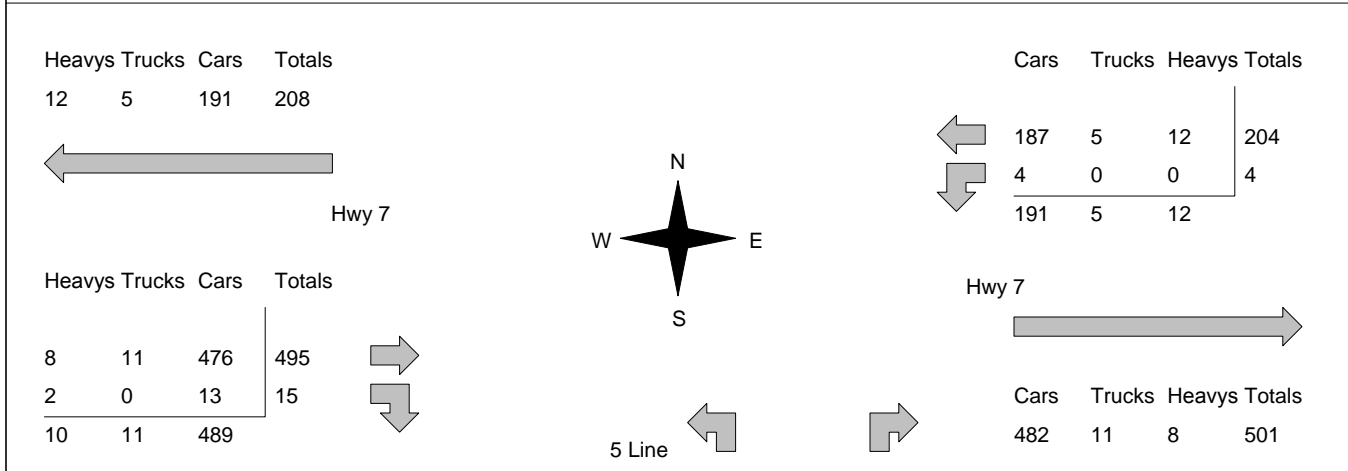
Accu-Traffic Inc.

| | | |
|-----------------------------|---|--|
| Morning Peak Diagram | Specified Period From: 7:00:00 To: 9:00:00 | One Hour Peak From: 7:15:00 To: 8:15:00 |
|-----------------------------|---|--|

| | |
|--|---|
| 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: 709 East Entering: 208 East Peds: 0 Peds Cross: ∞ |
|--|--|



| | | | |
|--|--|--|--|
| Peds Cross: ∞ West Peds: 0 West Entering: 510 West Leg Total: 718 | Cars 17 Trucks 0 Heavys 2 Totals 19 | Cars 4 Trucks 0 Heavys 0 Totals 4 | Cars 6 Trucks 0 Heavys 0 Totals 6 |
|--|--|--|--|

Comments

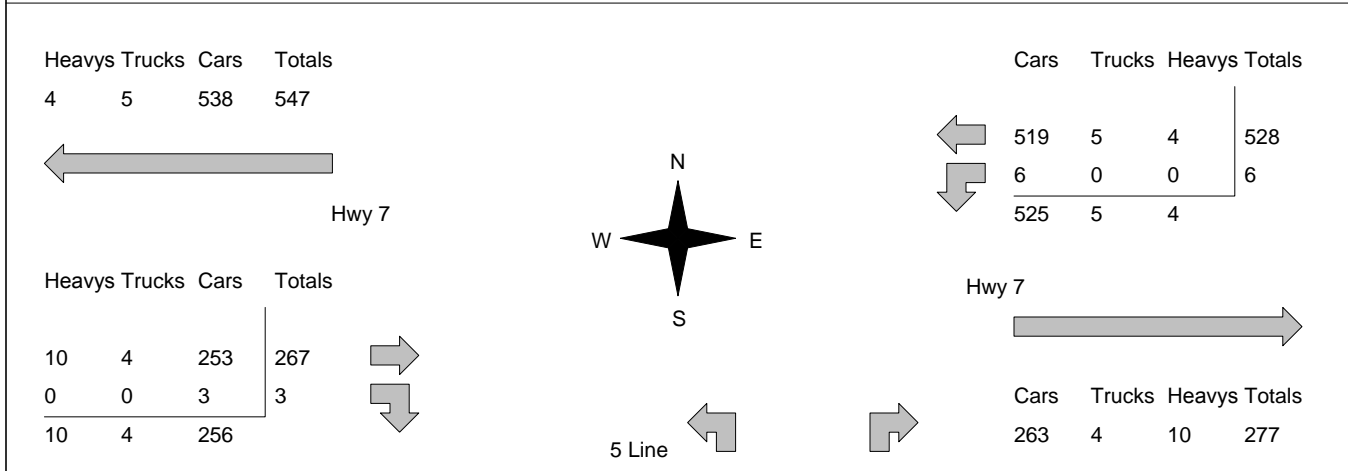
Accu-Traffic Inc.

