



Enhancing our communities



1017-1029 Brebeuf Road

TRANSPORTATION IMPACT STUDY

The Sarjeant Company Ltd.

Document Control

File:

424411

Date:

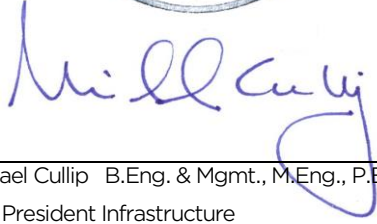
August
6, 2024

Prepared by:

Tatham Engineering Limited
645 Veterans Drive, Unit D
Barrie, Ontario L4N 9H8
T 705-733-9037
tathameng.com

Prepared for:

The Sarjeant Company Ltd.
15 Sarjeant Drive
Barrie, Ontario L4N 4V9

Authored by:	Reviewed by:
	 
Matthew Buttrum B.Eng., EIT Engineering Intern	Michael Cullip B.Eng. & Mgmt., M.Eng., P.Eng. Vice President Infrastructure

Disclaimer	Copyright
The information contained in this document is solely for the use of the Client identified on the cover sheet for the purpose for which it has been prepared and Tatham Engineering Limited undertakes no duty to or accepts any responsibility to any third party who may rely upon this document.	This document may not be used for any purpose other than that provided in the contract between the Owner/Client and the Engineer nor may any section or element of this document be removed, reproduced, electronically stored or transmitted in any form without the express written consent of Tatham Engineering Limited.

Issue	Date	Description
1	August 6, 2024	Final Report

Document Contents

1	Introduction	1
1.1	Report Objective	1
1.2	Report Structure	1
2	Existing Conditions.....	3
2.1	Road Network	3
2.2	Traffic Volumes	5
2.3	Traffic Operations	6
2.4	Road Network Improvements	9
3	Future Background Conditions.....	10
3.1	Road Network	10
3.2	Traffic Volumes	10
3.3	Traffic Operations	12
3.4	Road Network Improvements	17
4	Proposed Development	18
4.1	Location	18
4.2	Land Use	18
4.3	Site Access.....	18
4.4	Site Circulation.....	18
4.5	Parking	19
4.6	Site Traffic.....	19
5	Future Conditions	23
5.1	Traffic Volumes	23
5.2	Traffic Operations	23
5.3	Road Network Improvements	26
5.4	Other Impacts	27
6	Summary.....	28



Tables

Table 1: 2024 Traffic Counts	5
Table 2: MTO Highway Traffic Volumes	6
Table 3: Intersection Operations – 2024.....	8
Table 4: Intersection Operations – 2024 + Improvements	9
Table 5: Intersection Operations – 2026 Background	13
Table 6: Intersection Operations – 2026 Background + Improvements	14
Table 7: Intersection Operations – 2031 Background	15
Table 8: Intersection Operations – 2036 Background	16
Table 9: Intersection Operations – 2036 Background + Improvements	17
Table 10: Trip Generation – Existing Ready-Mix Plant (Daily)	20
Table 11: Trip Generation – Existing Ready-Mix Plant (Hourly)	21
Table 12: Trip Generation – Proposed Ready-Mix Plant	22
Table 13: Intersection Operations – 2026 Total	24
Table 14: Intersection Operations – 2031 Total	25
Table 15: Intersection Operations – 2036 Total	26

Figures

Figure 1: Site Location	30
Figure 2: Road Network	31
Figure 3: Traffic Volumes – 2024	33
Figure 4: Background Development Location	34
Figure 5: Background Development Traffic – Hanson Development	35
Figure 6: Traffic Volumes – 2026 Background	36
Figure 7: Traffic Volumes – 2031 Background	37
Figure 8: Traffic Volumes – 2036 Background	38
Figure 9: Site Plan – New Ready-Mix Plant	39
Figure 10: Site Access Road	40
Figure 11: Site Traffic – Existing Plant.....	41
Figure 12: Site Traffic – Proposed Plant.....	42
Figure 13: Site Traffic – Net	43
Figure 14: Traffic Volumes – 2026 Total.....	44
Figure 15: Traffic Volumes – 2031 Total.....	45
Figure 16: Traffic Volumes – 2036 Total.....	46



Appendices

Appendix A: Study Terms of Reference

Appendix B: Traffic Data

Appendix C: Level of Service Definitions

Appendix D: Existing Operations

Appendix E: Traffic Signal Warrants

Appendix F: Background Development Study Excerpts

Appendix G: Future Background Operations

Appendix H: Future Total Operations



1 Introduction

Tatham Engineering Limited was retained by The Sarjeant Company Ltd. to prepare a transportation impact study in support of the proposed relocation of a concrete ready-mix plant from its current location at 8933 County Road 93 to a new site at 1017 and 1029 Brebeuf Road in the Town of Midland. The locations of the current and proposed ready-mix plants are illustrated in Figure 1.

1.1 REPORT OBJECTIVE

The objective of this report is to present the findings of the transportation impact study and address the requirements of the Ministry of Transportation of Ontario (MTO) and the Town with respect to the potential transportation impacts of the development on the area road network. In particular, the following will be discussed:

- the operations of the road system through the study area prior to the proposed development.
- the growth in the traffic volumes not otherwise attributed to the development (i.e. from overall growth in the area and/or other developments);
- the number of new trips the proposed development is likely to generate;
- the operations of the study area road system upon completion of the development; and
- the resulting impacts and need for mitigating measures (if required) to ensure acceptable overall road operations.

A Terms of Reference encompassing the above scope were submitted to MTO prior to commencement of this study. The Terms of Reference as accepted by MTO is provided in Appendix A.

1.2 REPORT STRUCTURE

The report is structured as follows:

- Chapter 1: introduction and study purpose;
- Chapter 2: existing conditions, detailing the road system and corresponding traffic operations;
- Chapter 3: future conditions, prior to the completion of the proposed development (referred to as future background conditions), the expected growth in traffic levels and the resulting operating conditions;



- Chapter 4: proposed development and associated details including land use, access, and traffic volumes;
- Chapter 5: future conditions, with completion of the proposed development (referred to as future total conditions); and
- Chapter 6: summary of the report and key findings.



2 Existing Conditions

This chapter will detail the current transportation network, traffic volumes, and traffic operations under existing conditions.

2.1 ROAD NETWORK

The road network to be addressed by this study consists of the following roads and intersections:

Roads

- Highway 12
- Highway 93
- Beamish Road
- Brebeuf Road
- Hanson Road

Intersections

- Highway 12/The Angela Schmidt Foster Road & Highway 93/County Road 93
- Highway 12 & Beamish Road/Hanson Road

Aerial mapping of the road system is provided in Figure 2 with additional details provided below.

2.1.1 Roads

Brief descriptions of the study area roads are provided below. The functional classification of each road is based on that presented in MTO's *Highway Corridor Management Manual*¹ and *Schedule E – Roads* of the Town's *Official Plan*².

Highway 12

Highway 12 is an east-west Class 2B Arterial under the jurisdiction of MTO. Within the study area, Highway 12 has a 2-lane rural cross-section (unpaved shoulders, open ditches, one travel lane per direction) and a posted speed limit of 80 km/h.

Highway 93

Highway 93 is a north-south Class 3 Collector under the jurisdiction of MTO. Within the study area, Highway 93 has a 2-lane rural cross-section and a posted speed limit of 80 km/h. Approximately 200 metres north of its intersection with Highway 12, Highway 93 transfers to the

¹ *Highway Corridor Management Manual*. Ministry of Transportation of Ontario Corridor Management Office, April 2022.

² *Midland Official Plan*. Town of Midland, November 2019.



jurisdiction of the County of Simcoe as County Road 93; however, for the purposes of this study the road in general will be referred to as Highway 93.

Beamish Road

Beamish Road is a north-south local road under the jurisdiction of the Town. The road has a 2-lane rural cross-section and an assumed speed limit of 50 km/h (the speed limit is unposted on Beamish Road).

Brebeuf Road

Brebeuf Road is a north-south local road under the jurisdiction of the Town. The road has a 2-lane rural cross-section and an assumed speed limit of 50 km/h (the speed limit is unposted on Brebeuf Road).

Hanson Road

Hanson Road is a north-south local road under the jurisdiction of the Town. The road has a 2-lane urban cross-section (curb and gutter) with a posted speed limit of 50 km/h. A concrete sidewalk is provided on the east side of the road.

2.1.2 Intersections

The configuration and control of each study area intersection are detailed below and illustrated in Figure 2.

Highway 12/The Angela Schmidt Foster Road and Highway 93

The intersection of Highway 12 and The Angela Schmidt Foster Road with Highway 93 is a 4-leg, signalized intersection. The north leg (Highway 93) and west leg (The Angela Schmidt Foster Road) each consist of a left turn lane and a shared through-right turn lane, whereas the south leg (Highway 93) and east leg (Highway 12) each consist of a left turn lane, a through lane and a channelized right turn lane.

Highway 12 and Beamish Road/Hanson Road

The intersection of Highway 12 with Beamish Road and Hanson Road is a 4-leg, unsignalized intersection with Beamish Road and Hanson Road operating under stop control. The north and south legs (Hanson Road and Beamish Road, respectively) each consist of a shared left-through-right lane, whereas the east and west legs (Highway 12) each consist of a left turn lane, a through lane, and a right turn lane.



2.2 TRAFFIC VOLUMES

2.2.1 Traffic Counts

To determine existing traffic volumes on the adjacent road network, traffic counts were conducted at the study area intersections on Thursday, May 30, 2024, from 7:00 to 9:00, 11:00 to 14:00, and 15:00 to 18:00. A summary of the observed peak hours is provided in Table 1 with detailed count sheets available in Appendix B.

Table 1: 2024 Traffic Counts

INTERSECTION	PEAK HOURS & PEAK HOUR VOLUMES		
	Weekday AM	Weekday Mid-Day	Weekday PM
Highway 12 / The Angela S.F. Road & Highway 93	7:30 – 8:30 1,715 vehicles	12:30 – 13:30 1,776 vehicles	16:00 – 17:00 2,276 vehicles
Highway 12 & Beamish Road / Hanson Road	7:45 – 8:45 1,217	13:00 – 14:00 1,314	16:00 – 17:00 1,595

As indicated, the highest volumes travelling through each intersection occurred during the weekday PM peak hour (thus representing the most critical period on the road network). While the lowest volumes through each intersection occurred during the weekday AM peak, the volumes were not substantially lower (approximately 3% to 8% lower) than those observed during the weekday mid-day peak. As such, the weekday AM and PM peak periods have been carried forward in this study, as such typically represent the critical periods on a given road network.

2.2.2 Seasonal Adjustments

Traffic volumes on many roads are typically highest during the summer months owing to increased recreational/leisure travel. As the traffic counts noted above were completed in late May (typically reflective of a transitional period between summer peak volumes and spring/average volumes) the need to apply a seasonal adjustment was reviewed.

MTO publishes Annual Average Daily Traffic (AADT) and Summer Average Daily Traffic (SADT), volumes for all provincial highways³. The historical AADT and SADT volumes on Highway 12 (between Highway 93 and Midland) and on Highway 93 (between Highway 12 and County Road 27) were reviewed for the period 2014 to 2019 (the most recent 5-year period available) to establish any seasonal variations that may exist. The corresponding volumes and their respective

³ *Provincial Highways Traffic Volumes 1988-2019*. Ministry of Transportation of Ontario.



ratios are summarized in Table 2. As indicated, the SADT volumes on each road are, on average, in the order of 17% to 18% greater than the AADT volumes.

Table 2: MTO Highway Traffic Volumes

YEAR	HIGHWAY 12			HIGHWAY 93		
	AADT	SADT	$\frac{\text{SADT}}{\text{AADT}}$	AADT	SADT	$\frac{\text{SADT}}{\text{AADT}}$
2014	13,900	16,500	1.19	9,350	11,100	1.19
2015	14,200	16,900	1.19	8,550	10,200	1.19
2016	14,500	17,300	1.19	9,500	11,300	1.19
2017	14,800	17,400	1.18	9,650	10,900	1.13
2018	15,100	17,700	1.17	9,800	11,100	1.13
2019	15,400	18,100	1.18	9,950	11,700	1.18
Average			1.18			1.17

In consideration of the seasonal variation observed in the historical traffic volumes, and considering the transitional period the counts were conducted in (volumes in April are typically considered representative of average conditions, whereas those in July and August are representative of summer conditions) an adjustment factor of 1.10 (i.e. a 10% increase) was applied to the observed peak hour volumes on Highway 12 and Highway 93. No adjustments were applied to the Town roads given their local functions.

2.2.3 2024 Traffic Volumes

The resulting 2024 peak hour volumes are illustrated in Figure 3.

2.3 TRAFFIC OPERATIONS

The assessment of existing conditions provides the baseline from which the future traffic operations (both without and with the subject development) can be assessed. As the capacity, and hence operations, of a road system is effectively dictated by its intersections, the traffic assessment has focused on the operations of the study area intersections based on the following:

- the 2024 traffic volumes;
- the existing intersection configurations and controls; and



- procedures outlined in the *2000 Highway Capacity Manual*⁴ (using Synchro v.11 software).

The analysis considers the following metrics for each lane group at signalized intersections and for the critical movements at unsignalized intersections (namely the stop-controlled movements):

- average delay (measured in seconds);
- level of service (LOS); and
- volume to capacity (v/c) ratio.

Level of service definitions are provided in Appendix C; Level of Service A corresponds to the best operating condition with minimal delays whereas Level of Service F corresponds to poor operations resulting from high intersection delays. A v/c ratio of less than 1.0 indicates the intersection movement/approach is operating at less than capacity while v/c of 1.0 indicates capacity has been reached.

To more accurately model existing traffic conditions, the overall intersection peak hour factor and heavy vehicle percentages for each movement were determined from the traffic counts and input into the Synchro traffic model. Where the observed heavy vehicle percentage was less than the Synchro default value (2%), the default was applied. The in-use signal timing plans at the intersection of Highway 12 with Highway 93 were established based on field observations and input into the traffic model.

Results of the operational assessment are summarized in Table 3 with detailed operations worksheets provided in Appendix D. Any movements operating at Level of Service F and/or with a volume to capacity ratio of 1.0 or greater have been bolded in the summary table.

As indicated, the intersection of Highway 12 with Highway 93 provides good overall operations (LOS C) with individual movements providing acceptable operations (LOS D or better) with average delays and reserve capacity remaining ($v/c \leq 0.90$). At the intersection of Highway 12 with Beamish Road and Hanson Road, Beamish Road is noted to operate poorly (LOS F) with high delays during both peak periods, while Hanson Road operates acceptably (LOS E) with moderate delays. This is a result of the increased traffic volumes on Highway 12 and the difficulties associated with entering the highway from the intersecting side streets (the volumes on which are considered minor).

⁴ *2000 Highway Capacity Manual*. Transportation Research Board, Washington DC, 2000.



Table 3: Intersection Operations – 2024

INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Highway 12 / The Angela Schmidt Foster Road & Highway 93	EB L	signal	30	C	0.03	33	C	0.08
	EB TR	signal	44	D	0.77	41	D	0.65
	WB L	signal	24	C	0.61	27	C	0.67
	WB T	signal	19	B	0.22	22	C	0.34
	WB R	free	1	A	0.21	1	A	0.27
	NB L	signal	25	C	0.03	26	C	0.08
	NB T	signal	40	D	0.79	41	D	0.79
	NB R	free	1	A	0.21	1	A	0.16
	SB L	signal	25	C	0.74	39	D	0.90
	SB TR	signal	17	B	0.41	18	B	0.51
	overall	signal	22	C	0.75	23	C	0.86
Highway 12 & Beamish Road / Hanson Road	NB LTR	stop	57	F	0.29	184	F	0.84
	SB LTR	stop	39	E	0.19	42	E	0.18

Considering the poor operations at the noted intersection, traffic signal warrants were completed to determine if signalization of the intersection is currently warranted based on existing traffic volumes. The warrants are based on the methodologies outlined under *Justification 1* through *Justification 3* of *Ontario Traffic Manual Book 12 – Traffic Signals*. Completed warrants are provided in Appendix E; as indicated, signals are not currently warranted. Notwithstanding, recognizing that this intersection has been identified for signalization in the Town's *Multi-Modal Transportation Master Plan*⁵ between 2026 and 2031 (additional details are provided in Section 3.1), the intersection was reassessed under signalized control. Results of the reassessment are summarized in Table 4, with detailed worksheets provided in Appendix D. As indicated, signalization of the intersection will ensure that acceptable operations are realized under existing conditions.

⁵ *Town of Midland Multi-Modal Transportation Master Plan*. Town of Midland & Stantec, November 2019.



Table 4: Intersection Operations – 2024 + Improvements

INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Highway 12 & Beamish Road / Hanson Road	EB L	signal	2	A	0.01	3	A	0.04
	EB T	signal	6	A	0.67	7	A	0.67
	EB R	signal	3	A	0.06	3	A	0.02
	WB L	signal	3	A	0.06	3	A	0.02
	WB T	signal	4	A	0.54	9	A	0.76
	WB R	signal	2	A	0.01	3	A	0.01
	NB LTR	signal	26	C	0.02	28	C	0.34
	SB LTR	signal	29	C	0.25	25	C	0.01
overall		signal	5	A	0.65	9	A	0.72

2.4 ROAD NETWORK IMPROVEMENTS

Based on the results of the operational analysis under existing conditions, no improvements are required at the intersection of Highway 12 with Highway 93 to accommodate existing traffic volumes. Signalization of the intersection of Highway 12 with Beamish Road and Hanson Road may be considered under existing conditions to address high delays experienced on Beamish Road.



3 Future Background Conditions

This chapter will describe the road network, background traffic volumes and corresponding operations for the years 2026, 2031 and 2036. The 2026 horizon has been adopted to reflect full build-out of the proposed development, whereas the 2031 and 2036 horizons have been adopted to address longer-term impacts of the proposed development (5 and 10 years beyond build-out).

3.1 ROAD NETWORK

Upon review of the Town's 2019 *Multi-Modal Transportation Master Plan* (MTMP), the intersection of Highway 12 with Beamish Road was identified for signalization following the construction of a north leg at the intersection (Vehicular Network Project 14). This project was identified as a medium-term improvement, translating to a planned completion timeline between 2026 and 2031. While the north leg (Hanson Road) has since been constructed, the intersection has not yet been signalized as of the writing of this study. As such, the need for traffic signals will be reviewed as required based on the results of the operational analyses.

No other road improvements were identified within the study area. As such, the road network as described in Section 2.1 has been maintained through the 2036 horizon unless operations dictate the need for improvements.

3.2 TRAFFIC VOLUMES

Background traffic volumes for the future horizon years have been established based on the existing traffic volumes with consideration for historical growth, projected growth and development-specific traffic volumes.

3.2.1 Background Growth

Population

Based on recent census data, the population of the Town of Midland has grown from 16,572 persons in 2011 to 17,817 persons in 2021, reflective of a growth rate of approximately 0.7% per annum.

As per the Town's *Official Plan*, the Town is projected to reach a population of 22,500 persons by 2031. In considering the 2021 census population, this translates to a growth rate of approximately 2.4% per annum through 2031.



Traffic Volumes

Based on the historical traffic volumes on Highway 12 and Highway 93 (as summarized in Table 2), the following growth rates were realized between 2014 and 2019:

- Highway 12 – 1.9% per annum; and
- Highway 93 – 1.1% per annum.

Background Growth Rates

In consideration of the historical and projected population growth within the Town and historical growth in traffic volumes on Highway 12 and Highway 93, the following background growth rates have been considered on the study area road network:

- 1.0% per annum – Highway 12;
- 1.5% per annum – Highway 93 (south of Highway 12);
- 0.5% per annum – Highway 93 (north of Highway 12); and
- 0.0% per annum – all other roads

While the growth applied to each road does not necessarily correspond to observed historical trends and/or projections, additional volumes generated by background developments have been considered independently of the background growth rate, as detailed below.

No growth was applied to the lower-order roads within the study area, recognizing that they serve a local function.

3.2.2 Background Development

In reviewing planned developments within the study area, one background development (Hanson Development) was identified for consideration in this study. The location of the Hanson Development is illustrated in Figure 4.

Hanson Development

The Hanson Development is a large residential subdivision generally bounded by Highway 12 to the south, Little Lake to the north, King Street to the east and Highway 93 to the west. Information on this development was obtained from the *16533 Highway 12 Traffic Impact Study*⁶, which included relevant reference to the *Hanson Development Traffic Impact Study*⁷ (excerpts are provided in Appendix F). The Hanson development will consist of approximately 1,700

⁶ *16533 Highway 12 Traffic Impact Study*. J.D. Northcote Engineering Inc., November 2022.

⁷ *Hanson Development Traffic Impact Study*. MMM Group, August 2016.



residential units and 3,300 m² of commercial space. Upon completion, the development is expected to generate in the order of 730 trips during the weekday AM peak hour and 1,150 trips during the weekday PM peak hour. Access to the adjacent road network will be provided in part via Hanson Road. Assignment of development traffic through the study area road network is illustrated in Figure 5 as presented in the Hanson TIS and reflective of full build-out.

Based on observations made in late May 2024 (corresponding to the period when the 2024 traffic counts were completed), approximately 100 residential units were occupied, representing under 10% of the total proposed residential units; no commercial development was yet completed. As such, for the purposes of this study, it is assumed that the development is 5% built-out under existing conditions (i.e. 5% of the total development traffic is present on the road network). The development is assumed to be 20% built out by the 2026 horizon, 70% built out by the 2031 horizon, and fully built out by the 2036 horizon.

3.2.3 Future Traffic Volumes

The resulting background traffic volumes at each future horizon year are illustrated in Figure 6 through Figure 8 and have been determined based on:

- the existing 2024 volumes;
- the noted background growth applied to each road; and
- additional volumes generated by the noted background development.

Considering both background growth and additional development traffic, effective growth rates in the order of 1.5% to 2.4% per annum are realized on Highway 12 and Highway 93 within the study area, which is in line with historical trends and growth projections for the Town.

3.3 TRAFFIC OPERATIONS

The key intersections were reviewed again at each future horizon year given the projected background volumes and considering the same intersection configurations as assessed under existing conditions. Timing plans at the signalized intersections were reviewed and optimized at each horizon to ensure peak performance is maintained. Results of the operational analyses are summarized below with detailed operations worksheets provided in Appendix G.

2026 Horizon

Results of the operational analyses at the 2026 horizon are summarized in Table 5. As indicated, the intersection of Highway 12 with Highway 93 will continue to provide good overall operations (LOS C) with individual movements expected to provide acceptable operations (LOS E or better) with moderate delays and reserve capacity remaining ($v/c \leq 0.92$). With respect to the



intersection of Highway 12 with Beamish Road/Hanson Road, operations worsen compared to existing conditions, with both Beamish Road and Hanson Road providing poor operations (LOS F) with high delays during each peak period.

Table 5: Intersection Operations – 2026 Background

INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Highway 12 / The Angela Schmidt Foster Road & Highway 93	EB L	signal	30	C	0.03	33	C	0.09
	EB TR	signal	45	D	0.78	44	D	0.69
	WB L	signal	24	C	0.59	27	C	0.67
	WB T	signal	19	B	0.22	23	C	0.36
	WB R	free	1	A	0.22	1	A	0.26
	NB L	signal	25	C	0.03	26	C	0.08
	NB T	signal	39	D	0.78	38	D	0.76
	NB R	free	1	A	0.20	1	A	0.15
	SB L	signal	22	C	0.69	30	D	0.84
	SB TR	signal	17	B	0.38	16	B	0.46
	overall	signal	21	C	0.73	22	C	0.82
Highway 12 & Beamish Road / Hanson Road	NB LTR	stop	52	F	0.27	159	F	0.79
	SB LTR	stop	48	E	0.35	64	F	0.40

Signal warrants were reviewed again at the intersection of Highway 12 with Beamish Road/Hanson Road, considering the methodologies outlined under *Justification 7* of OTM Book 12. Completed warrants are provided in Appendix E; as indicated, signals are not warranted. Nevertheless, the intersection was reassessed with signals in place, as is recommended in the Town's MTMP and is otherwise required to ensure acceptable traffic operations. Results of the reassessment are summarized in Table 6 with detailed worksheets provided in Appendix G.

As indicated, signalization of the intersection will ensure that acceptable operations (LOS C or better) are provided through the 2026 horizon. As such, signalization of this intersection is recommended by the 2026 horizon to ensure acceptable operational performance is provided.



Table 6: Intersection Operations – 2026 Background + Improvements

INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Highway 12 & Beamish Road / Hanson Road	EB L	signal	3	A	0.02	3	A	0.07
	EB T	signal	6	A	0.66	6	A	0.62
	EB R	signal	3	A	0.06	3	A	0.02
	WB L	signal	3	A	0.06	3	A	0.02
	WB T	signal	5	A	0.53	7	A	0.71
	WB R	signal	3	A	0.01	3	A	0.02
	NB LTR	signal	25	C	0.02	28	C	0.39
	SB LTR	signal	27	C	0.28	27	C	0.22
overall		signal	6	A	0.63	7	A	0.69

2031 Horizon

Results of the operational assessment at the 2031 horizon are summarized in Table 7. Improvements recommended at the 2026 horizon have been carried forward in this assessment.

As indicated, each intersection will provide good overall operations (LOS C or better) through the 2031 horizon, with individual movements providing acceptable operations (LOS E or better) with moderate delays and reserve capacity remaining ($v/c \leq 0.97$).

2036 Horizon

Results of the operational assessment at the 2036 horizon are summarized in Table 8. As indicated, the intersection of Highway 12 with Beamish Road and Hanson Road will continue to provide excellent operations (LOS B) through the 2036 horizon, with individual movements providing good operations (LOS C or better) with average delays and reserve capacity remaining ($v/c \leq 0.87$).

By the 2036 horizon, the intersection of Highway 12 with Highway 93 is expected to provide poor operations (LOS F) and/or operate over capacity on some movements during the weekday PM peak hour. The overall operations remain acceptable (LOS D); however, the intersection does operate above capacity. This can be attributed to the anticipated growth in traffic volumes, in particular the significant increase in southbound left turns being made at the intersection (366 vph in 2024 versus 590 vph in 2036, largely attributed to the increase in traffic generated by the Hanson Development). Improvements to the southbound approach are required to accommodate the left turn volumes and address the poor operations.



Table 7: Intersection Operations – 2031 Background

INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Highway 12 / The Angela Schmidt Foster Road & Highway 93	EB L	signal	31	C	0.03	37	D	0.09
	EB TR	signal	56	E	0.86	55	D	0.78
	WB L	signal	28	C	0.70	41	D	0.83
	WB T	signal	19	B	0.24	26	C	0.38
	WB R	free	1	A	0.28	1	A	0.31
	NB L	signal	25	C	0.03	29	C	0.08
	NB T	signal	42	D	0.83	50	D	0.86
	NB R	free	1	A	0.21	1	A	0.16
	SB L	signal	26	C	0.78	58	E	0.97
	SB TR	signal	15	B	0.36	15	B	0.43
	overall	signal	23	C	0.81	31	C	0.97
Highway 12 & Beamish Road / Hanson Road	EB L	signal	4	A	0.05	6	A	0.30
	EB T	signal	12	B	0.79	9	A	0.72
	EB R	signal	4	A	0.06	4	A	0.02
	WB L	signal	5	A	0.10	4	A	0.03
	WB T	signal	8	A	0.62	13	B	0.84
	WB R	signal	4	A	0.02	4	A	0.05
	NB LTR	signal	23	C	0.10	25	C	0.25
	SB LTR	signal	25	C	0.37	26	C	0.35
	overall	signal	10	B	0.72	12	B	0.76



Table 8: Intersection Operations – 2036 Background

INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Highway 12 / The Angela Schmidt Foster Road & Highway 93	EB L	signal	34	C	0.03	45	D	0.11
	EB TR	signal	52	D	0.80	83	F	0.90
	WB L	signal	34	C	0.77	79	E	0.99
	WB T	signal	22	C	0.24	31	C	0.40
	WB R	free	1	A	0.32	1	A	0.34
	NB L	signal	27	C	0.03	33	C	0.08
	NB T	signal	50	D	0.87	39	D	0.94
	NB R	free	1	A	0.23	1	A	0.18
	SB L	signal	49	D	0.91	86	F	1.05
	SB TR	signal	17	B	0.36	15	B	0.41
	overall	signal	28	C	0.90	46	D	1.08
Highway 12 & Beamish Road / Hanson Road	EB L	signal	4	A	0.08	9	A	0.51
	EB T	signal	13	B	0.84	9	A	0.75
	EB R	signal	4	A	0.06	4	A	0.02
	WB L	signal	5	A	0.12	4	A	0.03
	WB T	signal	8	A	0.65	15	B	0.87
	WB R	signal	4	A	0.03	4	A	0.07
	NB LTR	signal	24	C	0.12	27	C	0.28
	SB LTR	signal	31	C	0.61	32	C	0.59
	overall	signal	12	B	0.80	14	B	0.83

The intersection was reassessed with a southbound double left turn, as summarized in Table 9. As indicated, this improvement (and corresponding signal timing adjustments to account for such) will see significant operational improvements realized at the intersection. Overall delay and utilized capacity at the intersection decreased by up to 18 seconds and 19%, respectively, whereas individual movements see reductions of up to 36 seconds in delay and similar reductions in utilized capacity. It is noted that these improvements are predicated on continuous background growth in the area and complete build-out of the Hanson Development. Should future growth be less than considered in this study and/or build-out of the Hanson Development



slower than assumed in this study, the need for these improvements may be delayed to a later horizon.

Table 9: Intersection Operations – 2036 Background + Improvements

INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Highway 12 / The Angela Schmidt Foster Road & Highway 93	EB L	signal	27	C	0.03	38	D	0.10
	EB TR	signal	38	D	0.74	60	E	0.82
	WB L	signal	22	C	0.66	42	D	0.85
	WB T	signal	16	B	0.22	24	C	0.36
	WB R	free	1	A	0.32	1	A	0.34
	NB L	signal	21	C	0.02	27	C	0.08
	NB T	signal	34	C	0.80	52	D	0.89
	NB R	free	1	A	0.23	1	A	0.19
	SB L	signal	21	C	0.68	50	D	0.86
	SB TR	signal	17	B	0.42	16	B	0.46
overall		signal	18	B	0.74	30	C	0.89

3.4 ROAD NETWORK IMPROVEMENTS

Based on the results of the operational review under future background conditions, the following improvements were found to be necessary to accommodate the future background traffic volumes:

2026 Horizon

- Traffic signals at the intersection of Highway 12 with Beamish Road/Hanson Road

2036 Horizon

- Construction of a southbound double left turn lane at the intersection of Highway 12 with Highway 93 (which would also require a 2nd receiving lane to be constructed on Highway 12)



4 Proposed Development

This chapter will provide additional details with respect to the proposed development including its location, land-use, site access, parking provision, anticipated trip generation and the assignment of site trips to the adjacent road network.

4.1 LOCATION

The subject site is to be located at 1017 to 1029 Brebeuf Road in the Town of Midland, County of Simcoe, as illustrated in Figure 1. The site is bounded by undeveloped land to the north, an aggregate extraction operation (Team Aggregates) to the south and east, and Brebeuf Road to the west.

4.2 LAND USE

The proposed development will consist of a 354 m² concrete ready-mix plant with ancillary 28 m² office. It is noted that the proposed ready-mix plant will replace the existing ready-mix plant currently in operation at 8933 County Road 93. A site plan is illustrated in Figure 9.

4.3 SITE ACCESS

While the site will be located on Brebeuf Road (and is addressed as such), access to the site will be provided through the Team Aggregates pit operation to the immediate east, which in turn connects to the wider road network via the pit access on Beamish Road as illustrated in Figure 10. Circulation of site traffic through the Team Aggregates pit will be provided by a private access road maintaining a minimum clear width of 6 metres and minimum centreline curve radii of 12 metres, as required by the Ontario Building Code for a fire route. This will also facilitate the transit of typical site traffic, such as heavy single-unit vehicles (dump trucks, ready-mix trucks, etc.) and passenger vehicles.

4.4 SITE CIRCULATION

Within the subject site, a large open area will be provided to accommodate the circulation of site traffic (which includes heavy vehicles), which will provide access to the concrete mixing plant, aggregate storage bins, site office, staff parking area and other on-site facilities.



4.5 PARKING

Parking requirements at the subject site have been reviewed in context of *Section 4 - Parking and Loading* of the Town's *Zoning By-law*⁸.

4.5.1 Standard Parking

An industrial development is required to supply 1 parking space per 40 m² gross floor area (GFA). Based on the size of the proposed ready-mix plant and plant office, a total of 10 parking spaces are required ($382 \text{ m}^2 / 40 = 10 \text{ spaces}$). As per the site plan, a total of 12 parking spaces will be supplied, satisfying the Town's requirement.

4.5.2 Barrier-Free Parking

Where between 11 and 100 parking spaces are supplied in an off-street parking facility, 1 barrier-free space must be provided. As per the site plan, 1 barrier-free space is provided, thus satisfying this requirement.

4.5.3 Loading Spaces

At a non-residential development of less than 500 m² GFA, a dedicated loading space is not required.

4.6 SITE TRAFFIC

4.6.1 Trip Generation

The number of vehicle trips to be generated by the proposed development during the weekday AM and weekday PM peak periods has been estimated based on the trip generation characteristics of the existing ready-mix plant in operation at 8933 County Road 93. It is noted that operations at the proposed ready-mix plant will reflect those of the existing plant.

Existing Ready-Mix Plant

Truck trip data for the existing ready-mix plant was provided for the years 2022 and 2023. The trip data included a break down by trip type:

- ready-mix deliveries (i.e. cement trucks);
- local aggregate deliveries (from local Team Aggregates pit); and
- non-local aggregate deliveries.

