

TRAFFIC IMPACT STUDY

REPORT

Proposed Residential Development

1812 County Road 10
Ida, Township of Cavan Monaghan
County of Peterborough

January 9, 2026

Project No. 2409-25



Transportation
Studies



Traffic
Operations



Traffic
Signals



Transportation
Safety

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Project Title

TIS - Proposed Residential Development, 1812 County Road 10

Project Number

2409-25

Report Date

January 9, 2026

Project Team

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January 9, 2026

Mr. Wayne Hancock
Township of Cavan Monaghan
988 County Rd 10
Millbrook, ON
LOA 1G0

Reference: Proposed Residential Development, 1812 County Road 10
Traffic Impact Study Report
Township of Cavan Monaghan, Peterborough County, ON
Project N° 2409-24

Dear Mr. Hancock,

Asurza Engineers Ltd. is pleased to submit the enclosed Traffic Impact Study in support of the proposed residential development to be located at 1812 County Road 10 in the Community of Ida, Township of Cavan Monaghan. The study was prepared on behalf of the proponent as part of the documentation required by the Township as well as Peterborough County.

Should you have any questions regarding this report, please do not hesitate to contact the undersigned.


Martin Asurza, M. Eng., P. Eng.
Senior Transportation/Traffic Engineer
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A circular blue ink stamp for a Licensed Professional Engineer. The outer ring contains the text 'LICENSED PROFESSIONAL ENGINEER' at the top and 'PROVING ENGINEER' at the bottom. The center of the stamp contains the text 'Jan 9, 2026', 'M.C. ASURZA AYVAR', and '100128443'.

Executive Summary

Asurza Engineers Ltd. was retained to undertake a traffic impact study in order to review, assess, and determine any traffic impact the proposed development may generate on the adjacent roads and intersections.

Presently an agricultural parcel with frontage along County Road 10, the subject site is located immediately outside of the rural area settlement boundary of Ida. As a minor hamlet surrounded by agricultural lands, the existing residential properties are concentrated near CR 10 & Sharpe Line.

It is intended for the proposed residential development to feature 29 single detached homes. Access to the internal development roadways will be provided via a new roadway planned to intersect with County Road 10. See the draft site plan in *Appendix A*.

A video-based traffic movement count was performed by Asurza Engineers for the intersections of CR 10 with Sharpe Line and Morton Line on Sept. 4, 2025, and the AM and PM peak hours were identified. See *Appendix B – Traffic Data*.

An intersection capacity analysis was undertaken for all relevant scenarios within the Synchro 11 software, based on the Highway Capacity Manual (HCM) methodology.

For the existing conditions (2025), the results show that all study intersections are currently operating with a Level of Service (LOS) “B” or better for all movements, representing no/minor delays.

In order to establish base conditions for the comparison and evaluation of future scenarios, it is necessary to review the results of traffic operations over time. Since the build-out of the development is expected for the year 2027, the traffic analysis was completed for 2027 and 2032, five years after the build-out.

A projection of the future traffic was estimated by applying a 1.5% compounded annual growth rate to the existing traffic counts. See *Appendix C – Traffic Volume Projections*.

The results show that, when considering only the natural traffic growth, the operational delays for all movements remain very stable over time.

The land use which most closely describes the proposed development is ‘Single-Family Detached Housing – ITE Code 210’.

At the time of the build-out of the proposed development (2027), it is estimated that the 29 single-family homes will generate:

- 24 trips (6 in, 18 out) during a typical weekday morning peak hour.
- 31 trips (20 in, 11 out) during a typical weekday afternoon peak hour.

The trips generated by the proposed development are distributed proportional to the traffic patterns along County Road 10 as indicated by the projected background volumes. Vehicles will access the site via the new roadway planned to intersect with County Road 10.

The future total traffic volumes are obtained by adding the background traffic volumes to the total new traffic volumes generated by the proposed development. The background volumes and total volumes are the basis for comparisons to identify any impacts on future projected traffic.