| | | |
|-------------------------------|---|--|
| Afternoon Peak Diagram | Specified Period From: 16:00:00 To: 18:00:00 | One Hour Peak From: 16:45:00 To: 17:45:00 |
|-------------------------------|---|--|

| | |
|--|---|
| 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: 811 East Entering: 534 East Peds: 0 Peds Cross: ∞ |
|--|--|



| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|------|----|--------|---|--------|---|--------|---|--|------|----|----|----|--------|---|---|---|--------|---|---|---|--------|----|----|--|---|
| Peds Cross: ∞ West Peds: 0 West Entering: 270 West Leg Total: 817 | <table style="border-collapse: collapse;"> <tr><td>Cars</td><td>9</td></tr> <tr><td>Trucks</td><td>0</td></tr> <tr><td>Heavys</td><td>0</td></tr> <tr style="border-top: 1px solid black;"><td>Totals</td><td>9</td></tr> </table> | Cars | 9 | Trucks | 0 | Heavys | 0 | Totals | 9 | <table style="border-collapse: collapse;"> <tr><td>Cars</td><td>19</td><td>10</td><td>29</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 style="border-top: 1px solid black;"><td>Totals</td><td>19</td><td>10</td><td></td></tr> </table> | Cars | 19 | 10 | 29 | Trucks | 0 | 0 | 0 | Heavys | 0 | 0 | 0 | Totals | 19 | 10 | | Peds Cross: ∞ South Peds: 0 South Entering: 29 South Leg Total: 38 |
| Cars | 9 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trucks | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Heavys | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Totals | 9 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cars | 19 | 10 | 29 | | | | | | | | | | | | | | | | | | | | | | | | |
| Trucks | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Heavys | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Totals | 19 | 10 | | | | | | | | | | | | | | | | | | | | | | | | | |

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

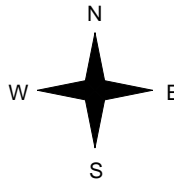
East Leg Total: 2875
 East Entering: 1419
 East Peds: 0
 Peds Cross: ∞

| 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 | 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

| | |
|--------|----|
| Cars | 65 |
| Trucks | 1 |
| Heavys | 9 |
| Totals | 75 |



| | | | |
|--------|----|----|----|
| Cars | 42 | 26 | 68 |
| Trucks | 0 | 1 | 1 |
| Heavys | 1 | 2 | 3 |
| Totals | 43 | 29 | |

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 Total Approaches | South Approach Totals | | | | | | |
| Includes Cars, Trucks, & Heavys | | | | | Total Peds | | Includes Cars, Trucks, & Heavys | | | | | Total Peds | |
| Hour Ending | Left | Thru | Right | Grand Total | | Hour Ending | 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 | 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 | |
| Totals: | 0 | 0 | 0 | 0 | 0 | 72 | | 43 | 0 | 29 | 72 | 1 | |
| East Approach Totals | | | | | | East/West Total Approaches | West Approach Totals | | | | | | |
| Includes Cars, Trucks, & Heavys | | | | | Total Peds | | Includes Cars, Trucks, & Heavys | | | | | Total Peds | |
| Hour Ending | Left | Thru | Right | Grand Total | | Hour Ending | 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 | 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 | |
| Totals: | 32 | 1387 | 0 | 1419 | 0 | 2889 | | 0 | 1427 | 43 | 1470 | 0 | |
| 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 | | | | |

