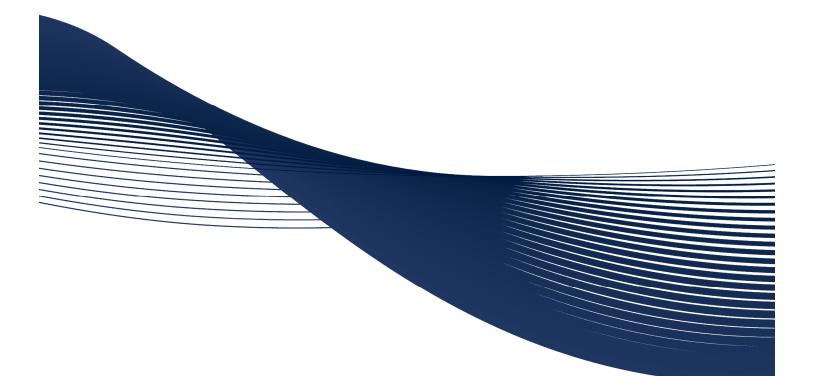
JAMES DICK CONSTRUCTION LIMITED

REVISED TRAFFIC IMPACT STUDY

Eramosa Quarry, Township of Guelph-Eramosa Project No.:TR12-0013





AUGUST 2015

COLE ENGINEERING GROUP LTD.

HEAD OFFICE 70 Valleywood Drive Markham, ON CANADA L3R 4T5 **T.** 905.940.6161 | 416.987.6161 **F.** 905.940.2064 | www.ColeEngineering.ca GTA WEST OFFICE

150 Courtneypark Drive West, Unit C100 Mississauga, ON CANADA L5W 1Y6 **T.** 905.364.6161 **F.** 905.364.6162



August 20, 2015 Our Ref: TR12-0013

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

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

Dear Mr. Sweetnam:

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

Cole Engineering Group Ltd. is pleased to submit this revised Traffic Impact Study in support of the proposed Eramosa Quarry, addressing comments received from the Ministry of Transportation (MTO), 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.

S12012 Projects/TR1TR12-0013 JamesDick_Hwy7-6Conc_Eramosa\300-Design-Engineering/312-Deliverables/Project Deliverables/007_Updated Studies/TIS/FINAL Revised TIS 08 19 15.docx

COLE ENGINEERING GROUP LTD.

HEAD OFFICE 70 Valleywood Drive Markham, ON CANADA L3R 4T5

T. 905.940.6161 | 416.987.6161 **F.** 905.940.2064 www.ColeEngineering.ca



Statement of Conditions

This Report / Study (the "Work") has been prepared at the request of, and for the exclusive use of, the Owner / Client, and its affiliates (the "Intended User"). No one other than the Intended User has the right to use and rely on the Work without first obtaining the written authorization of Cole Engineering Group Ltd. and its Owner. Cole Engineering expressly excludes liability to any party except the intended User for any use of, and/or reliance upon, the work.

Neither possession of the Work, nor a copy of it, carries the right of publication. All copyright in the Work is reserved to Cole Engineering. The Work shall not be disclosed, produced or reproduced, quoted from, or referred to, in whole or in part, or published in any manner, without the express written consent of Cole Engineering and the Owner.



Table of Contents

1.0	Study Background and Purpose1
2.0	Study Approach2
	2.1. Study Area2
	2.2. Horizon Year2
3.0	Existing Traffic Conditions
	3.1. Existing Road Network
	3.2. Existing Traffic Assessment
	3.3. Existing Traffic Conditions – Level of Service Analysis4
4.0	Site Generated Traffic5
	4.1. Development Proposal5
	4.2.Site Generated Traffic54.2.1.Load Sizes54.2.2.Forecasted Traffic5
	4.3. Trip Distribution
	4.4. Existing Plus Site-Related Traffic9
5.0	Traffic Growth 10
6.0	Future Total Traffic Conditions 11
	6.1. Future (2018) Total Traffic Conditions11
	6.2. Future (2023) Total Traffic Conditions 12 6.2.1. Without Left Turn Lane 12 6.2.2. With Left Turn Lane 13
7.0	Access Analysis 15
	7.1. Site Access Location and Sight Distance15
	7.2. Safety Consideration15
8.0	Conclusions 16

LIST OF FIGURES

Figure 1-1	Proposed Site Location	.1
Figure 1-2	Proposed Site Plan	. 2
Figure 3-1	Existing Lane Configurations	.3
Figure 3-2	Existing Traffic Volumes	.4
	2011 Erin Pit Monthly Distribution	
Figure 4-2	Weekly Truck Distribution	.7
-	Hourly Distribution of Trucks	
Figure 4-4	Site Traffic Volumes	.9
Figure 4-5	Existing Plus Site-Related Traffic Volumes	10
Figure 6-1	Future (2018) Total Traffic Volumes	11
Figure 6-2	Future (2023) Total Traffic Volumes	12

LIST OF TABLES

.4
. 5
. 6
. 8
. 8
. 9
10
11
12
13
14
L4
15

APPENDICES

- Appendix A Existing Traffic Data
- Appendix B Existing Traffic Level of Service Calculations
- Appendix C Erin Gravel Pit Truck Trip Generation
- Appendix D Existing Plus Site-Related Level of Service Calculations
- Appendix E Future (2018) Total Traffic Level of Service Calculations
- Appendix F Future (2023) Total Traffic Level of Service Calculations
- Appendix G 2023 SimTraffic Analysis Calculations
- Appendix H MTO Geometric Design Standards Manual Left Turn Warrant Design Charts
- Appendix I 2023 SimTraffic Analysis with Left Turn Lane Calculations
- Appendix J Future (2023) Total Traffic with Left Turn Lane Level of Service Calculations
- Appendix K Statement of Limiting Conditions and Assumptions

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**.



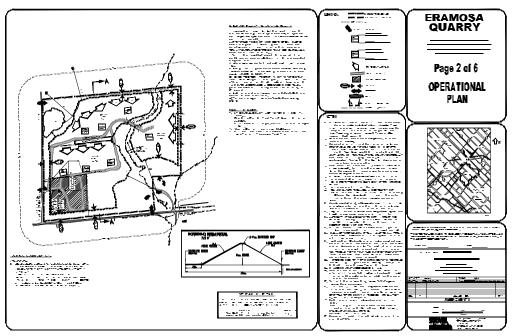


Figure 1-2 Proposed Site Plan

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**.

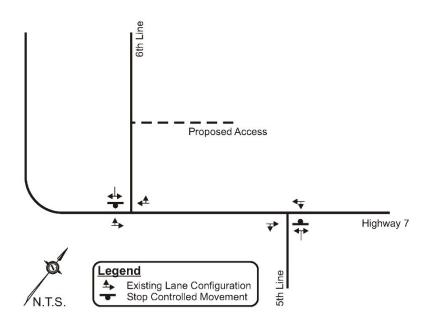


Figure 3-1 Existing Lane Configurations

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 / 6^{th} 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*.



Township of Guelph-Eramosa

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.

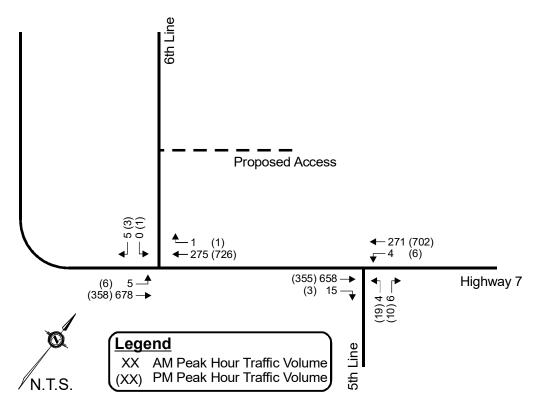


Figure 3-2 Existing Traffic Volumes

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

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

Table 3.1 – Existing Traffic Conditions – Levels of Service

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 if provided in **Table 4.1**.

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

Table 4.1 – Fleet Size

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**.

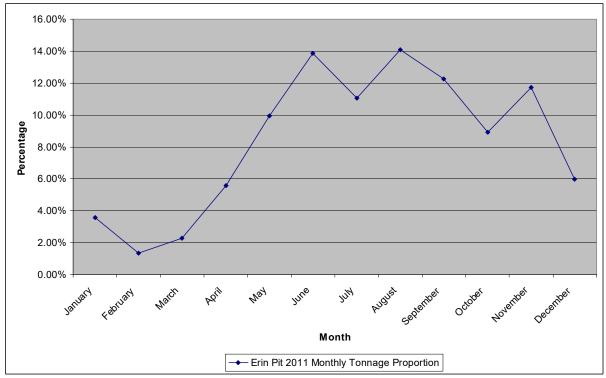


Figure 4-1 2011 Erin Pit Monthly Distribution

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**.

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				
Мау	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				

Table 4.2 – Expected Month	ly Distribution of Trucks
Table 4.2 Expected Month	ly Distribution of frucks

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

COLE

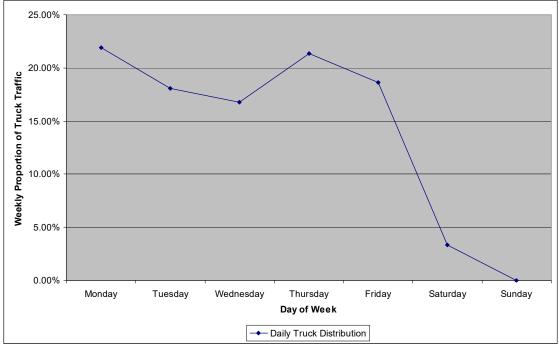


Figure 4-2 Weekly Truck Distribution

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**.

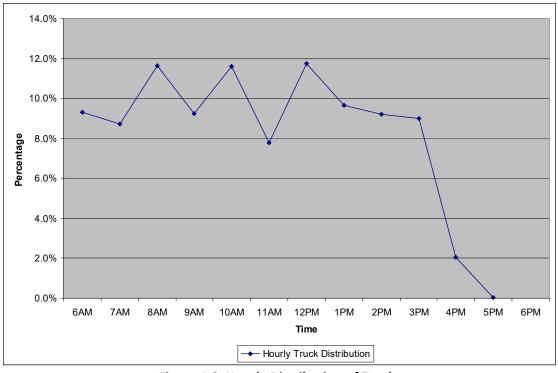


Figure 4-3 Hourly Distribution of Trucks

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

Table 4.5 – Expected Hourry 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

Table 4.3 – Expected Hourly Distribution of Truck Trips by Month

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**.