⁸ *Town of Midland Zoning By-law 2004-90*. Town of Midland, as consolidated March 2024.



Table 10 provides a summary of the daily trips generated by existing plant, summarized as follows for each year of data:

- average daily trips for the year (i.e. total trips divided by number of operating days);
- average daily trips during the peak month of each year (i.e. month that generated the most trips); and
- observed daily trips for the peak operating day (i.e. day that generated the most trips).

The trips reflect inbound and outbound trips combined (i.e. 40 ready-mix trips reflect 20 outbound trips and 20 inbound trips).

Table 10: Trip Generation – Existing Ready-Mix Plant (Daily)

YEAR	PERIOD	DAILY TRIPS BY TRIP TYPE ¹			
		Ready-Mix	Local Aggregate	Non-Local Aggregate	Total
2022	Annual	40	10	2	52
	Peak Month – June	60	18	2	80
	Peak Day – November 24	88	30	2	120
2023	Annual	32	10	2	44
	Peak Month – May	44	18	2	64
	Peak Day – May 25	58	80	2	140

¹ The daily trips for the annual and peak month periods reflect the average daily trips for the respective period, whereas the daily trips for the peak day reflect the observed trips for that day.

As noted above, the busiest day for the 2022-2023 period occurred on May 25, 2023 with the site generating 140 daily trips (70 inbound trips and 70 outbound trips), consisting of the following:

- 58 ready-mix trips (29 inbound + 29 outbound);
- 80 local aggregate delivery trips (40 inbound + 40 outbound); and
- 2 non-local aggregate delivery trips (1 inbound + 1 outbound).

The 80 local aggregate trips (translating to 40 inbound deliveries of aggregate material) are somewhat of an outlier when reviewing the available data for the 2-year reporting period, with 48 trips (or 24 inbound deliveries of aggregate material) being the next highest daily volume of local aggregate trips reported. Nonetheless, to ensure a conservative approach the peak daily trip volumes observed on May 25, 2023 have been considered in the assessment.



Assuming a 12-hour operating day during the peak season (6:00AM to 6:00PM), the existing site generates an average of 12 trips per hour during the peak operating day ($140 \text{ trips} \div 12 \text{ hrs} = 12 \text{ trips/hour}$); however, this assumes a uniform distribution of trips over the course of the day. Recognizing that some hours may be busier than others, it has been assumed that the peak hour experiences double the trips of an average hour. The peak day daily trips and the resulting average hourly and peak hour trip estimates for the existing ready-mix plant are summarized in Table 11. Given that there are only 2 daily trips associated with the delivery of non-local aggregate material, it has been assumed that these trips occur during the peak hour period.

Table 11: Trip Generation – Existing Ready-Mix Plant (Hourly)

TRIP TYPE	PEAK WEEKDAY DAILY			PEAK WEEKDAY AVERAGE HOUR			PEAK WEEKDAY PEAK HOUR		
	In	Out	Total	In	Out	Total	In	Out	Total
ready-mix	29	29	58	2.5	2.5	5	5	5	10
local aggregate	40	40	80	3.5	3.5	7	7	7	14
non-local aggregate	1	1	2	0	0	0	1	1	2
Total Trips	70	70	140	6	6	12	13	13	26

It is recognized that the plant will also generate automobile trips at the start and end of each day related to employee travel. The volume of such is expected to be minimal, however, thus the associated impacts are considered negligible.

Proposed Ready-Mix Plant

As detailed in Section 4.2, the proposed new ready-mix plant will be located immediately adjacent to and connected through the Team Aggregates pit. The internal connection will allow raw material deliveries from the Team Aggregates site to be delivered directly to the ready-mix plant without accessing the external road network. As noted in Table 10 and Table 11 (and in consideration of the 2023 operating figures) the internal connection will remove an average of 18 truck trips per day during the peak operating month, upwards of 80 truck trips per day during a peak operating day and 14 truck trips during the peak hour of the peak operating day. In this respect, proposed ready-mix plant will result in a net reduction of traffic on the road network.

A summary of the external trips (i.e. those trips that will access the external road network) to be generated by the proposed ready-mix plant on Brebeuf Road is provided in Table 12, along with the overall net impact in external trips generated by the site.



Table 12: Trip Generation – Proposed Ready-Mix Plant

TRIP TYPE	PEAK WEEKDAY DAILY			PEAK WEEKDAY HOURLY AVERAGE			PEAK WEEKDAY PEAK HOUR		
	In	Out	Total	In	Out	Total	In	Out	Total
ready-mix	29	29	58	2.5	2.5	5	5	5	10
local aggregate	0	0	0	0	0	0	0	0	0
non-local aggregate	1	1	2	0	0	0	1	1	2
Total Trips - Proposed	30	30	60	2.5	2.5	5	6	6	12
Total Trips - Existing	70	70	140	6	6	12	13	13	26
Net Impact	-40	-40	-80	-3.5	-3.5	-7	-7	-7	-14

As indicated and noted above, the proposed ready-mix concrete plant will result in 80 fewer daily trips on the road network, translating to 14 fewer peak hour trips.

While there is an overall reduction in traffic on the road network, there will also be a redistribution of the existing ready-mix trips and non-local aggregate delivery trips that will now travel to/from the new site (additional details are provided in the following section).

4.6.2 Trip Distribution & Assignment

In consideration of the market area served by the existing ready-mix plant, the following distribution was applied to the site-generated traffic:

- 20% to/from the north via Highway 93;
- 40% to/from the south via Highway 93; and
- 40% to/from the east via Highway 12.

The assignment of external trips generated by the existing ready-mix plant on Highway 93 are illustrated in Figure 11 for demonstrative purposes (such are already accounted for in the existing traffic volumes). The assignment of external trips generated by the proposed ready-mix plant on Brebeuf Road are illustrated in Figure 12.

The resulting net trips on the study area road network are illustrated in Figure 13. Individual movements showing negative trips reflect trips generated by the existing ready-mix plant which will be removed or reassigned following the relocation to the Brebeuf site.



5 Future Conditions

This chapter will address future conditions on the study area road network. The following areas will be addressed:

- operations of the study area intersections; and
- potential improvements to the study area road network, if necessary.

5.1 TRAFFIC VOLUMES

To assess the impacts of the proposed development, the existing site traffic volumes were removed from the background traffic volumes at each future horizon year (in that the existing site will be closed) and the anticipated site traffic volumes associated with the new location were added. The resulting total traffic volumes are illustrated in Figure 14 through Figure 16.

5.2 TRAFFIC OPERATIONS

A final operational analysis of the study area intersections was conducted to determine the impact of the proposed development. As under background conditions, the signal timings have been optimized at each horizon year as needed to ensure peak performance is maintained. Results of the operational analyses are summarized in Table 13 through Table 15, with detailed worksheets provided in Appendix H.

As indicated, the proposed development has no material impact on operations of the road network. In fact, the overall impacts are somewhat beneficial as the reduction in external trips resulting from the relocation of the ready-mix plant results in operational improvements at both intersections under all future horizons. Delays on each movement decrease by up to 2 seconds with reductions in utilized capacity of up to 2% compared to background conditions.



Table 13: Intersection Operations – 2026 Total

INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Highway 12 / The Angela Schmidt Foster Road & Highway 93	EB L	signal	29	C	0.03	32	C	0.08
	EB TR	signal	43	D	0.77	40	D	0.65
	WB L	signal	23	C	0.59	26	C	0.64
	WB T	signal	19	B	0.22	22	C	0.35
	WB R	free	1	A	0.21	1	A	0.26
	NB L	signal	25	C	0.03	26	C	0.08
	NB T	signal	38	D	0.76	38	D	0.76
	NB R	free	1	A	0.20	1	A	0.15
	SB L	signal	22	C	0.68	33	D	0.86
	SB TR	signal	17	B	0.38	17	B	0.47
	overall	signal	21	C	0.71	22	C	0.82
Highway 12 & Beamish Road / Hanson Road	EB L	signal	3	A	0.02	3	A	0.07
	EB T	signal	6	A	0.66	6	A	0.62
	EB R	signal	3	A	0.06	3	A	0.01
	WB L	signal	3	A	0.07	3	A	0.03
	WB T	signal	5	A	0.53	7	A	0.71
	WB R	signal	3	A	0.01	3	A	0.02
	NB LTR	signal	25	C	0.02	28	C	0.36
	SB LTR	signal	27	C	0.28	27	C	0.22
	overall	signal	6	A	0.63	7	A	0.68



Table 14: Intersection Operations – 2031 Total

INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Highway 12 / The Angela Schmidt Foster Road & Highway 93	EB L	signal	31	C	0.03	37	D	0.09
	EB TR	signal	56	E	0.86	54	D	0.78
	WB L	signal	28	C	0.70	40	D	0.82
	WB T	signal	19	B	0.24	26	C	0.38
	WB R	free	1	A	0.27	1	A	0.30
	NB L	signal	25	C	0.03	29	C	0.08
	NB T	signal	42	D	0.82	49	D	0.85
	NB R	free	1	A	0.21	1	A	0.17
	SB L	signal	25	C	0.77	56	E	0.97
	SB TR	signal	15	B	0.36	15	B	0.43
	overall	signal	23	C	0.80	30	C	0.97
Highway 12 & Beamish Road / Hanson Road	EB L	signal	4	A	0.05	6	A	0.30
	EB T	signal	12	B	0.79	9	A	0.72
	EB R	signal	4	A	0.06	4	A	0.01
	WB L	signal	5	A	0.11	4	A	0.04
	WB T	signal	8	A	0.62	13	B	0.84
	WB R	signal	4	A	0.02	4	A	0.05
	NB LTR	signal	23	C	0.07	25	C	0.23
	SB LTR	signal	25	C	0.37	26	C	0.35
	overall	signal	10	B	0.72	12	B	0.76



Table 15: Intersection Operations – 2036 Total

INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Highway 12 / The Angela Schmidt Foster Road & Highway 93	EB L	signal	26	C	0.03	38	D	0.10
	EB TR	signal	38	D	0.73	60	E	0.82
	WB L	signal	22	C	0.67	42	D	0.85
	WB T	signal	16	B	0.22	24	C	0.36
	WB R	free	1	A	0.31	1	A	0.33
	NB L	signal	21	C	0.02	27	C	0.08
	NB T	signal	34	C	0.79	51	D	0.88
	NB R	free	1	A	0.23	1	A	0.18
	SB L	signal	19	B	0.66	49	D	0.85
	SB TR	signal	17	B	0.42	16	B	0.45
	overall	signal	18	B	0.74	30	C	0.89
Highway 12 & Beamish Road / Hanson Road	EB L	signal	4	A	0.08	8	A	0.50
	EB T	signal	13	B	0.83	9	A	0.75
	EB R	signal	4	A	0.06	4	A	0.01
	WB L	signal	5	A	0.13	4	A	0.04
	WB T	signal	8	A	0.65	15	B	0.87
	WB R	signal	4	A	0.03	4	A	0.07
	NB LTR	signal	24	C	0.08	27	C	0.26
	SB LTR	signal	31	C	0.60	32	C	0.58
	overall	signal	12	B	0.80	13	B	0.83

5.3 ROAD NETWORK IMPROVEMENTS

5.3.1 Intersection Operations

Based on the results of the operational analyses under future total conditions, no improvements are required to accommodate the proposed development.

5.3.2 Turn Lane Requirements

Notwithstanding the otherwise good operations anticipated under future conditions, the need for exclusive turn lanes to serve the proposed development were reviewed.



Exclusive left and right turn lanes are already present on Highway 12 at Beamish Road and Hanson Road. Separated turn lanes on Beamish Road are not recommended when operating under stop control, as vehicles queued side-by-side can impede each other's sight lines along Highway 12. When signalized, a separated left turn lane could be considered on the north and south approaches (allowing for separation of higher-delay left turns from the rest of the traffic stream), however, such were not found to be necessary based on the otherwise acceptable operational performance demonstrated in Section 5.2.

With respect to the existing site access to the Team Aggregates pit, such serves as the south leg of the intersection of Beamish Road with Prospector Avenue. The access operates freely with Beamish Road (Prospector Avenue operates under stop control), thus no turn lanes are necessary at the site access.

5.4 OTHER IMPACTS

While already expressed in terms of daily and peak hour volumes, the overall annual reduction in truck volumes on the road network should also be considered. In 2022 and 2023, the existing ready-mix plant generated in the order of 2,125 and 2,600 truck trips per year to/from the Team Aggregates pit, half of which were loaded truck trips (i.e. delivery of aggregate material to the plant). The removal of these trips from the road network is not only beneficial in terms of improved traffic operations (as illustrated above), but also in terms of safety (fewer trucks on the road network) and impacts to existing infrastructure.



6 Summary

This study has addressed the transportation impacts associated with the proposed concrete ready-mix plant to be located at 1017-1029 Brebeuf Road in the Town of Midland.

Proposed Development

The proposed development consists of a concrete ready-mix plant, which will relocate from its existing site at 8933 County Road 93 to the new site on Brebeuf Road. The relocation of the plant will allow for internal deliveries of raw aggregate materials from the adjacent Team Aggregates pit, reducing the number of external trips generated by the plant by up to 2,600 trips per year, 80 trips per day and 14 trips per peak hour.

Transportation Impacts

In addressing the study area traffic operations, the study area intersections were reviewed under existing (2024) and future (2026, 2031 and 2036) horizon periods.

Results of the operational analyses indicate that the intersection of Highway 12 with Highway 93 currently provides good overall operations (LOS C) under existing traffic volumes and is expected to provide acceptable overall operations (LOS D or better) through the 2031 horizon under background conditions. By the 2036 horizon under background conditions, a double southbound left turn lane is recommended to accommodate the anticipated growth in traffic volumes (particularly the volumes at the southbound left turn movement). These operations are not influenced significantly by the current ready-mix operations given the limited volumes associated with such; the noted improvements are warranted to address other traffic volumes on the road network, including those associated with the Hanson Development.

At the intersection of Highway 12 with Beamish Road and Hanson Road, Beamish Road was found to provide poor operations (LOS F) with high delays under existing conditions, with Hanson Road also expected to provide poor operations by the 2026 horizon under background conditions. Signalization of the intersection, as identified in the Town's *Transportation Master Plan* (largely predicated by the Hanson Development), was found to improve operations to an acceptable level through the 2036 horizon under background conditions.

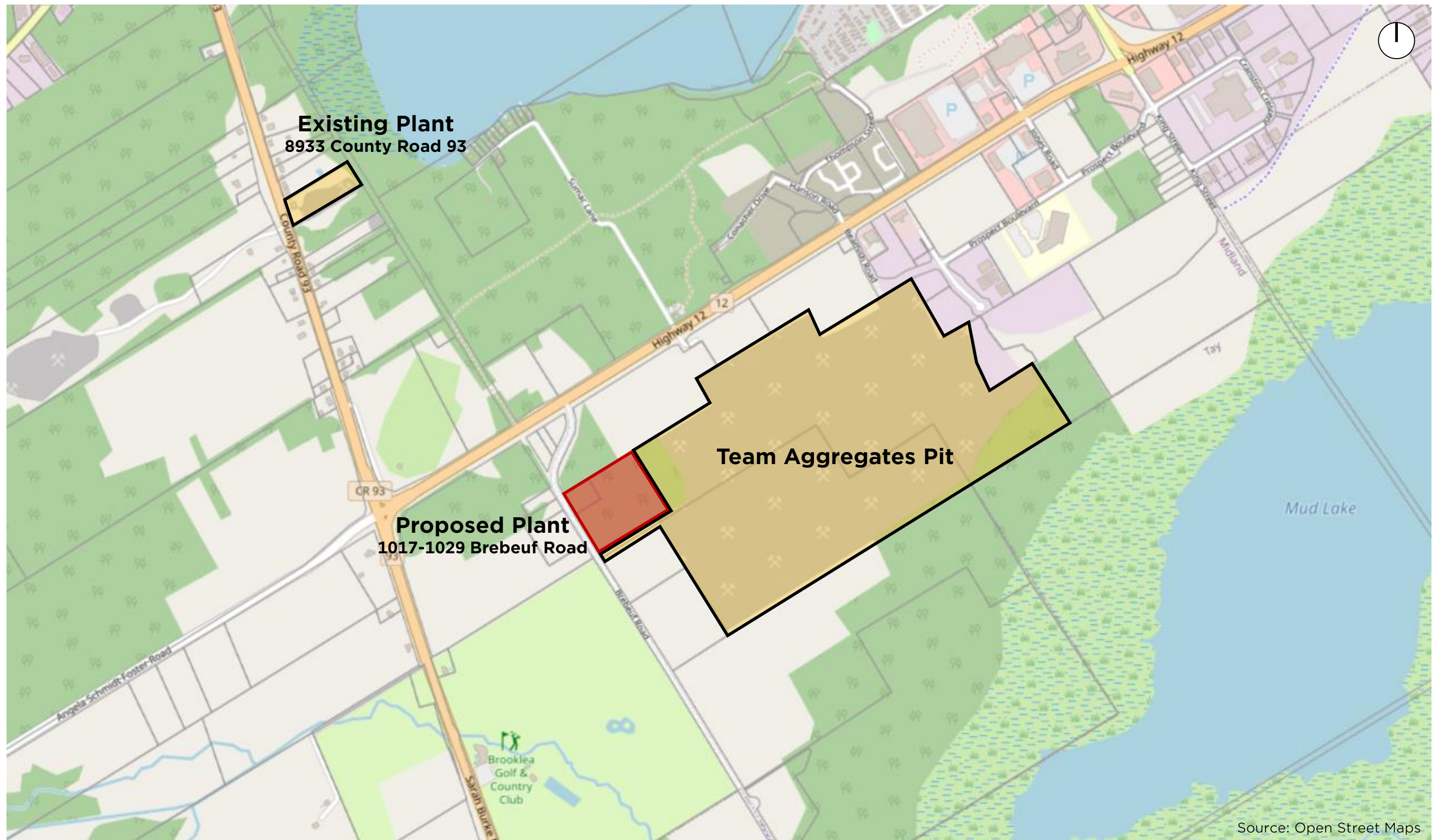
Under total conditions, all study area intersections are expected to provide improved operations through the 2036 horizon when compared to the background operations. This is directly due to the reduction in external truck trips afforded by the relocation of the subject ready-mix plant and subsequent internal connection to the Teams Aggregate pit operation. Overall, the proposed development results in a net benefit to the adjacent road network.



Turn Lanes

The need for exclusive turn lanes to serve the proposed development were reviewed. Based on the review, no new turn lanes are required to serve the proposed development.





1017-1029 BREBEUF ROAD - TRANSPORTATION IMPACT STUDY

Figure 1: Site Location





1017-1029 BREBEUF ROAD - TRANSPORTATION IMPACT STUDY

Figure 2A: Road Network





Intersection of Highway 12 and The Angela Schmidt Foster Road with Highway 93 and County Road 93