The results show that, including the proposed development, much of the delays and LOS for movements in the study area remain very similar when comparing the total traffic scenarios to the background traffic scenarios. Throughout the study years, no movement is close to exceeding LOS “B” during the peak hours, regardless of whether or not the subject development is in place.

As previously mentioned, it is planned to include a new roadway intersecting with County Road 10 to provide access to the internal development roadways. Similar to the existing CR 10 intersections with Sharpe Line and Morton Line, it is noted that the operations for the intersection of CR 10 with the new roadway are expected to perform well over time.

The MTO Design Supplement for the TAC Design Guide was consulted to evaluate the need for a left turn lane serving the CR 10 northbound left movement at the

planned new roadway. It was concluded that a left turn lane is not warranted at this location throughout the study horizon, see *Appendix I* for the procedure.

The TAC Design Guide was consulted to evaluate the need for a right turn lane serving the CR 10 southbound right movement at the planned new roadway. Based on the projected distribution of the estimated site trips generated, the highest right-turning volumes will be far from reaching the 60 veh/h threshold to indicate the necessity of a further review; therefore, a right turn taper is not warranted at this location.

The sight distance was reviewed based on the design speed of CR 10. A site visit was conducted to determine the sight distance available from both proposed new roadway location, for which full movements are intended.

The sight distances measured from the proposed roadway location comfortably exceed the sight distances required as per the TAC Guide; therefore, no issues were identified for sight lines.

Therefore, from the traffic point of view, it is concluded that the proposed residential development can take place without any significant impacts to the projected traffic operations.

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1 Introduction

1.1 Overview

Asurza Engineers Ltd. was retained to undertake a traffic impact study for the proposed residential development to be located at 1812 County Road 10 in the Community of Ida, Township of Cavan Monaghan. The study was prepared for review from the Township as well as Peterborough County for the approval to permit the proposed development.

1.2 Objectives

The purpose of this study is to determine any traffic impact the proposed development may generate on the adjacent roadways and adjacent intersections, as well as to identify the required improvements to maintain acceptable operational levels on the roadways within the study area.

The general scope of this study includes the following key elements:

- Establish baseline traffic conditions for the study area.
- Estimate the traffic growth for future planning horizons.
- Estimate the traffic generated by the proposed development.
- Estimate the total future traffic and identify impacts within the study area.
- Provide recommendations to address any deficiencies, if identified.

To achieve these objectives, the traffic study makes use of accepted methodologies and procedures including informational reports, publications from recognized institutions, recommended best practice manuals and the Provincial guidelines for the preparation of traffic impact studies.

2 Existing Conditions

2.1 Study Area

The Township of Cavan Monaghan, located southwest of the City of Peterborough, had a population of 10,016 according to the 2021 Census.

The study area focuses on Ida, a small hamlet centred at the County Road 10 & Sharpe Line intersection, which is just over 4 kilometres north of the County Road 10 & Highway 115 interchange. For an aerial view, see **Exhibit 1**.



Exhibit 1: Study Area Location.

2.2 The Subject Site

Presently an agricultural parcel with frontage along CR 10, the subject site is located immediately outside of the rural area settlement boundary of Ida. As a minor hamlet surrounded by agricultural lands, the existing residential properties are concentrated near CR 10 & Sharpe Line.

Residential development has continued as of the latest approval for the parcel north of the subject site, which was already within the settlement boundary. For an aerial view of the subject site, see **Exhibit 2**.



Exhibit 2: The Subject Site.

It is intended for the proposed residential development to feature 29 single detached homes. Access to the internal roadways will be provided via a new roadway intersecting CR 10. For further information, please see *Appendix A – Draft Site Plan*.

2.3 Existing Roadway Network

The following roadways are part of the study area:

County Road 10 is a two-lane (one lane per direction) north-south road, presenting a rural cross-section with a partially-paved granular shoulder and ditches for water drainage. A few portions further from the hamlet have a steep ditch, including a guide rail barrier along the shoulder. Within the Ida settlement boundary, this road provides direct driveway access to scattered residential properties.