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			
То	100%		

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

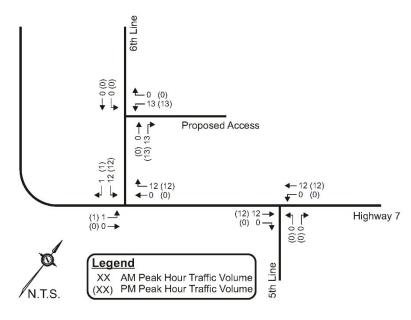


Figure 4-4 Site Traffic Volumes

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.



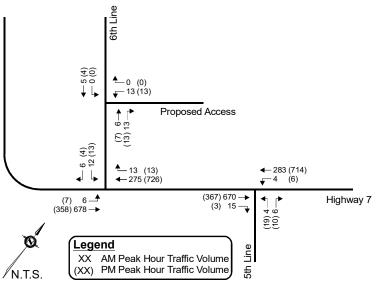


Figure 4-5 Existing Plus Site-Related Traffic Volumes

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

		AM P	eak Hour	PM Peak Hour		
Intersection	Key Movements	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	

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

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.

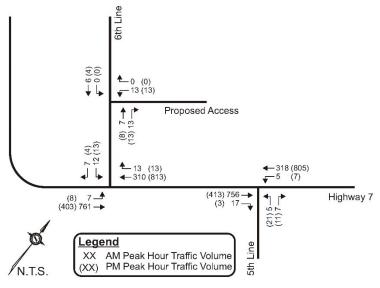


Figure 6-1 Future (2018) Total Traffic Volumes

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

		AM Pe	ak Hour	PM Peak Hour		
Intersection	Key Movements	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	

Table 6.1 – Future (2018) Traffic Conditions – Level	s of Service
--	--------------

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.

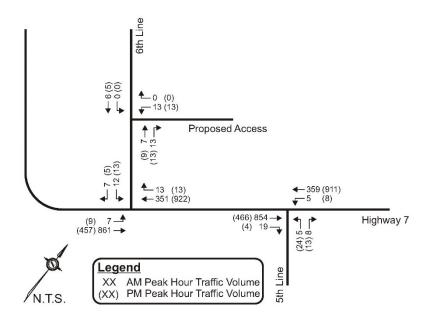


Figure 6-2 Future (2023) Total Traffic Volumes

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 / 6^{th} Line intersection using *Synchro 6.0* software. The detailed calculations are provided in **Appendix F** and are summarized **Table 6.2**.

		AM Pe	eak Hour	PM Peak Hour		
Intersection	Key MovementsLOS (v/c)95th Pe QuerteEB left-through SB left-rightA (0.01) E (0.22)CeWB left-through NB left-rightA (0.01) C (0.06)C	95 th Percentile Queue (m)	LOS (v/c)	95 th Percentile Queue (m)		
Highway 7 / 6th Line (Unsignalized)	0		0.2 6.1	A (0.01) F (0.29)	0.3 8.4	
Highway 7 / 5th Line (Unsignalized)		. ,	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	

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

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**.

Intersection	Key Movements		M Peak Ho tile Queue ((m)		PM Peak Hour Percentile Queue Lengths (m)			
		50 th	95 th	Max.	50 th	95 th	Max.	
Highway 7 / 6 th Line (Unsignalized)	EB left-through SB left-right	0.9 9.6	6.1 24.1	12.8 30.5	1.1 10.6	7.0 25.6	16.0 34.5	
Highway 7 / 5 th Line (Unsignalized)	WB left-through NB left-right	2.6 3.3	15.9 9.8	34.6 8.6	2.1 7.5	11.5 15.6	21.9 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 95^{th} percentile queue lengths of approximately one (1) vehicle for the eastbound left turn movement at the Highway 7 / 6^{th} 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 / 6^{th} Line intersection and Highway 7 / 5^{th} Line intersections using *Synchro 6.0* software. The results are summarized in **Table 6.4** and calculation sheets provided in **Appendix I**.



		AM Pe	eak Hour	PM Peak Hour		
Intersection	Key Movements	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	

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

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**.

Intersection	Key Movements		M Peak Ho tile Queue (m)		PM Peak Hour 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	

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

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 6^{th} Line in the vicinity of the site access. The crest will be lowered to improve sight distance as well as reduce the grade on approach to the Highway 7 / 6^{th} 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.**

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.

Township of Guelph-Eramosa

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-Ti	raffic Inc.					
Morning Peak Diagram	Specified Period One Hour Peak From: 7:00:00 From: 7:15:00 To: 9:00:00 To: 8:15:00					
Municipality:EramosaSite #:1202400002Intersection:Hwy 7 & 5 LineTFR File #:5Count 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: X					
Heavys Trucks Cars Totals 12 5 191 208	Cars Trucks Heavys Totals					
	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$					
W -W	E Line 7					
	Hwy 7 S					
8 11 476 495 2 0 13 15 10 11 489 5 Line	Cars Trucks Heavys Totals 482 11 8 501					
West Peds: 0 Trucks 0 Tru West Entering: 510 Heavys 2 Hea	Cars 4 6 10 Peds Cross: ⋈ ucks 0 0 0 South Peds: 0 vvys 0 0 0 South Entering: 10 otals 4 6 South Leg Total: 29					
Com	iments					



Accu-Tra	affic Inc.
Afternoon Peak Diagram	Specified Period One Hour Peak From: 16:00:00 From: 16:45:00 To: 18:00:00 To: 17:45:00
Municipality:EramosaSite #:1202400002Intersection:Hwy 7 & 5 LineTFR File #:5Count 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: ∑
Heavys Trucks Cars Totals 4 5 538 547	Cars Trucks Heavys Totals
4 3 330 347 Hwy 7	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
Heavys Trucks Cars Totals	Hwy 7
10 4 253 0 0 3 10 4 256 267 3 5 Line	Cars Trucks Heavys Totals 263 4 10 277
West Peds: 0 Trucks 0 Truck West Entering: 270 Heavys 0 Heavys	Irs 19 10 29 Peds Cross: Image: Cross:
Comr	nents



Total Count Diagram

Municipality:EramosaSite #:1202400002Intersection:Hwy 7 & 5 LineTFR File #:5			Weather conditions: Person(s) who counted:							
Count date: 17-Fe	b-12									
* Non-Signalized Ir	ntersection *	*	r	Major Ro	oad: H	wy 7 ri	uns W	//E		
								East Lee East En East Pe Peds Cr	tering: ds:	2875 1419 0 ∑
Heavys Trucks Cars Tota 35 18 1377 1430							Cars	Trucks	Heavy	s Totals
<	Hwy 7	V	N V	E		₽₽ ₽	1335 25 1360	18 1 19	34 6 40	1387 32
Heavys Trucks Cars Tota	ls		S			Hwy	/ 7			
36 21 1370 1427 3 0 40 43 39 21 1410			5 Line				Cars 1396	Trucks 22	Heavy 38	s Totals 1456
Peds Cross:∑West Peds:0West Entering:1470West Leg Total:2900	Cars 65 Trucks 1 Heavys 9 Totals 75		Cars Trucks Heavys Totals	0	26 1 2 29	68 1 3		Peds Cr South P South E South L	eds: ntering:	
			Comme	nte						



Accu-Traffic Inc. Traffic Count Summary

				Iran		ount 5	umn	nary				
Intersection:	Hwy 7 &	5 Line			Count E	^{Date:} 17-Feb-12	2 Mu	^{inicipality:} Er	amosa			
	North Include	n Appro es Cars, Ti	ach Tot rucks, & H	als eavys		North/South		Sout Include	h Appro es Cars, T	nach Tot	t als eavys	
Hour Ending	Left	Thru	Right	Grand Total	Total Peds	Total Approaches	Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00 8:00:00 9:00:00 16:00:00 17:00:00 18:00:00	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 12 11 0 27 22	7:00:0 8:00:0 9:00:0 16:00:0 17:00:0	0 3 0 5 0 0 0 19	0 0 0 0 0	0 9 6 0 8	0 12 11 0 27 22	0 0 1 0 0
Totals:	0 Fast	0	0 ach Tota	0	0	72		43 Wes	0	29 ach Tota	72 als	1
	Include	es Cars, Ti	rucks, & H	eavys		East/West		Include	es Cars, T	rucks, & H	ais eavys	
Hour Ending	Left	Thru	Right	Grand Total	Total Peds	Total Approaches	Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00 8:00:00 9:00:00 16:00:00 17:00:00 18:00:00	0 5 9 0 11 7	0 185 207 1 478 516	0 0 0 0 0	0 190 216 1 489 523	0 0 0 0 0		8:00:0	0 0 0 0 0 0 0 0	0 493 420 1 247 266	13 17 0 10	0 506 437 1 257 269	0 0 0 0 0
Totals: Hours En Crossing		1387 7:00 0	0 Calc 8:00 3	1419 ulated V 9:00 5	0 /alues f 16:00 0	2889 or Traffic Cr		0 18:00	<u>1427</u> eet 18:00 16		1470	0



	Pa	sseng	er Cars -	North Ap	oproach			Tru	icks - Nor	th Appro	ach			Hear	vys - Nort	h Appro	ach		Pedes	trians
nterval	Left		Thi	ru	Rig	ht	Let	ft	Th	ru	Rig	ht	Let	ft	Th	ru	Rig	ht	North	Cross
Time	Cum I	ncr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:30:00	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	
7:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:00:00	0	0	0	0	0	0		0		0	0	0	0	0	0	0	0	0	0	
8:15:00	0	0	0	0	0	0		0	1	0	0	0	0	0	0	0	0	0	0	
8:30:00	0	0	0	0	0	0		0		0	0	0	0	0	0	0	0	0	0	
8:45:00	0	0	0	0	0	0		0		0	0	0	0	0	0	0	0	0	0	
9:00:00	0	0	0	0	0	0		0		0	0	0	0	0	0	0	0	0	0	
9:00:21	0	0	0	0	0	0		0		0	0	0	0	0	0	0	0	0	0	
16:00:00	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
16:15:00	0	0	0	0	0	0		0	-	0	0	0	0	0	0	0	0	0	0	
16:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
16:45:00	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
17:00:00	0	0	0	0	0	0		0		0	0	0	0	0	0	0	0	0	0	
17:15:00	0	0	0	0	0	0		0		0	0	0	0	0	0	0	0	0	0	
17:30:00	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	
17:45:00	0	0	0	0	0	0		0		0	0	0	0	0	0	0	0	0	0	
18:00:00	0	0	0	0	0	0		0		0	0	0	0	0	0	0	0	0	0	
18:15:00	0	0	0	0	0	0		0		0	0	0		0	0	0	0	0	0	
18:15:18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	