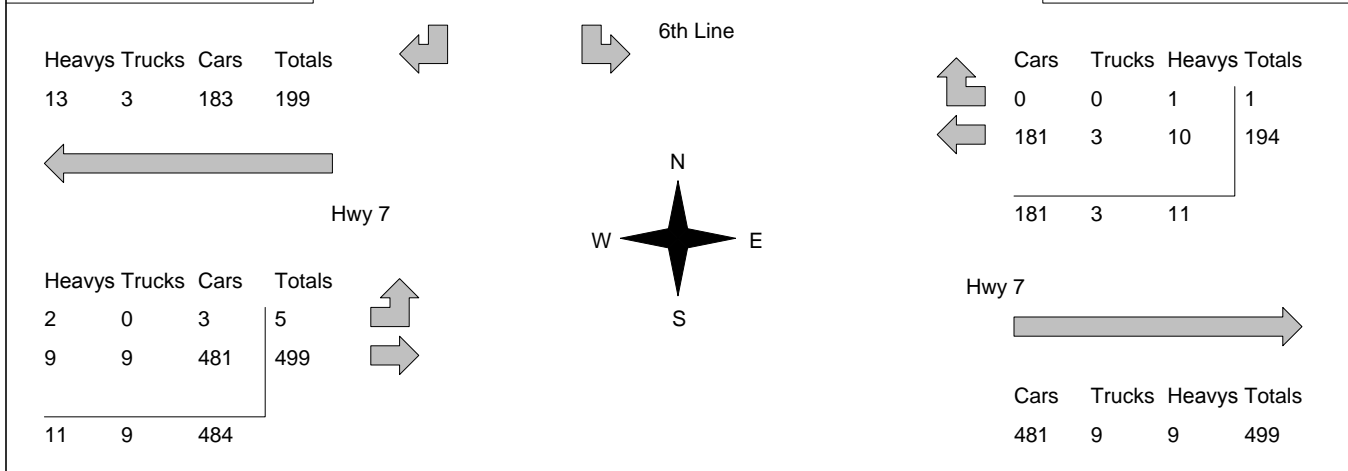
Accu-Traffic Inc.

| | | |
|-----------------------------|---|--|
| Morning Peak Diagram | Specified Period From: 7:00:00 To: 9:00:00 | One Hour Peak From: 7:15:00 To: 8:15:00 |
|-----------------------------|---|--|

| | |
|--|---|
| 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: 11 North Entering: 5 North Peds: 0 Peds Cross: ☒ | <table style="margin: auto;"> <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>0</td></tr> </table> | Heavys | 3 | 0 | 3 | Trucks | 0 | 0 | 0 | Cars | 2 | 0 | 2 | Totals | 5 | 0 | 0 |  | <table style="margin: auto;"> <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 East Entering: 195 East Peds: 0 Peds Cross: ☒ |
| Heavys | 3 | 0 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trucks | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cars | 2 | 0 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Totals | 5 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Heavys | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trucks | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cars | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Totals | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | |



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


Comments

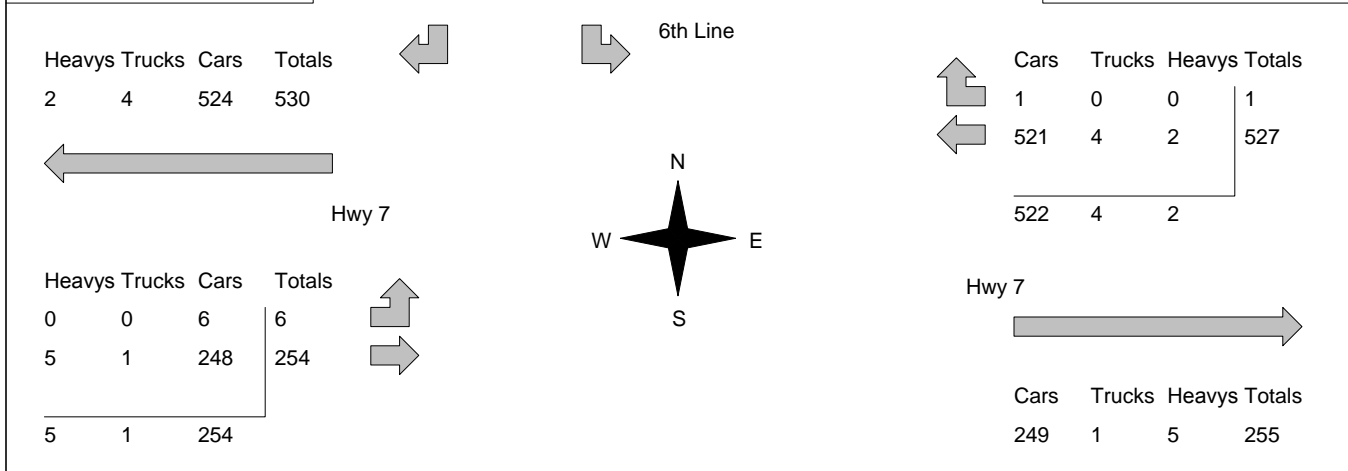
Accu-Traffic Inc.

| | | |
|-------------------------------|---|--|
| Afternoon Peak Diagram | Specified Period From: 16:00:00 To: 18:00:00 | One Hour Peak From: 16:45:00 To: 17:45:00 |
|-------------------------------|---|--|

| | |
|--|---|
| 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: 11 North Entering: 4 North Peds: 0 Peds Cross: ☒ | <table border="1" 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 border="1" 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 East Entering: 528 East Peds: 0 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: ☒ West Peds: 0 West Entering: 260 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 |



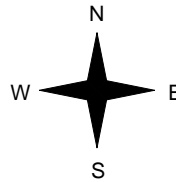
6th Line



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



Hwy 7



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



Hwy 7



| | | | |
|------|--------|--------|--------|
| 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 | | | | | | North/South Total Approaches | South Approach Totals | | | | | | |
| Hour Ending | Includes Cars, Trucks, & Heavys | | | | Total Peds | | 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 | |
| Totals: | 3 | 0 | 14 | 17 | 0 | 17 | | 0 | 0 | 0 | 0 | 0 | |
| East Approach Totals | | | | | | East/West Total Approaches | West Approach Totals | | | | | | |
| Hour Ending | Includes Cars, Trucks, & Heavys | | | | Total Peds | | 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 | |
| Totals: | 0 | 1359 | 4 | 1363 | 0 | 2797 | | 14 | 1420 | 0 | 1434 | 0 | |
| 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 | | | | |
| 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 |
| Direction, Lane # | EB 1 | WB 1 | SB 1 | | | |
| 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 | | | |
| Intersection Summary | | | | | | |
| 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 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | | | |
| 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 | | | |
| Intersection Summary | | | | | | |
| 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 |
| Direction, Lane # | EB 1 | WB 1 | SB 1 | | | |
| 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 | | | |
| Intersection Summary | | | | | | |
| 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 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | | | |
| 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 | | | |
| Intersection Summary | | | | | | |
| 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 | | | | | |
| Intersection Summary | | | | | | |
| 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 |
| TOTAL | 263 | 246 | 328 | 261 | 327 | 219 | 331 | 272 | 260 | 254 | 58 | 1 | | 2826 |
| % | 9.3% | 8.7% | 11.6% | 9.2% | 11.6% | 7.7% | 11.7% | 9.6% | 9.2% | 9.0% | 2.1% | 0.0% | | 100% |

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% |
| Sep-11 | 12.27% |
| 11-Oct | 8.90% |
| Nov-11 | 11.70% |
| Dec-11 | 5.95% |
| Total | |



Busiest Month

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 |
| Direction, Lane # | EB 1 | WB 1 | SB 1 | | | |
| 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 | | | |
| Intersection Summary | | | | | | |
| 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 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | | | |
| 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 | | | |
| Intersection Summary | | | | | | |
| 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 | |
| Direction, Lane # | WB 1 | NB 1 | SB 1 | | | |
| 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 | | | | | |
| Intersection Summary | | | | | | |
| 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 |
| Direction, Lane # | EB 1 | WB 1 | SB 1 | | | |
| 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 | | | |
| Intersection Summary | | | | | | |
| 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 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | | | |
| 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 | | | |
| Intersection Summary | | | | | | |
| 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 |
| Direction, Lane # | EB 1 | WB 1 | SB 1 | | | |
| 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 | | | |
| Intersection Summary | | | | | | |
| 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