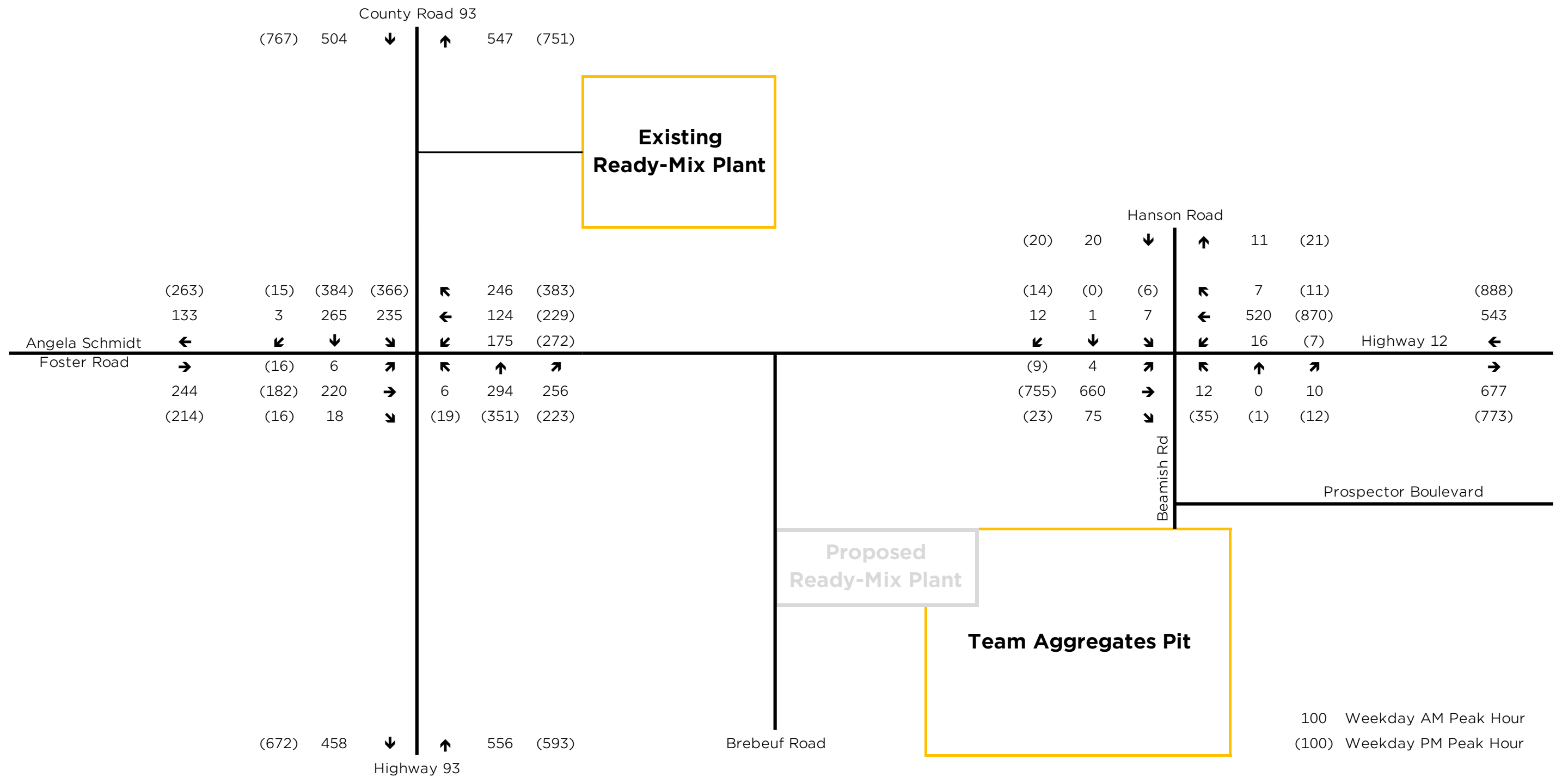


Intersection of Highway 12 with Hanson Road and Beamish Road

1017-1029 BREBEUF ROAD - TRANSPORTATION IMPACT STUDY

Figure 2B: Road Network





1017-1029 BREBEUF ROAD - TRANSPORTATION IMPACT STUDY

Figure 3: Traffic Volumes - 2024

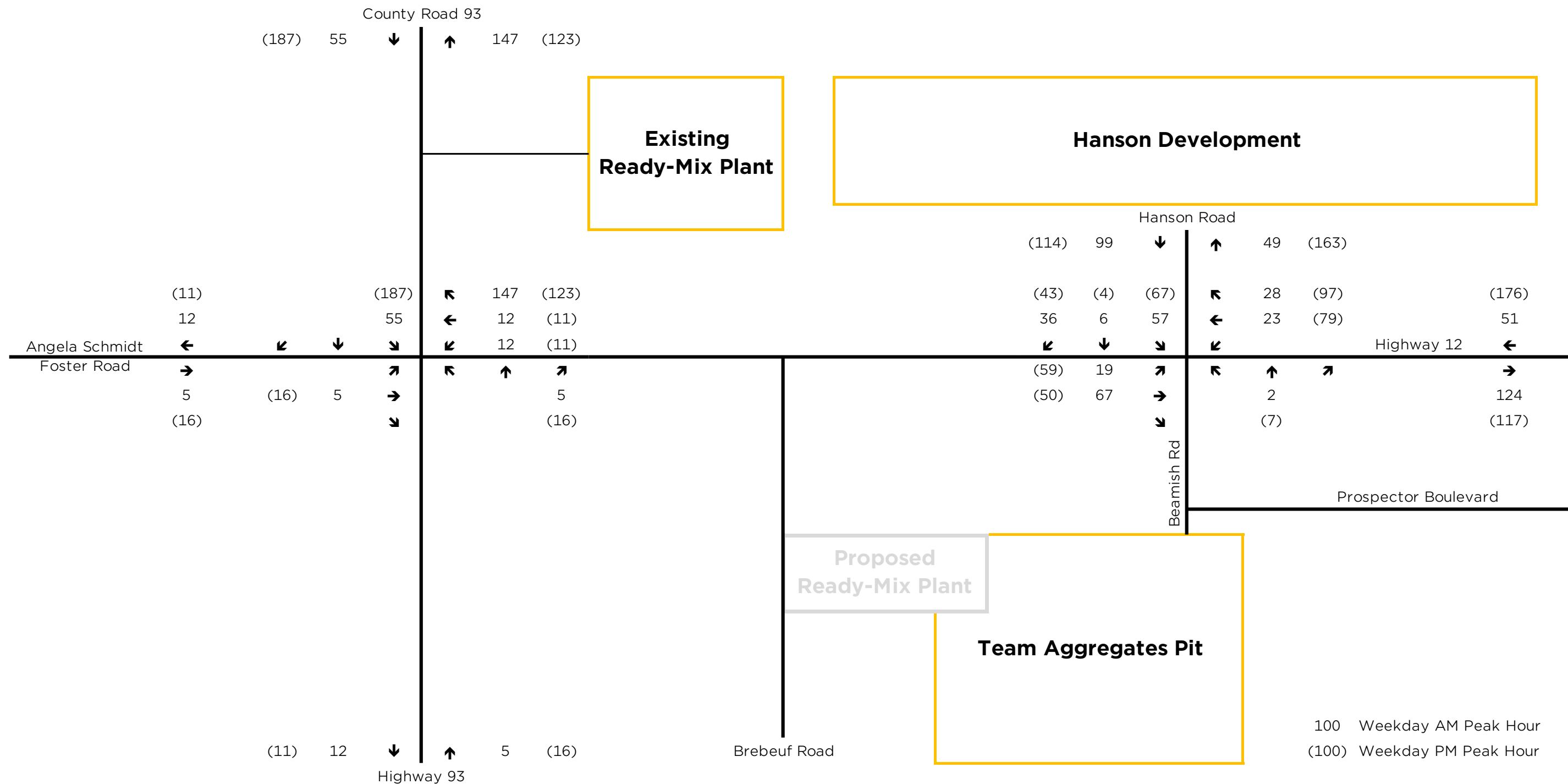




1017-1029 BREBEUF ROAD - TRANSPORTATION IMPACT STUDY

Figure 4: Background Development Location

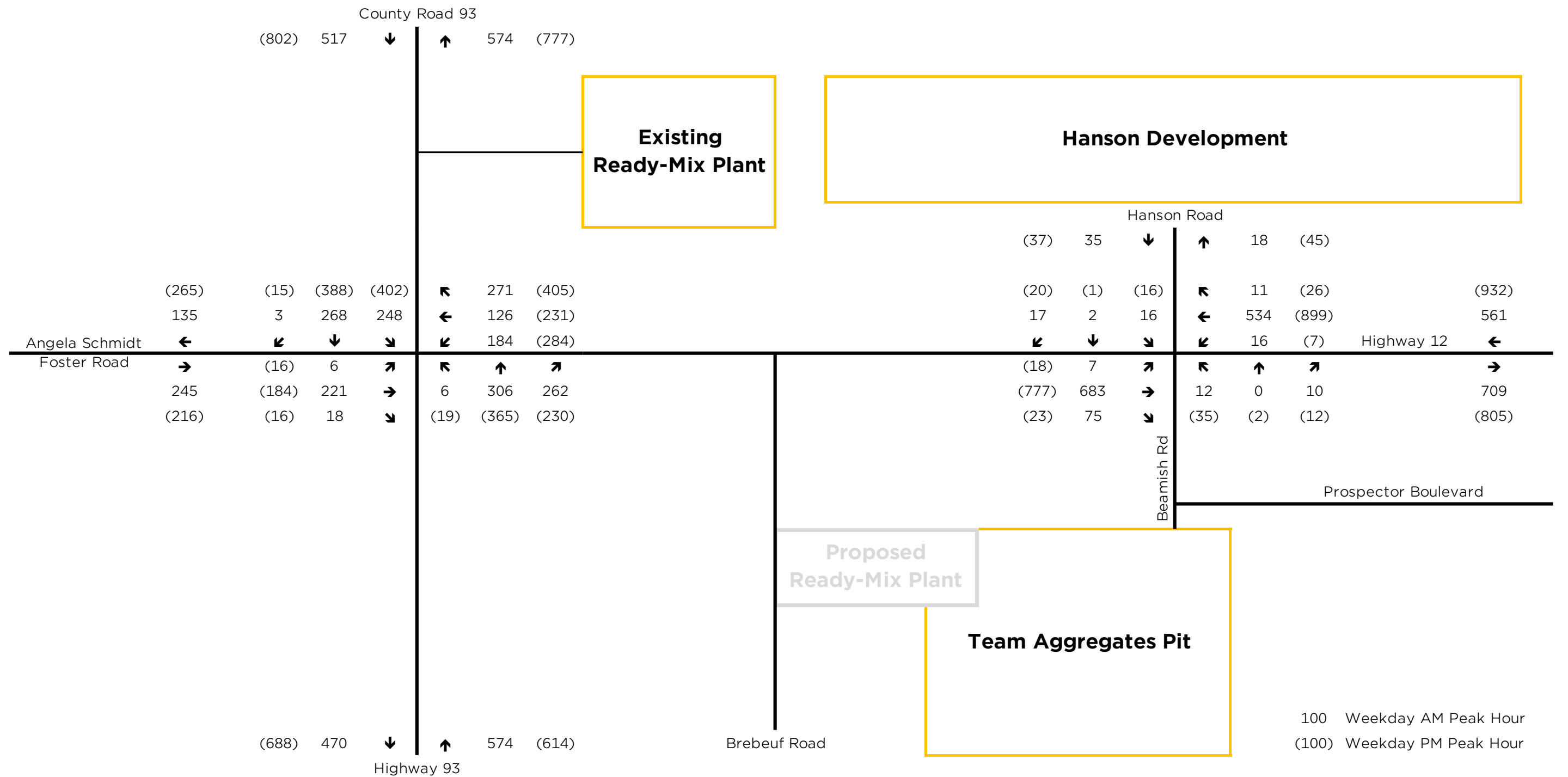




1017-1029 BREBEUF ROAD - TRANSPORTATION IMPACT STUDY

Figure 5: Background Development Traffic - Hanson Development

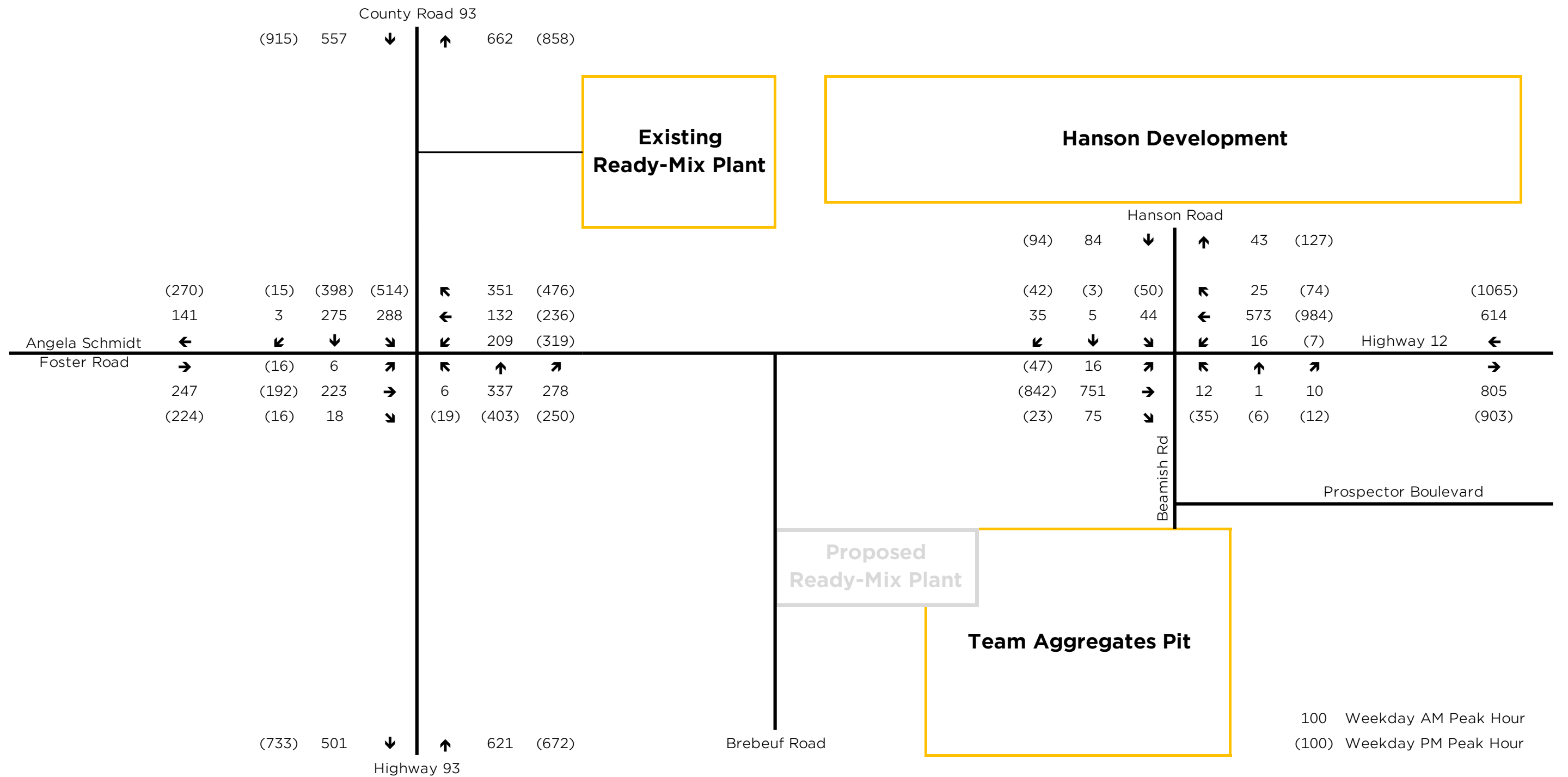




1017-1029 BREBEUF ROAD - TRANSPORTATION IMPACT STUDY

Figure 6: Traffic Volumes - 2026 Background

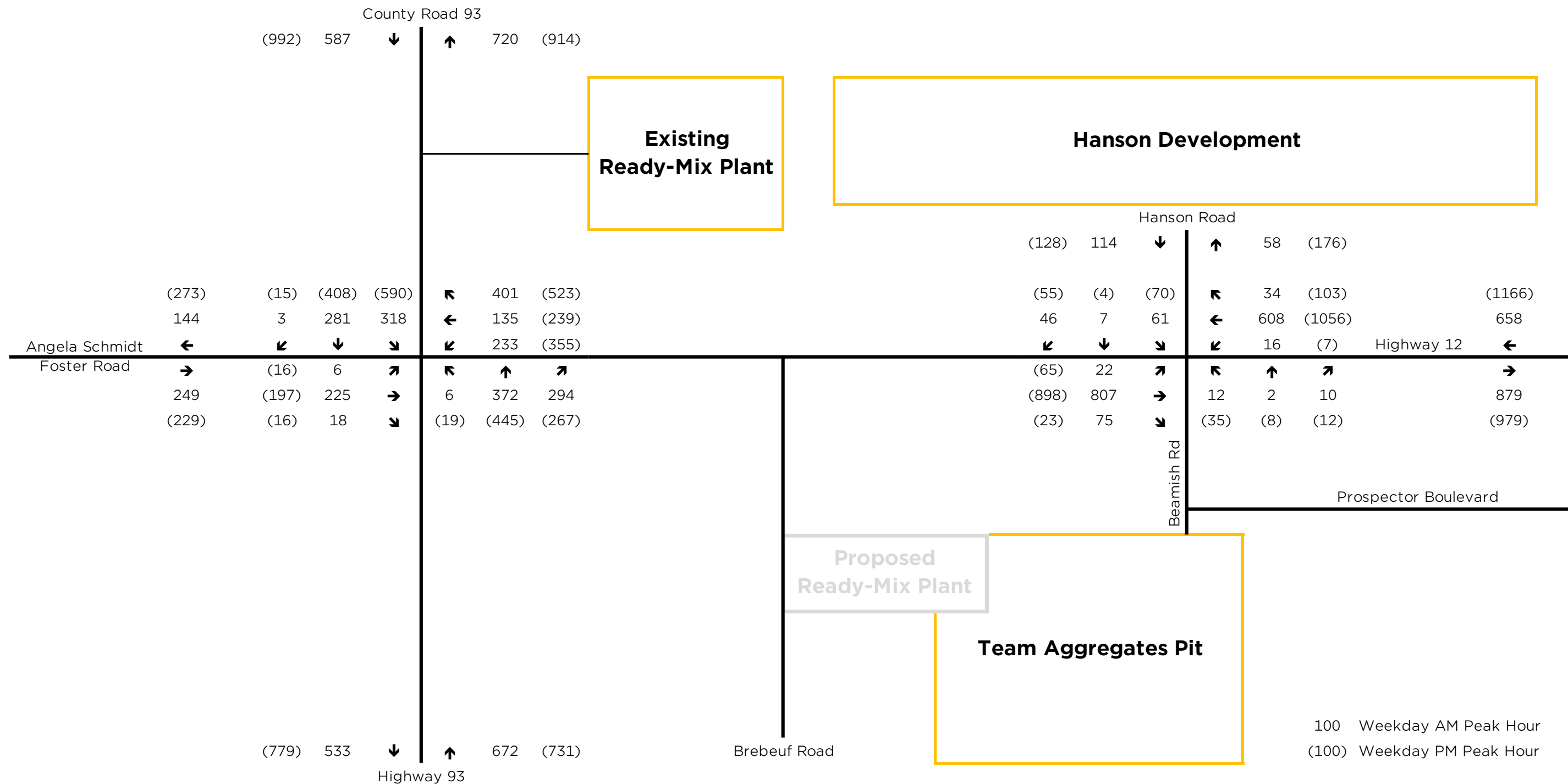




1017-1029 BREBEUF ROAD - TRANSPORTATION IMPACT STUDY

Figure 7: Traffic Volumes – 2031 Background

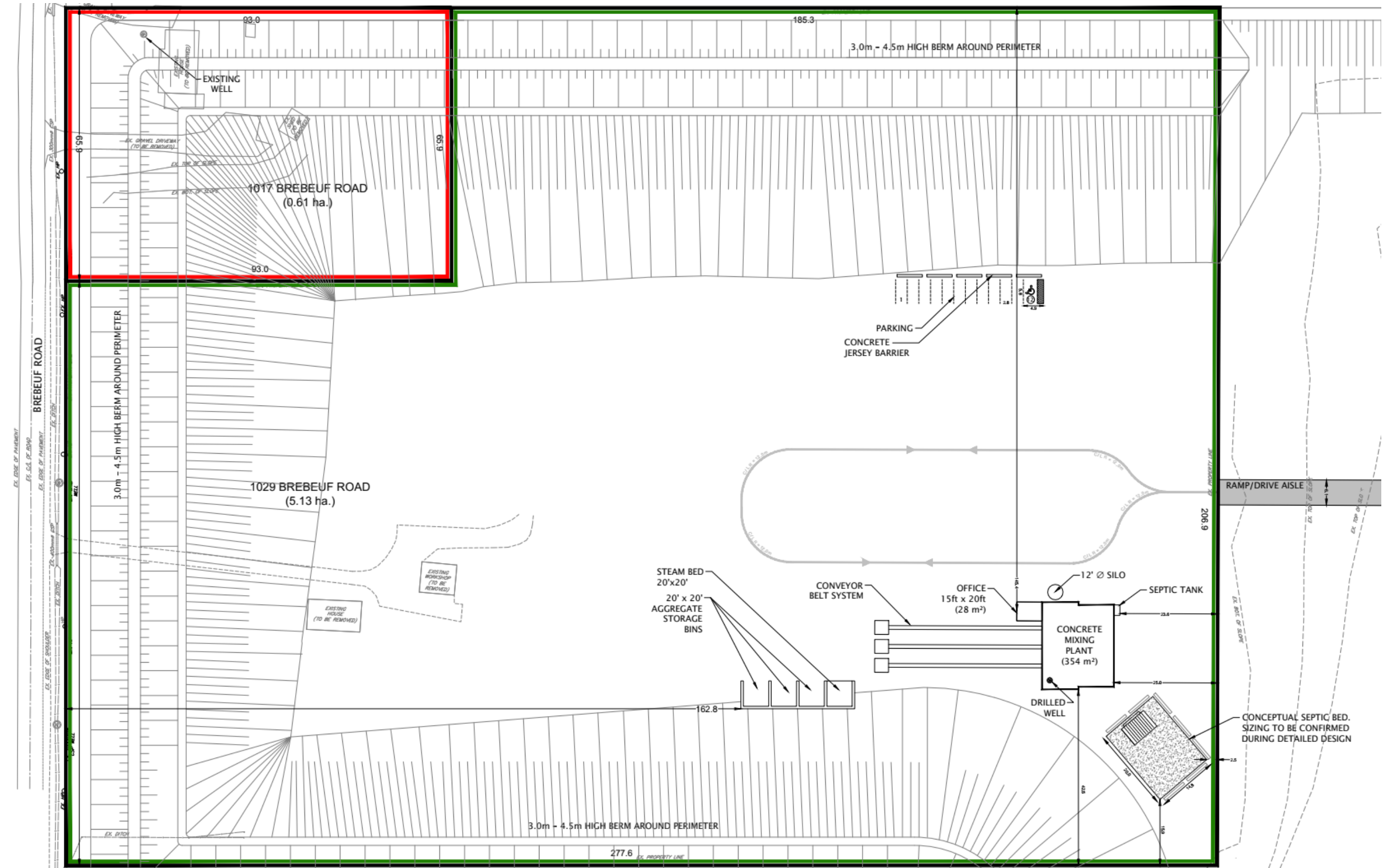




1017-1029 BREBEUF ROAD - TRANSPORTATION IMPACT STUDY

Figure 8: Traffic Volumes - 2036 Background

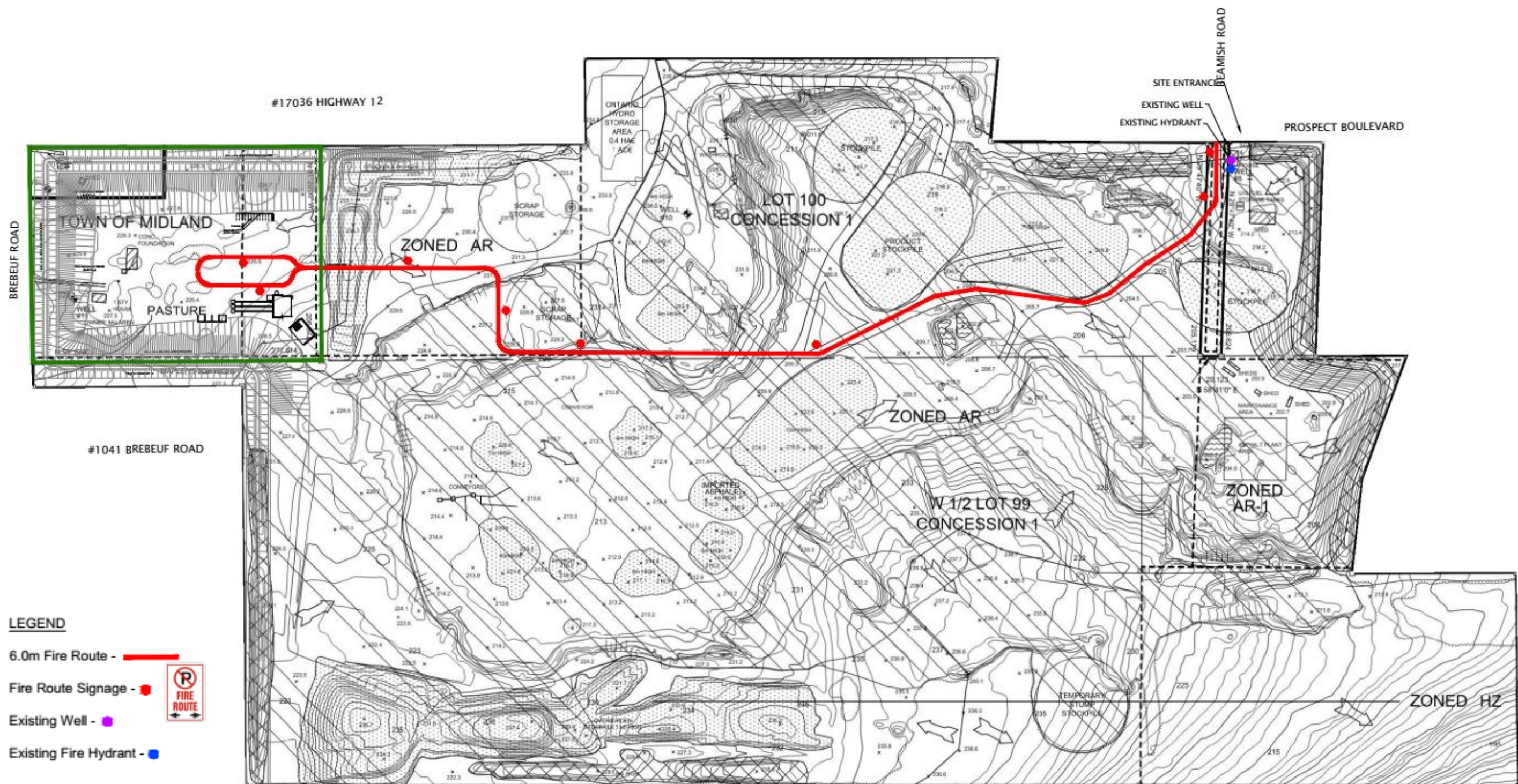




1017-1029 BREBEUF ROAD - TRANSPORTATION IMPACT STUDY

Figure 9: Site Plan - New Ready-Mix Plant

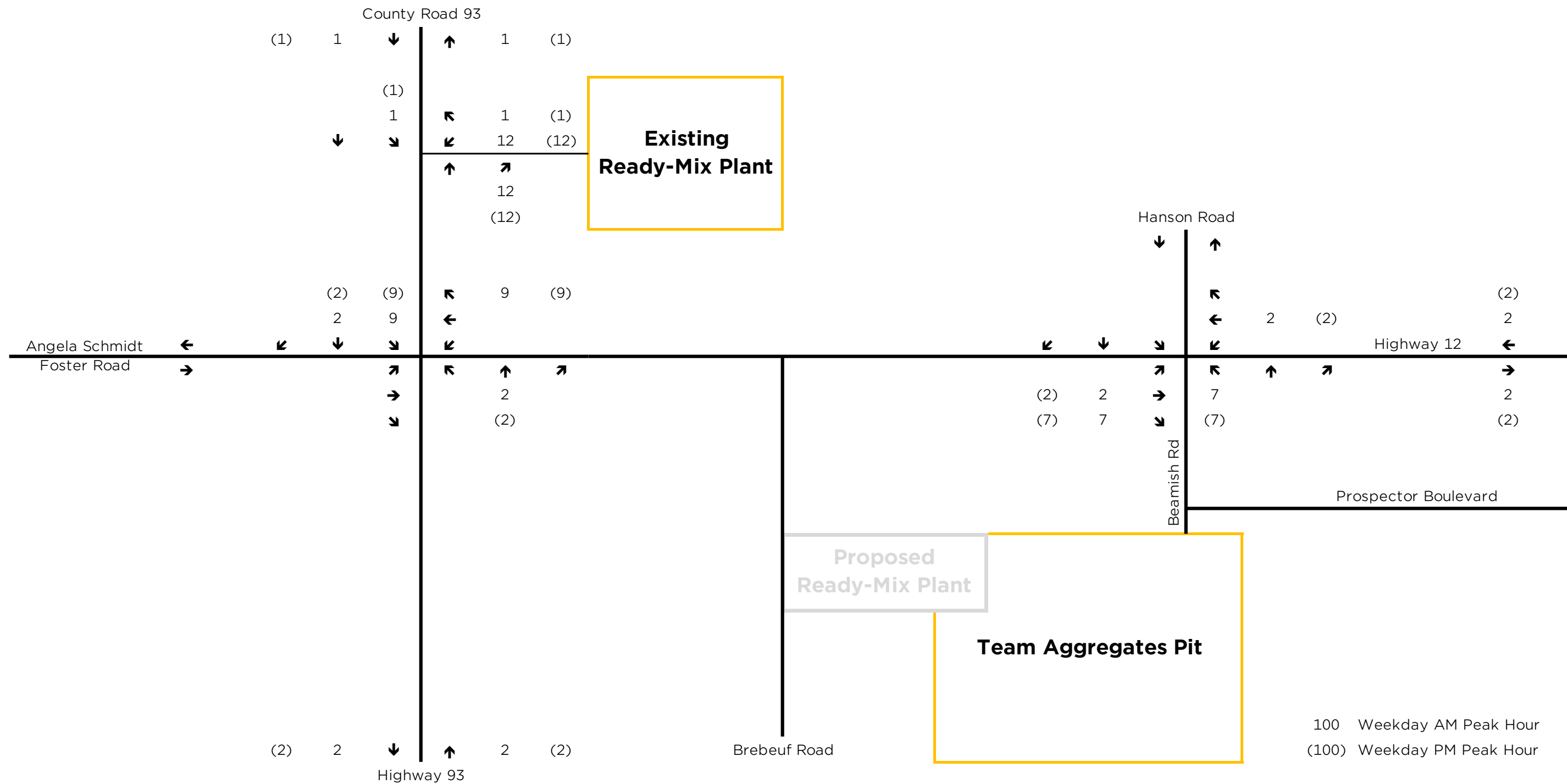




1017-1029 BREBEUF ROAD - TRANSPORTATION IMPACT STUDY

Figure 10: Site Access Road

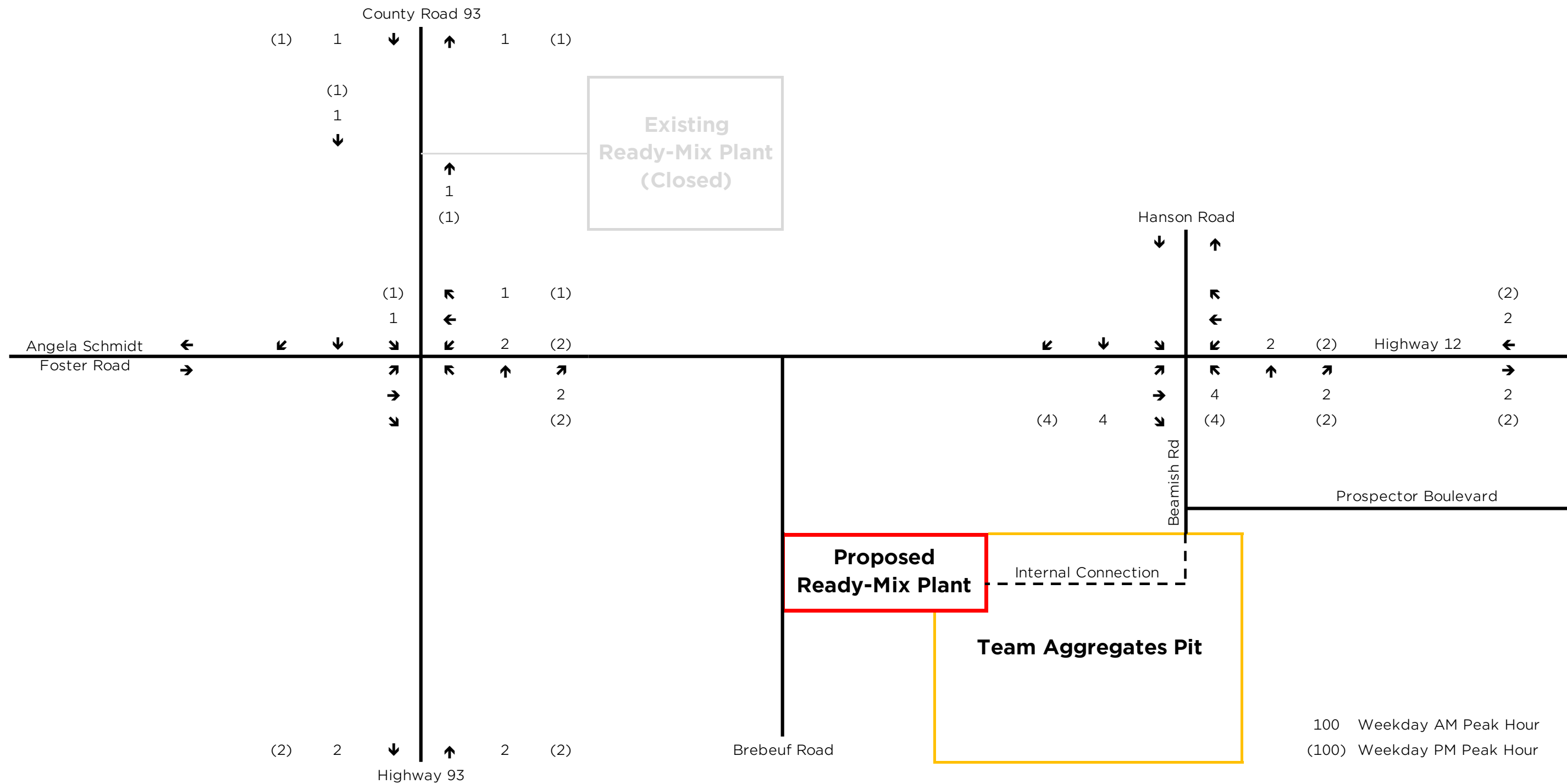




1017-1029 BREBEUF ROAD - TRANSPORTATION IMPACT STUDY

Figure 11: Site Traffic - Existing Plant

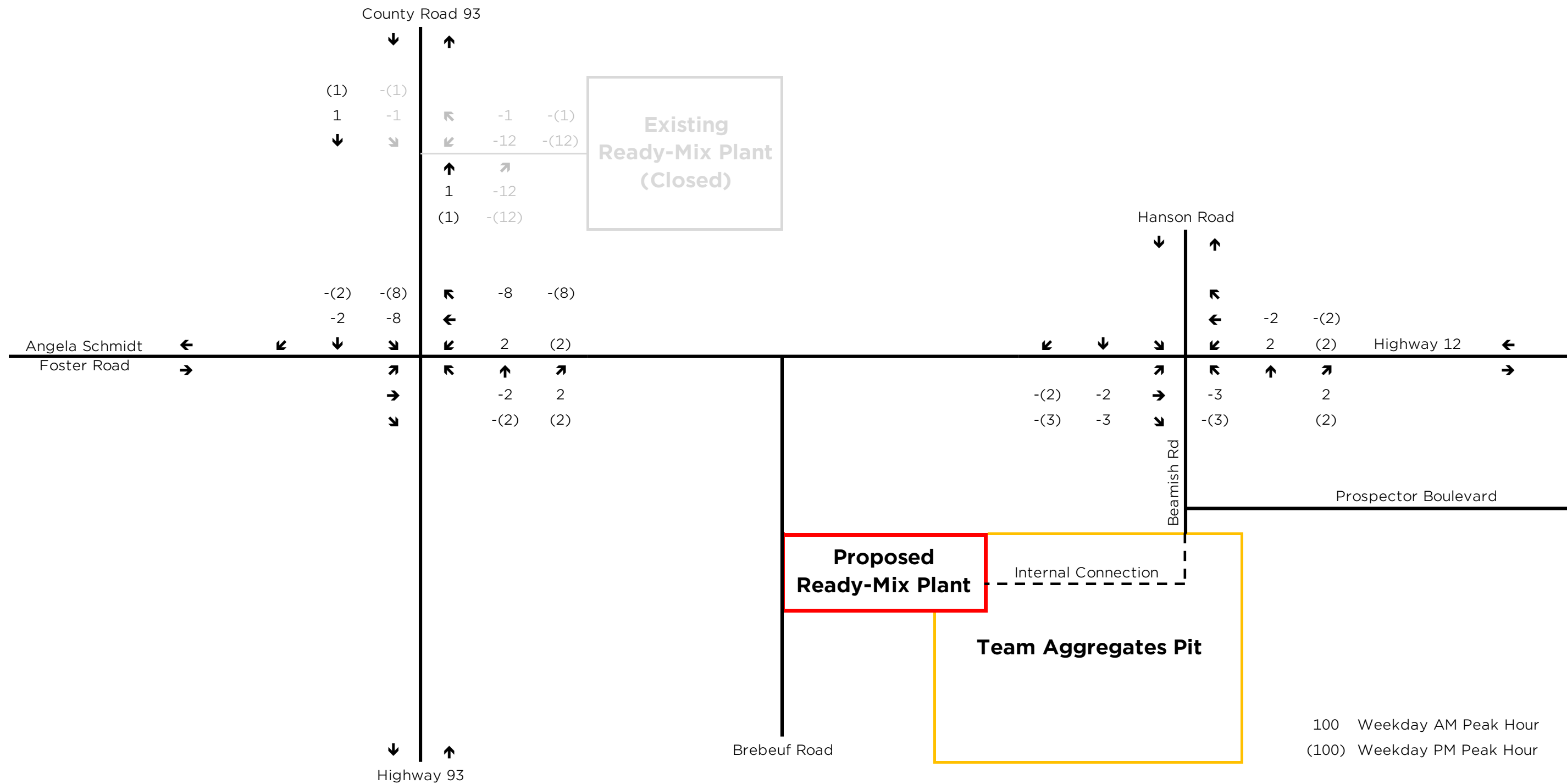




1017-1029 BREBEUF ROAD - TRANSPORTATION IMPACT STUDY

Figure 12: Site Traffic – Proposed Plant

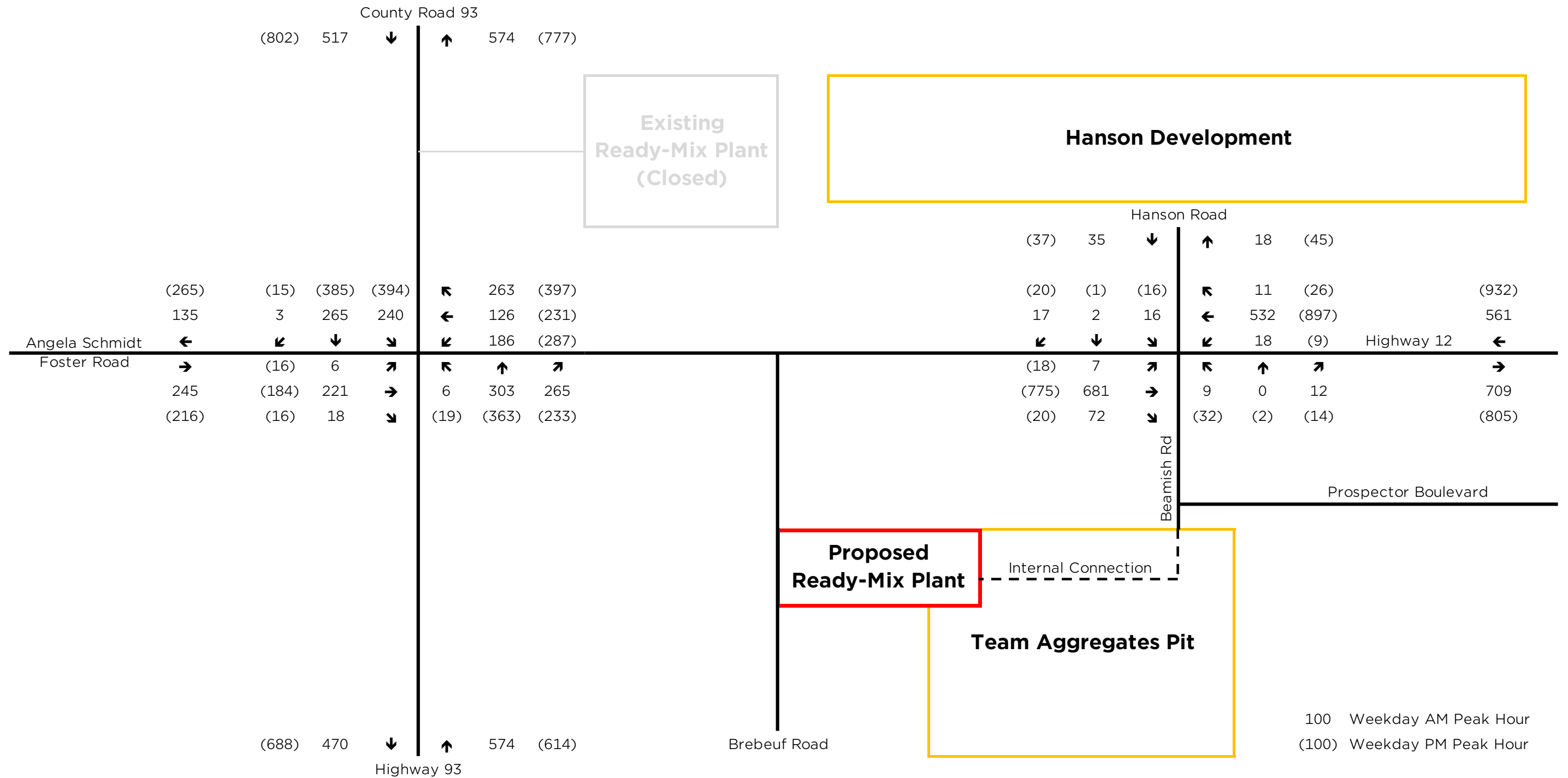




1017-1029 BREBEUF ROAD - TRANSPORTATION IMPACT STUDY

Figure 13: Site Traffic - Net

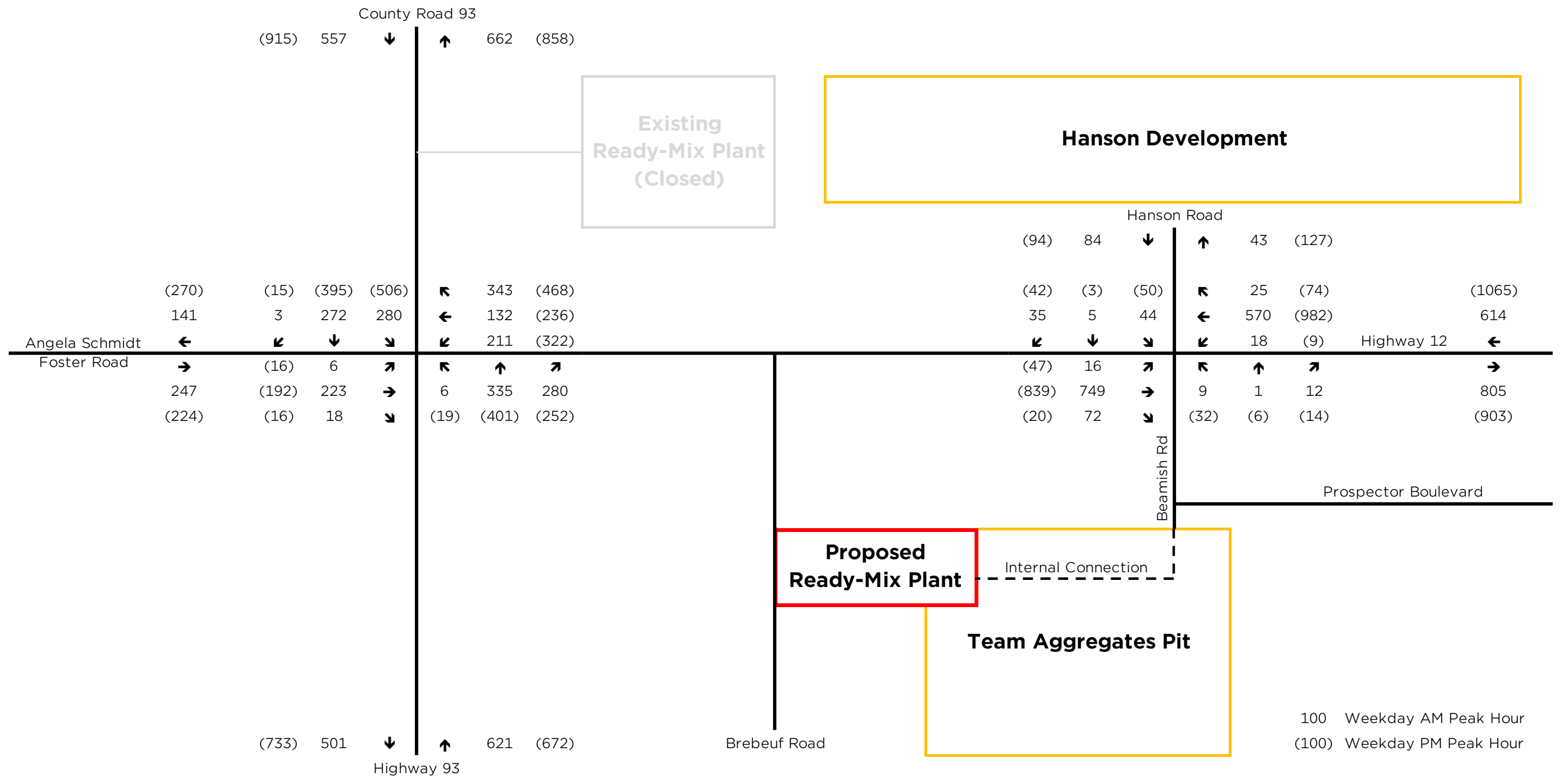




1017-1029 BREBEUF ROAD - TRANSPORTATION IMPACT STUDY

Figure 14: Traffic Volumes - 2026 Total

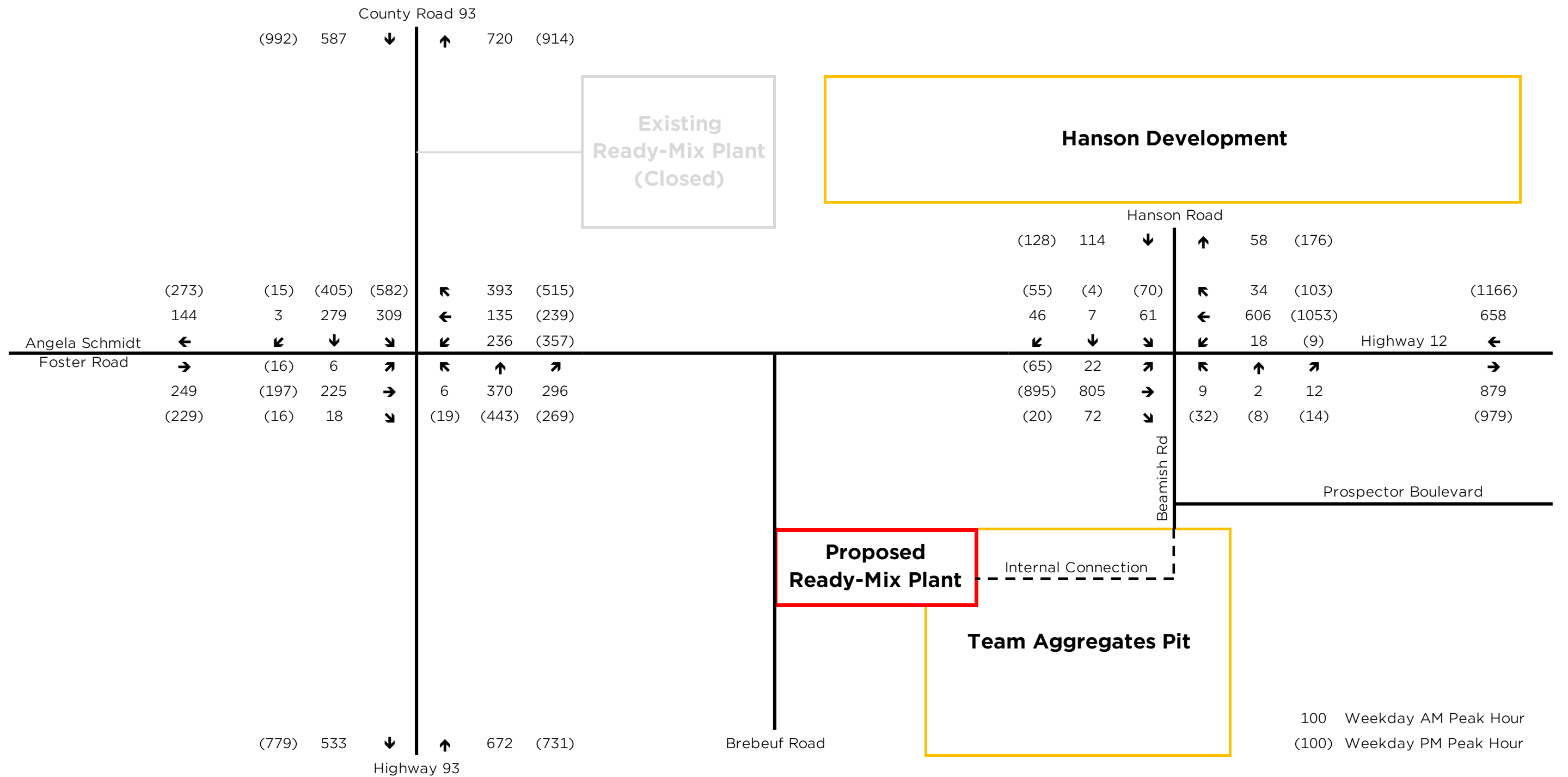




1017-1029 BREBEUF ROAD - TRANSPORTATION IMPACT STUDY

Figure 15: Traffic Volumes - 2031 Total





1017-1029 BREBEUF ROAD - TRANSPORTATION IMPACT STUDY

Figure 16: Traffic Volumes - 2036 Total



Appendix A: Study Terms of Reference

From: [Mulrenin, Colin \(MTQ\)](#)
To: [Matthew Buttrum](#); [Dorton, Peter \(MTQ\)](#);
Cc: [David Perks](#)
Subject: RE: Terms of Reference - 1017-1029 Brebeuf Road, Midland
Sent: 7/2/2024 5:18:07 PM

CAUTION: This email originated from outside of Tatham Engineering or Envision-Tatham. Do not click on links or open attachments unless you know the sender and have verified the sender's email address and know the content is safe.