Count Date: 17-Feb-12 Site #: 1202400002

		Passer	ger Cars -	East Ap	proach			Tru	icks - Eas	t Approa	ch			Hea	avys - Eas	st Approa	ch		Pedes	trians
Interval	Let	ft	Thr	u	Rig	ht	Le	ft	Th	ru	Rig	ht	Le	ft	Th	ru	Rig	jht	East C	Cross
Time	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0		0	0	0	0	0	0	0	0	C	0 0	0	0	0	0	0	0	0
7:15:00	1	1	31	31	0	0	0	0	1	1	0	C) 1	1	2	2	0	0	0	0
7:30:00	2	1	72	41	0	0	0	0		1	0	C		0		3	0	0	0	
7:45:00	2	0		44	0	0	0	0	3	1	0	C		0		2	0	0	0	
8:00:00	4	2		56	0	0	0	0		1	0	C		0		2	0	0	0	-
8:15:00	5	1	218	46	0	0	0	0		2	0	C		0		5	0	0	0	
8:30:00	6	1	270	52	0	0	0	0	7	1	0	0		2	17	3	0	0	0	
8:45:00	7	1		44	0	0	0	0		2	0	0		0		2	0	0	0	
9:00:00 9:00:21	10 10	3		46	0	0	0	0		1	0	C		1	22 22	3	0	0	0	
16:00:21	10	0		0 1	0	0	0	0	10 10	0	0	0		0		0	0	0	0	-
16:15:00		3		118	0	0	0	0	10	1	0	C		0		2	0	0	0	
16:30:00	13	1	591	112	0	0	0	0		0	0	0		0		2	0	0	0	
16:45:00	17	3		115	0	0	1	1	12	1	0	C		1	20	3	0	0	0	
17:00:00	19	2		121	0	0	1	0	14	2	0	0		0		1	0	0	0	
17:15:00	20	1		134	0	0	1	0		1	0	C	-	0		0	0	0	0	
17:30:00	22	2		135	0	0	1	0		0	0	C		0		2	0	0	0	
17:45:00		1	1225	129	0	0	1	0	17	2	0	C		0		1	0	0	0	
18:00:00	25	2		110	0	0	1	0		1	0	C		1	34	1	0	0	0	
18:15:00	25	0		0	0	0	1	0		0	0	C	6	0	34	0	0	0	0	
18:15:18	25	0	1335	0	0	0	1	0	18	0	0	C) 6	0	34	0	0	0	0	0



		Passeng	er Cars -	South A	oproach			Tru	cks - Sou	th Appro	ach			Heav	/ys - Sout	h Appro	ach		Pedes	trians
Interval	Le	ft	Th	ru	Rig	lht	Le	ft	Th	ru	Rig	ht	Let	ft	Th	ru	Rig	lht	South	Cross
Time	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:15:00	1	1	0	0	3	3	0	0	-	0		0		0	0	0	1	1	0	
7:30:00	2	1	0	0	4	1	0	0		0		0		0	0	0	1	0	0	
7:45:00	2	0	0	0	6	2	0	0		0		0	-	0	0	0	1	0	0	
8:00:00	3	1	0	0	8	2	0	0		0		0		0	0	0	1	0	0	
8:15:00	5	2	0	0	9	1	0	0		0		0		0	0	0	1	0	0	
8:30:00	5	0	0	0	10	1	0	0		0		0		0	0	0	2	1	0	
8:45:00	6	1	0	0	11	1	0	0		0		0	-	0	0	0	2	0	0	
9:00:00	8	2	0	0	13	2	0	0		0		0		0	0	0	2	0	1	
9:00:21 16:00:00	8	0	0	0	13 13	0	0	0		0		0		0	0	0	2	0	1	
16:00:00	11	3	0	0	13	1	0	0		0		0		0	0	0	2	0	1	
16:30:00	16	5	0	0	14	0	0	0		0		0		0	0	0	2	0	1	
16:45:00	21	5	0	0	15	1	0	0		0		1	-	1	0	0	2	0	1	
17:00:00	26	5	0	0	20	5	0	0		0		0		0	0	0	2	0	1	
17:15:00	29	3	0	0	22	2	0	0		0		0		0	0	0	2	0	1	
17:30:00	35	6	0	0	22	0	0	0		0		0		0	0	0	2	0	1	
17:45:00	40	5	0	0	25	3	0	0		0		0		0	0	0	2	0	1	
18:00:00	42	2	0	0	26	1	0	0		0		0	1	0	0	0		0	1	
18:15:00	42	0	0	0	26	0	0	0		0		0		0	0	0		0	1	
18:15:18	42	0	0	0	26	0	0	0	0	0	1	0	1	0	0	0	2	0	1	



Count Date: 17-Feb-12 Site #: 1202400002

		Passeng	ger Cars -	West Ap	proach			Tru	cks - We	st Approa	ach			Hea	vys - Wes	st Approa	ach		Pedes	trians
Interval	Le	ft	Thi	ru	Rig	lht	Le	ft	Th	ru	Riç	ght	Le	ft	Th	ru	Rig	lht	West 0	Cross
Time	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0		0	0	0	0	(0 0	0	0	0	0	0	0	C
7:15:00	0	0	114	114	2	2	0	0		1	0	(0	1	1	0	0	0	0
7:30:00	0	0	234	120	2	0		0				(0	3	2		0	0	C
7:45:00	0	0	360	126	3	1	0	0				(-	0	6	3		0	0	0
8:00:00	0	0	479	119	11	8		0				(-	0	7	1	2	2	0	0
8:15:00	0	0	590	111	15	4	0	0		5	-		0 0	0	9	2		0	0	0
8:30:00	0	0	692 787	102 95	19 22	4	0	0		2	0	(0	10 13	1		0	0	0
8:45:00 9:00:00	0	0	883	95 96	22	3 5		0			0		0 0	0	13	3		0	0	0
9:00:00	0	0	883	96	27	5 0		0				(0	15	2		0	0	0
16:00:00	0	0	884	1	27	0	-	0			-	(0	15	0	-	0	0	0
16:15:00	0	0	935	51	27	2		0			_	(-	0	13	2		0	0	0
16:30:00	0	0	994	59	33	4		0			0			0	21	4		0	0	0
16:45:00	0	0	1056	62	35	2	-	0			-	(0	23	2		0	0	0
17:00:00	0	0	1118	62	37	2		0			0	(0	26	3		0	0	C
17:15:00	0	0	1177	59	37	0		0			0	(0 0	0	28	2		0	0	C
17:30:00	0	0	1242	65	37	0	0	0			0	(0 0	0	31	3		0	0	C
17:45:00	0	0	1309	67	38	1	0	0	20	0	0	(0 0	0	33	2	3	0	0	C
18:00:00	0	0	1370	61	40	2	0	0	21	1	0	(0 0	0	36	3	3	0	0	C
18:15:00	0	0	1370	0	40	0	0	0		0	0	(0 0	0	36	0	3	0	0	0
18:15:18	0	0	1370	0	40	0	0	0	21	0	0	(0 0	0	36	0	3	0	0	C



Accu-Tr	affic Inc.
Morning Peak Diagram	Specified Period One Hour Peak From: 7:00:00 From: 7:15:00 To: 9:00:00 To: 8:15:00
Municipality:EramosaSite #:1202400001Intersection:Hwy 7 & 6th LineTFR File #:3Count date:14-Feb-12	Weather conditions: Person(s) who counted:
** Non-Signalized Intersection **	Major Road: Hwy 7 runs W/E
Heavys Trucks Cars Totals	E Hwy 7 Cars Trucks Heavys Totals
11 9 484	481 9 9 499
Peds Cross: X West Peds: 0 West Entering: 504 West Leg Total: 703 Comr	nents



Accu-Tr	affic Inc.
Afternoon Peak Diagram	Specified Period One Hour Peak From: 16:00:00 From: 16:45:00 To: 18:00:00 To: 17:45:00
Municipality:EramosaSite #:1202400001Intersection:Hwy 7 & 6th LineTFR File #:3Count date:14-Feb-12	Weather conditions: Person(s) who counted:
** Non-Signalized Intersection **	Major Road: Hwy 7 runs W/E
Heavys Trucks Cars Totals	Trucks 0 East Entering: 528
Peds Cross: West Peds: 0 West Entering: 260 West Leg Total: 790	
	ments



Total Count Diagram

	400001 7 & 6th Line	Weather conditions: Person(s) who counted:
** Non-Signalized I	ntersection **	Major Road: Hwy 7 runs W/E
North Leg Total: 35 North Entering: 17 North Peds: 0 Peds Cross: ⊠ Heavys Trucks Cars Tota		
33 11 1330 1374	Hwy 7	$N = E = \begin{bmatrix} 3 & 0 & 1 \\ 1320 & 11 & 29 \\ 1323 & 11 & 30 \end{bmatrix} = \begin{bmatrix} 4 \\ 1360 \\ 1360 \end{bmatrix}$
Heavys Trucks Cars Total 4 0 10 14 35 14 1371 1420 39 14 1381		Hwy 7 S Cars Trucks Heavys Totals 1373 14 36 1423
Peds Cross:XWest Peds:0West Entering:1434West Leg Total:2808		
		Comments



Accu-Traffic Inc. Traffic Count Summary

				Tran		ount 5							
Intersection:	Hwy 7 &	6th Line	Э		Count D	^{Date:} 14-Feb-12	2	Munic	^{ipality:} Era	amosa			
	North	n Appro	ach Tot	als					Sout	h Appro	ach Tot	als	
Hour Ending	Left	Thru	rucks, & H Right	eavys Grand Total	Total Peds	North/South Total Approaches	Hou Endir		Left	Thru	rucks, & H	eavys Grand Total	Total Peds
7:00:00 8:00:00 9:00:00 16:00:00 17:00:00	0 0 0 0 1	0 0 0 0	0 4 4 0 4	0 4 4 0 5	0 0 0 0	0 4 4 0 5	7:00 8:00 9:00 16:00 17:00	:00 :00 :00 :00 :00	0 0 0 0	0 0 0 0	0 0 0 0 0	0 0 0 0	0 0 0 0
18:00:00	2	0	2	4	0	4	18:00	:00	0	0	0	0	0
Totals:	3 East	0 Approa	14 ach Tota	17 als	0	17			0 Wes t	0 t Appro a	0 ach Tota	0 als	0
	Include	es Cars, Ti	rucks, & H	eavys	Tatal	East/West			Include	es Cars, Ti	rucks, & H	eavys	Takal
Hour Ending	Left	Thru	Right	Grand Total	Total Peds	Total Approaches	Hou Endir	r ng	Left	Thru	Right	Grand Total	Total Peds
7:00:00 8:00:00 9:00:00 16:00:00 17:00:00 18:00:00	0 0 0 0 0	0 181 186 1 476 515	0 1 0 2 1	0 182 186 1 478 516	0 0 0 0 0	2 694 602 4 732 763	8:00 9:00 16:00	:00 :00 :00 :00	0 3 2 1 3 5	2 509 414 251 242	0 0 0 0 0	2 512 416 3 254 247	0 0 0 0 0
Totals:	0	1359				2797 or Traffic Cr	ossing	-	-		0	1434	0
Hours En Crossing		7:00 0	8:00 0	9:00 0	16:00 0		-	-	18:00 2	18:00 2	18:00 2		