Future Total Traffic AM
2017

| | → | ↘ | ↙ | ← | ↖ | ↗ |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| 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 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | | | |
| 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 | | | |
| Intersection Summary | | | | | | |
| 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
 1: Highway 7 & 6th Line

Future Total Traffic PM
 2017



| 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 |
| Direction, Lane # | EB 1 | WB 1 | SB 1 | | | |
| 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 | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 1.0 | | | |
| Intersection Capacity Utilization | | 56.0% | | ICU Level of Service | | B |
| Analysis Period (min) | | | 15 | | | |










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

Future Total Traffic PM
2017

| | → | ↘ | ↙ | ← | ↖ | ↗ |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| 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 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | | | |
| 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 | | | |
| Intersection Summary | | | | | | |
| 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
 2017

| |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| 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 |
| Direction, Lane # | EB 1 | WB 1 | SB 1 | | | |
| 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 | | | |
| Intersection Summary | | | | | | |
| 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 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | | | |
| 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 | | | |
| Intersection Summary | | | | | | |
| 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 |
| Direction, Lane # | EB 1 | WB 1 | SB 1 | | | |
| 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 | | | |
| Intersection Summary | | | | | | |
| 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 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | | | |
| 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 | | | |
| Intersection Summary | | | | | | |
| 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) | | |

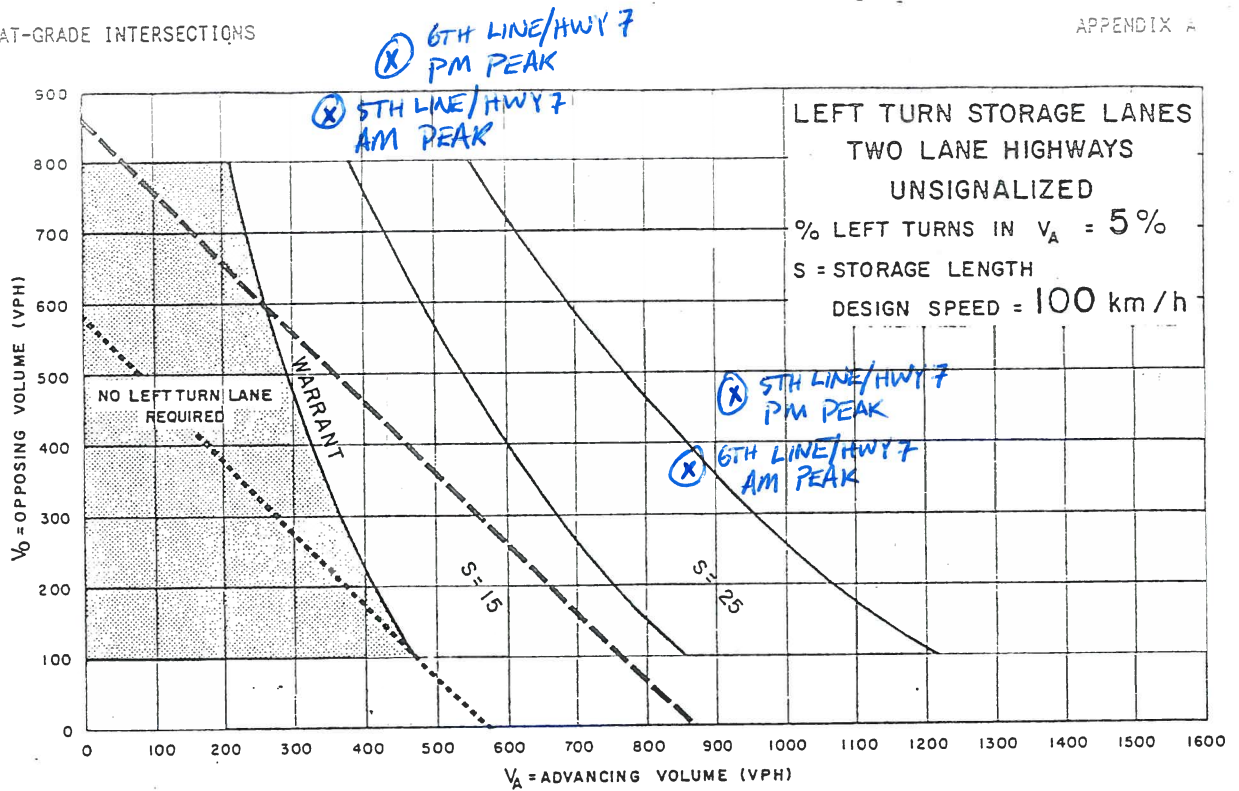
Intersection: 3: Proposed Access & 6th Line