Hi Matthew,

Our Traffic team has the following comments on the TOR:

- Please ensure traffic analysis is completed with the updated summer 2024 traffic volume counts.
- Please ensure opening day, 5 years and 10 years beyond opening day scenarios are analysed.
- Please ensure future developments within the study area are accounted for in future background traffic analysis.

Regards,

Colin Mulrenin (He/Him)

Corridor Management Planner (York/Simcoe) | Highway Corridor Management Section
Ministry Of Transportation | Ontario Public Service
437-533-9427 | colin.mulrenin@ontario.ca

7th Floor
159 Sir William Hearst Avenue
Toronto ON Postal Code M3M 0B7



Taking pride in strengthening Ontario, its places and its people

From: Matthew Buttrum <mbuttrum@tathameng.com>
Sent: Thursday, June 13, 2024 9:37 AM
To: Mulrenin, Colin (MTO) <Colin.Mulrenin@ontario.ca>; Dorton, Peter (MTO) <Peter.Dorton@ontario.ca>
Cc: David Perks <dperks@tathameng.com>
Subject: RE: Terms of Reference - 1017-1029 Brebeuf Road, Midland

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Hi Colin,

Thank you for the confirmation.

Regards,



Matthew Buttrum EIT
Engineering Intern

mbuttrum@tathameng.com T 705-733-9037 x2222
41 King Street, Unit 4, Barrie, Ontario L4N 6B5

tathameng.com



This email may contain confidential and/or privileged information for the sole use of the intended recipient. Any review or distribution by others is strictly prohibited. If you have received this email in error, please contact the sender and delete all copies.

Tatham Engineering's agreement to transfer digital documents electronically or otherwise is made under the following conditions: 1. Electronic documents made available by Tatham Engineering are supplied for the recipient's use only under authorization from the current owner and with consent of Tatham Engineering. It is the responsibility of the recipient to determine the accuracy, completeness and the appropriateness of the information provided. 2. It is agreed that only those hard copy documents bearing the professional seal and signature of the Tatham Engineering project engineer will govern the work of the project. In the event of any dispute concerning an electronic document, the appropriately dated hard copy will be the document used by Tatham Engineering to govern and resolve the dispute.

From: Mulrenin, Colin (MTO) <Colin.Mulrenin@ontario.ca>
Sent: Thursday, June 13, 2024 9:35 AM
To: Matthew Buttrum <mbuttrum@tathameng.com>; Dorton, Peter (MTO) <Peter.Dorton@ontario.ca>
Cc: David Perks <dperks@tathameng.com>
Subject: RE: Terms of Reference - 1017-1029 Brebeuf Road, Midland

CAUTION: This email originated from outside of Tatham Engineering or Envision-Tatham. Do not click on links or open attachments unless you know the sender and have verified the sender's email address and know the content is safe.

Hi Matthew,

Yes the TOR has been received and we are reviewing it.

Regards,

Colin Mulrenin (He/Him)

Corridor Management Planner (York/Simcoe) | Highway Corridor Management Section
Ministry Of Transportation | Ontario Public Service
437-533-9427 | colin.mulrenin@ontario.ca

7th Floor
159 Sir William Hearst Avenue
Toronto ON Postal Code M3M 0B7



Taking pride in strengthening Ontario, its places and its people

From: Matthew Buttrum <mbuttrum@tathameng.com>
Sent: Thursday, June 13, 2024 9:20 AM
To: Dorton, Peter (MTO) <Peter.Dorton@ontario.ca>
Cc: David Perks <dperks@tathameng.com>; Mulrenin, Colin (MTO) <Colin.Mulrenin@ontario.ca>
Subject: FW: Terms of Reference - 1017-1029 Brebeuf Road, Midland

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Hi Peter,

I sent Colin a Terms of Reference a few weeks ago (see below, and attached figures) for a traffic study we've been retained to prepare regarding the relocation of a concrete ready-mix plant near Midland.

I haven't heard back from him yet confirming his receipt of the ToR. Could you please follow up with him or pass this along to whoever will be reviewing it (if it that hasn't already happened)?

Thanks,



Matthew Buttrum EIT
Engineering Intern

mbuttrum@tathameng.com T 705-733-9037 x2222
41 King Street, Unit 4, Barrie, Ontario L4N 6B5

tathameng.com



This email may contain confidential and/or privileged information for the sole use of the intended recipient. Any review or distribution by others is strictly prohibited. If you have received this email in error, please contact the sender and delete all copies.

Tatham Engineering's agreement to transfer digital documents electronically or otherwise is made under the following conditions: 1. Electronic documents made available by Tatham Engineering are supplied for the recipient's use only under authorization from the current owner and with consent of Tatham Engineering. It is the responsibility of the recipient to determine the accuracy, completeness and the appropriateness of the information provided. 2. It is agreed that only those hard copy documents bearing the professional seal and signature of the Tatham Engineering project engineer will govern the work of the project. In the event of any dispute concerning an electronic document, the appropriately dated hard copy will be the document used by Tatham Engineering to govern and resolve the dispute.

From: Matthew Buttrum
Sent: Wednesday, June 5, 2024 4:42 PM
To: Mulrenin, Colin (MTO) <colin.mulrenin@ontario.ca>
Cc: David Perks <dperks@tathameng.com>
Subject: RE: Terms of Reference - 1017-1029 Brebeuf Road, Midland

Hi Colin,

Just checking in again to confirm that you've received the terms of reference outlined below.

Thanks,



Matthew Buttrum EIT
Engineering Intern

mbuttrum@tathameng.com T 705-733-9037 x2222
41 King Street, Unit 4, Barrie, Ontario L4N 6B5

tathameng.com



This email may contain confidential and/or privileged information for the sole use of the intended recipient. Any review or distribution by others is strictly prohibited. If you have received this email in error, please contact the sender and delete all copies.

Tatham Engineering's agreement to transfer digital documents electronically or otherwise is made under the following conditions: 1. Electronic documents made available by Tatham Engineering are supplied for the recipient's use only under authorization from the current owner and with consent of Tatham Engineering. It is the responsibility of the recipient to determine the accuracy, completeness and the appropriateness of the information provided. 2. It is agreed that only those hard copy documents bearing the professional seal and signature of the Tatham Engineering project engineer will govern the work of the project. In the event of any dispute concerning an electronic document, the appropriately dated hard copy will be the document used by Tatham Engineering to govern and resolve the dispute.

From: Matthew Buttrum
Sent: Wednesday, May 29, 2024 3:32 PM
To: Mulrenin, Colin (MTO) <colin.mulrenin@ontario.ca>
Cc: David Perks <dperks@tathameng.com>
Subject: RE: Terms of Reference - 1017-1029 Brebeuf Road, Midland

Hi Colin,

Just wanted to confirm that you've received the terms of reference outlined below.

Thanks,



Matthew Buttrum EIT
Engineering Intern

mbuttrum@tathameng.com T 705-733-9037 x2222
41 King Street, Unit 4, Barrie, Ontario L4N 6B5

tathameng.com A row of small, faint social media icons for LinkedIn, Facebook, and Twitter.



This email may contain confidential and/or privileged information for the sole use of the intended recipient. Any review or distribution by others is strictly prohibited. If you have received this email in error, please contact the sender and delete all copies.

Tatham Engineering's agreement to transfer digital documents electronically or otherwise is made under the following conditions: 1. Electronic documents made available by Tatham Engineering are supplied for the recipient's use only under authorization from the current owner and with consent of Tatham Engineering. It is the responsibility of the recipient to determine the accuracy, completeness and the appropriateness of the information provided. 2. It is agreed that only those hard copy documents bearing the professional seal and signature of the Tatham Engineering project engineer will govern the work of the project. In the event of any dispute concerning an electronic document, the appropriately dated hard copy will be the document used by Tatham Engineering to govern and resolve the dispute.

From: Matthew Buttrum
Sent: Wednesday, May 22, 2024 10:44 AM
To: Mulrenin, Colin (MTO) <colin.mulrenin@ontario.ca>
Cc: David Perks <dperks@tathameng.com>
Subject: Terms of Reference - 1017-1029 Brebeuf Road, Midland

Hello Colin,

We (Tatham Engineering Limited) have been retained to prepare a traffic impact study in support of a proposed ready-mix concrete plant to be located at 1017 and 1029 Brebeuf Road in the Town of Midland. Recognizing that our proposed development is located within the Permit Control Area for Highway 12, we have prepared the following terms of reference for MTO review and acceptance prior to commencement of the study.

Development Details

A ready-mix concrete plant operated by our client is currently located at 8933 County Road 93. They wish to relocate the plant to 1017 and 1029 Brebeuf Road, approximately 1.3 km southeast of the current location. This new location is located adjacent to a large aggregate extraction pit (Team Aggregates) which supplies a significant proportion of the raw aggregate materials used at the ready-mix plant.

At the existing ready-mix plant, based on trip data supplied by the client, peak daily truck trips were as follows:

- Ready-mix concrete – 30 daily round trips (i.e. 30 trucks in, 30 trucks out)
- Team Aggregates Pit – 40 daily round trips

Based on communications with the client, it is understood that access from the proposed ready-mix plant to the external road network will be provided only through the Team Aggregates pit to Beamish Road, not via Brebeuf Road. This will allow for synergies to be realized between the new ready-mix plant and adjacent aggregate pit – supply of aggregate materials can be performed internally, without the need for aggregate trucks to access the external road network. This will result in a notable reduction in truck traffic generated by the proposed development, as illustrated in the attached figures.

Terms of Reference:

Based on the anticipated trip generation of the site (in the order of 10 peak hour trips) and overall reduction in external traffic to be generated (as compared to the existing development site), we believe that a traffic impact brief will be sufficient to address the impacts associated with the proposed ready-mix plant. The scope for such would be as follows:

1. Study area to consist of intersections of Highway 12 with Highway 93/County Road 93 and Highway 12 with Beamish Road/Hanson Road.
2. New 8-hour traffic counts to be conducted at each intersection. We are intending on completing the counts within the next couple of weeks, as May and June represent the busiest period at the existing ready-mix plant. If possible, could MTO please expedite confirmation of the proposed study area such that we may schedule the counts within the noted window.
3. Study horizons – existing (2024), and a single future horizon (i.e. 5 years, build-out + 5 years, etc – whichever is preferable to MTO).
4. Future traffic volumes to consider historical and projected growth within area and along Highway 12/Highway 93 corridor.
5. Operations of study area intersections will be reviewed at each horizon, including commentary on any potential improvements required.
6. Study will also review concerns specific to local municipality, such as parking requirements, site circulation, etc.

As noted, the above scope of work is reflective of a Traffic Impact Brief. Should MTO require a full Traffic Impact Study to be completed, we will include the above scope and expand as necessary based on MTO's feedback and TIS requirements. In this

respect, the assessment would consider existing conditions (2024), year of build-out, and 5 and 10 year horizons beyond build-out, assessed under both background conditions (without subject development traffic) and total conditions (with subject development traffic).

Please review the above and provide me with any comments or questions. I look forward to hearing back from you.

Regards,



Matthew Buttrum EIT
Engineering Intern

mbuttrum@tathameng.com T 705-733-9037 x2222
41 King Street, Unit 4, Barrie, Ontario L4N 6B5

tathameng.com   



This email may contain confidential and/or privileged information for the sole use of the intended recipient. Any review or distribution by others is strictly prohibited. If you have received this email in error, please contact the sender and delete all copies.

Tatham Engineering's agreement to transfer digital documents electronically or otherwise is made under the following conditions: 1. Electronic documents made available by Tatham Engineering are supplied for the recipient's use only under authorization from the current owner and with consent of Tatham Engineering. It is the responsibility of the recipient to determine the accuracy, completeness and the appropriateness of the information provided. 2. It is agreed that only those hard copy documents bearing the professional seal and signature of the Tatham Engineering project engineer will govern the work of the project. In the event of any dispute concerning an electronic document, the appropriately dated hard copy will be the document used by Tatham Engineering to govern and resolve the dispute.

Appendix B: Traffic Data

Morning Peak Diagram		Specified Period From: 7:00:00 To: 9:00:00	One Hour Peak From: 7:30:00 To: 8:30:00
Municipality: Midland Site #: 2408700001 Intersection: HWY 93 & HWY 12 TFR File #: 1 Count date: 30-May-24		Weather conditions: Person counted: Person prepared: Person checked:	
** Signalized Intersection **		Major Road: HWY 93 runs N/S	

North Leg Total: 955 North Entering: 458 North Peds: 0 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 2px;">Heavys</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;">4</td> <td style="padding: 2px;">13</td> <td style="padding: 2px;">17</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Trucks</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;">5</td> <td style="padding: 2px;">7</td> <td style="padding: 2px;">12</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Cars</td> <td style="padding: 2px;">3</td> <td style="padding: 2px;">232</td> <td style="padding: 2px;">194</td> <td style="padding: 2px;">429</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Totals</td> <td style="padding: 2px;">3</td> <td style="padding: 2px;">241</td> <td style="padding: 2px;">214</td> <td style="padding: 2px;"></td> </tr> </table>	Heavys	0	4	13	17	Trucks	0	5	7	12	Cars	3	232	194	429	Totals	3	241	214		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 2px;">Heavys</td> <td style="padding: 2px;">35</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Trucks</td> <td style="padding: 2px;">7</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Cars</td> <td style="padding: 2px;">455</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Totals</td> <td style="padding: 2px;">497</td> </tr> </table>	Heavys	35	Trucks	7	Cars	455	Totals	497	East Leg Total: 1174 East Entering: 507 East Peds: 0 Peds Cross:
Heavys	0	4	13	17																											
Trucks	0	5	7	12																											
Cars	3	232	194	429																											
Totals	3	241	214																												
Heavys	35																														
Trucks	7																														
Cars	455																														
Totals	497																														

Heavys	Trucks	Cars	Totals
10	1	122	133

County Road 93

Cars	Trucks	Heavys	Totals
203	4	17	224
114	1	9	124
146	1	12	159
463	6	38	

The Angela Schmidt Foster Rd

N
S
W
E

HWY 12

Heavys	Trucks	Cars	Totals
0	0	6	6
10	1	209	220
0	0	18	18
10	1	233	

HWY 93

Cars	Trucks	Heavys	Totals
620	15	32	667

Peds Cross: West Peds: 0 West Entering: 244 West Leg Total: 377	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 2px;">Cars</td> <td style="padding: 2px;">396</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Trucks</td> <td style="padding: 2px;">6</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Heavys</td> <td style="padding: 2px;">16</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Totals</td> <td style="padding: 2px;">418</td> </tr> </table>	Cars	396	Trucks	6	Heavys	16	Totals	418	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 2px;">Cars</td> <td style="padding: 2px;">5</td> <td style="padding: 2px;">246</td> <td style="padding: 2px;">217</td> <td style="padding: 2px;">468</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Trucks</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;">3</td> <td style="padding: 2px;">7</td> <td style="padding: 2px;">10</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Heavys</td> <td style="padding: 2px;">1</td> <td style="padding: 2px;">18</td> <td style="padding: 2px;">9</td> <td style="padding: 2px;">28</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Totals</td> <td style="padding: 2px;">6</td> <td style="padding: 2px;">267</td> <td style="padding: 2px;">233</td> <td style="padding: 2px;"></td> </tr> </table>	Cars	5	246	217	468	Trucks	0	3	7	10	Heavys	1	18	9	28	Totals	6	267	233		Peds Cross: South Peds: 0 South Entering: 506 South Leg Total: 924
Cars	396																														
Trucks	6																														
Heavys	16																														
Totals	418																														
Cars	5	246	217	468																											
Trucks	0	3	7	10																											
Heavys	1	18	9	28																											
Totals	6	267	233																												

Comments

Mid-day Peak Diagram		Specified Period From: 11:00:00 To: 14:00:00	One Hour Peak From: 12:30:00 To: 13:30:00
Municipality: Midland Site #: 2408700001 Intersection: HWY 93 & HWY 12 TFR File #: 1 Count date: 30-May-24		Weather conditions: Person counted: Person prepared: Person checked:	
** Signalized Intersection **		Major Road: HWY 93 runs N/S	

North Leg Total: 1190 North Entering: 592 North Peds: 0 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">0</td> <td style="text-align: right;">14</td> <td style="text-align: right;">7</td> <td style="text-align: right;">21</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">0</td> <td style="text-align: right;">9</td> <td style="text-align: right;">3</td> <td style="text-align: right;">12</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">13</td> <td style="text-align: right;">204</td> <td style="text-align: right;">342</td> <td style="text-align: right;">559</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">13</td> <td style="text-align: right;">227</td> <td style="text-align: right;">352</td> <td></td> </tr> </table>	Heavys	0	14	7	21	Trucks	0	9	3	12	Cars	13	204	342	559	Totals	13	227	352		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">16</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">7</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">575</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">598</td> </tr> </table>	Heavys	16	Trucks	7	Cars	575	Totals	598	East Leg Total: 1275 East Entering: 664 East Peds: 0 Peds Cross:
Heavys	0	14	7	21																											
Trucks	0	9	3	12																											
Cars	13	204	342	559																											
Totals	13	227	352																												
Heavys	16																														
Trucks	7																														
Cars	575																														
Totals	598																														

Heavys	Trucks	Cars	Totals
3	3	184	190

The Angela Schmidt Foster Rd

Heavys	Trucks	Cars	Totals
0	0	10	10
2	1	112	115
0	0	12	12
2	1	134	

County Road 93

HWY 93

Cars	Trucks	Heavys	Totals
355	2	6	363
158	3	2	163
129	0	9	138
642	5	17	

HWY 12

Cars	Trucks	Heavys	Totals
591	5	15	611

Peds Cross: West Peds: 0 West Entering: 137 West Leg Total: 327	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">345</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">9</td> </tr> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">23</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">377</td> </tr> </table>	Cars	345	Trucks	9	Heavys	23	Totals	377	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">13</td> <td style="text-align: right;">210</td> <td style="text-align: right;">137</td> <td style="text-align: right;">360</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">0</td> <td style="text-align: right;">5</td> <td style="text-align: right;">1</td> <td style="text-align: right;">6</td> </tr> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">1</td> <td style="text-align: right;">10</td> <td style="text-align: right;">6</td> <td style="text-align: right;">17</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">14</td> <td style="text-align: right;">225</td> <td style="text-align: right;">144</td> <td></td> </tr> </table>	Cars	13	210	137	360	Trucks	0	5	1	6	Heavys	1	10	6	17	Totals	14	225	144		Peds Cross: South Peds: 0 South Entering: 383 South Leg Total: 760
Cars	345																														
Trucks	9																														
Heavys	23																														
Totals	377																														
Cars	13	210	137	360																											
Trucks	0	5	1	6																											
Heavys	1	10	6	17																											
Totals	14	225	144																												

Comments

Afternoon Peak Diagram		Specified Period From: 15:00:00 To: 18:00:00	One Hour Peak From: 16:00:00 To: 17:00:00
Municipality: Midland Site #: 2408700001 Intersection: HWY 93 & HWY 12 TFR File #: 1 Count date: 30-May-24		Weather conditions: Person counted: Person prepared: Person checked:	
** Signalized Intersection **		Major Road: HWY 93 runs N/S	

North Leg Total: 1380 North Entering: 697 North Peds: 0 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">0</td> <td style="text-align: right;">14</td> <td style="text-align: right;">5</td> <td style="text-align: right;">19</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">0</td> <td style="text-align: right;">8</td> <td style="text-align: right;">3</td> <td style="text-align: right;">11</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">15</td> <td style="text-align: right;">327</td> <td style="text-align: right;">325</td> <td style="text-align: right;">667</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">15</td> <td style="text-align: right;">349</td> <td style="text-align: right;">333</td> <td></td> </tr> </table>	Heavys	0	14	5	19	Trucks	0	8	3	11	Cars	15	327	325	667	Totals	15	349	333		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">10</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">7</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">666</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">683</td> </tr> </table>	Heavys	10	Trucks	7	Cars	666	Totals	683	East Leg Total: 1542 East Entering: 824 East Peds: 0 Peds Cross:
Heavys	0	14	5	19																											
Trucks	0	8	3	11																											
Cars	15	327	325	667																											
Totals	15	349	333																												
Heavys	10																														
Trucks	7																														
Cars	666																														
Totals	683																														

Heavys	3	Trucks	1	Cars	259	Totals	263
--------	---	--------	---	------	-----	--------	-----

County Road 93

Cars	340	Trucks	3	Heavys	5	Totals	348
Cars	226	Trucks	1	Heavys	2	Totals	229
Cars	244	Trucks	0	Heavys	3	Totals	247
Cars	810	Trucks	4	Heavys	10	Totals	

Heavys	0	Trucks	0	Cars	16	Totals	16
Heavys	10	Trucks	3	Cars	169	Totals	182
Heavys	0	Trucks	0	Cars	32	Totals	32
Heavys	10	Trucks	3	Cars	217	Totals	

The Angela Schmidt Foster Rd

Cars	688	Trucks	7	Heavys	23	Totals	718
------	-----	--------	---	--------	----	--------	-----

Peds Cross: West Peds: 0 West Entering: 230 West Leg Total: 493	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">603</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">8</td> </tr> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">17</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">628</td> </tr> </table>	Cars	603	Trucks	8	Heavys	17	Totals	628	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">18</td> <td style="text-align: right;">310</td> <td style="text-align: right;">194</td> <td style="text-align: right;">522</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">0</td> <td style="text-align: right;">4</td> <td style="text-align: right;">1</td> <td style="text-align: right;">5</td> </tr> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">1</td> <td style="text-align: right;">5</td> <td style="text-align: right;">8</td> <td style="text-align: right;">14</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">19</td> <td style="text-align: right;">319</td> <td style="text-align: right;">203</td> <td></td> </tr> </table>	Cars	18	310	194	522	Trucks	0	4	1	5	Heavys	1	5	8	14	Totals	19	319	203		Peds Cross: South Peds: 0 South Entering: 541 South Leg Total: 1169
Cars	603																														
Trucks	8																														
Heavys	17																														
Totals	628																														
Cars	18	310	194	522																											
Trucks	0	4	1	5																											
Heavys	1	5	8	14																											
Totals	19	319	203																												

Comments

Total Count Diagram

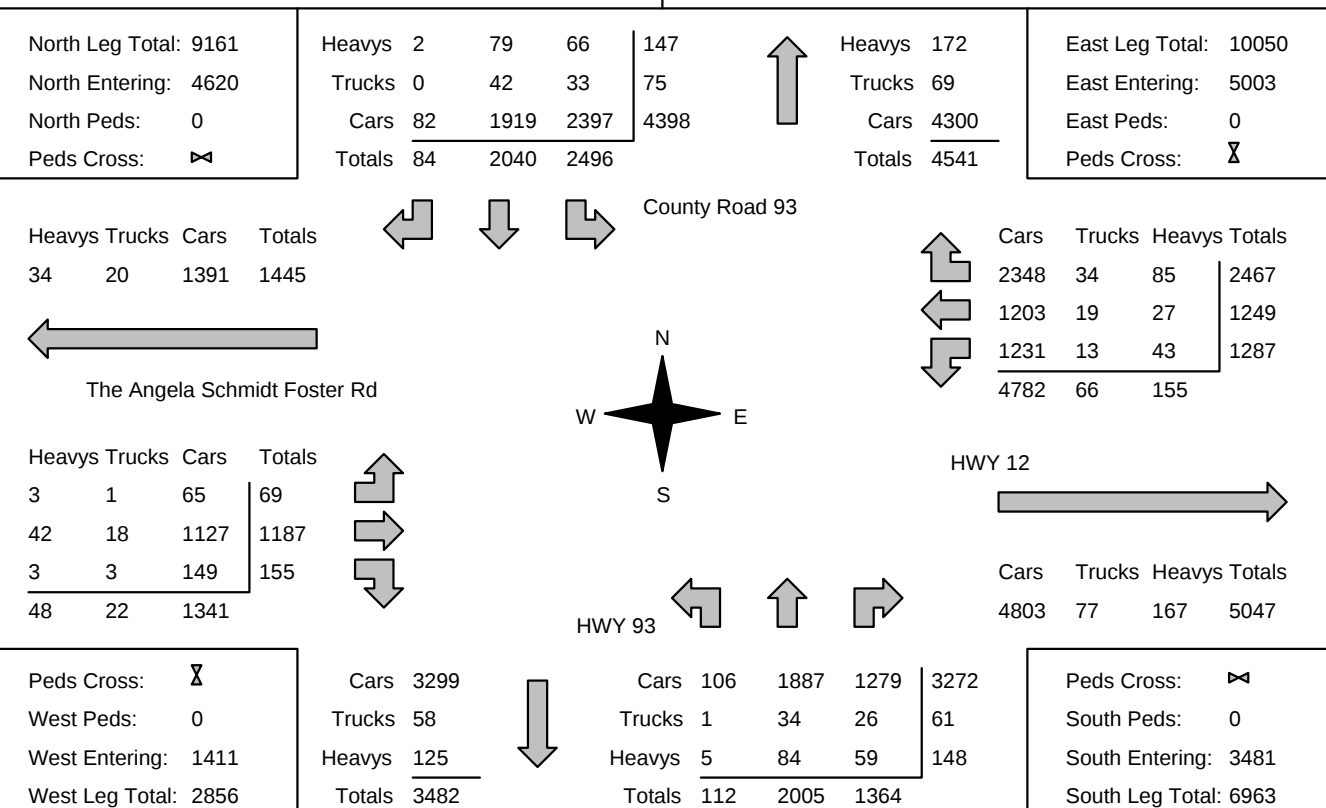
Municipality: Midland
Site #: 2408700001
Intersection: HWY 93 & HWY 12
TFR File #: 1
Count date: 30-May-24

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Signalized Intersection ****

Major Road: HWY 93 runs N/S



Comments

Traffic Count Summary

Intersection: HWY 93 & HWY 12

Count Date: 30-May-24

Municipality: Midland

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	189	270	7	466	0	857	8:00:00	4	201	186	391	0
9:00:00	223	215	5	443	0	904	9:00:00	7	247	207	461	0
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	385	211	13	609	0	964	12:00:00	14	214	127	355	0
13:00:00	329	222	14	565	0	940	13:00:00	13	220	142	375	0
14:00:00	346	217	15	578	0	965	14:00:00	14	228	145	387	0
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	365	297	8	670	0	1111	16:00:00	19	265	157	441	0
17:00:00	333	349	15	697	0	1238	17:00:00	19	319	203	541	0
18:00:00	326	259	7	592	0	1122	18:00:00	22	311	197	530	0

Count Date: 30-May-24 Site #: 2408700001

Interval Time	Passenger Cars - North Approach						Trucks - North Approach						Heavys - North Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		North Cross	
	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	0
7:15:00	34	34	73	73	2	2	1	1	1	1	0	0	4	4	1	1	1	1	0	0
7:30:00	71	37	146	73	3	1	1	0	1	0	0	0	7	3	3	2	2	1	0	0
7:45:00	113	42	195	49	4	1	1	0	1	0	0	0	11	4	3	0	2	0	0	0
8:00:00	172	59	262	67	5	1	2	1	3	2	0	0	15	4	5	2	2	0	0	0
8:15:00	214	42	316	54	6	1	5	3	4	1	0	0	17	2	6	1	2	0	0	0
8:30:00	265	51	378	62	6	0	8	3	6	2	0	0	20	3	7	1	2	0	0	0
8:45:00	329	64	425	47	8	2	8	0	6	0	0	0	23	3	13	6	2	0	0	0
9:00:00	372	43	464	39	10	2	9	1	7	1	0	0	31	8	14	1	2	0	0	0
9:15:00	372	0	464	0	10	0	9	0	7	0	0	0	31	0	14	0	2	0	0	0
11:00:00	372	0	464	0	10	0	9	0	7	0	0	0	31	0	14	0	2	0	0	0
11:15:00	457	85	510	46	14	4	12	3	7	0	0	0	33	2	17	3	2	0	0	0
11:30:00	545	88	563	53	17	3	13	1	8	1	0	0	36	3	22	5	2	0	0	0
11:45:00	639	94	616	53	22	5	13	0	8	0	0	0	38	2	22	0	2	0	0	0
12:00:00	742	103	663	47	23	1	16	3	8	0	0	0	39	1	25	3	2	0	0	0
12:15:00	811	69	716	53	26	3	17	1	9	1	0	0	40	1	28	3	2	0	0	0
12:30:00	888	77	767	51	29	3	17	0	9	0	0	0	42	2	34	6	2	0	0	0
12:45:00	963	75	816	49	34	5	17	0	11	2	0	0	43	1	37	3	2	0	0	0
13:00:00	1064	101	868	52	37	3	17	0	12	1	0	0	45	2	38	1	2	0	0	0
13:15:00	1140	76	914	46	38	1	19	2	14	2	0	0	46	1	42	4	2	0	0	0
13:30:00	1230	90	971	57	42	4	20	1	18	4	0	0	49	3	48	6	2	0	0	0
13:45:00	1308	78	1009	38	44	2	21	1	19	1	0	0	52	3	51	3	2	0	0	0
14:00:00	1396	88	1063	54	52	8	23	2	20	1	0	0	53	1	52	1	2	0	0	0
14:15:00	1396	0	1063	0	52	0	23	0	20	0	0	0	53	0	52	0	2	0	0	0
15:00:00	1396	0	1063	0	52	0	23	0	20	0	0	0	53	0	52	0	2	0	0	0
15:15:00	1473	77	1128	65	54	2	26	3	23	3	0	0	57	4	57	5	2	0	0	0
15:30:00	1555	82	1211	83	55	1	27	1	26	3	0	0	58	1	58	1	2	0	0	0
15:45:00	1658	103	1279	68	58	3	27	0	26	0	0	0	59	1	61	3	2	0	0	0
16:00:00	1750	92	1340	61	60	2	27	0	30	4	0	0	60	1	62	1	2	0	0	0
16:15:00	1852	102	1432	92	66	6	27	0	32	2	0	0	63	3	70	8	2	0	0	0
16:30:00	1921	69	1505	73	70	4	28	1	33	1	0	0	64	1	73	3	2	0	0	0
16:45:00	1991	70	1598	93	73	3	28	0	37	4	0	0	64	0	74	1	2	0	0	0
17:00:00	2075	84	1667	69	75	2	30	2	38	1	0	0	65	1	76	2	2	0	0	0
17:15:00	2154	79	1760	93	78	3	32	2	42	4	0	0	66	1	78	2	2	0	0	0
17:30:00	2236	82	1821	61	78	0	32	0	42	0	0	0	66	0	78	0	2	0	0	0
17:45:00	2330	94	1870	49	80	2	33	1	42	0	0	0	66	0	78	0	2	0	0	0
18:00:00	2397	67	1919	49	82	2	33	0	42	0	0	0	66	0	79	1	2	0	0	0
18:15:00	2397	0	1919	0	82	0	33	0	42	0	0	0	66	0	79	0	2	0	0	0
18:15:15	2397	0	1919	0	82	0	33	0	42	0	0	0	66	0	79	0	2	0	0	0