	F	Passeng	jer Cars -	North Ap	proach			Tru	cks - Nort	n Appro	ach			Heav	vys - Nort	h Approa	ach		Pedes	strians
Interval	Left	t	Th	ru	Rig	ht	Le	ft	Thr	u	Rigl	ht	Lei	ft	Th	ru	Rig	ht	North	Cross
Time	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:15:00	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:30:00	0	0	0	0	1	0	0	0		0	0	0	0	0	0	0	0	0	0	
7:45:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	
8:00:00	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	2	1	0	
8:15:00	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	3	1	0	
8:30:00	0	0	0	0	5	2	0	0	0	0	0	0	0	0	0	0	3	0	0	
8:45:00	0	0	0	0	5	0	0	0		0	0	0	0	0	0	0	3	0	0	
9:00:00	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	3	0	0	
9:00:09	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	3	0	0	
15:45:00	0	0	0	0	5	0	0	0		0	0	0	0	0	0	0	3	0	0	
16:00:00 16:15:00	0	0	0	0	5 5	0	0	0	0	0	0	0	0	0	0	0	3	1	0	
16:30:00	0	0	0	0	5 6	1	0	0	0	0	0	0	1	0	0	0	4	0	0	
16:45:00	0	0	0	0	7	1	0	0	0	0	0	0	1	0	0	0	4	0	0	
17:00:00	0	0	0	0	8	1	0	0	0	0	0	0	1	0	0	0	4	0	0	
17:15:00	0	0	0	0	10	2	0	0	0	0	0	0	1	0	0	0	4	0	0	
17:30:00	0	0	0	0	10	0	0	0	0	0	0	0	1	0	0	0	4	0	0	
17:45:00	1	1	0	0	10	0	0	0	-	0	0	0	1	0	0	0	4	0	0	
18:00:00	2	1	0	0	10	0	0	0		0	0	0	1	0	0	0	4	0	0	
18:15:00	2	0	0	0	10	0	0	0		0	0	0	1	0	0	0	4	0	0	
18:15:26	2	0	0	0	10	0	0	0		0	0	0	1	0	0	0	4	0	0	



		Passer	nger Cars -	East Ap	proach			Tru	icks - Eas	st Approa	ach			Hea	avys - Eas	st Approa	ch		Pedes	trians
Interval	Le	ft	Thr	u	Rig	ht	Le	ft	Th	ru	Rig	ht	Le	ft	Th	ru	Rig	Jht	East C	Cross
Time	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	C	0	0	0	0	0	0	0	0	0	C	0 0	0	0	0	0	0	0	0
7:15:00	0	0		28	0	0	0	0	0	0	-	C		0		1	0	0	0	0
7:30:00	0	0		40	0	0	0	0	1	1	0	C		0			0	0	0	0
7:45:00	0	0		52	0	0	0	0	3	2	_	C		0			1	1	0	0
8:00:00	0	0	-	50	0	0	0	0		0	-	0		0			1	0	0	0
8:15:00	0	0		39	0	0	0	0		0	-	0	-	0		3	1	0	0	0
8:30:00 8:45:00	0	0		48 42	0	0	0	0	4 5	1	0	0	-	0		2	1 1	0	0	0
9:00:00	0	0		42	0	0	0	0		0	-	C C		0			1	0	0	0
9:00:00	0	0		40	0	0	0	0	5	0		C	-	0			1	0	0	0
15:45:00	0	0		0	0	0	0	0	5	0	-	0	-	0			1	0	0	0
16:00:00	0	0		1	0	0	0	0	5	0		0		0			1	0	0	0
16:15:00	0	0		124	0	0	0	0		0	-	0		0				0	0	0
16:30:00	0	0		107	1	1	0	0	6	1	0	C		0		3	1	0	0	0
16:45:00	0	C		113	2	1	0	0	7	1	0	C	-	0		4	1	0	0	0
17:00:00	0	C		117	2	0	0	0	8	1	0	C	0 0	0		2	1	0	0	0
17:15:00	0	C		127	3	1	0	0	9	1	0	C	0 0	0		0	1	0	0	0
17:30:00	0	C	1083	147	3	0	0	0	11	2	0	C	0 0	0	27	0	1	0	0	0
17:45:00	0	0		130	3	0	0	0		0	-	C		0		0	1	0	0	0
18:00:00	0	C		106	3	0	0	0		0	_	C	-	0			1	0	0	0
18:15:00	0	0		1	3	0	0	0		0		C		0			1	0	0	0
18:15:26	0	C	1320	0	3	0	0	0	11	0	0	C	0 0	0	29	0	1	0	0	0



Accu-Traffic Inc.

Interval	Passenger Cars - South Approach						Trucks - South Approach							nea	vys - Sout		aon		Pedes	linans
Interval	Le	ft	Thi	ru	Rig	ht	Let	ft	Th	ru	Rig	ht	Lef	it	Th	ru	Rig	lht	South	Cross
Time	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:30:00	0	0	0	0	0	0	_	0	-	0		0	0	0		0	0	0	0	
7:45:00	0	0	0	0	0	0		0		0	0	0	0	0	0	0	0	0	0	
8:00:00	0	0	0	0	0	0		0		0	0	0	0	0	0	0	0	0	0	
8:15:00	0	0	0	0	0	0	-	0	-	0	0	0	0	0	0	0	0	0	0	
8:30:00	0	0	0	0	0	0	-	0	-	0	0	0	0	0	0	0	0	0	0	
8:45:00	0	0	0	0	0	0		0		0	0	0	0	0	0	0	0	0	0	
9:00:00	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	
9:00:09	0	0	0	0	0	0	-	0	-	0	0	0	0	0	0	0	0	0	0	
15:45:00	0	0	0	0	0	0	_	0		0	0	0	0	0		0	0	0	0	
16:00:00	0	0	0	0	0	0		0		0	0	0	0	0	0	0	0	0	0	
16:15:00	0	0	0	0	0	0		0		0	0	0	0	0	0	0	0	0	0	
16:30:00	0	0	0	0	0	0	-	0	-	0	0	0	0	0	0	0	0	0	0	
16:45:00	0	0	0	0	0	0	-	0		0	0	0	0	0	0	0	0	0	0	
17:00:00	0	0	0	0	0	0		0		0	0	0	0	0	0	0	0	0	0	
17:15:00	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	
17:30:00	0	0	0	0	0	0	-	0		0		0	0	0	0	0	0	0	0	
17:45:00	0	0	0	0	0	0		0		0	0	0	0	0	0	0	0	0	0	
18:00:00	0	0	0	0	0	0	_	0		0	0	0	0	0	0	0	0	0	0	
18:15:00	0	0	0	0	0	0	_	0	-	0		0	0	0	0	0	0	0	0	
18:15:26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	



Accu-Traffic Inc.

	Passenger Cars - West Approach							Tru	icks - We	st Approa	ach			Hear	vys - Wes	st Approa	ich		Pedest	trians
Interval	Let	ft	Thi	ru	Rig	lht	Le	ft	Th	ru	Riç	jht	Le	ft	Th	ru	Rig	ht	West 0	Cross
Time	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	2	2	0	0	0	0	0	0	0	C	0 0	0	0	0	0	0	0	0
7:15:00	0	0	121	119	0	0	0	0	2	2	0	0	0 0	0	2	2	0	0	0	0
7:30:00	0	0	231	110	0	0	0	0	3	1	0	(0 0	0	4	2	0	0	0	0
7:45:00	0	0	371	140	0	0		0		1	0	0	-	0	6	2	0	0	0	0
8:00:00	2	2	494	123	0	0		0		3	_	0		1	10	4	0	0	0	0
8:15:00	3	1	602	108	0	0		0		4	-	(1	11	1	0	0	0	0
8:30:00	3	0	697	95	0	0	-	0		0	-	(0	13	2	0	0	0	0
8:45:00	3	0	785	88	0	0		0		0	-	(0	17	4	0	0	0	0
9:00:00	3	0	894	109	0	0	-	0		1	0	(0	19	2	0	0	0	0
9:00:09	3	0	895	1	0	0		0		0	-	(0	19	0	0	0	0	0
15:45:00	3	0	895	0	0	0		0		0	-	(0	19	0	0	0	0	0
16:00:00	3	0	896	1	0	0		0		0	-	(1	19	0	0	0	0	0
16:15:00	3	0	944	48	0	0		0		0	_	0		1	22	3	0	0	0	0
16:30:00	4	1	1008	64	0	0		0		0		(0	25	3	0	0	0	0
16:45:00	4	0	1066	58	0	0	-	0		1	0	(0	28	3	0	0	0	0
17:00:00 17:15:00	5	1	1132 1189	66 57	0	0		0		1	0	(0 0	32 32	4	0	0	0	0
17:15:00	10	2	1250	57 61	0	0	-	0		0	-	(0	32	0	0	0	0	0
17:45:00	10	0	1250	64	0	0		0		0	-	(0	32	1	0	0	0	0 0
17:45:00	10	0	1314	64 57	0	0		0		0		(0	35	2	0	0	0	0
18:15:00	10	0	1371	0	0	0	_	0		0	_	(0	35	2	0	0	0	0
18:15:26	10	0	1371	0	0	0		0		0	-	(0	35	0	0	0	0	0
10.15.20	10	0	13/1	0	0	0	0	0	14	0	0	(4	0		0	0	0	0	0

APPENDIX B Existing Traffic

	٦	+	+	×	1	~	
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		ર્સ	¢Î,		¥		
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	0.0	В				
Approach Delay (s)	0.1	0.0	11.0				
Approach LOS	5	0.0	B				
Intersection Summary							
Average Delay			0.2				
Intersection Capacity Ut	ilizatior	<u>ו</u>	51.9%	10	CU Leve	el of Service	
Analysis Period (min)		-	15			0.001100	
			10				