Further south from the hamlet along CR 10, the posted speed is noted to be 80 km/h, transitioning to 60 km/h when drivers are near the hamlet. North of the hamlet, this transition occurs much closer to the historic settlement boundary, enhanced by the presence of a community safety zone, communicated via regulatory signs with flashing beacons for school/commuting hours. Within this zone, the posted speed is reduced to 60 km/h for a considerable distance, which is accompanied by doubled speeding fines.

Sharpe Line is a two-lane (one lane per direction) east-west road, presenting a rural cross section. This road provides Ida residents with access to the majority of properties within the original settlement area. This road intersects with CR 10 to form a four-leg two-way stop-controlled intersection, with stop signs on Sharpe Line. A posted speed of 50 km/h has been identified in the area.

Morton Line is a two-lane (one lane per direction) east-west road, presenting a rural cross section. Numerous agricultural businesses are accessed via this road, which runs parallel to and immediately north of Highway 7A. This road intersects with CR 10 to form a four-leg two-way stop-controlled intersection, with stop signs on Morton Line. While a posted speed of 50 km/h has been identified east of CR 10, no posted speed to the west was observed; therefore, 50 km/h is assumed in accordance with the Highway Traffic Act.

2.4 Traffic Data

A video-based traffic movement count was performed by Asurza Engineers for the intersections of CR 10 with Sharpe Line and Morton Line on Sept. 4, 2025. The existing traffic volumes throughout the morning and afternoon peak hours were identified. For further information, see *Appendix B – Traffic Data*.

The existing lane configuration at the subject intersections are shown in **Exhibit 3**, and the existing 2025 traffic volumes for the morning and afternoon peak hours are shown in **Exhibits 4 to 5**.

Existing Lane Configuration at Intersections

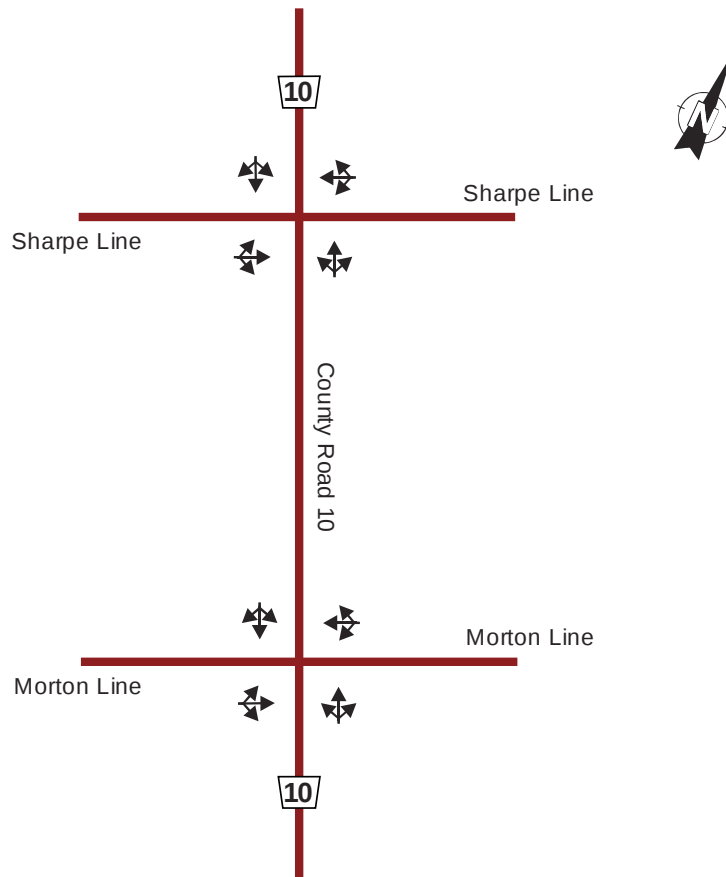


Exhibit 3: Existing Lane Config. at Intersections.