Count Date: 30-May-24 Site #: 2408700001

Interval Time	Passenger Cars - East Approach						Trucks - East Approach						Heavys - East Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		East Cross	
	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	0
7:15:00	36	36	22	22	25	25	0	0	2	2	2	2	0	0	2	2	6	6	0	0
7:30:00	73	37	44	22	45	20	0	0	3	1	2	0	1	1	3	1	8	2	0	0
7:45:00	108	35	73	29	87	42	0	0	3	0	2	0	2	1	4	1	12	4	0	0
8:00:00	143	35	108	35	150	63	0	0	3	0	3	1	6	4	8	4	15	3	0	0
8:15:00	183	40	135	27	198	48	1	1	4	1	4	1	11	5	12	4	23	8	0	0
8:30:00	219	36	158	23	248	50	1	0	4	0	6	2	13	2	12	0	25	2	0	0
8:45:00	242	23	188	30	296	48	1	0	5	1	6	0	13	0	13	1	30	5	0	0
9:00:00	262	20	212	24	360	64	2	1	6	1	9	3	14	1	14	1	32	2	0	0
9:15:00	262	0	212	0	360	0	2	0	6	0	9	0	14	0	14	0	32	0	0	0
11:00:00	262	0	212	0	360	0	2	0	6	0	9	0	14	0	14	0	32	0	0	0
11:15:00	288	26	245	33	443	83	2	0	6	0	9	0	16	2	14	0	37	5	0	0
11:30:00	322	34	267	22	521	78	3	1	7	1	10	1	17	1	14	0	38	1	0	0
11:45:00	343	21	289	22	595	74	3	0	7	0	10	0	17	0	15	1	42	4	0	0
12:00:00	381	38	324	35	690	95	4	1	8	1	13	3	18	1	16	1	42	0	0	0
12:15:00	418	37	364	40	756	66	4	0	8	0	18	5	20	2	17	1	48	6	0	0
12:30:00	448	30	402	38	827	71	4	0	9	1	18	0	22	2	18	1	51	3	0	0
12:45:00	496	48	446	44	920	93	4	0	12	3	19	1	22	0	19	1	54	3	0	0
13:00:00	516	20	483	37	1005	85	4	0	12	0	19	0	23	1	19	0	55	1	0	0
13:15:00	553	37	529	46	1096	91	4	0	12	0	20	1	26	3	19	0	57	2	0	0
13:30:00	577	24	560	31	1182	86	4	0	12	0	20	0	31	5	20	1	57	0	0	0
13:45:00	617	40	599	39	1270	88	5	1	13	1	22	2	34	3	22	2	58	1	0	0
14:00:00	648	31	632	33	1358	88	5	0	13	0	23	1	35	1	22	0	62	4	0	0
14:15:00	648	0	632	0	1358	0	5	0	13	0	23	0	35	0	22	0	62	0	0	0
15:00:00	648	0	632	0	1358	0	5	0	13	0	23	0	35	0	22	0	62	0	0	0
15:15:00	688	40	669	37	1441	83	8	3	15	2	24	1	36	1	23	1	68	6	0	0
15:30:00	733	45	704	35	1528	87	8	0	17	2	25	1	37	1	25	2	70	2	0	0
15:45:00	789	56	740	36	1609	81	9	1	17	0	25	0	39	2	25	0	72	2	0	0
16:00:00	829	40	788	48	1689	80	10	1	17	0	27	2	39	0	25	0	75	3	0	0
16:15:00	892	63	839	51	1778	89	10	0	17	0	28	1	41	2	25	0	77	2	0	0
16:30:00	960	68	890	51	1853	75	10	0	17	0	28	0	41	0	25	0	77	0	0	0
16:45:00	1022	62	947	57	1948	95	10	0	18	1	29	1	42	1	27	2	79	2	0	0
17:00:00	1073	51	1014	67	2029	81	10	0	18	0	30	1	42	0	27	0	80	1	0	0
17:15:00	1118	45	1079	65	2130	101	12	2	19	1	30	0	43	1	27	0	81	1	0	0
17:30:00	1161	43	1126	47	2209	79	13	1	19	0	33	3	43	0	27	0	83	2	0	0
17:45:00	1197	36	1167	41	2285	76	13	0	19	0	34	1	43	0	27	0	84	1	0	0
18:00:00	1231	34	1203	36	2348	63	13	0	19	0	34	0	43	0	27	0	85	1	0	0
18:15:00	1231	0	1203	0	2348	0	13	0	19	0	34	0	43	0	27	0	85	0	0	0
18:15:15	1231	0	1203	0	2348	0	13	0	19	0	34	0	43	0	27	0	85	0	0	0

Count Date: 30-May-24 Site #: 2408700001

Interval Time	Passenger Cars - South Approach						Trucks - South Approach						Heavys - South Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		South Cross	
	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	0
7:15:00	0	0	20	20	19	19	0	0	1	1	0	0	0	0	4	4	3	3	0	0
7:30:00	2	2	56	36	59	40	0	0	2	1	0	0	0	0	4	0	6	3	0	0
7:45:00	2	0	117	61	107	48	0	0	2	0	1	1	0	0	7	3	10	4	0	0
8:00:00	3	1	187	70	170	63	0	0	3	1	4	3	1	1	11	4	12	2	0	0
8:15:00	6	3	245	58	227	57	0	0	3	0	7	3	1	0	16	5	14	2	0	0
8:30:00	7	1	302	57	276	49	0	0	5	2	7	0	1	0	22	6	15	1	0	0
8:45:00	9	2	349	47	314	38	0	0	7	2	8	1	1	0	27	5	18	3	0	0
9:00:00	10	1	409	60	363	49	0	0	8	1	10	2	1	0	31	4	20	2	0	0
9:15:00	10	0	409	0	363	0	0	0	8	0	10	0	1	0	31	0	20	0	0	0
11:00:00	10	0	409	0	363	0	0	0	8	0	10	0	1	0	31	0	20	0	0	0
11:15:00	12	2	466	57	394	31	0	0	9	1	11	1	1	0	34	3	22	2	0	0
11:30:00	15	3	508	42	415	21	0	0	11	2	13	2	1	0	36	2	24	2	0	0
11:45:00	18	3	561	53	452	37	0	0	14	3	13	0	1	0	38	2	26	2	0	0
12:00:00	24	6	604	43	479	27	0	0	16	2	15	2	1	0	42	4	26	0	0	0
12:15:00	29	5	650	46	514	35	0	0	17	1	15	0	1	0	46	4	26	0	0	0
12:30:00	33	4	700	50	540	26	0	0	20	3	16	1	1	0	50	4	27	1	0	0
12:45:00	34	1	755	55	575	35	0	0	20	0	16	0	1	0	50	0	28	1	0	0
13:00:00	37	3	807	52	615	40	0	0	21	1	17	1	1	0	54	4	30	2	0	0
13:15:00	40	3	850	43	642	27	0	0	22	1	17	0	2	1	58	4	31	1	0	0
13:30:00	46	6	910	60	677	35	0	0	25	3	17	0	2	0	60	2	33	2	0	0
13:45:00	46	0	957	47	710	33	0	0	26	1	18	1	2	0	63	3	36	3	0	0
14:00:00	50	4	1017	60	750	40	0	0	28	2	19	1	2	0	65	2	38	2	0	0
14:15:00	50	0	1017	0	750	0	0	0	28	0	19	0	2	0	65	0	38	0	0	0
15:00:00	50	0	1017	0	750	0	0	0	28	0	19	0	2	0	65	0	38	0	0	0
15:15:00	51	1	1084	67	784	34	1	1	29	1	19	0	3	1	68	3	41	3	0	0
15:30:00	53	2	1133	49	814	30	1	0	29	0	21	2	3	0	72	4	41	0	0	0
15:45:00	58	5	1185	52	843	29	1	0	29	0	21	0	3	0	75	3	44	3	0	0
16:00:00	66	8	1270	85	897	54	1	0	29	0	21	0	4	1	76	1	46	2	0	0
16:15:00	68	2	1332	62	945	48	1	0	32	3	21	0	4	0	77	1	48	2	0	0
16:30:00	73	5	1428	96	994	49	1	0	33	1	21	0	4	0	79	2	50	2	0	0
16:45:00	80	7	1493	65	1036	42	1	0	33	0	22	1	5	1	80	1	52	2	0	0
17:00:00	84	4	1580	87	1091	55	1	0	33	0	22	0	5	0	81	1	54	2	0	0
17:15:00	89	5	1644	64	1133	42	1	0	33	0	23	1	5	0	82	1	58	4	0	0
17:30:00	94	5	1719	75	1179	46	1	0	33	0	25	2	5	0	84	2	59	1	0	0
17:45:00	99	5	1802	83	1237	58	1	0	34	1	25	0	5	0	84	0	59	0	0	0
18:00:00	106	7	1887	85	1279	42	1	0	34	0	26	1	5	0	84	0	59	0	0	0
18:15:00	106	0	1887	0	1279	0	1	0	34	0	26	0	5	0	84	0	59	0	0	0
18:15:15	106	0	1887	0	1279	0	1	0	34	0	26	0	5	0	84	0	59	0	0	0

Count Date: 30-May-24 Site #: 2408700001

Interval Time	Passenger Cars - West Approach						Trucks - West Approach						Heavys - West Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		West Cross	
	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	0
7:15:00	0	0	26	26	7	7	0	0	0	0	0	0	0	0	2	2	0	0	0	0
7:30:00	0	0	66	40	9	2	0	0	0	0	0	0	1	1	5	3	0	0	0	0
7:45:00	2	2	113	47	14	5	0	0	0	0	0	0	1	0	8	3	0	0	0	0
8:00:00	3	1	192	79	19	5	0	0	0	0	0	0	1	0	11	3	0	0	0	0
8:15:00	5	2	240	48	23	4	0	0	1	1	0	0	1	0	13	2	0	0	0	0
8:30:00	6	1	275	35	27	4	0	0	1	0	0	0	1	0	15	2	0	0	0	0
8:45:00	8	2	311	36	34	7	0	0	1	0	0	0	1	0	15	0	0	0	0	0
9:00:00	10	2	356	45	36	2	0	0	3	2	0	0	1	0	16	1	1	1	0	0
9:15:00	10	0	356	0	36	0	0	0	3	0	0	0	1	0	16	0	1	0	0	0
11:00:00	10	0	356	0	36	0	0	0	3	0	0	0	1	0	16	0	1	0	0	0
11:15:00	12	2	376	20	42	6	0	0	4	1	0	0	1	0	16	0	2	1	0	0
11:30:00	15	3	414	38	49	7	1	1	5	1	0	0	1	0	19	3	2	0	0	0
11:45:00	18	3	453	39	51	2	1	0	5	0	0	0	1	0	20	1	2	0	0	0
12:00:00	20	2	491	38	56	5	1	0	5	0	0	0	1	0	20	0	2	0	0	0
12:15:00	22	2	516	25	62	6	1	0	6	1	0	0	1	0	21	1	2	0	0	0
12:30:00	22	0	540	24	69	7	1	0	8	2	0	0	1	0	21	0	2	0	0	0
12:45:00	25	3	563	23	73	4	1	0	9	1	0	0	1	0	21	0	2	0	0	0
13:00:00	27	2	602	39	77	4	1	0	9	0	0	0	1	0	22	1	2	0	0	0
13:15:00	28	1	627	25	78	1	1	0	9	0	0	0	1	0	22	0	2	0	0	0
13:30:00	32	4	652	25	81	3	1	0	9	0	0	0	1	0	23	1	2	0	0	0
13:45:00	35	3	674	22	87	6	1	0	10	1	0	0	1	0	25	2	2	0	0	0
14:00:00	37	2	705	31	88	1	1	0	11	1	0	0	1	0	25	0	3	1	0	0
14:15:00	37	0	705	0	88	0	1	0	11	0	0	0	1	0	25	0	3	0	0	0
15:00:00	37	0	705	0	88	0	1	0	11	0	0	0	1	0	25	0	3	0	0	0
15:15:00	38	1	736	31	90	2	1	0	11	0	1	1	2	1	25	0	3	0	0	0
15:30:00	39	1	758	22	97	7	1	0	12	1	2	1	3	1	27	2	3	0	0	0
15:45:00	42	3	796	38	105	8	1	0	12	0	2	0	3	0	28	1	3	0	0	0
16:00:00	45	3	828	32	106	1	1	0	12	0	3	1	3	0	29	1	3	0	0	0
16:15:00	54	9	859	31	113	7	1	0	13	1	3	0	3	0	31	2	3	0	0	0
16:30:00	56	2	900	41	125	12	1	0	14	1	3	0	3	0	33	2	3	0	0	0
16:45:00	58	2	944	44	136	11	1	0	14	0	3	0	3	0	35	2	3	0	0	0
17:00:00	61	3	997	53	138	2	1	0	15	1	3	0	3	0	39	4	3	0	0	0
17:15:00	61	0	1026	29	139	1	1	0	15	0	3	0	3	0	42	3	3	0	0	0
17:30:00	63	2	1064	38	144	5	1	0	17	2	3	0	3	0	42	0	3	0	0	0
17:45:00	63	0	1094	30	147	3	1	0	18	1	3	0	3	0	42	0	3	0	0	0
18:00:00	65	2	1127	33	149	2	1	0	18	0	3	0	3	0	42	0	3	0	0	0
18:15:00	65	0	1127	0	149	0	1	0	18	0	3	0	3	0	42	0	3	0	0	0
18:15:15	65	0	1127	0	149	0	1	0	18	0	3	0	3	0	42	0	3	0	0	0

Morning Peak Diagram		Specified Period From: 7:00:00 To: 9:00:00	One Hour Peak From: 7:45:00 To: 8:45:00
Municipality: Midland Site #: 2408700002 Intersection: HWY 12 & Hanson Rd TFR File #: 1 Count date: 30-May-24		Weather conditions: Person counted: Person prepared: Person checked:	
** Non-Signalized Intersection **		Major Road: HWY 12 runs W/E	

North Leg Total: 31 North Entering: 20 North Peds: 0 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 2px;">Heavys</td> <td style="padding: 2px;">1</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;">1</td> <td style="border-right: 1px solid black; padding: 2px;">2</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Trucks</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;">0</td> <td style="border-right: 1px solid black; padding: 2px;">0</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Cars</td> <td style="padding: 2px;">11</td> <td style="padding: 2px;">1</td> <td style="padding: 2px;">6</td> <td style="border-right: 1px solid black; padding: 2px;">18</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Totals</td> <td style="padding: 2px;">12</td> <td style="padding: 2px;">1</td> <td style="padding: 2px;">7</td> <td style="border-right: 1px solid black; padding: 2px;"></td> <td style="padding: 2px;"></td> </tr> </table>	Heavys	1	0	1	2		Trucks	0	0	0	0		Cars	11	1	6	18		Totals	12	1	7			<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 2px;">Heavys</td> <td style="padding: 2px;">2</td> <td style="padding: 2px;"></td> <td style="padding: 2px;"></td> <td style="border-right: 1px solid black; padding: 2px;"></td> <td style="padding: 2px;"></td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Trucks</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;"></td> <td style="padding: 2px;"></td> <td style="border-right: 1px solid black; padding: 2px;"></td> <td style="padding: 2px;"></td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Cars</td> <td style="padding: 2px;">9</td> <td style="padding: 2px;"></td> <td style="padding: 2px;"></td> <td style="border-right: 1px solid black; padding: 2px;"></td> <td style="padding: 2px;"></td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Totals</td> <td style="padding: 2px;">11</td> <td style="padding: 2px;"></td> <td style="padding: 2px;"></td> <td style="border-right: 1px solid black; padding: 2px;"></td> <td style="padding: 2px;"></td> </tr> </table>	Heavys	2					Trucks	0					Cars	9					Totals	11					East Leg Total: 1113 East Entering: 496 East Peds: 0 Peds Cross:
Heavys	1	0	1	2																																															
Trucks	0	0	0	0																																															
Cars	11	1	6	18																																															
Totals	12	1	7																																																
Heavys	2																																																		
Trucks	0																																																		
Cars	9																																																		
Totals	11																																																		

Heavys	Trucks	Cars	Totals
32	4	461	497

Hanson Rd

Cars	Trucks	Heavys	Totals
5	0	2	7
441	4	28	473
15	0	1	16
461	4	31	

HWY 12

Heavys	Trucks	Cars	Totals
0	0	4	4
20	15	565	600
6	2	67	75
26	17	636	

Beamish Rd

HWY 12

Cars	83
Trucks	2
Heavys	7
Totals	92

Cars	9	0	10	19	
Trucks	0	0	0	0	
Heavys	3	0	0	3	
Totals	12	0	10		

Peds Cross:
 South Peds: 0
 South Entering: 22
 South Leg Total: 114

Comments

Mid-day Peak Diagram	Specified Period From: 11:00:00 To: 14:00:00	One Hour Peak From: 12:45:00 To: 13:45:00
Municipality: Midland Site #: 2408700002 Intersection: HWY 12 & Hanson Rd TFR File #: 1 Count date: 30-May-24	Weather conditions: Person counted: Person prepared: Person checked:	
** Non-Signalized Intersection **	Major Road: HWY 12 runs W/E	

North Leg Total: 29 North Entering: 14 North Peds: 0 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 2px;"> Heavys 0 0 0 0 Trucks 0 0 1 1 Cars 5 1 7 13 Totals 5 1 8 13 </td> <td style="text-align: center; padding: 2px;"> </td> <td style="padding: 2px;"> Heavys 0 Trucks 2 Cars 13 Totals 15 </td> </tr> </table>	Heavys 0 0 0 0 Trucks 0 0 1 1 Cars 5 1 7 13 Totals 5 1 8 13		Heavys 0 Trucks 2 Cars 13 Totals 15	East Leg Total: 1236 East Entering: 635 East Peds: 0 Peds Cross:
Heavys 0 0 0 0 Trucks 0 0 1 1 Cars 5 1 7 13 Totals 5 1 8 13		Heavys 0 Trucks 2 Cars 13 Totals 15			

Heavys	Trucks	Cars	Totals
16	7	619	642

HWY 12

Hanson Rd

Cars	Trucks	Heavys	Totals
6	1	0	7
591	6	15	612
16	0	0	16
613	7	15	

Heavys	Trucks	Cars	Totals
0	1	6	7
18	5	560	583
3	1	35	39
21	7	601	

HWY 12

Cars	Trucks	Heavys	Totals
577	6	18	601

Peds Cross:	Cars 52
West Peds: 0	Trucks 1
West Entering: 629	Heavys 3
West Leg Total: 1271	Totals 56

Beamish Rd

Cars 23 1 10 34 Trucks 1 0 0 1 Heavys 1 0 0 1 Totals 25 1 10 34	Cars 23 1 10 34 Trucks 1 0 0 1 Heavys 1 0 0 1 Totals 25 1 10 34
--	--

Peds Cross:	South Peds: 0
South Entering: 36	South Leg Total: 92

Comments

Afternoon Peak Diagram		Specified Period From: 15:00:00 To: 18:00:00	One Hour Peak From: 16:00:00 To: 17:00:00
Municipality: Midland Site #: 2408700002 Intersection: HWY 12 & Hanson Rd TFR File #: 1 Count date: 30-May-24		Weather conditions: Person counted: Person prepared: Person checked:	
** Non-Signalized Intersection **		Major Road: HWY 12 runs W/E	

North Leg Total: 41 North Entering: 20 North Peds: 0 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>1</td><td>0</td><td>0</td><td style="border-left: 1px solid black;">1</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>0</td><td style="border-left: 1px solid black;">0</td></tr> <tr><td>Cars</td><td>13</td><td>0</td><td>6</td><td style="border-left: 1px solid black;">19</td></tr> <tr><td>Totals</td><td>14</td><td>0</td><td>6</td><td style="border-left: 1px solid black;"></td></tr> </table>	Heavys	1	0	0	1	Trucks	0	0	0	0	Cars	13	0	6	19	Totals	14	0	6		<table style="width: 100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>1</td></tr> <tr><td>Trucks</td><td>0</td></tr> <tr><td>Cars</td><td>20</td></tr> <tr><td>Totals</td><td>21</td></tr> </table>	Heavys	1	Trucks	0	Cars	20	Totals	21	East Leg Total: 1503 East Entering: 799 East Peds: 0 Peds Cross:
Heavys	1	0	0	1																											
Trucks	0	0	0	0																											
Cars	13	0	6	19																											
Totals	14	0	6																												
Heavys	1																														
Trucks	0																														
Cars	20																														
Totals	21																														

Heavys	Trucks	Cars	Totals
10	4	816	830

HWY 12

Hanson Rd

Cars	Trucks	Heavys	Totals
11	0	0	11
771	3	7	781
6	0	1	7
788	3	8	

N
S
E
W

Heavys	Trucks	Cars	Totals
1	0	8	9
22	7	657	686
2	0	21	23
25	7	686	

Beamish Rd

HWY 12

Cars	Trucks	Heavys	Totals
675	7	22	704

Peds Cross: West Peds: 0 West Entering: 718 West Leg Total: 1548	<table style="width: 100%; border-collapse: collapse;"> <tr><td>Cars</td><td>27</td></tr> <tr><td>Trucks</td><td>0</td></tr> <tr><td>Heavys</td><td>3</td></tr> <tr><td>Totals</td><td>30</td></tr> </table>	Cars	27	Trucks	0	Heavys	3	Totals	30	<table style="width: 100%; border-collapse: collapse;"> <tr><td>Cars</td><td>32</td><td>1</td><td>12</td><td style="border-left: 1px solid black;">45</td></tr> <tr><td>Trucks</td><td>1</td><td>0</td><td>0</td><td style="border-left: 1px solid black;">1</td></tr> <tr><td>Heavys</td><td>2</td><td>0</td><td>0</td><td style="border-left: 1px solid black;">2</td></tr> <tr><td>Totals</td><td>35</td><td>1</td><td>12</td><td style="border-left: 1px solid black;"></td></tr> </table>	Cars	32	1	12	45	Trucks	1	0	0	1	Heavys	2	0	0	2	Totals	35	1	12		Peds Cross: South Peds: 0 South Entering: 48 South Leg Total: 78
Cars	27																														
Trucks	0																														
Heavys	3																														
Totals	30																														
Cars	32	1	12	45																											
Trucks	1	0	0	1																											
Heavys	2	0	0	2																											
Totals	35	1	12																												

Comments

Total Count Diagram

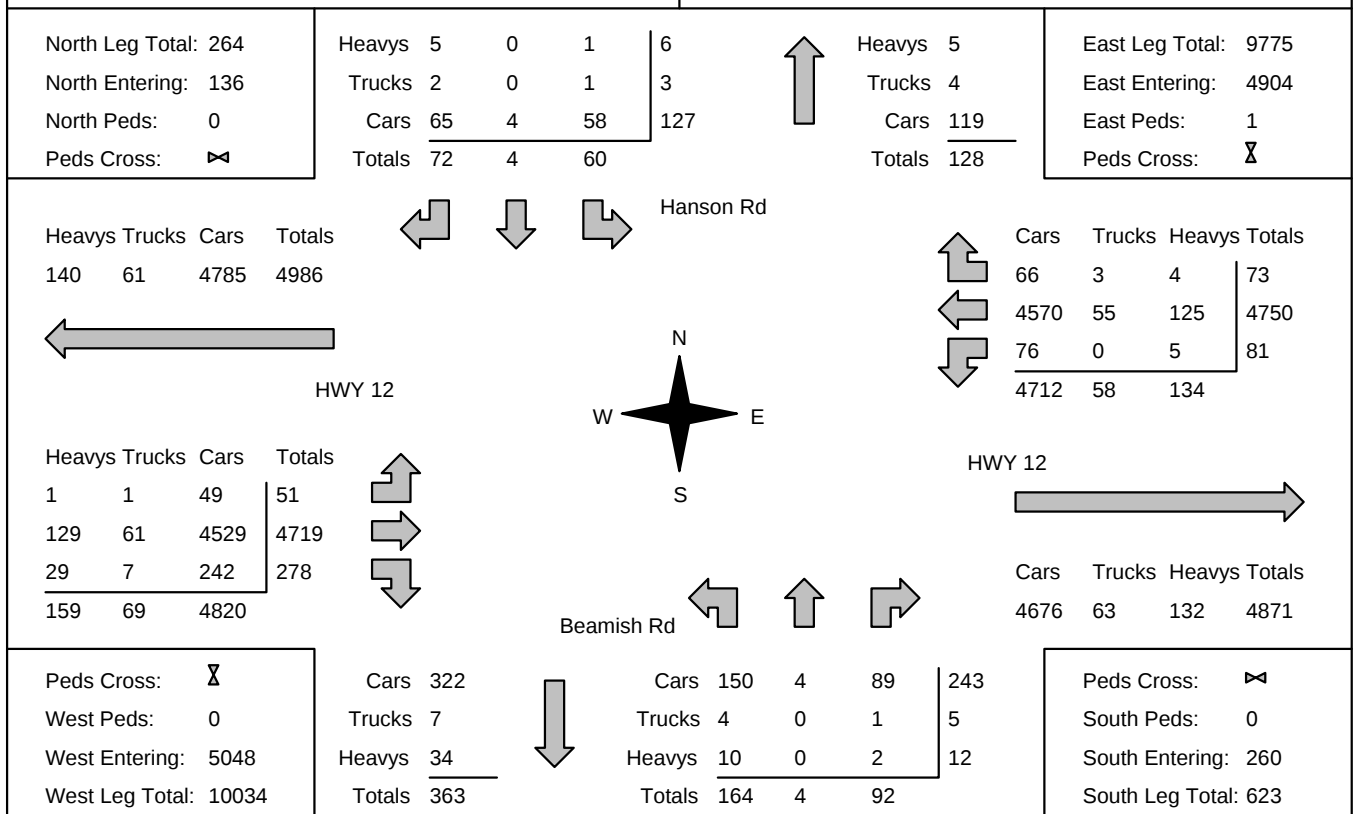
Municipality: Midland
Site #: 2408700002
Intersection: HWY 12 & Hanson Rd
TFR File #: 1
Count date: 30-May-24

Weather conditions:

Person counted:
Person prepared:
Person checked:

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

Major Road: HWY 12 runs W/E



Comments

Traffic Count Summary

Intersection: HWY 12 & Hanson Rd

Count Date: 30-May-24

Municipality: Midland

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	3	1	7	11	0	33	8:00:00	9	0	13	22	0
9:00:00	10	0	9	19	0	45	9:00:00	15	0	11	26	0
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	6	1	8	15	0	40	12:00:00	14	0	11	25	0
13:00:00	5	1	9	15	0	57	13:00:00	30	2	10	42	0
14:00:00	6	0	7	13	0	54	14:00:00	27	0	14	41	0
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	13	0	10	23	0	56	16:00:00	22	1	10	33	0
17:00:00	6	0	14	20	0	68	17:00:00	35	1	12	48	0
18:00:00	11	1	8	20	0	43	18:00:00	12	0	11	23	0

Count Date: 30-May-24 Site #: 2408700002

Interval Time	Passenger Cars - North Approach						Trucks - North Approach						Heavys - North Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		North Cross	
	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	0
7:15:00	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30:00	1	1	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45:00	2	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
8:00:00	3	1	1	1	6	4	0	0	0	0	0	0	0	0	0	0	1	0	0	0
8:15:00	3	0	1	0	8	2	0	0	0	0	0	0	0	0	0	0	2	1	0	0
8:30:00	6	3	1	0	11	3	0	0	0	0	0	0	1	1	0	0	2	0	0	0
8:45:00	8	2	1	0	13	2	0	0	0	0	0	0	1	0	0	0	2	0	0	0
9:00:00	12	4	1	0	14	1	0	0	0	0	0	0	1	0	0	0	2	0	0	0
9:15:00	12	0	1	0	14	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0
11:00:00	12	0	1	0	14	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0
11:15:00	13	1	2	1	18	4	0	0	0	0	0	0	1	0	0	0	2	0	0	0
11:30:00	13	0	2	0	19	1	0	0	0	0	0	0	1	0	0	0	2	0	0	0
11:45:00	17	4	2	0	20	1	0	0	0	0	0	0	1	0	0	0	2	0	0	0
12:00:00	18	1	2	0	21	1	0	0	0	0	1	1	1	0	0	0	2	0	0	0
12:15:00	19	1	2	0	25	4	0	0	0	0	1	0	1	0	0	0	2	0	0	0
12:30:00	21	2	2	0	27	2	0	0	0	0	1	0	1	0	0	0	3	1	0	0
12:45:00	21	0	2	0	28	1	0	0	0	0	1	0	1	0	0	0	3	0	0	0
13:00:00	23	2	3	1	29	1	0	0	0	0	1	0	1	0	0	0	3	0	0	0
13:15:00	26	3	3	0	29	0	0	0	0	0	1	0	1	0	0	0	3	0	0	0
13:30:00	26	0	3	0	31	2	1	1	0	0	1	0	1	0	0	0	3	0	0	0
13:45:00	28	2	3	0	33	2	1	0	0	0	1	0	1	0	0	0	3	0	0	0
14:00:00	28	0	3	0	36	3	1	0	0	0	1	0	1	0	0	0	3	0	0	0
14:15:00	28	0	3	0	36	0	1	0	0	0	1	0	1	0	0	0	3	0	0	0
15:00:00	28	0	3	0	36	0	1	0	0	0	1	0	1	0	0	0	3	0	0	0
15:15:00	32	4	3	0	39	3	1	0	0	0	1	0	1	0	0	0	3	0	0	0
15:30:00	37	5	3	0	41	2	1	0	0	0	1	0	1	0	0	0	3	0	0	0
15:45:00	38	1	3	0	44	3	1	0	0	0	1	0	1	0	0	0	3	0	0	0
16:00:00	41	3	3	0	46	2	1	0	0	0	1	0	1	0	0	0	3	0	0	0
16:15:00	43	2	3	0	50	4	1	0	0	0	1	0	1	0	0	0	3	0	0	0
16:30:00	45	2	3	0	55	5	1	0	0	0	1	0	1	0	0	0	3	0	0	0
16:45:00	45	0	3	0	56	1	1	0	0	0	1	0	1	0	0	0	4	1	0	0
17:00:00	47	2	3	0	59	3	1	0	0	0	1	0	1	0	0	0	4	0	0	0
17:15:00	50	3	4	1	60	1	1	0	0	0	1	0	1	0	0	0	5	1	0	0
17:30:00	53	3	4	0	62	2	1	0	0	0	2	1	1	0	0	0	5	0	0	0
17:45:00	54	1	4	0	63	1	1	0	0	0	2	0	1	0	0	0	5	0	0	0
18:00:00	58	4	4	0	65	2	1	0	0	0	2	0	1	0	0	0	5	0	0	0
18:15:00	58	0	4	0	65	0	1	0	0	0	2	0	1	0	0	0	5	0	0	0
18:15:15	58	0	4	0	65	0	1	0	0	0	2	0	1	0	0	0	5	0	0	0

Count Date: 30-May-24 Site #: 2408700002

Interval Time	Passenger Cars - East Approach						Trucks - East Approach						Heavys - East Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		East Cross	
	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	0
7:15:00	0	0	81	81	0	0	0	0	4	4	0	0	0	0	7	7	0	0	0	0
7:30:00	0	0	156	75	1	1	0	0	5	1	0	0	0	0	8	1	0	0	0	0
7:45:00	1	1	258	102	1	0	0	0	5	0	0	0	0	0	14	6	1	1	0	0
8:00:00	3	2	390	132	4	3	0	0	6	1	0	0	0	0	26	12	1	0	0	0
8:15:00	9	6	495	105	4	0	0	0	7	1	0	0	0	0	36	10	3	2	0	0
8:30:00	13	4	609	114	6	2	0	0	7	0	0	0	0	0	37	1	3	0	0	0
8:45:00	16	3	699	90	6	0	0	0	9	2	0	0	1	1	42	5	3	0	0	0
9:00:00	19	3	818	119	8	2	0	0	13	4	0	0	1	0	46	4	3	0	0	0
9:15:00	19	0	818	0	8	0	0	0	13	0	0	0	1	0	46	0	3	0	0	0
11:00:00	19	0	818	0	8	0	0	0	13	0	0	0	1	0	46	0	3	0	0	0
11:15:00	21	2	946	128	9	1	0	0	13	0	0	0	2	1	52	6	3	0	0	0
11:30:00	24	3	1075	129	9	0	0	0	16	3	0	0	3	1	53	1	3	0	0	0
11:45:00	27	3	1193	118	9	0	0	0	17	1	0	0	3	0	58	5	3	0	0	0
12:00:00	31	4	1350	157	10	1	0	0	20	3	1	1	3	0	60	2	3	0	0	0
12:15:00	32	1	1489	139	15	5	0	0	24	4	1	0	3	0	67	7	4	1	0	0
12:30:00	34	2	1642	153	17	2	0	0	25	1	1	0	3	0	73	6	4	0	0	0
12:45:00	36	2	1801	159	19	2	0	0	28	3	1	0	3	0	76	3	4	0	0	0
13:00:00	40	4	1942	141	23	4	0	0	29	1	1	0	3	0	79	3	4	0	0	0
13:15:00	46	6	2104	162	23	0	0	0	29	0	1	0	3	0	82	3	4	0	0	0
13:30:00	48	2	2232	128	24	1	0	0	30	1	2	1	3	0	88	6	4	0	0	0
13:45:00	52	4	2392	160	25	1	0	0	34	4	2	0	3	0	91	3	4	0	0	0
14:00:00	54	2	2533	141	27	2	0	0	36	2	2	0	3	0	97	6	4	0	0	0
14:15:00	54	0	2533	0	27	0	0	0	36	0	2	0	3	0	97	0	4	0	0	0
15:00:00	54	0	2533	0	27	0	0	0	36	0	2	0	3	0	97	0	4	0	0	0
15:15:00	55	1	2691	158	31	4	0	0	40	4	2	0	3	0	102	5	4	0	0	0
15:30:00	60	5	2848	157	35	4	0	0	43	3	2	0	4	1	108	6	4	0	0	0
15:45:00	62	2	3005	157	35	0	0	0	44	1	2	0	4	0	110	2	4	0	0	0
16:00:00	64	2	3167	162	43	8	0	0	47	3	2	0	4	0	113	3	4	0	1	1
16:15:00	66	2	3358	191	49	6	0	0	48	1	2	0	4	0	117	4	4	0	1	0
16:30:00	66	0	3539	181	51	2	0	0	48	0	2	0	4	0	117	0	4	0	1	0
16:45:00	68	2	3745	206	53	2	0	0	50	2	2	0	4	0	119	2	4	0	1	0
17:00:00	70	2	3938	193	54	1	0	0	50	0	2	0	5	1	120	1	4	0	1	0
17:15:00	72	2	4123	185	57	3	0	0	54	4	2	0	5	0	122	2	4	0	1	0
17:30:00	72	0	4287	164	58	1	0	0	55	1	3	1	5	0	123	1	4	0	1	0
17:45:00	73	1	4441	154	61	3	0	0	55	0	3	0	5	0	124	1	4	0	1	0
18:00:00	76	3	4570	129	66	5	0	0	55	0	3	0	5	0	125	1	4	0	1	0
18:15:00	76	0	4570	0	66	0	0	0	55	0	3	0	5	0	125	0	4	0	1	0
18:15:15	76	0	4570	0	66	0	0	0	55	0	3	0	5	0	125	0	4	0	1	0