	-	\rightarrow	∢	-	1	1			
Movement	EBT	EBR	WBL	WBT	NBL	NBR			
Lane Configurations	4Î			ę	Y				
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	0.0	A	C						
Approach Delay (s)	0.0	0.2	15.8						
Approach LOS			С						
Intersection Summary									
Average Delay			0.2						
Intersection Capacity Ut	ilizatior	1	47.5%](CU Leve	el of Servic)	А	
Analysis Period (min)			15						
			-						

Movement WBL WBR NBT NBR SBL SBT Lane Configurations Y Pree Free Free Grade 0%		4	•	1	1	1	Ļ		
Sign Control Stop Free Free Grade 0% <th>Movement</th> <th>WBL</th> <th>WBR</th> <th>NBT</th> <th>NBR</th> <th>SBL</th> <th>SBT</th> <th></th> <th></th>	Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Sign Control Stop Free Free Grade 0% 0% 0% Volume (veh/h) 0 0 6 0 0 Peak Hour Factor 0.65 0.65 0.65 0.65 0.65 Hourly flow rate (vph) 0 0 9 0 0 8 Peak Hour Factor 0.65 0.65 0.65 0.65 0.65 Hourly flow rate (vph) 0 0 9 0 0 8 Pedestrians Walking Speed (m/s) Percent Blockage Right turn flare (veh) Median type None Wedian type None 9 <td>Lane Configurations</td> <td>¥</td> <td></td> <td>ĥ</td> <td></td> <td></td> <td>થ</td> <td></td> <td></td>	Lane Configurations	¥		ĥ			થ		
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 Hourly flow rate (vph) 0 0 9 0 0 8 Pedestrians Lane Width (m) Valking Speed (m/s) Valking Speed (m/s) Valking Speed (m/s) Valking Speed (m/s) Percent Blockage Right turn flare (veh) Valking Speed (m/s) Valking Speed (m/s) Valking Speed (m/s) Median storage veh) Upstream Signal (m) VS. conflicting volume Valking Speed (m/s) Valking Speed (m/s) pX, platoon unblocked VC. unblocked vol 17 9 9 Valking Speed (m/s) VC1, stage 1 conf vol VC2, stage 2 conf vol Valking Speed (m/s) S 3.3 2.2 Vp oue free % 100 100 100 100 100 2.2 Valume Total 0 9 8 Valume S Valume S Valume S Valume S Valume S Valum	-	Stop							
Peak Hour Factor 0.65 0.65 0.65 0.65 0.65 Hourly flow rate (vph) 0 0 9 0 0 8 Pedestrians				0%			0%		
Hourly flow rate (vph) 0 0 9 0 0 8 Pedestrians	Volume (veh/h)	0	0	6	0	0	5		
Pedestrians Lane Width (m) Walking Speed (m/s) Percent Blockage Right turn flare (veh) Median type None Median type aignal (m) pX, platoon unblocked vC, conflicting volume vC, conflicting volume vC, stage 1 conf vol vC1, stage 1 conf vol vC2, stage 2 conf vol vC1, stage 1 conf vol vC2, stage 2 conf vol vC1, stage 1 conf vol vC2, stage 2 conf vol vC1, stage 1 conf vol vC1, stage 1 conf vol vC2, stage 2 conf vol vC1, stage 1 conf vol vC2, stage 2 conf vol vC2, stage 2 conf vol vC1, stage 1 conf vol vOume Total 0 volume Right 0	Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65		
Lane Width (m) Walking Speed (m/s) Percent Blockage Right turn flare (veh) Median storage veh) Upstream signal (m) pX, platoon unblocked vC, conflicting volume 17 vC, stage 1 conf vol vCL, stage 2 conf vol vCL, stage 2 conf vol vCL, stage 2 conf vol vCL, stage 1 conf vol vCL, stage 2 conf vol vCL, stage 3 ft (s) 6.4 rt (s) 3.5 p0 queue free % 100 p0 queue free % 100 ibrection, Lane # WB 1 VB 1 SB 1 Volume Total 0 0 0 Volume Right 0 0 0 Volume Right 0 0 0 Volume Cospacity 0.0 Control Delay (s) 0.0 0 0 Volume Left 0 0 0 Volume Kight 0 0 0.0 Control Delay	Hourly flow rate (vph)	0	0	9	0	0	8		
Walking Speed (m/s) Percent Blockage Right turn flare (veh) Median storage veh) Upstream signal (m) pX, platoon unblocked vC, conflicting volume 17 9 vC1, stage 1 conf vol vC2, stage 2 conf vol vC4, stage 1 conf vol vC2, stage 2 conf vol vC4, stage 1 conf vol vC2, stage 2 conf vol vC4, unblocked vol vC4, stage 1 conf vol vC4, stage 1 conf vol vC4, stage 1 conf vol vC4, stage 2 conf vol vC4, unblocked vol vC4, stage (s) tF (s) 3.5 90 queue free % 100 p10 queue free % 100 cm capacity (veh/h) 1001 tG72 1611 Direction, Lane # WB 1 SB 1 Volume Total 0 9 Volume Right 0 0 Volume Right 0 0 Volume Loft 0 0.0 Volume Right 0.0 0.0 Queue Length 95th (m) 0.0 0.0 <td>Pedestrians</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Pedestrians								
Percent Biockage Right turn flare (veh) Median type None Median type None Median storage veh) Upstream signal (m) pX, platoon unblocked vC, conflicting volume vC, conflicting volume 17 9 9 vCl, stage 1 conf vol vC, conflicting volume 17 9 9 vCL, stage 2 conf vol vCu, unblocked vol 17 9 9 vCL, stage 2 conf vol vCu, unblocked vol 17 9 9 vCL, stage 2 conf vol vCu, unblocked vol 17 9 9 vCL, stage 2 conf vol vCu, unblocked vol 17 9 9 vCL, stage 2 conf vol vC, stage 2 conf vol vCu, unblocked vol 17 9 9 vCL, stage (s) if (s) 6.2 4.1 tC, stage (s) if (s) 4.1 tC, Stage (s) if (s) 3.5 3.3 2.2 p0 pouloe free % 100 100 100 100 100 100 100 100 100 100 100 100 10 100	Lane Width (m)								
Right turn flare (veh) Median type None Median storage veh) Velocation unblocked Velocation unblocked pX, platoon unblocked VC, conflicting volume 17 9 9 vC1, stage 1 conf vol VC2, stage 2 conf vol Velocation unblocked vol 17 9 9 vC2, stage 2 conf vol Velocation unblocked vol 17 9 9 9 vC2, stage 2 conf vol Velocation unblocked vol 17 9 9 9 vC2, stage 2 conf vol Velocation unblocked vol 17 9 9 9 vC2, stage 2 conf vol Velocation unblocked vol 17 9 9 9 vC1, stage 1 conf vol 0 17 9 9 9 vC2, stage 2 conf vol Velocation unblocked vol 17 9 9 vC1, stage 2 conf vol 0 100 100 100 vC2, stage 2 conf vol Velocation unblocked vol 100 100 100 vC3 stage 2 conf vol 0 100 100 100 100 veloue free % 100 100 100 <td>Walking Speed (m/s)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Walking Speed (m/s)								
Median storage veh) None Upstream signal (m)	Percent Blockage								
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 vC4, unblocked vol 17 9 9 vC2, stage 2 conf vol vC4, unblocked vol 17 9 9 9 vC4, stage 1 conf vol vC4, unblocked vol 17 9 9 9 tC, single (s) 6.4 6.2 4.1 10 10 100 tC, stage (s) tF (s) 3.5 3.3 2.2 p0 queue free % 100 100 100 cM capacity (veh/h) 1001 1072 1611 100 100 100 Direction, Lane # WB 1 NB 1 SB 1 100 <	Right turn flare (veh)								
Upstream signal (m) pX, platoon unblocked vC, conflicting volume 17 9 9 vC1, stage 1 conf vol vC2, stage 2 conf vol vC2, stage 2 conf vol vCu, unblocked vol 17 9 9 tC, single (s) 6.4 6.2 4.1 tC, single (s) 6.4 6.2 4.1 tC, single (s) 6.4 6.2 4.1 tC, stage (s) T 9 9 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 cSH 1700 1611 Volume Capacity 0.0 Queue Length 95th (m) 0.0 0.0 0.0 0.0 Queue Length 95th (m) 0.0 0.0 0.0 0.0 Lane LOS A A A A Approach LOS A	Median type	None							
pX, platoon unblocked vC, conflicting volume 17 9 9 vC1, stage 1 conf vol vC2, stage 2 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) tr 100 100 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 Right 0 0 0 Volume Right 0 0 0 Volume to Capacity 0.00 0.0 0.0 Control Delay (s) 0.0 0.0 0.0 Control Delay (s) 0.0 0.0 0.0 Lane LOS A Approach LOS A Approach LOS A A Approach LOS A Intersection Capacity Utilization 6.7% ICU Level of Service A </td <td>Median storage veh)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Median storage veh)								
vC, conflicting volume 17 9 9 vC1, stage 1 conf vol vC2, stage 2 conf vol vC4, unblocked vol 17 9 9 vCu, unblocked vol 17 9 9 9 0 0 0 tC, single (s) 6.4 6.2 4.1 0 10 100 100 0	Upstream signal (m)								
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) t t t tF (s) 3.5 3.3 2.2 p0 queue free % 100 100 cM capacity (veh/h) 1001 1072 1611 1611 1611 1611 Direction, Lane # WB 1 NB 1 SB 1 Volume Total 0 9 8 Volume Total 0 9 8 1611 1611 1700 1611 Volume Left 0 0 0 0 0 0 1611 Volume Right 0 0 0 0 0 1700 1611 Volume to Capacity 0.00 0.01 0.00 0.0 0.0 1611 1700 1611 1700 1611 1700 1611 1700 1611 1700 1611 1700 1611 1700 1611 1700 1611 1700 1611 1700 1611 1700 <td>pX, platoon unblocked</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	pX, platoon unblocked								
vC2, stage 2 conf vol vCu, unblocked vol 17 9 9 tC, single (s) 6.4 6.2 4.1 tC, 2 stage (s) ref 7 9 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 Volume to Capacity 0.00 0.01 0.00 Queue Length 95th (m) 0.0 0.0 0.0 Lane LOS A Approach Delay (s) 0.0 0.0 Approach LOS A Approach LOS A Average Delay 0.0 0.0 0.0 Intersection Capacity Utilization 6.7% ICU Level of Service A	vC, conflicting volume	17	9			9			
vCu, unblocked vol 17 9 9 tC, single (s) 6.4 6.2 4.1 tC, 2 stage (s) t 100 100 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 Right 0 0 0 vSH 1700 1611 1611 Volume to Capacity 0.0 0 0 Queue Length 95th (m) 0.0 0.0 0 Queue Length 95th (m) 0.0 0.0 0.0 Lane LOS A A Approach Delay (s) 0.0 0.0 Approach LOS A A A A A Intersection Summary 0.0 0.0 0.0 A Intersection Capacity Utilization 6.7% ICU Level of Service A	vC1, stage 1 conf vol								
tC, single (s) 6.4 6.2 4.1 tC, 2 stage (s)	vC2, stage 2 conf vol								
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 Volume to Capacity 0.00 0.01 0.00 Queue Length 95th (m) 0.0 0.0 0.0 Queue Length 95th (m) 0.0 0.0 0.0 Lane LOS A Approach Delay (s) 0.0 0.0 Approach LOS A Approach LOS A Average Delay 0.0 0.0 ICU Level of Service A	vCu, unblocked vol	17	9			9			
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 Volume to Capacity 0.00 0.01 0.00 Queue Length 95th (m) 0.0 0.0 0.0 Queue Length 95th (m) 0.0 0.0 0.0 Lane LOS A Approach Delay (s) 0.0 0.0 Approach LOS A A Approach LOS A Intersection Summary 0.0 0.0 ICU Level of Service A	tC, single (s)	6.4	6.2			4.1			
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 1611 Volume to Capacity 0.00 0.0 Queue Length 95th (m) 0.0 0.0 Queue Length 95th (m) 0.0 0.0 Lane LOS A Approach Delay (s) 0.0 0.0 Approach LOS A Intersection Summary 0.0 Average Delay 0.0 Intersection Capacity Utilization 6.7%	tC, 2 stage (s)								
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 Approach LOS A Approach LOS A A Average Delay 0.0 0.0 10.0 10.0 Intersection Capacity Utilization 6.7% ICU Level of Service A	tF (s)	3.5	3.3			2.2			
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 1611 0 Volume to Capacity 0.00 0.00 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 Approach LOS A Approach LOS A Approach LOS A Average Delay 0.0 0.0 0.0 0.0 0.0	p0 queue free %	100	100			100			
Volume Total 0 9 8 Volume Left 0 0 0 Volume Right 0 0 0 CSH 1700 1611 Volume to Capacity 0.00 0.01 Queue Length 95th (m) 0.0 0.0 Control Delay (s) 0.0 0.0 Lane LOS A Approach Delay (s) 0.0 0.0 Intersection Summary 0.0 Average Delay 0.0 Intersection Capacity Utilization 6.7%	cM capacity (veh/h)	1001	1072			1611			
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 Approach LOS A A Approach LOS A Intersection Summary 0.0 0.0 ICU Level of Service A	Direction, Lane #	WB 1	NB 1	SB 1					
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 Approach LOS A A Approach LOS A Intersection Summary 0.0 0.0 ICU Level of Service A	Volume Total	0	9	8					
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	Volume Left	0	0	0					
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	Volume Right	0	0	0					
Queue Length 95th (m) 0.0 0.0 0.0 Control Delay (s) 0.0 0.0 0.0 Lane LOS A A Approach Delay (s) 0.0 0.0 0.0 Approach LOS A A Intersection Summary 0.0 0.0 Average Delay 0.0 0.0 Intersection Capacity Utilization 6.7% ICU Level of Service A		1700	1700						
Control Delay (s) 0.0 0.0 0.0 Lane LOS A A Approach Delay (s) 0.0 0.0 Approach LOS A Intersection Summary 0.0 Average Delay 0.0 Intersection Capacity Utilization 6.7% ICU Level of Service	Volume to Capacity	0.00	0.01	0.00					
Control Delay (s) 0.0 0.0 0.0 Lane LOS A A Approach Delay (s) 0.0 0.0 Approach LOS A Intersection Summary 0.0 Average Delay 0.0 Intersection Capacity Utilization 6.7% ICU Level of Service	Queue Length 95th (m)	0.0	0.0	0.0					
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			0.0	0.0					
Approach LOS A Intersection Summary Average Delay 0.0 Intersection Capacity Utilization 6.7% ICU Level of Service		А							
Intersection Summary Average Delay 0.0 Intersection Capacity Utilization 6.7% ICU Level of Service A	Approach Delay (s)	0.0	0.0	0.0					
Average Delay 0.0 Intersection Capacity Utilization 6.7% ICU Level of Service A	Approach LOS	Α							
Intersection Capacity Utilization 6.7% ICU Level of Service A	Intersection Summary							 	
	Average Delay			0.0					
	Intersection Capacity U	tilization	n	6.7%	10	CU Leve	el of Service	А	
				15					