Existing Traffic Volumes, 2025 - AM Peak Hour

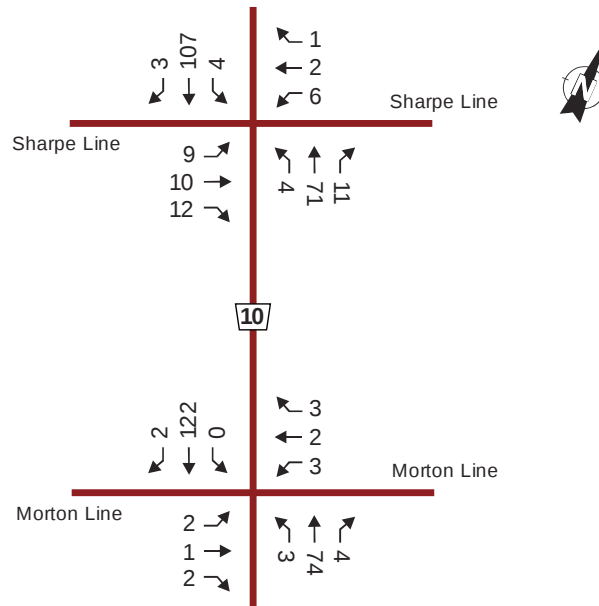


Exhibit 4: Existing Traffic Volumes, 2025 – AM Peak Hour.

Existing Traffic Volumes, 2025 - PM Peak Hour

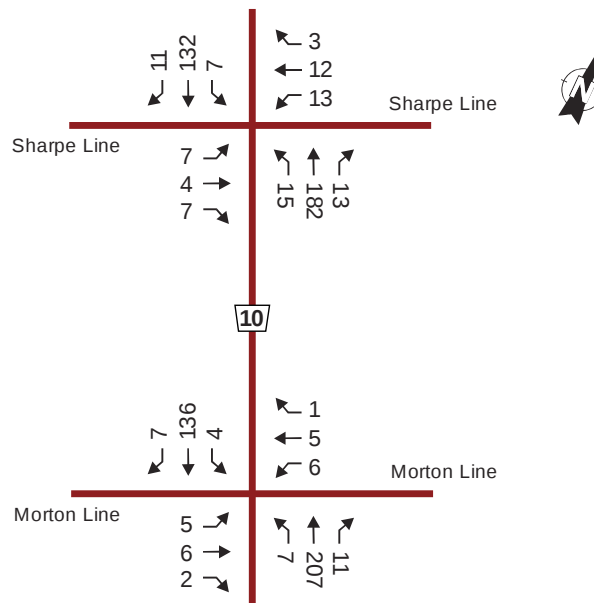


Exhibit 5: Existing Traffic Volumes, 2025 – PM Peak Hour.

2.5 Existing Traffic Operations

Intersection level of service (LOS) is a recognized method of qualifying the efficiency of traffic flow at intersections. The assigned LOS is determined from the delay caused by the control system, experienced by individual vehicles executing the various movements. The delay is related to the number of vehicles desiring to make a particular movement, compared to the estimated capacity for that movement.

Table 1 shows the LOS criteria for intersections, ranging from ‘A’ to ‘F,’ where ‘A’ represents ideal traffic and ‘F’ represents extreme congestion.

LOS	Description of Traffic Conditions	Control Delay (sec/veh)
A	No delay for stop-controlled approaches.	0 - 10
B	Operations with minor delay.	> 10 - 15
C	Operations with moderate delays.	> 15 - 25
D	Operations with some delays.	> 25 - 35
E	Operations with high delays.	> 35 - 50
F	Operations with a breakdown in the traffic flow.	> 50

Table 1: Level of Service Definition.

The intersection analysis, based on the Highway Capacity Manual (HCM), considers the following:

- The volume-to-capacity (v/c) ratio for the intersection and for each movement
- The average delay in seconds per vehicle (s/veh) for each movement and overall delay of the intersection.
- The 95th percentile queue length (shown in metres) for each movement.
- The level of service for each movement and overall level of service of the intersection.