Count Date: 30-May-24 Site #: 2408700002

Interval Time	Passenger Cars - South Approach						Trucks - South Approach						Heavys - South Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		South Cross	
	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	0
7:15:00	1	1	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30:00	4	3	0	0	7	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45:00	7	3	0	0	12	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00:00	8	1	0	0	13	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0
8:15:00	12	4	0	0	15	2	0	0	0	0	0	0	2	1	0	0	0	0	0	0
8:30:00	15	3	0	0	17	2	0	0	0	0	0	0	3	1	0	0	0	0	0	0
8:45:00	16	1	0	0	22	5	0	0	0	0	0	0	3	0	0	0	0	0	0	0
9:00:00	19	3	0	0	23	1	1	1	0	0	0	0	4	1	0	0	1	1	0	0
9:15:00	19	0	0	0	23	0	1	0	0	0	0	0	4	0	0	0	1	0	0	0
11:00:00	19	0	0	0	23	0	1	0	0	0	0	0	4	0	0	0	1	0	0	0
11:15:00	20	1	0	0	26	3	1	0	0	0	0	0	5	1	0	0	2	1	0	0
11:30:00	22	2	0	0	27	1	1	0	0	0	0	0	5	0	0	0	2	0	0	0
11:45:00	26	4	0	0	28	1	1	0	0	0	0	0	6	1	0	0	2	0	0	0
12:00:00	31	5	0	0	33	5	1	0	0	0	0	0	6	0	0	0	2	0	0	0
12:15:00	37	6	0	0	36	3	1	0	0	0	0	0	7	1	0	0	2	0	0	0
12:30:00	41	4	0	0	38	2	1	0	0	0	0	0	7	0	0	0	2	0	0	0
12:45:00	55	14	1	1	41	3	2	1	0	0	0	0	7	0	0	0	2	0	0	0
13:00:00	59	4	2	1	43	2	2	0	0	0	0	0	7	0	0	0	2	0	0	0
13:15:00	66	7	2	0	44	1	2	0	0	0	0	0	7	0	0	0	2	0	0	0
13:30:00	73	7	2	0	48	4	2	0	0	0	0	0	7	0	0	0	2	0	0	0
13:45:00	78	5	2	0	51	3	3	1	0	0	0	0	8	1	0	0	2	0	0	0
14:00:00	84	6	2	0	57	6	3	0	0	0	0	0	8	0	0	0	2	0	0	0
14:15:00	84	0	2	0	57	0	3	0	0	0	0	0	8	0	0	0	2	0	0	0
15:00:00	84	0	2	0	57	0	3	0	0	0	0	0	8	0	0	0	2	0	0	0
15:15:00	89	5	2	0	61	4	3	0	0	0	0	0	8	0	0	0	2	0	0	0
15:30:00	93	4	2	0	64	3	3	0	0	0	0	0	8	0	0	0	2	0	0	0
15:45:00	102	9	3	1	64	0	3	0	0	0	1	1	8	0	0	0	2	0	0	0
16:00:00	106	4	3	0	66	2	3	0	0	0	1	0	8	0	0	0	2	0	0	0
16:15:00	111	5	4	1	71	5	3	0	0	0	1	0	8	0	0	0	2	0	0	0
16:30:00	118	7	4	0	73	2	3	0	0	0	1	0	8	0	0	0	2	0	0	0
16:45:00	129	11	4	0	75	2	3	0	0	0	1	0	10	2	0	0	2	0	0	0
17:00:00	138	9	4	0	78	3	4	1	0	0	1	0	10	0	0	0	2	0	0	0
17:15:00	143	5	4	0	81	3	4	0	0	0	1	0	10	0	0	0	2	0	0	0
17:30:00	145	2	4	0	85	4	4	0	0	0	1	0	10	0	0	0	2	0	0	0
17:45:00	147	2	4	0	88	3	4	0	0	0	1	0	10	0	0	0	2	0	0	0
18:00:00	150	3	4	0	89	1	4	0	0	0	1	0	10	0	0	0	2	0	0	0
18:15:00	150	0	4	0	89	0	4	0	0	0	1	0	10	0	0	0	2	0	0	0
18:15:15	150	0	4	0	89	0	4	0	0	0	1	0	10	0	0	0	2	0	0	0

Count Date: 30-May-24 Site #: 2408700002

Interval Time	Passenger Cars - West Approach						Trucks - West Approach						Heavys - West Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		West Cross	
	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	0
7:15:00	0	0	67	67	5	5	0	0	0	0	0	0	0	0	7	7	1	1	0	0
7:30:00	2	2	189	122	11	6	0	0	0	0	0	0	0	0	13	6	2	1	0	0
7:45:00	2	0	302	113	20	9	0	0	1	1	0	0	0	0	20	7	5	3	0	0
8:00:00	4	2	486	184	47	27	0	0	4	3	1	1	0	0	27	7	7	2	0	0
8:15:00	5	1	611	125	73	26	0	0	11	7	2	1	0	0	34	7	7	0	0	0
8:30:00	5	0	743	132	75	2	0	0	15	4	2	0	0	0	37	3	9	2	0	0
8:45:00	6	1	867	124	87	12	0	0	16	1	2	0	0	0	40	3	11	2	0	0
9:00:00	6	0	997	130	96	9	0	0	18	2	2	0	0	0	46	6	15	4	0	0
9:15:00	6	0	997	0	96	0	0	0	18	0	2	0	0	0	46	0	15	0	0	0
11:00:00	6	0	997	0	96	0	0	0	18	0	2	0	0	0	46	0	15	0	0	0
11:15:00	7	1	1123	126	100	4	0	0	22	4	2	0	0	0	49	3	15	0	0	0
11:30:00	9	2	1258	135	109	9	0	0	25	3	3	1	0	0	55	6	16	1	0	0
11:45:00	9	0	1426	168	110	1	0	0	26	1	4	1	0	0	60	5	16	0	0	0
12:00:00	10	1	1597	171	114	4	0	0	29	3	4	0	0	0	60	0	17	1	0	0
12:15:00	12	2	1729	132	119	5	0	0	30	1	4	0	0	0	62	2	17	0	0	0
12:30:00	14	2	1843	114	127	8	0	0	31	1	5	1	0	0	63	1	19	2	0	0
12:45:00	16	2	1965	122	134	7	0	0	33	2	5	0	0	0	64	1	20	1	0	0
13:00:00	17	1	2135	170	146	12	0	0	33	0	5	0	0	0	68	4	21	1	0	0
13:15:00	19	2	2256	121	154	8	0	0	35	2	5	0	0	0	69	1	21	0	0	0
13:30:00	20	1	2393	137	163	9	0	0	36	1	6	1	0	0	73	4	23	2	0	0
13:45:00	22	2	2525	132	169	6	1	1	38	2	6	0	0	0	82	9	23	0	0	0
14:00:00	24	2	2682	157	175	6	1	0	41	3	7	1	0	0	83	1	24	1	0	0
14:15:00	24	0	2682	0	175	0	1	0	41	0	7	0	0	0	83	0	24	0	0	0
15:00:00	24	0	2682	0	175	0	1	0	41	0	7	0	0	0	83	0	24	0	0	0
15:15:00	25	1	2807	125	179	4	1	0	44	3	7	0	0	0	91	8	25	1	0	0
15:30:00	29	4	2939	132	181	2	1	0	47	3	7	0	0	0	93	2	25	0	0	0
15:45:00	32	3	3090	151	192	11	1	0	47	0	7	0	0	0	97	4	26	1	0	0
16:00:00	34	2	3249	159	202	10	1	0	47	0	7	0	0	0	100	3	26	0	0	0
16:15:00	36	2	3419	170	211	9	1	0	48	1	7	0	0	0	106	6	27	1	0	0
16:30:00	38	2	3582	163	214	3	1	0	50	2	7	0	1	1	110	4	28	1	0	0
16:45:00	40	2	3721	139	221	7	1	0	51	1	7	0	1	0	114	4	28	0	0	0
17:00:00	42	2	3906	185	223	2	1	0	54	3	7	0	1	0	122	8	28	0	0	0
17:15:00	46	4	4050	144	229	6	1	0	55	1	7	0	1	0	129	7	28	0	0	0
17:30:00	47	1	4210	160	235	6	1	0	58	3	7	0	1	0	129	0	29	1	0	0
17:45:00	48	1	4380	170	239	4	1	0	60	2	7	0	1	0	129	0	29	0	0	0
18:00:00	49	1	4529	149	242	3	1	0	61	1	7	0	1	0	129	0	29	0	0	0
18:15:00	49	0	4529	0	242	0	1	0	61	0	7	0	1	0	129	0	29	0	0	0
18:15:15	49	0	4529	0	242	0	1	0	61	0	7	0	1	0	129	0	29	0	0	0

Appendix C: Level of Service Definitions

Level of Service – Unsignalized Intersections

Level of Service (LOS) for unsignalized intersections is defined in terms of control delay for each critical lane. Control delay includes initial deceleration, queue move-up time, stopped delay and final acceleration delay, and is a function of the service rate or capacity of the approach and degree of saturation.

The following table describes in detail the characteristics of each level of service, with A being the best and F being the worst.

LOS	EXPECTED DELAY TO STREET TRAFFIC	DELAY (sec/veh)
A	Little or no delays	$0 < d \leq 10$
B	Short traffic delays	$10 < d \leq 15$
C	Average traffic delays	$15 < d \leq 25$
D	Long traffic delays	$25 < d \leq 35$
E	Very long traffic delays	$35 < d \leq 50$
F	Extreme delays with queuing which may cause congestion affecting other traffic movements in the intersection	$50 < d$

source: 2010 Highway Capacity Manual

Level of Service – Signalized Intersections

Level of Service (LOS) for signalized intersections is defined in terms of delay, which is made up of a number of factors that relate to control, geometrics, traffic and incidents. Only the portion of total delay attributed to the control facility is quantified. This control delay includes initial deceleration, queue move-up time, stopped delay and final acceleration delay.

The following table describes in detail the characteristics of each level of service, with A being the best and F being the worst.

LOS	EXPECTED DELAY TO STREET TRAFFIC	DELAY (sec/veh)
A	This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all at this LOS. Short cycle lengths may also contribute to low delay.	$0 < d \leq 10$
B	This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop at this level than at LOS A, causing longer average delays.	$10 < d \leq 20$
C	These higher delays may result from fair progression, longer cycle length, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.	$20 < d \leq 35$
D	At this level, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavourable progression, long cycle lengths, or high volume to capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures become noticeable.	$35 < d \leq 55$
E	This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.	$55 < d \leq 80$
F	At this level, oversaturation occurs when arrival flow rates exceed the design capacity of the intersection. It may also occur at high v/c ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors to such high delay levels. LOS F is considered to be unacceptable to most drivers.	$80 < d$

source: 2010 Highway Capacity Manual

Appendix D: Existing Operations

HCM Signalized Intersection Capacity Analysis

1: Highway 93 & The Angela Schmidt Foster Road/Highway 12

2024 Existing Conditions

Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	220	18	191	124	269	6	320	280	257	289	3
Future Volume (vph)	6	220	18	191	124	269	6	320	280	257	289	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.2	7.2		3.0	7.2	4.0	7.4	7.4	4.0	3.0	7.4	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	1813		1690	1795	1512	1560	1795	1570	1722	1880	
Flt Permitted	0.66	1.00		0.32	1.00	1.00	0.55	1.00	1.00	0.27	1.00	
Satd. Flow (perm)	1247	1813		576	1795	1512	903	1795	1570	485	1880	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	7	265	22	230	149	324	7	386	337	310	348	4
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	7	285	0	230	149	324	7	386	337	310	351	0
Heavy Vehicles (%)	2%	5%	2%	8%	7%	8%	17%	7%	4%	6%	2%	2%
Turn Type	Perm	NA		pm+pt	NA	Free	Perm	NA	Free	pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		Free	2		Free	6		
Actuated Green, G (s)	18.9	18.9		35.2	35.2	92.5	25.1	25.1	92.5	42.7	42.7	
Effective Green, g (s)	18.9	18.9		35.2	35.2	92.5	25.1	25.1	92.5	42.7	42.7	
Actuated g/C Ratio	0.20	0.20		0.38	0.38	1.00	0.27	0.27	1.00	0.46	0.46	
Clearance Time (s)	7.2	7.2		3.0	7.2		7.4	7.4		3.0	7.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	254	370		379	683	1512	245	487	1570	419	867	
v/s Ratio Prot		c0.16		c0.09	0.08			0.21		c0.12	0.19	
v/s Ratio Perm	0.01			0.14		0.21	0.01		0.21	c0.22		
v/c Ratio	0.03	0.77		0.61	0.22	0.21	0.03	0.79	0.21	0.74	0.41	
Uniform Delay, d1	29.4	34.7		21.2	19.4	0.0	24.7	31.3	0.0	17.9	16.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	9.3		2.7	0.2	0.3	0.0	8.6	0.3	6.7	0.3	
Delay (s)	29.5	44.0		23.9	19.5	0.3	24.8	39.9	0.3	24.6	16.8	
Level of Service	C	D		C	B	A	C	D	A	C	B	
Approach Delay (s)		43.7			12.1			21.5			20.5	
Approach LOS		D			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			21.2			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			92.5			Sum of lost time (s)			20.6			
Intersection Capacity Utilization			78.3%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Beamish Road/Hanson Road & Highway 12

2024 Existing Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	720	75	16	568	7	12	0	10	7	1	12
Future Volume (Veh/h)	4	720	75	16	568	7	12	0	10	7	1	12
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	5	911	95	20	719	9	15	0	13	9	1	15
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	728			1006			1696	1689	911	1693	1775	719
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	728			1006			1696	1689	911	1693	1775	719
tC, single (s)	4.1			4.2			7.3	6.5	6.2	7.2	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.7	4.0	3.3	3.6	4.0	3.4
p0 queue free %	99			97			75	100	96	86	99	96
cM capacity (veh/h)	876			673			60	90	332	64	80	419
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	5	911	95	20	719	9	28	25				
Volume Left	5	0	0	20	0	0	15	9				
Volume Right	0	0	95	0	0	9	13	15				
cSH	876	1700	1700	673	1700	1700	97	133				
Volume to Capacity	0.01	0.54	0.06	0.03	0.42	0.01	0.29	0.19				
Queue Length 95th (m)	0.1	0.0	0.0	0.7	0.0	0.0	8.3	5.0				
Control Delay (s)	9.1	0.0	0.0	10.5	0.0	0.0	56.9	38.3				
Lane LOS	A			B			F	E				
Approach Delay (s)	0.0			0.3			56.9	38.3				
Approach LOS							F	E				
Intersection Summary												
Average Delay	1.5											
Intersection Capacity Utilization	47.9%			ICU Level of Service					A			
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis

1: Highway 93 & The Angela Schmidt Foster Road/Highway 12

2024 Existing Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	182	16	296	229	418	19	383	244	400	419	15
Future Volume (vph)	16	182	16	296	229	418	19	383	244	400	419	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.2	7.2		3.0	7.2	4.0	7.4	7.4	4.0	3.0	7.4	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	1812		1789	1883	1601	1738	1883	1570	1789	1839	
Flt Permitted	0.61	1.00		0.44	1.00	1.00	0.50	1.00	1.00	0.25	1.00	
Satd. Flow (perm)	1152	1812		831	1883	1601	923	1883	1570	462	1839	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	16	188	16	305	236	431	20	395	252	412	432	15
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	16	201	0	305	236	431	20	395	252	412	446	0
Heavy Vehicles (%)	2%	5%	2%	2%	2%	2%	5%	2%	4%	2%	4%	2%
Turn Type	Perm	NA		pm+pt	NA	Free	Perm	NA	Free	pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		Free	2		Free	6		
Actuated Green, G (s)	15.6	15.6		33.5	33.5	92.0	24.3	24.3	92.0	43.9	43.9	
Effective Green, g (s)	15.6	15.6		33.5	33.5	92.0	24.3	24.3	92.0	43.9	43.9	
Actuated g/C Ratio	0.17	0.17		0.36	0.36	1.00	0.26	0.26	1.00	0.48	0.48	
Clearance Time (s)	7.2	7.2		3.0	7.2		7.4	7.4		3.0	7.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	195	307		457	685	1601	243	497	1570	459	877	
v/s Ratio Prot		0.11		c0.11	0.13			0.21		c0.16	0.24	
v/s Ratio Perm	0.01			c0.13		0.27	0.02		0.16	c0.27		
v/c Ratio	0.08	0.65		0.67	0.34	0.27	0.08	0.79	0.16	0.90	0.51	
Uniform Delay, d1	32.2	35.7		22.6	21.3	0.0	25.5	31.5	0.0	18.3	16.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	4.9		3.7	0.3	0.4	0.1	8.5	0.2	19.8	0.5	
Delay (s)	32.4	40.6		26.3	21.6	0.4	25.6	40.1	0.2	38.1	17.1	
Level of Service	C	D		C	C	A	C	D	A	D	B	
Approach Delay (s)		40.0			13.7			24.6			27.2	
Approach LOS		D			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			22.8			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			92.0			Sum of lost time (s)			20.6			
Intersection Capacity Utilization			88.2%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Beamish Road/Hanson Road & Highway 12

2024 Existing Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	823	23	7	949	11	35	1	12	6	0	14
Future Volume (Veh/h)	9	823	23	7	949	11	35	1	12	6	0	14
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	9	866	24	7	999	12	37	1	13	6	0	15
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1011			890			1912	1909	866	1910	1921	999
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1011			890			1912	1909	866	1910	1921	999
tC, single (s)	4.2			4.2			7.2	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.0	3.3	3.5	4.0	3.4
p0 queue free %	99			99			21	98	96	88	100	95
cM capacity (veh/h)	652			713			47	67	353	48	66	289
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	9	866	24	7	999	12	51	21				
Volume Left	9	0	0	7	0	0	37	6				
Volume Right	0	0	24	0	0	12	13	15				
cSH	652	1700	1700	713	1700	1700	61	119				
Volume to Capacity	0.01	0.51	0.01	0.01	0.59	0.01	0.84	0.18				
Queue Length 95th (m)	0.3	0.0	0.0	0.2	0.0	0.0	29.0	4.6				
Control Delay (s)	10.6	0.0	0.0	10.1	0.0	0.0	183.3	41.5				
Lane LOS	B			B			F	E				
Approach Delay (s)	0.1			0.1			183.3	41.5				
Approach LOS							F	E				
Intersection Summary												
Average Delay	5.2											
Intersection Capacity Utilization	62.5%			ICU Level of Service					B			
Analysis Period (min)	15											

Timings

3: Beamish Road/Hanson Road & Highway 12

2024 Existing Conditions

Weekday AM Peak Hour + Improvements

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	4	720	75	16	568	7	12	0	7	1
Future Volume (vph)	4	720	75	16	568	7	12	0	7	1
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	2	2	2	6	6	6	8	8	4	4
Switch Phase										
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	27.1	27.1	27.1	27.1	27.1	27.1	16.0	16.0	16.0	16.0
Total Split (s)	54.0	54.0	54.0	54.0	54.0	54.0	16.0	16.0	16.0	16.0
Total Split (%)	77.1%	77.1%	77.1%	77.1%	77.1%	77.1%	22.9%	22.9%	22.9%	22.9%
Yellow Time (s)	5.1	5.1	5.1	5.1	5.1	5.1	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0		6.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Min	Min	Min	Min	Min	Min	None	None	None	None
Act Effect Green (s)	45.9	45.9	45.9	45.9	45.9	45.9		10.4		10.4
Actuated g/C Ratio	0.93	0.93	0.93	0.93	0.93	0.93		0.21		0.21
v/c Ratio	0.01	0.52	0.07	0.04	0.42	0.01		0.07		0.07
Control Delay	2.2	3.9	0.9	2.4	3.0	0.0		2.5		15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	2.2	3.9	0.9	2.4	3.0	0.0		2.5		15.2
LOS	A	A	A	A	A	A		A		B
Approach Delay		3.6			3.0			2.5		15.2
Approach LOS		A			A			A		B

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 49.1

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.52

Intersection Signal Delay: 3.5

Intersection LOS: A

Intersection Capacity Utilization 58.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Beamish Road/Hanson Road & Highway 12

 Ø2	 Ø4
54 s	16 s
 Ø6	 Ø8
54 s	16 s

HCM Signalized Intersection Capacity Analysis

3: Beamish Road/Hanson Road & Highway 12

2024 Existing Conditions
Weekday AM Peak Hour + Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	720	75	16	568	7	12	0	10	7	1	12
Future Volume (vph)	4	720	75	16	568	7	12	0	10	7	1	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.94			0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97			0.98	
Satd. Flow (prot)	1789	1865	1512	1722	1812	1266		1534			1578	
Flt Permitted	0.37	1.00	1.00	0.26	1.00	1.00		1.00			1.00	
Satd. Flow (perm)	691	1865	1512	477	1812	1266		1575			1606	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	5	911	95	20	719	9	15	0	13	9	1	15
RTOR Reduction (vph)	0	0	26	0	0	2	0	27	0	0	15	0
Lane Group Flow (vph)	5	911	69	20	719	7	0	1	0	0	10	0
Heavy Vehicles (%)	2%	3%	8%	6%	6%	29%	25%	2%	2%	14%	2%	8%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	39.5	39.5	39.5	39.5	39.5	39.5		1.4			1.4	
Effective Green, g (s)	39.5	39.5	39.5	39.5	39.5	39.5		1.4			1.4	
Actuated g/C Ratio	0.73	0.73	0.73	0.73	0.73	0.73		0.03			0.03	
Clearance Time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	505	1364	1106	348	1325	926		40			41	
v/s Ratio Prot		c0.49			0.40							
v/s Ratio Perm	0.01		0.05	0.04		0.01		0.00			c0.01	
v/c Ratio	0.01	0.67	0.06	0.06	0.54	0.01		0.02			0.25	
Uniform Delay, d1	2.0	3.8	2.0	2.0	3.2	2.0		25.6			25.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.0	1.3	0.0	0.1	0.5	0.0		0.2			3.2	
Delay (s)	2.0	5.1	2.1	2.1	3.7	2.0		25.8			29.0	
Level of Service	A	A	A	A	A	A		C			C	
Approach Delay (s)		4.8			3.6			25.8			29.0	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			5.0				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			54.0				Sum of lost time (s)			13.1		
Intersection Capacity Utilization			58.5%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

Timings

3: Beamish Road/Hanson Road & Highway 12

2024 Existing Conditions

Weekday PM Peak Hour + Improvements

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	9	823	23	7	949	11	35	1	6	0
Future Volume (vph)	9	823	23	7	949	11	35	1	6	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	2	2	2	6	6	6	8	8	4	4
Switch Phase										
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	27.1	27.1	27.1	27.1	27.1	27.1	16.0	16.0	16.0	16.0
Total Split (s)	54.0	54.0	54.0	54.0	54.0	54.0	16.0	16.0	16.0	16.0
Total Split (%)	77.1%	77.1%	77.1%	77.1%	77.1%	77.1%	22.9%	22.9%	22.9%	22.9%
Yellow Time (s)	5.1	5.1	5.1	5.1	5.1	5.1	3.7	3.7	3.7	3.7
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0		6.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Min	Min	Min	Min	Min	Min	None	None	None	None
Act Effect Green (s)	45.3	45.3	45.3	45.3	45.3	45.3		10.5		10.5
Actuated g/C Ratio	0.79	0.79	0.79	0.79	0.79	0.79		0.18		0.18
v/c Ratio	0.04	0.59	0.02	0.02	0.67	0.01		0.19		0.07
Control Delay	4.6	7.9	0.7	4.3	9.8	0.0		22.5		0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	4.6	7.9	0.7	4.3	9.8	0.0		22.5		0.4
LOS	A	A	A	A	A	A		C		A
Approach Delay		7.6			9.7			22.5		0.4
Approach LOS		A			A			C		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 57.1

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 9.0

Intersection LOS: A

Intersection Capacity Utilization 69.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 3: Beamish Road/Hanson Road & Highway 12

 Ø2	 Ø4
54 s	16 s
 Ø6	 Ø8
54 s	16 s

HCM Signalized Intersection Capacity Analysis

3: Beamish Road/Hanson Road & Highway 12

2024 Existing Conditions
Weekday PM Peak Hour + Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	823	23	7	949	11	35	1	12	6	0	14
Future Volume (vph)	9	823	23	7	949	11	35	1	12	6	0	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.97			0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96			0.99	
Satd. Flow (prot)	1644	1865	1498	1601	1883	1601		1706			1621	
Flt Permitted	0.19	1.00	1.00	0.26	1.00	1.00		0.77			0.89	
Satd. Flow (perm)	325	1865	1498	440	1883	1601		1366			1456	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	9	866	24	7	999	12	37	1	13	6	0	15
RTOR Reduction (vph)	0	0	7	0	0	4	0	12	0	0	19	0
Lane Group Flow (vph)	9	866	17	7	999	8	0	39	0	0	2	0
Heavy Vehicles (%)	11%	3%	9%	14%	2%	2%	6%	2%	2%	2%	2%	7%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	41.4	41.4	41.4	41.4	41.4	41.4		5.1			5.1	
Effective Green, g (s)	41.4	41.4	41.4	41.4	41.4	41.4		5.1			5.1	
Actuated g/C Ratio	0.69	0.69	0.69	0.69	0.69	0.69		0.09			0.09	
Clearance Time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	225	1295	1040	305	1307	1112		116			124	
v/s Ratio Prot		0.46			c0.53							
v/s Ratio Perm	0.03		0.01	0.02		0.01		c0.03			0.00	
v/c Ratio	0.04	0.67	0.02	0.02	0.76	0.01		0.34			0.01	
Uniform Delay, d1	2.9	5.2	2.8	2.8	5.9	2.8		25.7			24.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.1	1.3	0.0	0.0	2.7	0.0		1.7			0.0	
Delay (s)	2.9	6.5	2.8	2.9	8.6	2.8		27.4			25.0	
Level of Service	A	A	A	A	A	A		C			C	
Approach Delay (s)		6.4			8.5			27.4			25.0	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			8.2				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			59.6				Sum of lost time (s)			13.1		
Intersection Capacity Utilization			69.2%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

Appendix E: Traffic Signal Warrants

GENERAL INFORMATION

Analyst MJB
Agency or Company Tatham Engineering Limited
Analysis Period 2024 Existing
Jurisdiction/Area Town of Midland **Date** July 2024
East-West Street Highway 12
North-South Street Beamish Road/Hanson Road
Flow Conditions Free flow (rural)
T Intersection No
Major Street East-West
Approach Lanes per Directio 1
Hours of Traffic Volume Data 8 hours
Additional Comments Volumes adjusted for summer

TRAFFIC & PEDESTRIAN VOLUMES

Hour of Data Hour Ending	Hour 1 8:00:00	Hour 2 9:00:00	Hour 3 12:00:00	Hour 4 13:00:00	Hour 5 14:00:00	Hour 6 16:00:00	Hour 7 17:00:00	Hour 8 18:00:00	AM + PM 4
MAJOR STREET									
Eastbound right	55	58	22	37	34	29	23	20	
thru	620	653	750	660	684	708	823	764	
left	4	2	4	7	8	10	9	7	
Westbound right	5	6	3	14	5	16	11	13	
thru	506	546	664	744	739	793	937	770	
left	3	17	14	9	14	11	7	6	
MINOR STREET									
Northbound right	13	11	11	10	14	10	12	11	
thru	0	0	0	2	0	1	1	0	
left	9	15	14	30	27	22	35	12	
Southbound right	7	9	8	9	7	10	14	8	
thru	1	0	1	1	0	0	0	1	
left	3	10	6	5	6	13	6	11	
PEDESTRIANS									
crossing MAJOR street	0	0	0	0	0	1	0	0	
crossing MINOR street	0	0	0	0	0	0	0	0	
APPROACH VOLUMES									
major	1194	1282	1457	1471	1484	1567	1810	1581	
minor	33	45	40	57	54	56	68	43	
TOTAL	1227	1327	1497	1528	1538	1623	1878	1624	
CROSSING VOLUMES									
TOTAL	13	25	21	37	33	37	42	24	
note 1	12	25	20	35	33	35	41	23	
note 2	1	0	1	2	0	1	1	1	
note 3	0	0	0	0	0	0	0	0	
3a	no	no	no	no	no	no	no	no	
3b	no	no	yes	no	no	no	yes	yes	
note 4	0	0	0	0	0	1	0	0	

ACCIDENT HISTORY

Reportable accidents over the past 36 months susceptible to correction by a traffic signal.	months 1 to 12	-
	months 13 to 24	-
	months 25 to 36	-

NOTES

Traffic crossing MAJOR street defined as:

- note 1 Left turns from both minor street approaches
- note 2 The heaviest through volume from the minor street
- note 3 50% of the heavier left turn movement from the major street when both of the following are met:
 - 3a the left turn volume > 120
 - 3b the left turn volume + opposing volume > 720
- note 4 Pedestrians crossing the major street

Free Flow Conditions

- roads with operating speeds greater than or equal to 70 km/h
- normally encountered in rural areas
- may also be used at intersections within the built-up area of a community with < 10 000 people and outside the commuting influence of a large urban centre, even if the speed is less than 70 km/h

Restricted Flow Conditions

- roads with operating speeds less than 70 km/h
- normally encountered in urban areas where the traffic volumes approach or exceed practical working capacity of road

JUSTIFICATION 1 - MINIMUM VEHICLE VOLUME												
JUSTIFICATION	GUIDANCE	HOUR ENDING								No. of hours with compliance		Average Compliance
		Hour 1	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Hour 7	Hour 8			
1A	TOTAL TRAFFIC ENTERING INTERSECTION	1227	1327	1497	1528	1538	1623	1878	1624	100%	80%+	-
	COMPLIANCE % $\frac{VOL \times 100}{480}$ OR $\frac{VOL \times 100}{600}$ (1 lane approach on main road) (2 or more lane approach on)	100%	100%	100%	100%	100%	100%	100%	100%	8	8	100%
1B	TRAFFIC ON MINOR STREET (vph) (2 way Total)	33	45	40	57	54	56	68	43	100%	80%+	-
	COMPLIANCE % $\frac{VOL \times 100}{120}$ OR $\frac{VOL \times 100}{180}$ (full intersection) (tee intersection)	28%	38%	33%	48%	45%	47%	57%	36%	0	0	41%
FREE FLOW		BOTH 2A AND 2B FULFILLED 100% EACH OF 8 HOURS									NO	
SIGNAL JUSTIFICATION 1:		LESSER OF 2A OR 2B FULFILLED 80% EACH OF 8 HOURS									NO	

JUSTIFICATION 2 - DELAY TO CROSS TRAFFIC												
JUSTIFICATION	GUIDANCE	HOUR ENDING								No. of hours with compliance		Average Compliance
		Hour 1	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Hour 7	Hour 8			
2A	MAIN ROAD TRAFFIC VOLUME (2 way Total)	1194	1282	1457	1471	1484	1567	1810	1581	100%	80%+	-
	COMPLIANCE % $\frac{VOL \times 100}{480}$ OR $\frac{VOL \times 100}{600}$ (1 lane approach on main road) (2 or more lane approach on)	100%	100%	100%	100%	100%	100%	100%	100%	8	8	100%
2B	CROSSING TRAFFIC (vph) (2 way Total)	13	25	21	37	33	37	42	24	100%	80%+	-
	COMPLIANCE % $\frac{VOL \times 100}{50}$	26%	50%	42%	74%	66%	74%	84%	48%	0	1	58%
FREE FLOW		BOTH 2A AND 2B FULFILLED 100% EACH OF 8 HOURS									NO	
SIGNAL JUSTIFICATION 2:		LESSER OF 2A OR 2B FULFILLED 80% EACH OF 8 HOURS									NO	

JUSTIFICATION 3 - COMBINATION JUSTIFICATION			
JUSTIFICATION SATISFIED 80% OR MORE			Two Justifications Satisfied 80% or more
Justification 1	- Minimum Vehicle Volume	NO	NO
Justification 2	- Delay to Cross Traffic	NO	

JUSTIFICATION 5 - COLLISION EXPERIENCE			
A. Number of reportable collisions susceptible to prevention by a traffic signal.	Preceding Months	Number of Collisions	Percent Fulfillment
	1 - 12	-	-
	13 - 24	-	-
	25 - 36	-	-
	annual average	-	-
B. Adequate trial of less restrictive remedies has failed to reduce collision frequency.	☐ YES	☐ NO	n/a
SIGNAL JUSTIFICATION 5:		BOTH OF 5A & 5B FULFILLED TO 100%?	
		NO	

JUSTIFICATION SUMMARY	
ARE TRAFFIC SIGNALS JUSTIFIED FOR THE INTERSECTION IN QUESTION?	NO

GENERAL INFORMATION

Analyst	MJB	Jurisdiction/Area	Town of Midland	Date	July 2024
Agency or Company	Tatham Engineering Limited	East-West Street	Highway 12		
Analysis Period	2026 Background	North-South Street	Beamish Road/Hanson Road		
Flow Conditions	Free flow (rural)	Major Street	East-West		
T Intersection	No	Approach Lanes per Direction	1		
		Existing or Planned Intersection	existing intersection		
Additional Comments					

TRAFFIC & PEDESTRIAN VOLUMES

	AM Peak Hour			PM Peak Hour			Average Hour (AM+PM) ÷ 4		
	right	thru	left	right	thru	left	right	thru	left
MAJOR STREET									
Eastbound	75	683	7	23	777	18	25	365	6
Westbound	11	534	16	26	899	7	9	358	6
MINOR STREET									
Northbound	10	0	12	12	2	35	6	1	12
Southbound	17	2	16	20	1	16	9	1	8
PEDESTRIANS									
crossing MAJOR street					1			0	
crossing MINOR street								0	

	AM Peak Hour			PM Peak Hour			Average Hour (AM+PM) ÷ 4		
	major	minor	total	major	minor	total	major	minor	total
APPROACH VOLUMES	1327	57	1384	1750	86	1836	769	36	805
CROSSING VOLUMES			29			54			21

JUSTIFICATION 7 - PROJECTED VOLUMES

Justification	Description	Warrant Level	Warrant Adjustment	Sectional Numerical	Sectional Compliance	Entire Compliance
1. MINIMUM VEHICULAR VOLUMES	A. Vehicle volume, all approaches (average hour)	480 or 600 (1 lane approach on main road) (2 or more lane approach on main road)	120%	805	100%	25%
	B. Vehicle volume, along minor streets (average hour)	120 or 180 (full intersection) (tee intersection)	120%	36	25%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volume, major street (average hour)	480 or 600 (1 lane approach on main road) (2 or more lane approach on main road)	120%	769	100%	35%
	B. Combined vehicle and pedestrian volume crossing artery from minor streets	50 or 120 (1 lane approach on main road) (2 or more lane approach on main road)	120%	21	35%	

Signals are warranted if BOTH Justification 1A and Justification 1B OR Justification 2A and Justification 2B are 100% compliant.