	≯	-	+	•	1	1		
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations		ę	ĥ		- M			
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		С					
Approach Delay (s)	0.2	0.0	16.3					
Approach LOS			С					
Intersection Summary								
Average Delay			0.2					
Intersection Capacity Ut	ilizatior	1	50.4%](CU Leve	el of Servio	e	А
Analysis Period (min)			15					
			-					

	-	\mathbf{r}	<	+	1	1		
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	4			با	Y			
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		А	С					
Approach Delay (s)	0.0	0.1	18.2					
Approach LOS			С					
Intersection Summary								
Average Delay			0.6					
Intersection Capacity Ut	ilizatior	۱	54.0%](CU Leve	el of Servi	ice	;
Analysis Period (min)			15					
· · · · · · · · · · · · · · · · · · ·								

	4	•	Ť	۲	1	Ļ
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	¥		ĥ			ę
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	Α					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	А					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Ut	tilization	1	6.7%	IC	CU Leve	el of Servi
Analysis Period (min)			15			

APPENDIX C Erin Gravel Pit Truck Trip Generation

TOTAL	158	62	145	114	123	71	100	96	122	22	162	119	162	174	122	170	94	128	152	131	135	159	105	2826	100%	
6PM																										
5PM																-								-	0.0%	
4PM	N	-	N	0	-	-	0	N	0	0	-	-	5	0	0	4	9	8	-	7	7	N	-	58	2.1%	
3PM	16	9	13	10	12	-	10	ო	8	0	18	13	17	19	15	16	5	12	б	12	1	20	8	254	9.0%	
2PM	ω	6	21	6	16	ъ	10	ъ	1	0	17	10	14	15	12	19	=	12	14	12	14	ი	7	260	9.2%	
1PM	19	ъ	15	11	11	ъ	8	10	8	0	13	16	16	19	=	17	2	21	10	1	12	18	=	272	9.6%	
12PM	15	7	18	16	21	7	12	11	16	0	21	14	15	18	18	22	15	10	20	17	13	15	10	331	11.7%	
11AM																								219	7.7%	
10AM	19	5	15	12	15	5	16	13	19	N	20	23	21	1	10	21	10	7	23	14	14	21	=	327	11.6%	bur
9AM	1	5	15	16	6	6	7	17	12	4	16	ω	12	17	14	12	6	б	13	1	13	12	10	261	9.2%	ed in one ho
8AM	19	7	11	12	11	12	12	7	13	S	23	10	18	23	16	21	=	14	19	18	12	19	16	328	11.6%	23 Trucks Shipped in one hour 0.814%
7AM	20	4	13	1	80	13	12	14	14	0	7	8	13	15	13	12	6	1	11	6	1	1	£	246	8.7%	23 Tr 23/2826
6AM	13	6	11	6	11	8	9	5	12	9	12	10	16	20	11	12	6	8	18	12	15	15	15	263	9.3%	
DATE	02-Aug	03-Aug	04-Aug	05-Aug	08-Aug	09-Aug	10-Aug	11-Aug	12-Aug	13-Aug	15-Aug	16-Aug	17-Aug	18-Aug	19-Aug	22-Aug	23-Aug	24-Aug	25-Aug	26-Aug	29-Aug	30-Aug	31-Aug	TOTAL	%	Busiest Hour % of Monthly Shipping

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

Total Monthly Tonnage Percentage for Erin Pit 2011

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

APPENDIX D Existing Plus Site Related Traffic

	≯	+	Ļ	×	1	~		
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations		ę	ĥ		Y			
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 Ut	ilizatior	1 I	52.7%	IC	CU Leve	el of Servio	e /	A
Analysis Period (min)			15					

	-	\rightarrow	4	+	1	1		
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	4Î			ę	W.			
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	С					
Approach Delay (s)	0.0	0.2	16.1					
Approach LOS			С					
Intersection Summary								
Average Delay			0.2					
Intersection Capacity Ut	ilization	1	48.2%	10	CULeve	el of Service	А	
Analysis Period (min)		•	15					
			10					

	4	•	1	۲	1	Ļ			
Movement	WBL	WBR	NBT	NBR	SBL	SBT			
Lane Configurations	¥		4Î			ę			
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	А								
Approach Delay (s)	9.7	0.0	0.0						
Approach LOS	А								
Intersection Summary									
Average Delay			3.4						
Intersection Capacity U	tilizatior	n –	13.3%	IC	CU Leve	el of Servic	e	А	
Analysis Period (min)			15						

	≯	+	Ļ	•	1	~	
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		÷٩	el el		Y		
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 Ut	ilizatior	۱	51.2%	10	CU Leve	el of Servi	ce A
Analysis Period (min)			15				

	-	\mathbf{r}	4	-	1	1	
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	4Î			ę	¥		
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)					<u> </u>		
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	С				
Approach Delay (s)	0.0	0.1	18.6				
Approach LOS			С				
Intersection Summary							
Average Delay			0.6				
Intersection Capacity Ut	ilizatior	۱	54.7%	IC	CU Leve	el of Servio	e
Analysis Period (min)			15				
- , , ,							

	1	•	1	1	1	Ļ		
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	¥		ĥ			<u>स</u>		
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)		0.02	0.00					
Control Delay (s)	9.7	0.0	0.0					
Lane LOS	A	0.0	0.0					
Approach Delay (s)	9.7	0.0	0.0					
Approach LOS	A	0.0	0.0					
Intersection Summary								
Average Delay			3.4					
	tilization			14		of Sonvice	٨	
Intersection Capacity U	unzauor		13.3%	I.		el of Service	A	
Analysis Period (min)			15					

APPENDIX E Future (2018) Total Traffic

MovementEBLEBTWBTWBRSBLSBRLane ConfigurationsImage: Control freeFreeImage: Control freeImage: Control freeStopGrade0%0%0%0%	
Sign Control Free Free Stop	
Sign Control Free Free Stop	
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	

	-	\rightarrow	•	-	1	1			
Movement	EBT	EBR	WBL	WBT	NBL	NBR			
Lane Configurations	¢Î			ų	Y				
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		А	С						
Approach Delay (s)	0.0	0.2	18.2						
Approach LOS			С						
Intersection Summary									
Average Delay			0.3						
Intersection Capacity Ut	ilizatior	1	53.1%	10	CU Leve	el of Serv	се	А	
Analysis Period (min)			15						
			-						