| 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

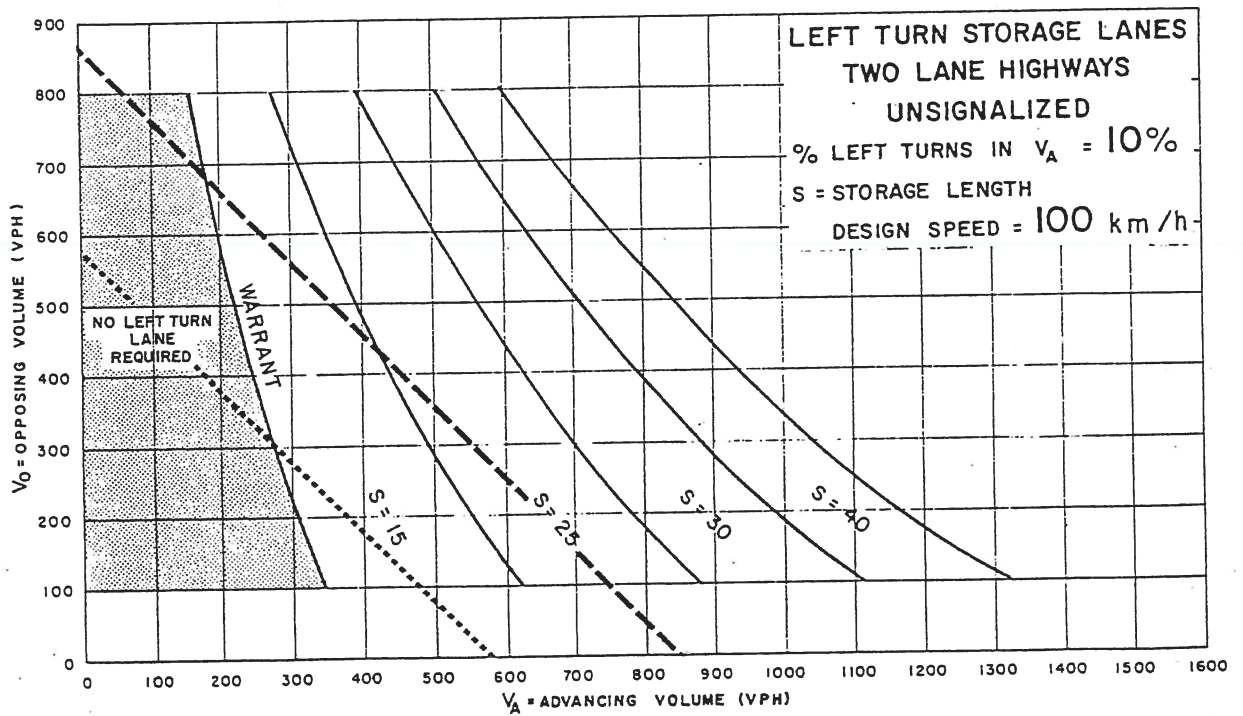
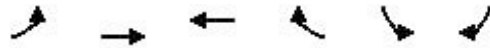