Not Warranted

Signals are warranted if THE LESSER of Justification 1A or 1B AND the lesser of Justification 2A or Justification 2B are 80% compliant.

Not Warranted

Notes:

- Restricted Flow Conditions**
- roads with operating speeds less than 70 km/h
 - normally encountered in urban areas where the traffic volumes approach or exceed practical working capacity of road
- Free Flow Conditions**
- roads with operating speeds greater than or equal to 70 km/h
 - normally encountered in rural areas
 - may also be used at intersections within the built-up area of a community with < 10 000 people and outside the commuting influence of a large urban centre, even if the speed is less than 70 km/h

Appendix F: Background Development Study Excerpts

16533 Highway 12

Town of Midland

Traffic Impact Study for Pratt Development Inc.

Type of Document:
Final Report

Project Number:
JDE – 20066

Date Submitted:
October 16th, 2020
Revised November 23rd, 2022



John Northcote, P.Eng.
Professional License #: 100124071



ENGINEERING

JD Northcote Engineering Inc.
86 Cumberland Street
Barrie, ON
705.725.4035
www.JDEngineering.ca

Figure 3 – Adjacent Development Location



2.4.1 Development Growth Traffic Generation

Traffic volumes generated by the 786 William Street, 16982 Highway 12 and Hanson development have been determined based on their respective traffic impact studies (Excerpts provided in **Appendix B**). For the remaining developments, traffic volumes have been calculated based on the data provided in the Institute of Transportation Engineers [ITE] Trip Generation Manual (10th Edition) [ITE Trip Generation Manual].

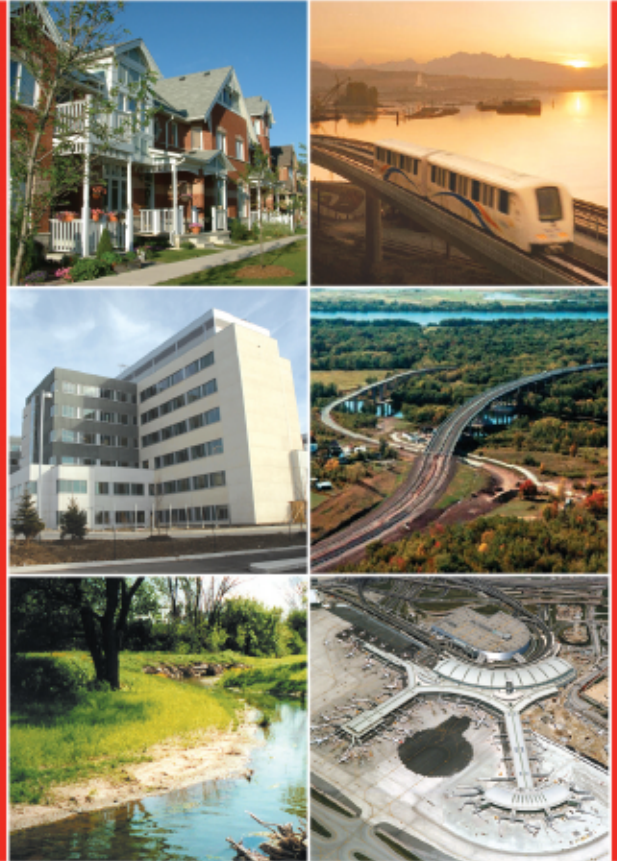
The following ITE land uses have been applied to estimate the traffic from the adjacent developments:

- ITE land use 210 (Single-Family Detached Housing) – General Urban/Suburban Setting; and
- ITE land use 220 (Multifamily Housing (Low-Rise)) – General Urban/Suburban Setting

The AM and PM peak hour traffic generation for the adjacent developments do not exactly align with the AM and PM peak hour in the traffic counts; consequently, we have applied the peak hour of adjacent street traffic values provided in the ITE Trip Generation Manual.

Appendix B – Adjacent Development Excerpts

MMM Group Limited



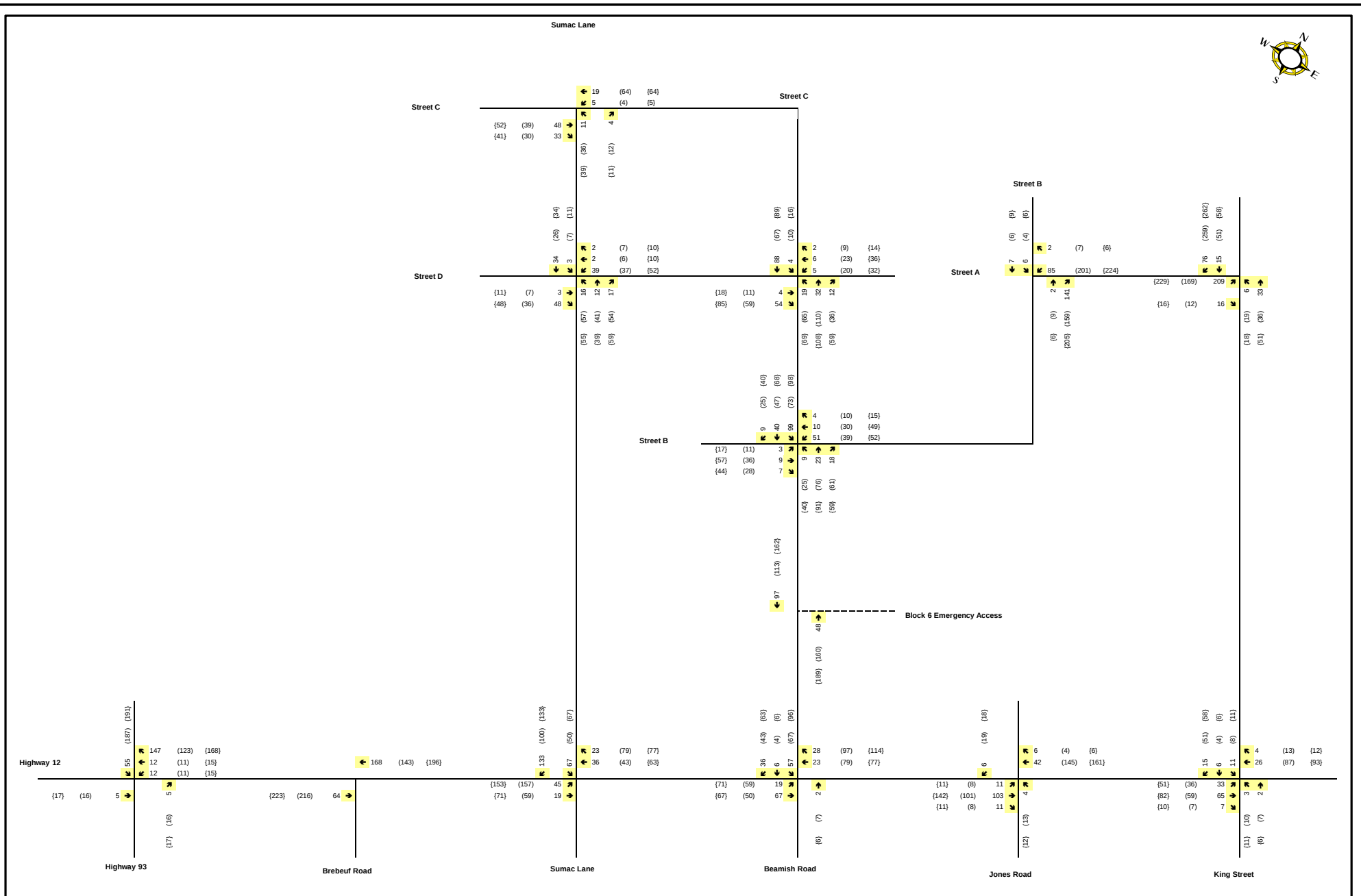
Hanson Development,
Town of Midland

Traffic Impact Study

COMMUNITIES
TRANSPORTATION
BUILDINGS
INFRASTRUCTURE



August 2016 | 10-04062



Appendix G: Future Background Operations

HCM Signalized Intersection Capacity Analysis

1: Highway 93 & The Angela Schmidt Foster Road/Highway 12

2026 Background Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	221	18	184	126	271	6	306	262	248	268	3
Future Volume (vph)	6	221	18	184	126	271	6	306	262	248	268	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.2	7.2		3.0	7.2	4.0	7.4	7.4	4.0	3.0	7.4	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	1813		1690	1795	1512	1560	1795	1570	1722	1880	
Flt Permitted	0.66	1.00		0.32	1.00	1.00	0.56	1.00	1.00	0.28	1.00	
Satd. Flow (perm)	1244	1813		569	1795	1512	924	1795	1570	516	1880	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	7	266	22	222	152	327	7	369	316	299	323	4
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	7	286	0	222	152	327	7	369	316	299	326	0
Heavy Vehicles (%)	2%	5%	2%	8%	7%	8%	17%	7%	4%	6%	2%	2%
Turn Type	Perm	NA		pm+pt	NA	Free	Perm	NA	Free	pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		Free	2		Free	6		
Actuated Green, G (s)	18.2	18.2		34.1	34.1	90.5	23.9	23.9	90.5	41.8	41.8	
Effective Green, g (s)	18.2	18.2		34.1	34.1	90.5	23.9	23.9	90.5	41.8	41.8	
Actuated g/C Ratio	0.20	0.20		0.38	0.38	1.00	0.26	0.26	1.00	0.46	0.46	
Clearance Time (s)	7.2	7.2		3.0	7.2		7.4	7.4		3.0	7.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	250	364		374	676	1512	244	474	1570	436	868	
v/s Ratio Prot		c0.16		c0.08	0.08			c0.21		c0.11	0.17	
v/s Ratio Perm	0.01			0.14		0.22	0.01		0.20	0.20		
v/c Ratio	0.03	0.78		0.59	0.22	0.22	0.03	0.78	0.20	0.69	0.38	
Uniform Delay, d1	29.0	34.3		20.9	19.2	0.0	24.7	30.8	0.0	17.2	15.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	10.6		2.5	0.2	0.3	0.0	7.9	0.3	4.4	0.3	
Delay (s)	29.1	44.9		23.4	19.4	0.3	24.7	38.7	0.3	21.6	16.1	
Level of Service	C	D		C	B	A	C	D	A	C	B	
Approach Delay (s)		44.5			11.8			21.0			18.7	
Approach LOS		D			B			C			B	
Intersection Summary												
HCM 2000 Control Delay			20.6			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			90.5			Sum of lost time (s)			20.6			
Intersection Capacity Utilization			77.9%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Beamish Road/Hanson Road & Highway 12

2026 Background Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	683	75	16	534	11	12	0	10	16	2	17
Future Volume (Veh/h)	7	683	75	16	534	11	12	0	10	16	2	17
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	9	865	95	20	676	14	15	0	13	20	3	22
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	690			960			1622	1613	865	1612	1694	676
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	690			960			1622	1613	865	1612	1694	676
tC, single (s)	4.1			4.2			7.3	6.5	6.2	7.2	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.7	4.0	3.3	3.6	4.0	3.4
p0 queue free %	99			97			77	100	96	73	97	95
cM capacity (veh/h)	905			701			65	100	353	75	89	443
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	9	865	95	20	676	14	28	45				
Volume Left	9	0	0	20	0	0	15	20				
Volume Right	0	0	95	0	0	14	13	22				
cSH	905	1700	1700	701	1700	1700	105	129				
Volume to Capacity	0.01	0.51	0.06	0.03	0.40	0.01	0.27	0.35				
Queue Length 95th (m)	0.2	0.0	0.0	0.7	0.0	0.0	7.5	10.8				
Control Delay (s)	9.0	0.0	0.0	10.3	0.0	0.0	51.3	47.3				
Lane LOS	A			B			F	E				
Approach Delay (s)	0.1			0.3			51.3	47.3				
Approach LOS							F	E				
Intersection Summary												
Average Delay	2.2											
Intersection Capacity Utilization	45.9%			ICU Level of Service					A			
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis

1: Highway 93 & The Angela Schmidt Foster Road/Highway 12

2026 Background Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	184	16	284	231	405	19	365	230	402	388	15
Future Volume (vph)	16	184	16	284	231	405	19	365	230	402	388	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.2	7.2		3.0	7.2	4.0	7.4	7.4	4.0	3.0	7.4	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	1812		1789	1883	1601	1738	1883	1570	1789	1838	
Flt Permitted	0.61	1.00		0.43	1.00	1.00	0.52	1.00	1.00	0.27	1.00	
Satd. Flow (perm)	1150	1812		803	1883	1601	950	1883	1570	510	1838	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	16	190	16	293	238	418	20	376	237	414	400	15
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	2	0
Lane Group Flow (vph)	16	203	0	293	238	418	20	376	237	414	413	0
Heavy Vehicles (%)	2%	5%	2%	2%	2%	2%	5%	2%	4%	2%	4%	2%
Turn Type	Perm	NA		pm+pt	NA	Free	Perm	NA	Free	pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		Free	2		Free	6		
Actuated Green, G (s)	14.9	14.9		32.5	32.5	92.0	24.2	24.2	92.0	44.9	44.9	
Effective Green, g (s)	14.9	14.9		32.5	32.5	92.0	24.2	24.2	92.0	44.9	44.9	
Actuated g/C Ratio	0.16	0.16		0.35	0.35	1.00	0.26	0.26	1.00	0.49	0.49	
Clearance Time (s)	7.2	7.2		3.0	7.2		7.4	7.4		3.0	7.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	186	293		440	665	1601	249	495	1570	494	897	
v/s Ratio Prot		0.11		c0.11	0.13			0.20		c0.16	0.22	
v/s Ratio Perm	0.01			c0.13		0.26	0.02		0.15	c0.25		
v/c Ratio	0.09	0.69		0.67	0.36	0.26	0.08	0.76	0.15	0.84	0.46	
Uniform Delay, d1	32.8	36.4		23.2	22.0	0.0	25.5	31.2	0.0	17.4	15.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	7.0		3.8	0.3	0.4	0.1	6.6	0.2	11.8	0.4	
Delay (s)	33.0	43.4		27.0	22.4	0.4	25.7	37.8	0.2	29.2	15.9	
Level of Service	C	D		C	C	A	C	D	A	C	B	
Approach Delay (s)		42.6			14.1			23.4			22.5	
Approach LOS		D			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			21.4			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			92.0			Sum of lost time (s)			20.6			
Intersection Capacity Utilization			86.7%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Beamish Road/Hanson Road & Highway 12

2026 Background Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	777	23	7	899	26	35	2	12	16	1	20
Future Volume (Veh/h)	18	777	23	7	899	26	35	2	12	16	1	20
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	19	818	24	7	946	27	37	2	13	17	1	21
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	973			842			1838	1843	818	1830	1840	946
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	973			842			1838	1843	818	1830	1840	946
tC, single (s)	4.2			4.2			7.2	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			99			27	97	97	69	99	93
cM capacity (veh/h)	685			744			51	72	376	54	73	313
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	19	818	24	7	946	27	52	39				
Volume Left	19	0	0	7	0	0	37	17				
Volume Right	0	0	24	0	0	27	13	21				
cSH	685	1700	1700	744	1700	1700	66	99				
Volume to Capacity	0.03	0.48	0.01	0.01	0.56	0.02	0.79	0.40				
Queue Length 95th (m)	0.6	0.0	0.0	0.2	0.0	0.0	27.6	12.2				
Control Delay (s)	10.4	0.0	0.0	9.9	0.0	0.0	159.0	63.5				
Lane LOS	B			A			F	F				
Approach Delay (s)	0.2			0.1			159.0	63.5				
Approach LOS							F	F				
Intersection Summary												
Average Delay	5.7											
Intersection Capacity Utilization	58.5%			ICU Level of Service					B			
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis

3: Beamish Road/Hanson Road & Highway 12

2026 Background Conditions
Weekday AM Peak + Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	683	75	16	534	11	12	0	10	16	2	17
Future Volume (vph)	7	683	75	16	534	11	12	0	10	16	2	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.94			0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97			0.98	
Satd. Flow (prot)	1789	1865	1512	1722	1812	1361		1534			1618	
Flt Permitted	0.38	1.00	1.00	0.27	1.00	1.00		0.93			0.88	
Satd. Flow (perm)	713	1865	1512	489	1812	1361		1466			1448	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	9	865	95	20	676	14	15	0	13	20	3	22
RTOR Reduction (vph)	0	0	28	0	0	4	0	26	0	0	21	0
Lane Group Flow (vph)	9	865	67	20	676	10	0	2	0	0	24	0
Heavy Vehicles (%)	2%	3%	8%	6%	6%	20%	25%	2%	2%	10%	2%	8%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	38.4	38.4	38.4	38.4	38.4	38.4		3.3			3.3	
Effective Green, g (s)	38.4	38.4	38.4	38.4	38.4	38.4		3.3			3.3	
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.70	0.70		0.06			0.06	
Clearance Time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	499	1306	1059	342	1269	953		88			87	
v/s Ratio Prot		c0.46			0.37							
v/s Ratio Perm	0.01		0.04	0.04		0.01		0.00			c0.02	
v/c Ratio	0.02	0.66	0.06	0.06	0.53	0.01		0.02			0.28	
Uniform Delay, d1	2.5	4.6	2.6	2.6	3.9	2.5		24.2			24.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.0	1.3	0.0	0.1	0.4	0.0		0.1			1.8	
Delay (s)	2.5	5.9	2.6	2.6	4.3	2.5		24.3			26.4	
Level of Service	A	A	A	A	A	A		C			C	
Approach Delay (s)		5.5			4.3			24.3			26.4	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay		5.8			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.63										
Actuated Cycle Length (s)		54.8			Sum of lost time (s)			13.1				
Intersection Capacity Utilization		58.5%			ICU Level of Service			B				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Beamish Road/Hanson Road & Highway 12

2026 Background Conditions
Weekday PM Peak + Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	777	23	7	899	26	35	2	12	16	1	20
Future Volume (vph)	18	777	23	7	899	26	35	2	12	16	1	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.97			0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97			0.98	
Satd. Flow (prot)	1690	1865	1498	1601	1883	1601		1710			1683	
Flt Permitted	0.23	1.00	1.00	0.30	1.00	1.00		1.00			0.90	
Satd. Flow (perm)	406	1865	1498	503	1883	1601		1770			1543	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	19	818	24	7	946	27	37	2	13	17	1	21
RTOR Reduction (vph)	0	0	7	0	0	8	0	12	0	0	20	0
Lane Group Flow (vph)	19	818	17	7	946	19	0	40	0	0	19	0
Heavy Vehicles (%)	8%	3%	9%	14%	2%	2%	6%	2%	2%	2%	2%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	39.2	39.2	39.2	39.2	39.2	39.2		3.2			3.2	
Effective Green, g (s)	39.2	39.2	39.2	39.2	39.2	39.2		3.2			3.2	
Actuated g/C Ratio	0.71	0.71	0.71	0.71	0.71	0.71		0.06			0.06	
Clearance Time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	286	1317	1058	355	1329	1130		102			88	
v/s Ratio Prot		0.44			c0.50							
v/s Ratio Perm	0.05		0.01	0.01		0.01		c0.02			0.01	
v/c Ratio	0.07	0.62	0.02	0.02	0.71	0.02		0.39			0.22	
Uniform Delay, d1	2.5	4.3	2.4	2.4	4.8	2.4		25.2			25.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.1	0.9	0.0	0.0	1.8	0.0		2.5			1.3	
Delay (s)	2.6	5.2	2.4	2.4	6.6	2.4		27.7			26.2	
Level of Service	A	A	A	A	A	A		C			C	
Approach Delay (s)		5.0			6.5			27.7			26.2	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			6.8				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			55.5				Sum of lost time (s)			13.1		
Intersection Capacity Utilization			66.6%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Highway 93 & The Angela Schmidt Foster Road/Highway 12

2031 Background Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	223	18	209	132	351	6	337	278	288	275	3
Future Volume (vph)	6	223	18	209	132	351	6	337	278	288	275	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		3.0	6.0	4.0	6.2	6.2	4.0	3.0	6.2	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	1813		1690	1795	1512	1560	1795	1570	1722	1880	
Flt Permitted	0.66	1.00		0.25	1.00	1.00	0.56	1.00	1.00	0.22	1.00	
Satd. Flow (perm)	1236	1813		444	1795	1512	918	1795	1570	403	1880	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	7	269	22	252	159	423	7	406	335	347	331	4
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	7	289	0	252	159	423	7	406	335	347	334	0
Heavy Vehicles (%)	2%	5%	2%	8%	7%	8%	17%	7%	4%	6%	2%	2%
Turn Type	Perm	NA		pm+pt	NA	Free	Perm	NA	Free	pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		Free	2		Free	6		
Actuated Green, G (s)	16.8	16.8		34.0	34.0	91.0	24.9	24.9	91.0	44.8	44.8	
Effective Green, g (s)	16.8	16.8		34.0	34.0	91.0	24.9	24.9	91.0	44.8	44.8	
Actuated g/C Ratio	0.18	0.18		0.37	0.37	1.00	0.27	0.27	1.00	0.49	0.49	
Clearance Time (s)	6.0	6.0		3.0	6.0		6.2	6.2		3.0	6.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	228	334		360	670	1512	251	491	1570	443	925	
v/s Ratio Prot		c0.16		c0.11	0.09			0.23		c0.15	0.18	
v/s Ratio Perm	0.01			0.15		0.28	0.01		0.21	c0.24		
v/c Ratio	0.03	0.86		0.70	0.24	0.28	0.03	0.83	0.21	0.78	0.36	
Uniform Delay, d1	30.4	36.0		21.9	19.6	0.0	24.2	31.0	0.0	16.9	14.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	20.0		5.9	0.2	0.5	0.0	10.9	0.3	8.8	0.2	
Delay (s)	30.5	56.0		27.8	19.8	0.5	24.2	42.0	0.3	25.7	14.5	
Level of Service	C	E		C	B	A	C	D	A	C	B	
Approach Delay (s)		55.4			12.4			23.1			20.2	
Approach LOS		E			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			22.6				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			91.0				Sum of lost time (s)			18.2		
Intersection Capacity Utilization			76.4%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Beamish Road/Hanson Road & Highway 12

2031 Background Conditions

Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	751	75	16	573	25	12	1	10	44	5	35
Future Volume (vph)	16	751	75	16	573	25	12	1	10	44	5	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.94			0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97			0.97	
Satd. Flow (prot)	1789	1865	1512	1722	1812	1420		1545			1685	
Flt Permitted	0.32	1.00	1.00	0.18	1.00	1.00		0.83			0.82	
Satd. Flow (perm)	599	1865	1512	324	1812	1420		1308			1417	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	20	951	95	20	725	32	15	1	13	56	6	44
RTOR Reduction (vph)	0	0	34	0	0	11	0	11	0	0	37	0
Lane Group Flow (vph)	20	951	61	20	725	21	0	18	0	0	69	0
Heavy Vehicles (%)	2%	3%	8%	6%	6%	15%	25%	2%	2%	5%	2%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	37.2	37.2	37.2	37.2	37.2	37.2		7.6			7.6	
Effective Green, g (s)	37.2	37.2	37.2	37.2	37.2	37.2		7.6			7.6	
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64		0.13			0.13	
Clearance Time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	384	1198	971	208	1164	912		171			185	
v/s Ratio Prot		c0.51			0.40							
v/s Ratio Perm	0.03		0.04	0.06		0.01		0.01			c0.05	
v/c Ratio	0.05	0.79	0.06	0.10	0.62	0.02		0.10			0.37	
Uniform Delay, d1	3.8	7.6	3.9	3.9	6.2	3.8		22.1			23.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.1	3.7	0.0	0.2	1.0	0.0		0.3			1.3	
Delay (s)	3.9	11.3	3.9	4.1	7.2	3.8		22.4			24.2	
Level of Service	A	B	A	A	A	A		C			C	
Approach Delay (s)		10.5			7.0			22.4			24.2	
Approach LOS		B			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			10.0				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			57.9				Sum of lost time (s)			13.1		
Intersection Capacity Utilization			58.8%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Highway 93 & The Angela Schmidt Foster Road/Highway 12

2031 Background Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	192	16	319	236	476	19	403	250	514	398	15
Future Volume (vph)	16	192	16	319	236	476	19	403	250	514	398	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		3.0	6.0	4.0	6.2	6.2	4.0	3.0	6.2	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	1813		1789	1883	1601	1738	1883	1570	1789	1839	
Flt Permitted	0.61	1.00		0.33	1.00	1.00	0.51	1.00	1.00	0.17	1.00	
Satd. Flow (perm)	1145	1813		617	1883	1601	941	1883	1570	329	1839	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	16	198	16	329	243	491	20	415	258	530	410	15
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	16	211	0	329	243	491	20	415	258	530	424	0
Heavy Vehicles (%)	2%	5%	2%	2%	2%	2%	5%	2%	4%	2%	4%	2%
Turn Type	Perm	NA		pm+pt	NA	Free	Perm	NA	Free	pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		Free	2		Free	6		
Actuated Green, G (s)	15.0	15.0		34.2	34.2	100.6	25.9	25.9	100.6	54.2	54.2	
Effective Green, g (s)	15.0	15.0		34.2	34.2	100.6	25.9	25.9	100.6	54.2	54.2	
Actuated g/C Ratio	0.15	0.15		0.34	0.34	1.00	0.26	0.26	1.00	0.54	0.54	
Clearance Time (s)	6.0	6.0		3.0	6.0		6.2	6.2		3.0	6.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	170	270		398	640	1601	242	484	1570	544	990	
v/s Ratio Prot		0.12		c0.13	0.13			0.22		c0.24	0.23	
v/s Ratio Perm	0.01			c0.15		0.31	0.02		0.16	c0.28		
v/c Ratio	0.09	0.78		0.83	0.38	0.31	0.08	0.86	0.16	0.97	0.43	
Uniform Delay, d1	36.9	41.2		27.4	25.2	0.0	28.3	35.6	0.0	25.9	13.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	13.8		13.1	0.4	0.5	0.1	14.0	0.2	31.8	0.3	
Delay (s)	37.2	55.0		40.5	25.5	0.5	28.5	49.6	0.2	57.7	14.2	
Level of Service	D	D		D	C	A	C	D	A	E	B	
Approach Delay (s)		53.8			18.6			30.6			38.4	
Approach LOS		D			B			C			D	
Intersection Summary												
HCM 2000 Control Delay			30.6									
HCM 2000 Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			100.6									
Intersection Capacity Utilization			95.3%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Beamish Road/Hanson Road & Highway 12

2031 Background Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	842	23	7	984	74	35	6	12	50	3	42
Future Volume (vph)	47	842	23	7	984	74	35	6	12	50	3	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.97			0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97			0.97	
Satd. Flow (prot)	1722	1865	1498	1601	1883	1601		1721			1711	
Flt Permitted	0.14	1.00	1.00	0.23	1.00	1.00		0.80			0.80	
Satd. Flow (perm)	249	1865	1498	380	1883	1601		1424			1412	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	49	886	24	7	1036	78	37	6	13	53	3	44
RTOR Reduction (vph)	0	0	8	0	0	27	0	11	0	0	38	0
Lane Group Flow (vph)	49	886	16	7	1036	51	0	45	0	0	62	0
Heavy Vehicles (%)	6%	3%	9%	14%	2%	2%	6%	2%	2%	2%	2%	4%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	39.7	39.7	39.7	39.7	39.7	39.7		7.6			7.6	
Effective Green, g (s)	39.7	39.7	39.7	39.7	39.7	39.7		7.6			7.6	
Actuated g/C Ratio	0.66	0.66	0.66	0.66	0.66	0.66		0.13			0.13	
Clearance Time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	163	1225	984	249	1237	1052		179			177	
v/s Ratio Prot		0.48			c0.55							
v/s Ratio Perm	0.20		0.01	0.02		0.03		0.03			c0.04	
v/c Ratio	0.30	0.72	0.02	0.03	0.84	0.05		0.25			0.35	
Uniform Delay, d1	4.4	6.8	3.6	3.6	7.9	3.7		23.8			24.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	1.0	2.1	0.0	0.0	5.1	0.0		0.7			1.2	
Delay (s)	5.5	8.9	3.6	3.7	13.0	3.7		24.6			25.3	
Level of Service	A	A	A	A	B	A		C			C	
Approach Delay (s)		8.6			12.3			24.6			25.3	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			11.6				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			60.4				Sum of lost time (s)			13.1		
Intersection Capacity Utilization			71.0%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Highway 93 & The Angela Schmidt Foster Road/Highway 12

2036 Background Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	197	16	355	239	523	19	445	267	590	408	15
Future Volume (vph)	16	197	16	355	239	523	19	445	267	590	408	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		3.0	6.0	4.0	6.2	6.2	4.0	3.0	6.2	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	1813		1789	1883	1601	1738	1883	1570	1789	1839	
Flt Permitted	0.61	1.00		0.25	1.00	1.00	0.51	1.00	1.00	0.12	1.00	
Satd. Flow (perm)	1142	1813		475	1883	1601	932	1883	1570	229	1839	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	16	203	16	366	246	539	20	459	275	608	421	15
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	16	216	0	366	246	539	20	459	275	608	435	0
Heavy Vehicles (%)	2%	5%	2%	2%	2%	2%	5%	2%	4%	2%	4%	2%
Turn Type	Perm	NA		pm+pt	NA	Free	Perm	NA	Free	pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		Free	2		Free	6		
Actuated Green, G (s)	15.3	15.3		37.3	37.3	115.5	29.9	29.9	115.5	66.0	66.0	
Effective Green, g (s)	15.3	15.3		37.3	37.3	115.5	29.9	29.9	115.5	66.0	66.0	
Actuated g/C Ratio	0.13	0.13		0.32	0.32	1.00	0.26	0.26	1.00	0.57	0.57	
Clearance Time (s)	6.0	6.0		3.0	6.0		6.2	6.2		3.0	6.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	151	240		369	608	1601	241	487	1570	577	1050	
v/s Ratio Prot		0.12		c0.16	0.13			0.24		c0.30	0.24	
v/s Ratio Perm	0.01			c0.16		0.34	0.02		0.18	c0.30		
v/c Ratio	0.11	0.90		0.99	0.40	0.34	0.08	0.94	0.18	1.05	0.41	
Uniform Delay, d1	44.1	49.4		34.6	30.5	0.0	32.4	42.0	0.0	33.3	13.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	33.1		44.5	0.4	0.6	0.1	26.9	0.2	52.4	0.3	
Delay (s)	44.4	82.4		79.1	30.9	0.6	32.6	68.8	0.2	85.7	14.2	
Level of Service	D	F		E	C	A	C	E	A	F	B	
Approach Delay (s)		79.8			32.0			42.9			55.8	
Approach LOS		E			C			D			E	
Intersection Summary												
HCM 2000 Control Delay			45.9			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			1.08									
Actuated Cycle Length (s)			115.5			Sum of lost time (s)			18.2			
Intersection Capacity Utilization			103.9%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Beamish Road/Hanson Road & Highway 12