	4	•	1	1	1	ţ			
Movement	WBL	WBR	NBT	NBR	SBL	SBT			
Lane Configurations	Y		eî.			ŧ			
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)		0.0	0.0						
Control Delay (s)	9.7	0.0	0.0						
Lane LOS	Α								
Approach Delay (s)	9.7	0.0	0.0						
Approach LOS	А								
Intersection Summary									
Average Delay			3.2						
Intersection Capacity U	tilizatior	1	13.3%	IC	CU Leve	el of Service	;	А	
Analysis Period (min)			15						

Movement EBL EBT WBT WBR SBL SBR Lane Configurations Image: state st
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 0.60 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) None Median type None None None 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 5 5 tF (s) 2.3 4.3 3.5 5 9 80 98 cM capacity (veh/h) 718 110 314 314 314
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 0.60 0.60 Hourly flow rate (vph) 9 433 874 14 22 7 Pedestrians Lane Width (m) Walking Speed (m/s) Volume (veh) None Volume (veh) Percent Blockage Right turn flare (veh) None Volume (veh) None Median storage veh) Upstream signal (m) None VC, conflicting volume 888 1332 881 VC1, stage 1 conf vol VC2, stage 2 conf vol VC2, stage 2 conf vol VC2, stage 2 conf vol VC2, stage (s) T tF (s) 2.3 4.3 3.5 90 98 98 cM capacity (veh/h) 718 110 314 314 314
Volume (veh/h)840381313134Peak Hour Factor 0.93 0.93 0.93 0.60 0.60 Hourly flow rate (vph)9433 874 14227Pedestrians
Peak Hour Factor 0.93 0.93 0.93 0.93 0.60 Hourly flow rate (vph) 9 433 874 14 22 7 Pedestrians
Hourly flow rate (vph) 9 433 874 14 22 7 Pedestrians Lane Width (m) Walking Speed (m/s) Fercent Blockage Fercent Blockage Fercent Blockage Right turn flare (veh) Median type None None Median storage veh) Upstream signal (m) Fercent Blockage Fercent Blockage VC, conflicting volume 888 1332 881 vC1, stage 1 conf vol VC2, stage 2 conf vol VC4. Fercent Blockage vC2, stage 2 conf vol VC4. 7.3 6.5 tC, single (s) 4.2 7.3 6.5 tF (s) 2.3 4.3 3.5 p0 queue free % 99 80 98 cM capacity (veh/h) 718 110 314
PedestriansLane Width (m)Walking Speed (m/s)Percent BlockageRight turn flare (veh)Median typeNoneMedian storage veh)Upstream signal (m)pX, platoon unblockedvC, conflicting volume8881332881vC1, stage 1 conf volvC2, stage 2 conf volvC4, unblocked vol8881332881tC, single (s)4.2r, 2 stage (s)tF (s)2.3et f (s)2.3et f (s)998098cM capacity (veh/h)718110314
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 vC2, stage 2 conf vol vC4, 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
Walking Speed (m/s)Percent BlockageRight turn flare (veh)Median typeNoneMedian storage veh)Upstream signal (m)pX, platoon unblockedvC, conflicting volume8881332881vC1, stage 1 conf volvC2, stage 2 conf volvCu, unblocked vol8881332881tC, single (s)4.2r, stage (s)tF (s)2.3p0 queue free %998098cM capacity (veh/h)718110314
Percent BlockageRight turn flare (veh)Median typeNoneMedian storage veh)Upstream signal (m)pX, platoon unblockedvC, conflicting volume8881332881vC1, stage 1 conf volvC2, stage 2 conf volvCu, unblocked vol8881332881tC, single (s)4.2r, stage (s)tF (s)2.3p0 queue free %998098cM capacity (veh/h)718t110314
Right turn flare (veh)NoneMedian typeNoneMedian storage veh)Upstream signal (m)pX, platoon unblockedVC, conflicting volumevC, conflicting volume8881332881vC1, stage 1 conf volVC, stage 2 conf volvC2, stage 2 conf volVCu, unblocked volvCu, unblocked vol8881332881tC, single (s)4.27.36.5tC, 2 stage (s)VCUtF (s)2.3tF (s)998098cM capacity (veh/h)718110314
Median typeNoneMedian storage veh)Upstream signal (m)pX, platoon unblocked732vC, conflicting volume8881332881vC1, stage 1 conf volvC2, stage 2 conf volvCu, unblocked vol8881332881tC, single (s)4.2tF (s)2.3tF (s)2.3p0 queue free %998098cM capacity (veh/h)718110314
Median storage veh)Upstream signal (m)pX, platoon unblockedvC, conflicting volume8881332881vC1, stage 1 conf volvC2, stage 2 conf volvCu, unblocked vol8881332881tC, single (s)4.27.36.5tC, 2 stage (s)tF (s)2.34.33.5p0 queue free %998098cM capacity (veh/h)718
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) t t t tF (s) 2.3 4.3 3.5 p0 queue free % 99 80 98 cM capacity (veh/h) 718 110 314
pX, platoon unblocked vC, conflicting volume 888 1332 881 vC1, stage 1 conf vol vC2, stage 2 conf vol 700 700 vCu, unblocked vol 888 1332 881 tC, single (s) 4.2 7.3 6.5 tC, 2 stage (s) 700 700 700 tF (s) 2.3 4.3 3.5 p0 queue free % 99 80 98 cM capacity (veh/h) 718 110 314
vC, conflicting volume 888 1332 881 vC1, stage 1 conf vol
vC1, stage 1 conf vol vC2, stage 2 conf vol vCu, unblocked vol 888 1332 881 tC, single (s) 4.2 tF (s) 2.3 p0 queue free % 99 80 98 cM capacity (veh/h) 718
vC2, stage 2 conf vol vCu, unblocked vol 888 1332 881 tC, single (s) 4.2 7.3 6.5 tC, 2 stage (s) 7.3 3.5 tF (s) 2.3 4.3 3.5 p0 queue free % 99 80 98 cM capacity (veh/h) 718 110 314
vCu, unblocked vol 888 1332 881 tC, single (s) 4.2 7.3 6.5 tC, 2 stage (s) 5 5 tF (s) 2.3 4.3 3.5 p0 queue free % 99 80 98 cM capacity (veh/h) 718 110 314
tC, single (s) 4.2 7.3 6.5 tC, 2 stage (s)
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
tF (s)2.34.33.5p0 queue free %998098cM capacity (veh/h)718110314
p0 queue free % 99 80 98 cM capacity (veh/h) 718 110 314
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

	-	\rightarrow	-	-	1	1			
Movement	EBT	EBR	WBL	WBT	NBL	NBR			
Lane Configurations	4Î			र्भ	Y				
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	0.0	A	C						
Approach Delay (s)	0.0	0.2	22.0						
Approach LOS			С						
Intersection Summary									
Average Delay			0.7						
Intersection Capacity Ut	ilizatior	า	60.6%	10	CU Leve	el of Servio	e	В	
Analysis Period (min)			15						
· · · ·									

	4	•	1	1	1	Ļ			
Movement	WBL	WBR	NBT	NBR	SBL	SBT			
Lane Configurations	Y		eî.			÷Î			
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	А								
Approach Delay (s)	9.7	0.0	0.0						
Approach LOS	А								
Intersection Summary									
Average Delay			3.3						
Intersection Capacity Ut	tilization	l	13.3%	10	CU Leve	el of Servic	е	А	
Analysis Period (min)			15						
- , , ,									

APPENDIX F Future (2023) Total Traffic

	≯	+	+	•	1			
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations		÷٩	ĥ		- M			
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	А		E					
Approach Delay (s)	0.2	0.0	39.5					
Approach LOS			E					
Intersection Summary								
Average Delay			1.0					
Intersection Capacity Ut Analysis Period (min)	ilizatior	۱	63.7%	IC	CU Leve	el of Service	В	

	-	\rightarrow	•	-	1	1			
Movement	EBT	EBR	WBL	WBT	NBL	NBR			
Lane Configurations	4Î			ę	Y				
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		А	С						
Approach Delay (s)	0.0	0.2	20.7						
Approach LOS			С						
Intersection Summary									
Average Delay			0.3						
Intersection Capacity Ut	ilization	h	58.7%	10		el of Servio	0	В	
Analysis Period (min)	Izatio	-	15				<i>,</i> e	U	

	4	•	†	1	1	Ļ			
Movement	WBL	WBR	NBT	NBR	SBL	SBT			
Lane Configurations	Y		eî.			Ł			
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	А								
Approach Delay (s)	9.7	0.0	0.0						
Approach LOS	А								
Intersection Summary									
Average Delay			3.2						
Intersection Capacity U	tilization	1	13.3%	IC	CU Leve	el of Servic	e	А	
Analysis Period (min)			15						

	≯	+	+	•	1	4			
Movement	EBL	EBT	WBT	WBR	SBL	SBR			
Lane Configurations		ę	ĥ		Y				
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	0.0	64.1 F						
Approach Delay (s)	0.4	0.0	54.1						
Approach LOS	5.1	0.0	F						
Intersection Summary									
Average Delay			1.2						
Intersection Capacity Ut	ilizatior	า	62.1%	10	CU Leve	el of Servic	е	В	
Analysis Period (min)			15						
, (,			-						

	-	\rightarrow	-	-	1	1		
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	4Î			ર્શ	¥			
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		А	D					
Approach Delay (s)	0.0	0.2	27.2					
Approach LOS			D					
Intersection Summary								
Average Delay			0.8					
Intersection Capacity Ut	ilizatior	า	67.3%	IC	CU Leve	el of Servi	ce C	
Analysis Period (min)			15					

	4	*	1	1	1	ţ			
Movement	WBL	WBR	NBT	NBR	SBL	SBT			
Lane Configurations	Y		¢Î			Ł			
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	01	20			01				
vC2, stage 2 conf vol									
vCu, unblocked vol	34	26			37				
tC, single (s)	7.4	6.2			4.1				
tC, 2 stage (s)		0.2							
tF (s)	4.4	3.3			2.2				
p0 queue free %	97	100			100				
cM capacity (veh/h)	779	1050			1574				
,			05.4		1074				
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	Α								
Approach Delay (s)	9.8	0.0	0.0						
Approach LOS	A								
Intersection Summary									
Average Delay			3.2						
Intersection Capacity Ut	ilization	1	13.3%	IC	CU Leve	of Service	•	А	
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 (I)	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 P	HF, Growth Factors.
No data recorded this ir	nterval.