Using the Synchro 11 software, the existing operations for the subject intersections were evaluated using the existing traffic volume counts. For both of the study intersections, the AM and PM peak hour intersection capacity factors were calculated, and the results are summarized below in **Table 2**.

		Existing Volumes 2025							
		AM Peak Hour				PM Peak Hour			
		V/C	Delay (s)	Q ₉₅ (m)	LOS	V/C	Delay (s)	Q ₉₅ (m)	LOS
County Road 10 & Sharpe Line	EB-LTR	0.05	9.9	1.1	A	0.03	10.7	0.7	B
	WB-LTR	0.01	10.4	0.4	B	0.05	11.6	1.2	B
	NB-LTR	0.00	0.4	0.1	A	0.01	0.6	0.3	A
	SB-LTR	0.00	0.3	0.1	A	0.01	0.4	0.1	A
County Road 10 & Morton Line	EB-LTR	0.01	9.9	0.2	A	0.03	11.6	0.7	B
	WB-LTR	0.01	9.8	0.3	A	0.03	11.8	0.6	B
	NB-LTR	0.00	0.3	0.0	A	0.01	0.3	0.1	A
	SB-LTR	0.00	0.0	0.0	A	0.00	0.2	0.1	A

Table 2: Intersection Capacity, Existing Volumes, 2025.

The traffic operations results show that both study intersections are currently operating well with a Level of Service (LOS) “B” or better for all movements, which is to be expected based on the low traffic volume noted in the area.

Based on the very limited control delays expected for each peak hour movement, it is clear that vehicles desiring to turn left or right from the minor road onto County Road 10 will have an excess of large gaps in the traffic flow to safely merge.

3 Background Traffic Volumes and Operations

3.1 Background Traffic Volumes

In order to establish base conditions for the comparison and evaluation of future scenarios, it is necessary to review the results of traffic operations over time.

Since the build-out of the development is expected for the year 2027, the traffic analysis was completed for 2027 and 2032, five years after the build-out.

A projection of the future traffic was estimated by applying a 1.5% compounded annual growth rate to the existing through volumes along County Road 10. See *Appendix C – Traffic Volume Projections*.

The following **Exhibits 6 to 9** show the projected morning and afternoon peak hour background traffic volumes for the horizon years 2027 and 2032.

Background Traffic Volumes, 2027 - AM Peak Hour

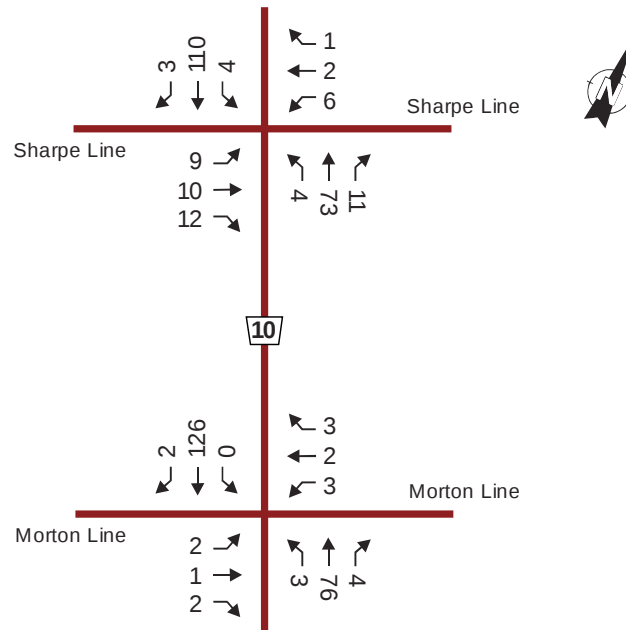


Exhibit 6: Background Traffic Volumes, 2027 – AM Peak Hour.