Figure EA-22

APPENDIX I

2023 SimTraffic Analysis With Left Turn Lane Calculations

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



| 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 | |

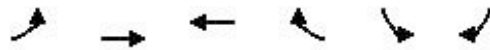
HCM Unsignalized Intersection Capacity Analysis Future (2023) Total Traffic - with Left Turn lane
 2: Highway 7 & 5th Line AM Peak

| | → | ↘ | ↙ | ← | ↖ | ↗ |
|-----------------------------------|-------------|-------------|-------------|-------------|----------------------|------|
| 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 |
| Direction, Lane # | EB 1 | WB 1 | WB 2 | NB 1 | | |
| Volume Total | 939 | 5 | 386 | 14 | | |
| Volume Left | 0 | 5 | 0 | 5 | | |
| Volume Right | 20 | 0 | 0 | 9 | | |
| cSH | 1700 | 738 | 1700 | 243 | | |
| Volume to Capacity | 0.55 | 0.01 | 0.23 | 0.06 | | |
| Queue Length 95th (m) | 0.0 | 0.2 | 0.0 | 1.4 | | |
| Control Delay (s) | 0.0 | 9.9 | 0.0 | 20.7 | | |
| Lane LOS | | A | | C | | |
| Approach Delay (s) | 0.0 | 0.1 | | 20.7 | | |
| Approach LOS | | | | C | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 0.3 | | | |
| Intersection Capacity Utilization | | | 58.7% | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | |

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

| |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| 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 Future (2023) Total Traffic - with Left Turn lane
 1: Highway 7 & 6th Line PM Peak



| 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 Future (2023) Total Traffic - with Left Turn lane
 2: Highway 7 & 5th Line PM Peak

| | → | ↘ | ↙ | ← | ↖ | ↗ |
|-----------------------------------|-------------|-------------|-------------|-------------|----------------------|------|
| 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 |
| Direction, Lane # | EB 1 | WB 1 | WB 2 | NB 1 | | |
| Volume Total | 485 | 8 | 939 | 38 | | |
| Volume Left | 0 | 8 | 0 | 25 | | |
| Volume Right | 4 | 0 | 0 | 13 | | |
| cSH | 1700 | 1089 | 1700 | 200 | | |
| Volume to Capacity | 0.29 | 0.01 | 0.55 | 0.19 | | |
| Queue Length 95th (m) | 0.0 | 0.2 | 0.0 | 5.2 | | |
| Control Delay (s) | 0.0 | 8.3 | 0.0 | 27.2 | | |
| Lane LOS | | A | | D | | |
| Approach Delay (s) | 0.0 | 0.1 | | 27.2 | | |
| Approach LOS | | | | D | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 0.8 | | | |
| Intersection Capacity Utilization | | | 60.6% | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | |

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



| 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 J

Future (2023) Total Traffic With Left Turn Lane

Level of Service Calculations

Intersection: 1: Highway 7 & 6th Line

| Movement | EB | SB |
|-----------------------|------|-------|
| Directions Served | L | LR |
| Maximum Queue (m) | 9.6 | 22.8 |
| Average Queue (m) | 0.4 | 6.9 |
| 95th Queue (m) | 4.1 | 19.3 |
| Link Distance (m) | | 150.6 |
| 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 | L | LR |
| Maximum Queue (m) | 4.8 | 11.0 |
| Average Queue (m) | 0.5 | 3.2 |
| 95th Queue (m) | 3.4 | 10.1 |
| Link Distance (m) | | 403.3 |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (m) | 25.0 | |
| 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) | 5.9 |
| 95th Queue (m) | 17.7 |
| 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

Intersection: 1: Highway 7 & 6th Line

| Movement | EB | SB |
|-----------------------|------|-------|
| Directions Served | L | LR |
| Maximum Queue (m) | 7.8 | 21.5 |
| Average Queue (m) | 1.0 | 5.6 |
| 95th Queue (m) | 5.2 | 17.3 |
| Link Distance (m) | | 150.6 |
| 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 | L | LR |
| Maximum Queue (m) | 8.1 | 16.7 |
| Average Queue (m) | 0.7 | 6.7 |
| 95th Queue (m) | 4.4 | 14.2 |
| Link Distance (m) | | 403.3 |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (m) | 25.0 | |
| 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) | 5.0 |
| 95th Queue (m) | 16.4 |
| 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.
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