Interval #1 Information Recording

Start Time	7:30
End Time	8:30
Total Time (min)	60
Volumes adjusted by F	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 (I)	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

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)	

Nework Summary

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 (I)	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 P	HF, Growth Factors.	
No data recorded this i	nterval.	

Interval #1 Information Recording

Start Time	4:30
End Time	5:30
Total Time (min)	60
Volumes adjusted by I	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 (I)	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

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)	

Nework Summary

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

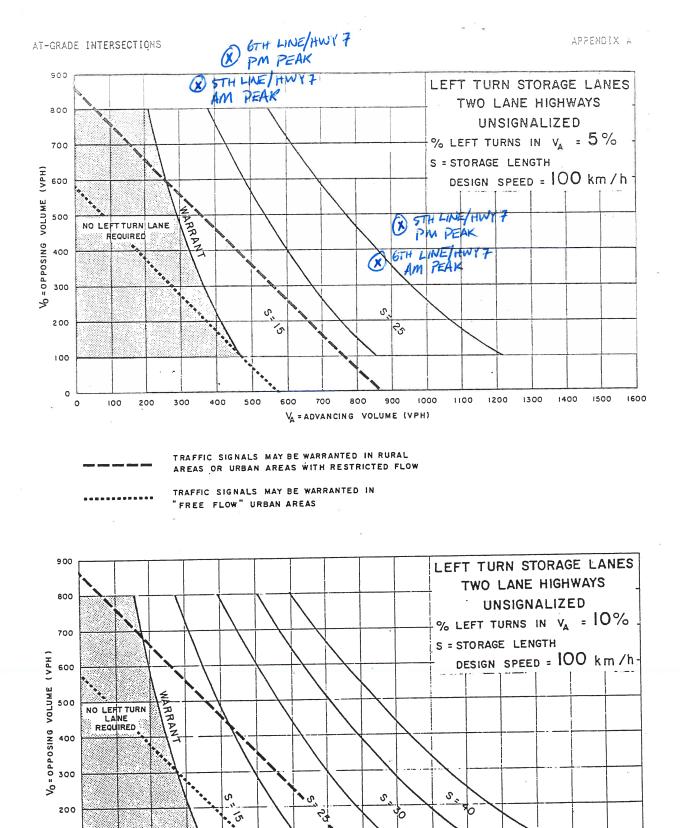


Figure EA-22

VA = ADVANCING VOLUME (VPH)

•••

APPENDIX I 2023 SimTraffic Analysis With Left Turn Lane Calculations HCM Unsignalized Intersection Capacity Analys Suture (2023) Total Traffic - with Left Turn lane 1: Highway 7 & 6th Line AM Peak

EBL	EBT							
100		WBT	WBR	SBL	SBR			
7	•	Þ		¥.				
	Free	Free		Stop				
	0%	0%		0%				
7	861	351	13	12	7			
0.87	0.87	0.87	0.87	0.65	0.65			
8	990	403	15	18	11			
				None				
418				1417	411			
418				1417	411			
4.5				7.4	6.9			
2.6				4.4	3.9			
99				80	98			
952				93	516			
EB 1	EB 2	WB 1	SB 1					
8	990	418	29					
8	0	0	18					
0	0	15	11					
952	1700	1700	133					
0.01	0.58	0.25	0.22					
0.2	0.0	0.0	6.1					
8.8	0.0	0.0	39.5					
А			Е					
0.1		0.0	39.5					
			Е					
		0.8						
zation		57.8%	IC	CU Leve	I of Service		В	
		15						
	0.87 8 418 418 4.5 2.6 99 952 EB 1 8 8 8 0 952 0.01 0.2 8.8 A 0.1	0.87 0.87 8 990 418 418 418 4.5 2.6 99 952 EB 1 EB 2 8 990 8 00 0 0 952 1700 0.01 0.58 0.2 0.0 8.8 0.0 A 0.1	0.87 0.87 0.87 8 990 403 403 403 403 403 403 403 403	0.87 0.87 0.87 0.87 8 990 403 15 418 418 418 418 45 2.6 99 952 EB 1 EB 2 WB 1 SB 1 8 990 418 29 8 0 0 18 0 0 15 11 952 1700 1700 133 0.01 0.58 0.25 0.22 0.2 0.0 0.0 6.1 8.8 0.0 0.0 39.5 A E 0.1 0.0 39.5 E E 0.1 0.0 39.5 A E 0.1 0.0 39.5 0.22 0.0 0.0 6.1 0.0 39.5 0.22 0.0	0.87 0.87 0.87 0.87 0.65 8 990 403 15 18 None A18 1417 418 1417 418 1417 418 1417 4.5 7.4 2.6 4.4 99 80 952 93 EB 1 EB 2 WB 1 SB 1 8 990 418 29 8 0 0 18 0 0 15 11 952 1700 1700 133 0.01 0.58 0.25 0.22 0.2 0.0 0.0 6.1 8.8 0.0 0.0 39.5 A E 0.1 0.0 39.5 A E	0.87 0.87 0.87 0.87 0.65 0.65 8 990 403 15 18 11 None 418 1417 411 418 1417 411 418 1417 411 4.5 7.4 6.9 2.6 4.4 3.9 99 80 98 952 4.4 3.9 99 80 98 952 93 516 EB 1 EB 2 WB 1 SB 1 8 990 418 29 8 0 0 18 0 0 15 11 952 1700 1700 133 0.01 0.58 0.25 0.22 0.2 0.0 0.0 6.1 8.8 0.0 0.0 39.5 A E 0.1 0.0 39.5 B ICU Level of Service	0.87 0.87 0.87 0.87 0.65 0.65 8 990 403 15 18 11 None 418 1417 411 418 1417 411 418 1417 411 4.5 7.4 6.9 2.6 4.4 3.9 99 80 98 952 93 516 EB 1 EB 2 WB 1 SB 1 8 990 418 29 8 0 0 18 0 0 15 11 952 1700 1700 133 0.01 0.58 0.25 0.22 0.2 0.0 0.0 6.1 8.8 0.0 0.0 39.5 A E 0.1 0.0 39.5 B ICU Level of Service	0.87 0.87 0.87 0.87 0.65 0.65 8 990 403 15 18 11 None 418 1417 411 418 1417 411 418 1417 411 4.5 7.4 6.9 2.6 4.4 3.9 99 80 98 952 93 516 EB 1 EB 2 WB 1 SB 1 8 990 418 29 8 0 0 18 0 0 15 11 952 1700 1700 133 0.01 0.58 0.25 0.22 0.2 0.0 0.0 6.1 8.8 0.0 0.0 39.5 A E 0.1 0.0 39.5 CU Level of Service B

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

	->	7	1	←	1	1
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	ħ		٢	1	Y	
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		А		С		
Approach Delay (s)	0.0	0.1		20.7		
Approach LOS				С		
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Uti	lization		58.7%	10	CU Leve	el of Servi
Analysis Period (min)			15			
			10			

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

	1	*	1	1	*	Ļ		
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	¥		¢Î			ę		
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					ļ
Volume Left	20	0	0					
Volume Right	20	20	0					
cSH	783	1700	1582					
Volume to Capacity	0.03	0.02	0.00					
Queue Length 95th (m)		0.02	0.00					
Control Delay (s)	9.7	0.0	0.0					
Lane LOS	9.7 A	0.0	0.0					
Approach Delay (s)	9.7	0.0	0.0					
Approach LOS	A	5.0	0.0					
Intersection Summary								
Average Delay			3.2					
Intersection Capacity U	tilization		13.3%	10		l of Servi	ce	
Analysis Period (min)			15.570					
			15					

HCM Unsignalized Intersection Capacity Analys Suture (2023) Total Traffic - with Left Turn lane 1: Highway 7 & 6th Line PM Peak

MovementEBLEBTWBTWBRSBLSBRLane ConfigurationsIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	
Sign ControlFreeFreeStopGrade0%0%0%Volume (veh/h)945792213135Peak Hour Factor0.930.930.930.930.600.60Hourly flow rate (vph)1049199114228PedestriansEane Width (m)Valking Speed (m/s)Fercent BlockageFercent BlockageFercent BlockageRight turn flare (veh)Median storage veh)Upstream signal (m)None	
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	
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	
Peak Hour Factor0.930.930.930.930.600.60Hourly flow rate (vph)1049199114228PedestriansLane Width (m)Walking Speed (m/s)Percent BlockageRight turn flare (veh)Median typeNoneMedian storage veh)Upstream signal (m)pX, platoon unblocked	
Hourly flow rate (vph)1049199114228PedestriansLane Width (m)Walking Speed (m/s)Percent BlockageRight turn flare (veh)Median typeMedian storage veh)Upstream signal (m)pX, platoon unblocked	
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	
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	
Walking Speed (m/s) Percent Blockage Right turn flare (veh) Median type None Median storage veh) Upstream signal (m) pX, platoon unblocked	
Percent Blockage Right turn flare (veh) Median type None Median storage veh) Upstream signal (m) pX, platoon unblocked	
Right turn flare (veh)NoneMedian typeNoneMedian storage veh)Upstream signal (m)pX, platoon unblockedVertice	
Median typeNoneMedian storage veh)Upstream signal (m)pX, platoon unblockedVertice	
Median storage veh) Upstream signal (m) pX, platoon unblocked	
Upstream signal (m) pX, platoon unblocked	
pX, platoon unblocked	
vC conflicting volume 1005 1500 009	
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	В
Analysis Period (min) 15	

HCM Unsignalized Intersection Capacity Analys Suture (2023) Total Traffic - with Left Turn lane 2: Highway 7 & 5th Line PM Peak

	-	7	4	←	1	1
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	ĥ		ň	Ŷ	Y	
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		Α		D		
Approach Delay (s)	0.0	0.1		27.2		
Approach LOS				D		
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Uti	lization		60.6%	IC	CU Leve	el of Serv
Analysis Period (min)			15			
,						

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

	4	•	1	1	*	Ŧ			
Movement	WBL	WBR	NBT	NBR	SBL	SBT			
Lane Configurations	Y		ef (÷.			
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	А								
Approach Delay (s)	9.8	0.0	0.0						
Approach LOS	A								
Intersection Summary									
Average Delay			3.2						
Intersection Capacity Ut	ilization		13.3%	IC	CU Leve	l of Servic	е	A	
Analysis Period (min)			15						

APPENDIX J Future (2023) Total Traffic With Left Turn Lane

Level of Service Calculations

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)	

Nework Summary

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)	

Nework Summary

APPENDIX K Statement Of Limiting Conditions And Assumptions

Statement of Limiting Conditions and Assumptions

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

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

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

Copyright 2010
 Cole Engineering Group Ltd.