Background Traffic Volumes, 2027 - PM Peak Hour

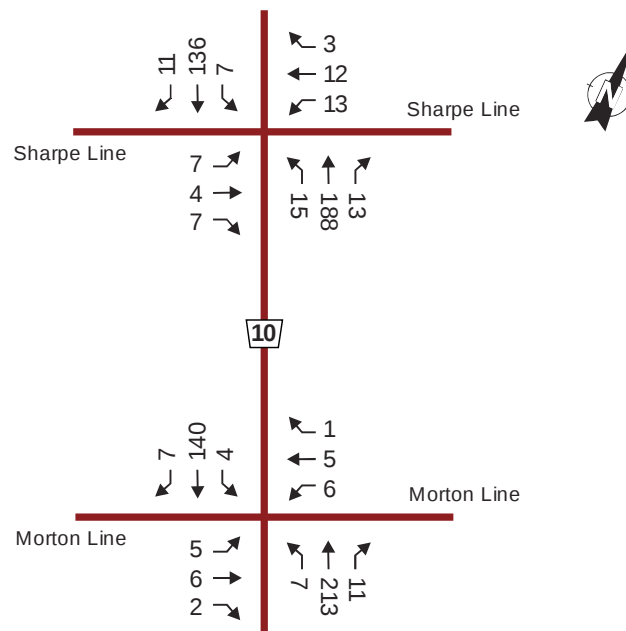


Exhibit 7: Background Traffic Volumes, 2027 – PM Peak Hour.

Background Traffic Volumes, 2032 - AM Peak Hour

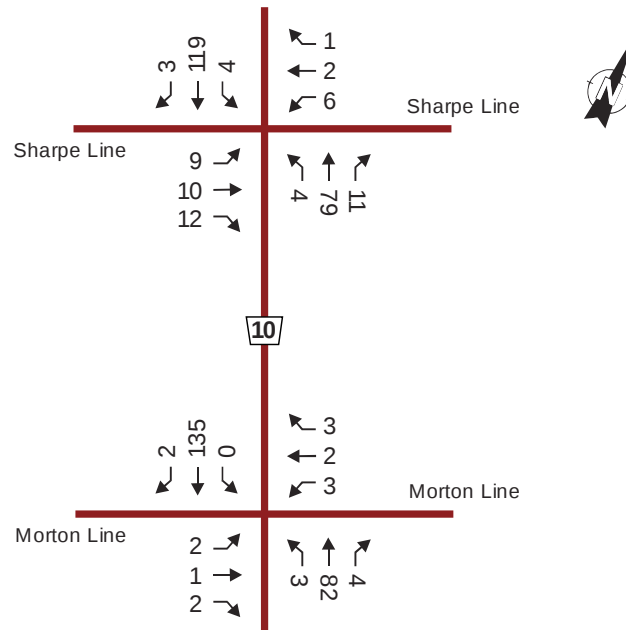


Exhibit 8: Background Traffic Volumes, 2032 – AM Peak Hour.

Background Traffic Volumes, 2032 - PM Peak Hour

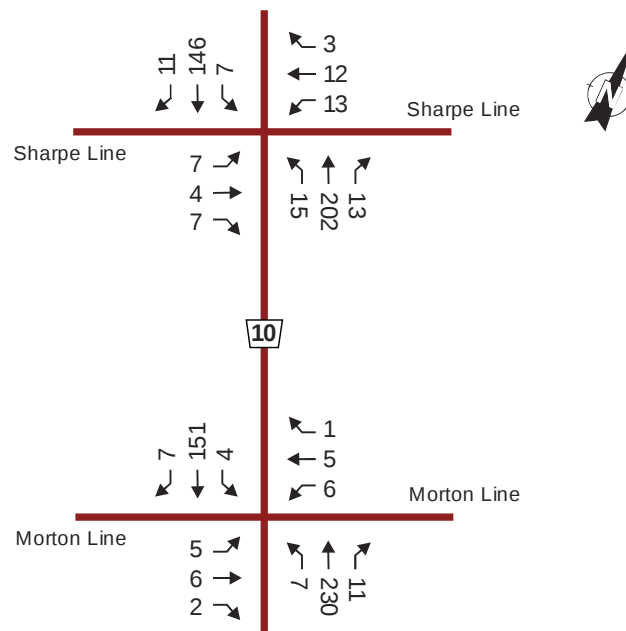


Exhibit 9: Background Traffic Volumes, 2032 – PM Peak Hour.