2036 Background Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	898	23	7	1056	103	35	8	12	70	4	55
Future Volume (vph)	65	898	23	7	1056	103	35	8	12	70	4	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.97			0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97			0.97	
Satd. Flow (prot)	1755	1865	1498	1601	1883	1601		1727			1721	
Flt Permitted	0.11	1.00	1.00	0.20	1.00	1.00		0.79			0.80	
Satd. Flow (perm)	197	1865	1498	341	1883	1601		1410			1412	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	68	945	24	7	1112	108	37	8	13	74	4	58
RTOR Reduction (vph)	0	0	8	0	0	35	0	11	0	0	40	0
Lane Group Flow (vph)	68	945	16	7	1112	73	0	47	0	0	96	0
Heavy Vehicles (%)	4%	3%	9%	14%	2%	2%	6%	2%	2%	2%	2%	3%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	43.0	43.0	43.0	43.0	43.0	43.0		7.4			7.4	
Effective Green, g (s)	43.0	43.0	43.0	43.0	43.0	43.0		7.4			7.4	
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.68	0.68		0.12			0.12	
Clearance Time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	133	1262	1014	230	1275	1084		164			164	
v/s Ratio Prot		0.51			c0.59							
v/s Ratio Perm	0.34		0.01	0.02		0.05		0.03			c0.07	
v/c Ratio	0.51	0.75	0.02	0.03	0.87	0.07		0.28			0.59	
Uniform Delay, d1	5.1	6.7	3.3	3.4	8.1	3.5		25.6			26.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	3.3	2.5	0.0	0.1	6.8	0.0		1.0			5.3	
Delay (s)	8.4	9.2	3.4	3.4	14.9	3.5		26.6			31.9	
Level of Service	A	A	A	A	B	A		C			C	
Approach Delay (s)		9.0			13.8			26.6			31.9	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			13.1				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			63.5				Sum of lost time (s)			13.1		
Intersection Capacity Utilization			74.9%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Highway 93 & The Angela Schmidt Foster Road/Highway 12

2036 Background Conditions

Weekday AM Peak + Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	225	18	233	135	401	6	372	294	318	281	3
Future Volume (vph)	6	225	18	233	135	401	6	372	294	318	281	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		3.0	6.0	4.0	6.2	6.2	4.0	3.0	6.2	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	1813		1690	1795	1512	1560	1795	1570	3340	1880	
Flt Permitted	0.65	1.00		0.31	1.00	1.00	0.55	1.00	1.00	0.23	1.00	
Satd. Flow (perm)	1231	1813		559	1795	1512	911	1795	1570	811	1880	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	7	271	22	281	163	483	7	448	354	383	339	4
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	7	291	0	281	163	483	7	448	354	383	342	0
Heavy Vehicles (%)	2%	5%	2%	8%	7%	8%	17%	7%	4%	6%	2%	2%
Turn Type	Perm	NA		pm+pt	NA	Free	Perm	NA	Free	pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		Free	2		Free	6		
Actuated Green, G (s)	18.5	18.5		35.7	35.7	84.7	26.6	26.6	84.7	36.8	36.8	
Effective Green, g (s)	18.5	18.5		35.7	35.7	84.7	26.6	26.6	84.7	36.8	36.8	
Actuated g/C Ratio	0.22	0.22		0.42	0.42	1.00	0.31	0.31	1.00	0.43	0.43	
Clearance Time (s)	6.0	6.0		3.0	6.0		6.2	6.2		3.0	6.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	268	395		425	756	1512	286	563	1570	567	816	
v/s Ratio Prot		0.16		c0.11	0.09			c0.25		c0.06	0.18	
v/s Ratio Perm	0.01			c0.17		0.32	0.01		0.23	0.24		
v/c Ratio	0.03	0.74		0.66	0.22	0.32	0.02	0.80	0.23	0.68	0.42	
Uniform Delay, d1	26.0	30.8		17.8	15.6	0.0	20.1	26.6	0.0	17.2	16.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	7.0		3.8	0.1	0.6	0.0	7.7	0.3	3.2	0.4	
Delay (s)	26.1	37.8		21.6	15.7	0.6	20.1	34.2	0.3	20.4	16.9	
Level of Service	C	D		C	B	A	C	C	A	C	B	
Approach Delay (s)		37.5			9.6			19.3			18.8	
Approach LOS		D			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			17.9			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			84.7			Sum of lost time (s)			18.2			
Intersection Capacity Utilization			77.8%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Highway 93 & The Angela Schmidt Foster Road/Highway 12

2036 Background Conditions

Weekday PM Peak + Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	197	16	355	239	523	19	445	267	590	408	15
Future Volume (vph)	16	197	16	355	239	523	19	445	267	590	408	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		3.0	6.0	4.0	6.2	6.2	4.0	4.0	6.2	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	1813		1789	1883	1601	1738	1883	1570	3471	1839	
Flt Permitted	0.61	1.00		0.31	1.00	1.00	0.51	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1142	1813		584	1883	1601	932	1883	1570	3471	1839	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	16	203	16	366	246	539	20	459	275	608	421	15
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	16	216	0	366	246	539	20	459	275	608	435	0
Heavy Vehicles (%)	2%	5%	2%	2%	2%	2%	5%	2%	4%	2%	4%	2%
Turn Type	Perm	NA		pm+pt	NA	Free	Perm	NA	Free	Prot	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		Free	2		Free			
Actuated Green, G (s)	14.6	14.6		35.9	35.9	99.9	27.5	27.5	99.9	20.3	51.8	
Effective Green, g (s)	14.6	14.6		35.9	35.9	99.9	27.5	27.5	99.9	20.3	51.8	
Actuated g/C Ratio	0.15	0.15		0.36	0.36	1.00	0.28	0.28	1.00	0.20	0.52	
Clearance Time (s)	6.0	6.0		3.0	6.0		6.2	6.2		4.0	6.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	166	264		430	676	1601	256	518	1570	705	953	
v/s Ratio Prot		0.12		c0.16	0.13			c0.24		c0.18	0.24	
v/s Ratio Perm	0.01			c0.15		0.34	0.02		0.18			
v/c Ratio	0.10	0.82		0.85	0.36	0.34	0.08	0.89	0.18	0.86	0.46	
Uniform Delay, d1	36.9	41.4		26.3	23.6	0.0	26.8	34.7	0.0	38.5	15.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	17.7		14.9	0.3	0.6	0.1	16.5	0.2	10.6	0.3	
Delay (s)	37.2	59.1		41.2	23.9	0.6	26.9	51.2	0.2	49.1	15.5	
Level of Service	D	E		D	C	A	C	D	A	D	B	
Approach Delay (s)		57.6			18.5			32.0			35.0	
Approach LOS		E			B			C			D	
Intersection Summary												
HCM 2000 Control Delay			30.0									
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			99.9									
Intersection Capacity Utilization			88.7%									
Analysis Period (min)			15									
c Critical Lane Group												

Appendix H: Future Total Operations

HCM Signalized Intersection Capacity Analysis

1: Highway 93 & The Angela Schmidt Foster Road/Highway 12

2026 Total Conditions
Weekday AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	221	18	186	126	263	6	304	264	240	266	3
Future Volume (vph)	6	221	18	186	126	263	6	304	264	240	266	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.2	7.2		3.0	7.2	4.0	7.4	7.4	4.0	3.0	7.4	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	1813		1690	1795	1512	1560	1795	1570	1722	1880	
Flt Permitted	0.66	1.00		0.33	1.00	1.00	0.56	1.00	1.00	0.29	1.00	
Satd. Flow (perm)	1244	1813		582	1795	1512	927	1795	1570	534	1880	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	7	266	22	224	152	317	7	366	318	289	320	4
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	7	286	0	224	152	317	7	366	318	289	323	0
Heavy Vehicles (%)	2%	5%	2%	8%	7%	8%	17%	7%	4%	6%	2%	2%
Turn Type	Perm	NA		pm+pt	NA	Free	Perm	NA	Free	pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		Free	2		Free	6		
Actuated Green, G (s)	18.7	18.7		34.7	34.7	90.8	24.4	24.4	90.8	41.5	41.5	
Effective Green, g (s)	18.7	18.7		34.7	34.7	90.8	24.4	24.4	90.8	41.5	41.5	
Actuated g/C Ratio	0.21	0.21		0.38	0.38	1.00	0.27	0.27	1.00	0.46	0.46	
Clearance Time (s)	7.2	7.2		3.0	7.2		7.4	7.4		3.0	7.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	256	373		381	685	1512	249	482	1570	428	859	
v/s Ratio Prot		c0.16		c0.08	0.08			c0.20		c0.10	0.17	
v/s Ratio Perm	0.01			0.14		0.21	0.01		0.20	0.20		
v/c Ratio	0.03	0.77		0.59	0.22	0.21	0.03	0.76	0.20	0.68	0.38	
Uniform Delay, d1	28.8	34.0		20.6	18.9	0.0	24.5	30.5	0.0	17.3	16.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	9.1		2.3	0.2	0.3	0.0	6.8	0.3	4.2	0.3	
Delay (s)	28.8	43.0		22.9	19.1	0.3	24.5	37.3	0.3	21.5	16.4	
Level of Service	C	D		C	B	A	C	D	A	C	B	
Approach Delay (s)		42.7			11.7			20.1			18.8	
Approach LOS		D			B			C			B	
Intersection Summary												
HCM 2000 Control Delay			20.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			90.8			Sum of lost time (s)			20.6			
Intersection Capacity Utilization			78.0%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Beamish Road/Hanson Road & Highway 12

2026 Total Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	681	71	18	532	11	8	0	12	16	2	17
Future Volume (vph)	7	681	71	18	532	11	8	0	12	16	2	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.92			0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98			0.98	
Satd. Flow (prot)	1789	1865	1512	1722	1812	1361		1557			1618	
Flt Permitted	0.38	1.00	1.00	0.27	1.00	1.00		0.85			0.88	
Satd. Flow (perm)	717	1865	1512	493	1812	1361		1349			1448	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	9	862	90	23	673	14	10	0	15	20	3	22
RTOR Reduction (vph)	0	0	27	0	0	4	0	23	0	0	21	0
Lane Group Flow (vph)	9	862	63	23	673	10	0	2	0	0	24	0
Heavy Vehicles (%)	2%	3%	8%	6%	6%	20%	25%	2%	2%	10%	2%	8%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	38.5	38.5	38.5	38.5	38.5	38.5		3.3			3.3	
Effective Green, g (s)	38.5	38.5	38.5	38.5	38.5	38.5		3.3			3.3	
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.70	0.70		0.06			0.06	
Clearance Time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	502	1307	1060	345	1270	954		81			87	
v/s Ratio Prot		c0.46			0.37							
v/s Ratio Perm	0.01		0.04	0.05		0.01		0.00			c0.02	
v/c Ratio	0.02	0.66	0.06	0.07	0.53	0.01		0.02			0.28	
Uniform Delay, d1	2.5	4.6	2.6	2.6	3.9	2.5		24.3			24.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.0	1.2	0.0	0.1	0.4	0.0		0.1			1.8	
Delay (s)	2.5	5.8	2.6	2.7	4.3	2.5		24.4			26.4	
Level of Service	A	A	A	A	A	A		C			C	
Approach Delay (s)		5.4			4.2			24.4			26.4	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			5.8				HCM 2000 Level of Service				A	
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			54.9				Sum of lost time (s)			13.1		
Intersection Capacity Utilization			58.5%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Highway 93 & The Angela Schmidt Foster Road/Highway 12

2026 Total Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	184	16	286	231	397	19	363	232	394	386	15
Future Volume (vph)	16	184	16	286	231	397	19	363	232	394	386	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.2	7.2		3.0	7.2	4.0	7.4	7.4	4.0	3.0	7.4	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	1812		1789	1883	1601	1738	1883	1570	1789	1838	
Flt Permitted	0.61	1.00		0.44	1.00	1.00	0.52	1.00	1.00	0.27	1.00	
Satd. Flow (perm)	1150	1812		834	1883	1601	952	1883	1570	515	1838	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	16	190	16	295	238	409	20	374	239	406	398	15
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	16	204	0	295	238	409	20	374	239	406	412	0
Heavy Vehicles (%)	2%	5%	2%	2%	2%	2%	5%	2%	4%	2%	4%	2%
Turn Type	Perm	NA		pm+pt	NA	Free	Perm	NA	Free	pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		Free	2		Free	6		
Actuated Green, G (s)	15.6	15.6		33.2	33.2	90.7	23.7	23.7	90.7	42.9	42.9	
Effective Green, g (s)	15.6	15.6		33.2	33.2	90.7	23.7	23.7	90.7	42.9	42.9	
Actuated g/C Ratio	0.17	0.17		0.37	0.37	1.00	0.26	0.26	1.00	0.47	0.47	
Clearance Time (s)	7.2	7.2		3.0	7.2		7.4	7.4		3.0	7.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	197	311		459	689	1601	248	492	1570	471	869	
v/s Ratio Prot		0.11		c0.10	0.13			0.20		c0.15	0.22	
v/s Ratio Perm	0.01			c0.13		0.26	0.02		0.15	c0.25		
v/c Ratio	0.08	0.65		0.64	0.35	0.26	0.08	0.76	0.15	0.86	0.47	
Uniform Delay, d1	31.5	35.0		22.0	20.9	0.0	25.3	30.9	0.0	17.9	16.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	4.9		3.1	0.3	0.4	0.1	6.8	0.2	14.9	0.4	
Delay (s)	31.7	39.9		25.1	21.2	0.4	25.4	37.7	0.2	32.8	16.6	
Level of Service	C	D		C	C	A	C	D	A	C	B	
Approach Delay (s)		39.3			13.4			23.1			24.7	
Approach LOS		D			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			21.5			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			90.7			Sum of lost time (s)			20.6			
Intersection Capacity Utilization			86.3%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Beamish Road/Hanson Road & Highway 12

2026 Total Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	775	19	9	897	26	31	2	14	16	1	20
Future Volume (vph)	18	775	19	9	897	26	31	2	14	16	1	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.96			0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97			0.98	
Satd. Flow (prot)	1690	1865	1498	1601	1883	1601		1705			1683	
Flt Permitted	0.23	1.00	1.00	0.30	1.00	1.00		1.00			0.90	
Satd. Flow (perm)	408	1865	1498	505	1883	1601		1762			1543	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	19	816	20	9	944	27	33	2	15	17	1	21
RTOR Reduction (vph)	0	0	6	0	0	8	0	14	0	0	20	0
Lane Group Flow (vph)	19	816	14	9	944	19	0	36	0	0	19	0
Heavy Vehicles (%)	8%	3%	9%	14%	2%	2%	6%	2%	2%	2%	2%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	39.2	39.2	39.2	39.2	39.2	39.2		3.2			3.2	
Effective Green, g (s)	39.2	39.2	39.2	39.2	39.2	39.2		3.2			3.2	
Actuated g/C Ratio	0.71	0.71	0.71	0.71	0.71	0.71		0.06			0.06	
Clearance Time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	288	1317	1058	356	1329	1130		101			88	
v/s Ratio Prot		0.44			c0.50							
v/s Ratio Perm	0.05		0.01	0.02		0.01		c0.02			0.01	
v/c Ratio	0.07	0.62	0.01	0.03	0.71	0.02		0.36			0.22	
Uniform Delay, d1	2.5	4.3	2.4	2.4	4.8	2.4		25.2			25.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.1	0.9	0.0	0.0	1.8	0.0		2.1			1.3	
Delay (s)	2.6	5.1	2.4	2.5	6.6	2.4		27.3			26.2	
Level of Service	A	A	A	A	A	A		C			C	
Approach Delay (s)		5.0			6.5			27.3			26.2	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			6.8				HCM 2000 Level of Service				A	
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			55.5				Sum of lost time (s)			13.1		
Intersection Capacity Utilization			66.5%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Highway 93 & The Angela Schmidt Foster Road/Highway 12

2031 Total Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	223	18	211	132	343	6	335	280	280	273	3
Future Volume (vph)	6	223	18	211	132	343	6	335	280	280	273	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		3.0	6.0	4.0	6.2	6.2	4.0	3.0	6.2	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	1813		1690	1795	1512	1560	1795	1570	1722	1880	
Flt Permitted	0.66	1.00		0.25	1.00	1.00	0.56	1.00	1.00	0.23	1.00	
Satd. Flow (perm)	1236	1813		447	1795	1512	919	1795	1570	409	1880	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	7	269	22	254	159	413	7	404	337	337	329	4
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	7	289	0	254	159	413	7	404	337	337	332	0
Heavy Vehicles (%)	2%	5%	2%	8%	7%	8%	17%	7%	4%	6%	2%	2%
Turn Type	Perm	NA		pm+pt	NA	Free	Perm	NA	Free	pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		Free	2		Free	6		
Actuated Green, G (s)	16.7	16.7		34.0	34.0	90.3	24.7	24.7	90.3	44.1	44.1	
Effective Green, g (s)	16.7	16.7		34.0	34.0	90.3	24.7	24.7	90.3	44.1	44.1	
Actuated g/C Ratio	0.18	0.18		0.38	0.38	1.00	0.27	0.27	1.00	0.49	0.49	
Clearance Time (s)	6.0	6.0		3.0	6.0		6.2	6.2		3.0	6.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	228	335		365	675	1512	251	490	1570	438	918	
v/s Ratio Prot		c0.16		c0.11	0.09			0.23		c0.14	0.18	
v/s Ratio Perm	0.01			0.15		0.27	0.01		0.21	c0.24		
v/c Ratio	0.03	0.86		0.70	0.24	0.27	0.03	0.82	0.21	0.77	0.36	
Uniform Delay, d1	30.2	35.7		21.6	19.3	0.0	24.0	30.8	0.0	16.8	14.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	19.7		5.7	0.2	0.4	0.0	10.8	0.3	7.9	0.2	
Delay (s)	30.2	55.4		27.3	19.4	0.4	24.1	41.6	0.3	24.8	14.6	
Level of Service	C	E		C	B	A	C	D	A	C	B	
Approach Delay (s)		54.8			12.3			22.8			19.7	
Approach LOS		D			B			C			B	
Intersection Summary												
HCM 2000 Control Delay			22.3			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			90.3			Sum of lost time (s)			18.2			
Intersection Capacity Utilization			76.5%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Beamish Road/Hanson Road & Highway 12

2031 Total Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	749	71	18	571	25	8	1	12	44	5	35
Future Volume (vph)	16	749	71	18	571	25	8	1	12	44	5	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.92			0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98			0.97	
Satd. Flow (prot)	1789	1865	1512	1722	1812	1420		1568			1685	
Flt Permitted	0.32	1.00	1.00	0.18	1.00	1.00		0.86			0.82	
Satd. Flow (perm)	601	1865	1512	328	1812	1420		1371			1419	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	20	948	90	23	723	32	10	1	15	56	6	44
RTOR Reduction (vph)	0	0	32	0	0	11	0	13	0	0	37	0
Lane Group Flow (vph)	20	948	58	23	723	21	0	13	0	0	69	0
Heavy Vehicles (%)	2%	3%	8%	6%	6%	15%	25%	2%	2%	5%	2%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	37.2	37.2	37.2	37.2	37.2	37.2		7.6			7.6	
Effective Green, g (s)	37.2	37.2	37.2	37.2	37.2	37.2		7.6			7.6	
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64		0.13			0.13	
Clearance Time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	386	1198	971	210	1164	912		179			186	
v/s Ratio Prot		c0.51			0.40							
v/s Ratio Perm	0.03		0.04	0.07		0.01		0.01			c0.05	
v/c Ratio	0.05	0.79	0.06	0.11	0.62	0.02		0.07			0.37	
Uniform Delay, d1	3.8	7.5	3.8	4.0	6.2	3.8		22.1			23.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.1	3.7	0.0	0.2	1.0	0.0		0.2			1.2	
Delay (s)	3.9	11.2	3.9	4.2	7.2	3.8		22.2			24.2	
Level of Service	A	B	A	A	A	A		C			C	
Approach Delay (s)		10.4			7.0			22.2			24.2	
Approach LOS		B			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			10.0				HCM 2000 Level of Service				A	
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			57.9				Sum of lost time (s)			13.1		
Intersection Capacity Utilization			58.7%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Highway 93 & The Angela Schmidt Foster Road/Highway 12

2031 Total Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	192	16	321	236	468	19	401	252	506	396	15
Future Volume (vph)	16	192	16	321	236	468	19	401	252	506	396	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		3.0	6.0	4.0	6.2	6.2	4.0	3.0	6.2	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	1813		1789	1883	1601	1738	1883	1570	1789	1839	
Flt Permitted	0.61	1.00		0.33	1.00	1.00	0.52	1.00	1.00	0.18	1.00	
Satd. Flow (perm)	1145	1813		623	1883	1601	943	1883	1570	338	1839	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	16	198	16	331	243	482	20	413	260	522	408	15
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	16	211	0	331	243	482	20	413	260	522	422	0
Heavy Vehicles (%)	2%	5%	2%	2%	2%	2%	5%	2%	4%	2%	4%	2%
Turn Type	Perm	NA		pm+pt	NA	Free	Perm	NA	Free	pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		Free	2		Free	6		
Actuated Green, G (s)	15.0	15.0		34.2	34.2	99.9	25.8	25.8	99.9	53.5	53.5	
Effective Green, g (s)	15.0	15.0		34.2	34.2	99.9	25.8	25.8	99.9	53.5	53.5	
Actuated g/C Ratio	0.15	0.15		0.34	0.34	1.00	0.26	0.26	1.00	0.54	0.54	
Clearance Time (s)	6.0	6.0		3.0	6.0		6.2	6.2		3.0	6.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	171	272		402	644	1601	243	486	1570	539	984	
v/s Ratio Prot		0.12		c0.13	0.13			0.22		c0.24	0.23	
v/s Ratio Perm	0.01			c0.15		0.30	0.02		0.17	c0.28		
v/c Ratio	0.09	0.78		0.82	0.38	0.30	0.08	0.85	0.17	0.97	0.43	
Uniform Delay, d1	36.6	40.8		27.0	24.8	0.0	28.1	35.2	0.0	25.3	14.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	13.0		12.8	0.4	0.5	0.1	13.1	0.2	30.5	0.3	
Delay (s)	36.8	53.9		39.8	25.2	0.5	28.2	48.3	0.2	55.8	14.3	
Level of Service	D	D		D	C	A	C	D	A	E	B	
Approach Delay (s)		52.7			18.5			29.7			37.2	
Approach LOS		D			B			C			D	
Intersection Summary												
HCM 2000 Control Delay			29.9									
HCM 2000 Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			99.9									
Intersection Capacity Utilization			94.8%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Beamish Road/Hanson Road & Highway 12

2031 Total Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	840	19	9	982	74	31	6	14	50	3	42
Future Volume (vph)	47	840	19	9	982	74	31	6	14	50	3	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.96			0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97			0.97	
Satd. Flow (prot)	1722	1865	1498	1601	1883	1601		1718			1711	
Flt Permitted	0.14	1.00	1.00	0.23	1.00	1.00		0.81			0.81	
Satd. Flow (perm)	252	1865	1498	383	1883	1601		1432			1414	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	49	884	20	9	1034	78	33	6	15	53	3	44
RTOR Reduction (vph)	0	0	7	0	0	27	0	13	0	0	38	0
Lane Group Flow (vph)	49	884	13	9	1034	51	0	41	0	0	62	0
Heavy Vehicles (%)	6%	3%	9%	14%	2%	2%	6%	2%	2%	2%	2%	4%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	39.8	39.8	39.8	39.8	39.8	39.8		7.6			7.6	
Effective Green, g (s)	39.8	39.8	39.8	39.8	39.8	39.8		7.6			7.6	
Actuated g/C Ratio	0.66	0.66	0.66	0.66	0.66	0.66		0.13			0.13	
Clearance Time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	165	1226	985	251	1238	1053		179			177	
v/s Ratio Prot		0.47			c0.55							
v/s Ratio Perm	0.19		0.01	0.02		0.03		0.03			c0.04	
v/c Ratio	0.30	0.72	0.01	0.04	0.84	0.05		0.23			0.35	
Uniform Delay, d1	4.4	6.7	3.6	3.6	7.9	3.7		23.8			24.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	1.0	2.1	0.0	0.1	5.0	0.0		0.7			1.2	
Delay (s)	5.4	8.9	3.6	3.7	12.9	3.7		24.5			25.4	
Level of Service	A	A	A	A	B	A		C			C	
Approach Delay (s)		8.6			12.2			24.5			25.4	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			11.5				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			60.5				Sum of lost time (s)			13.1		
Intersection Capacity Utilization			70.9%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Highway 93 & The Angela Schmidt Foster Road/Highway 12

2036 Total Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	225	18	235	135	393	6	370	296	310	279	3
Future Volume (vph)	6	225	18	235	135	393	6	370	296	310	279	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		3.0	6.0	4.0	6.2	6.2	4.0	3.0	6.2	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	1813		1690	1795	1512	1560	1795	1570	3340	1880	
Flt Permitted	0.65	1.00		0.31	1.00	1.00	0.56	1.00	1.00	0.23	1.00	
Satd. Flow (perm)	1231	1813		560	1795	1512	913	1795	1570	816	1880	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	7	271	22	283	163	473	7	446	357	373	336	4
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	7	291	0	283	163	473	7	446	357	373	339	0
Heavy Vehicles (%)	2%	5%	2%	8%	7%	8%	17%	7%	4%	6%	2%	2%
Turn Type	Perm	NA		pm+pt	NA	Free	Perm	NA	Free	pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		Free	2		Free	6		
Actuated Green, G (s)	18.5	18.5		35.7	35.7	84.6	26.5	26.5	84.6	36.7	36.7	
Effective Green, g (s)	18.5	18.5		35.7	35.7	84.6	26.5	26.5	84.6	36.7	36.7	
Actuated g/C Ratio	0.22	0.22		0.42	0.42	1.00	0.31	0.31	1.00	0.43	0.43	
Clearance Time (s)	6.0	6.0		3.0	6.0		6.2	6.2		3.0	6.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	269	396		425	757	1512	285	562	1570	568	815	
v/s Ratio Prot		0.16		c0.11	0.09			c0.25		c0.06	0.18	
v/s Ratio Perm	0.01			c0.17		0.31	0.01		0.23	0.23		
v/c Ratio	0.03	0.73		0.67	0.22	0.31	0.02	0.79	0.23	0.66	0.42	
Uniform Delay, d1	26.0	30.8		17.8	15.5	0.0	20.1	26.6	0.0	17.2	16.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	6.9		3.9	0.1	0.5	0.0	7.6	0.3	2.7	0.3	
Delay (s)	26.0	37.7		21.7	15.7	0.5	20.1	34.1	0.3	19.9	16.9	
Level of Service	C	D		C	B	A	C	C	A	B	B	
Approach Delay (s)		37.4			9.7			19.1			18.5	
Approach LOS		D			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			17.8				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			84.6				Sum of lost time (s)			18.2		
Intersection Capacity Utilization			78.0%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Beamish Road/Hanson Road & Highway 12

2036 Total Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	805	71	18	606	34	8	2	12	61	7	46
Future Volume (vph)	22	805	71	18	606	34	8	2	12	61	7	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.93			0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98			0.97	
Satd. Flow (prot)	1789	1865	1512	1722	1812	1484		1589			1703	
Flt Permitted	0.30	1.00	1.00	0.15	1.00	1.00		0.87			0.82	
Satd. Flow (perm)	557	1865	1512	265	1812	1484		1401			1430	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	28	1019	90	23	767	43	10	3	15	77	9	58
RTOR Reduction (vph)	0	0	31	0	0	15	0	13	0	0	35	0
Lane Group Flow (vph)	28	1019	59	23	767	28	0	15	0	0	109	0
Heavy Vehicles (%)	2%	3%	8%	6%	6%	10%	25%	2%	2%	4%	2%	4%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	39.3	39.3	39.3	39.3	39.3	39.3		7.6			7.6	
Effective Green, g (s)	39.3	39.3	39.3	39.3	39.3	39.3		7.6			7.6	
Actuated g/C Ratio	0.65	0.65	0.65	0.65	0.65	0.65		0.13			0.13	
Clearance Time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	364	1221	990	173	1186	972		177			181	
v/s Ratio Prot		c0.55			0.42							
v/s Ratio Perm	0.05		0.04	0.09		0.02		0.01			c0.08	
v/c Ratio	0.08	0.83	0.06	0.13	0.65	0.03		0.08			0.60	
Uniform Delay, d1	3.8	7.9	3.7	3.9	6.2	3.6		23.1			24.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.1	5.1	0.0	0.4	1.2	0.0		0.2			5.6	
Delay (s)	3.9	12.9	3.7	4.3	7.4	3.7		23.3			30.3	
Level of Service	A	B	A	A	A	A		C			C	
Approach Delay (s)		12.0			7.1			23.3			30.3	
Approach LOS		B			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			11.5				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			60.0				Sum of lost time (s)			13.1		
Intersection Capacity Utilization			63.5%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Highway 93 & The Angela Schmidt Foster Road/Highway 12

2036 Total Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	197	16	357	239	515	19	443	269	582	406	15
Future Volume (vph)	16	197	16	357	239	515	19	443	269	582	406	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		3.0	6.0	4.0	6.2	6.2	4.0	4.0	6.2	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	1813		1789	1883	1601	1738	1883	1570	3471	1839	
Flt Permitted	0.61	1.00		0.31	1.00	1.00	0.51	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1142	1813		582	1883	1601	934	1883	1570	3471	1839	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	16	203	16	368	246	531	20	457	277	600	419	15
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	16	216	0	368	246	531	20	457	277	600	433	0
Heavy Vehicles (%)	2%	5%	2%	2%	2%	2%	5%	2%	4%	2%	4%	2%
Turn Type	Perm	NA		pm+pt	NA	Free	Perm	NA	Free	Prot	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		Free	2		Free			
Actuated Green, G (s)	14.5	14.5		35.9	35.9	99.7	27.4	27.4	99.7	20.2	51.6	
Effective Green, g (s)	14.5	14.5		35.9	35.9	99.7	27.4	27.4	99.7	20.2	51.6	
Actuated g/C Ratio	0.15	0.15		0.36	0.36	1.00	0.27	0.27	1.00	0.20	0.52	
Clearance Time (s)	6.0	6.0		3.0	6.0		6.2	6.2		4.0	6.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	166	263		432	678	1601	256	517	1570	703	951	
v/s Ratio Prot		0.12		c0.16	0.13			c0.24		c0.17	0.24	
v/s Ratio Perm	0.01			c0.15		0.33	0.02		0.18			
v/c Ratio	0.10	0.82		0.85	0.36	0.33	0.08	0.88	0.18	0.85	0.45	
Uniform Delay, d1	36.9	41.4		26.3	23.5	0.0	26.8	34.6	0.0	38.3	15.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	18.4		14.9	0.3	0.6	0.1	16.3	0.2	9.9	0.3	
Delay (s)	37.2	59.8		41.2	23.8	0.6	26.9	51.0	0.2	48.2	15.5	
Level of Service	D	E		D	C	A	C	D	A	D	B	
Approach Delay (s)		58.2			18.6			31.7			34.5	
Approach LOS		E			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			29.8			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			99.7			Sum of lost time (s)			19.2			
Intersection Capacity Utilization			88.7%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Beamish Road/Hanson Road & Highway 12

2036 Total Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	896	19	9	1054	103	31	8	14	70	4	55
Future Volume (vph)	65	896	19	9	1054	103	31	8	14	70	4	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.96			0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97			0.97	
Satd. Flow (prot)	1755	1865	1498	1601	1883	1601		1724			1721	
Flt Permitted	0.11	1.00	1.00	0.20	1.00	1.00		0.80			0.80	
Satd. Flow (perm)	200	1865	1498	343	1883	1601		1426			1414	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	68	943	20	9	1109	108	33	8	15	74	4	58
RTOR Reduction (vph)	0	0	6	0	0	35	0	13	0	0	40	0
Lane Group Flow (vph)	68	943	14	9	1109	73	0	43	0	0	96	0
Heavy Vehicles (%)	4%	3%	9%	14%	2%	2%	6%	2%	2%	2%	2%	3%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	42.9	42.9	42.9	42.9	42.9	42.9		7.4			7.4	
Effective Green, g (s)	42.9	42.9	42.9	42.9	42.9	42.9		7.4			7.4	
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.68	0.68		0.12			0.12	
Clearance Time (s)	7.1	7.1	7.1	7.1	7.1	7.1		6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	135	1261	1013	232	1274	1083		166			165	
v/s Ratio Prot		0.51			c0.59							
v/s Ratio Perm	0.34		0.01	0.03		0.05		0.03			c0.07	
v/c Ratio	0.50	0.75	0.01	0.04	0.87	0.07		0.26			0.58	
Uniform Delay, d1	5.0	6.7	3.3	3.4	8.1	3.5		25.5			26.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	2.9	2.5	0.0	0.1	6.7	0.0		0.8			5.2	
Delay (s)	8.0	9.2	3.3	3.5	14.8	3.5		26.3			31.7	
Level of Service	A	A	A	A	B	A		C			C	
Approach Delay (s)		9.0			13.7			26.3			31.7	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			13.0				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			63.4				Sum of lost time (s)			13.1		
Intersection Capacity Utilization			75.2%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												