3.2 Background Traffic Operations

Using the 2027 and 2032 background traffic volumes, the AM and PM peak hour operations were calculated and are summarized below in **Tables 3 & 4**. The results show that, when considering only the natural traffic growth, the operational capacity for each movement will remain very stable over time.

		Background Volumes 2027							
		AM Peak Hour				PM Peak Hour			
		V/C	Delay (s)	Q ₉₅ (m)	LOS	V/C	Delay (s)	Q ₉₅ (m)	LOS
County Road 10 & Sharpe Line	EB-LTR	0.05	0.9	1.1	A	0.03	10.8	0.7	B
	WB-LTR	0.01	10.4	0.4	B	0.05	11.7	1.2	B
	NB-LTR	0.00	0.4	0.1	A	0.01	0.6	0.3	A
	SB-LTR	0.00	0.3	0.1	A	0.01	0.4	0.1	A
County Road 10 & Morton Line	EB-LTR	0.01	10.0	0.2	A	0.03	11.7	0.7	B
	WB-LTR	0.01	9.8	0.3	A	0.03	11.9	0.6	B
	NB-LTR	0.00	0.3	0.0	A	0.01	0.3	0.1	A
	SB-LTR	0.00	0.0	0.0	A	0.00	0.2	0.1	A

Table 3: Intersection Capacity, Background Volumes, 2027.

		Background Volumes 2032							
		AM Peak Hour				PM Peak Hour			
		V/C	Delay (s)	Q ₉₅ (m)	LOS	V/C	Delay (s)	Q ₉₅ (m)	LOS
County Road 10 & Sharpe Line	EB-LTR	0.05	10.0	1.2	B	0.03	10.9	0.7	B
	WB-LTR	0.02	10.5	0.4	B	0.05	11.9	1.3	B
	NB-LTR	0.00	0.4	0.1	A	0.01	0.6	0.3	A
	SB-LTR	0.00	0.3	0.1	A	0.01	0.4	0.1	A
County Road 10 & Morton Line	EB-LTR	0.01	10.1	0.2	B	0.03	12.0	0.7	B
	WB-LTR	0.01	9.9	0.3	A	0.03	12.2	0.7	B
	NB-LTR	0.00	0.3	0.0	A	0.01	0.3	0.1	A
	SB-LTR	0.00	0.0	0.0	A	0.00	0.2	0.1	A

Table 4: Intersection Capacity, Background Volumes, 2032.

4 Proposed Development Traffic Forecasting

4.1 Traffic Impact Study Methodology

The traffic impact analysis was completed in accordance with the methodologies published by the Transportation Research Board (TRB) and the Transportation Impact Analysis for Site Developments published by the Institute of Transportation Engineers (ITE).

The estimation of trips generated by the proposed development were derived from the Trip Generation Manual, 11th Edition, published by ITE.

4.2 Site Trip Generation

The land use which most closely describes the proposed development is 'Single-Family Detached Housing – ITE Code 210'.

The trip rates and directional distributions for this land use, as well as the estimated trips generated by the proposed development, are shown in **Table 5**.

Trip Generation Rates - ITE Trip Generation Manual, 11th Ed.								
ITE Code	ITE Land Use	Unit of Measure	AM Peak Hr. of Adj. Street			PM Peak Hr. of Generator		
			Rate	In	Out	Rate	In	Out
210	Single-Family Detached Housing	Dwelling Units	$0.91 \ln(X) + 0.12$	25%	75%	$0.94 \ln(X) + 0.27$	63%	37%

Estimation of New Trips Generated by the Development								
ITE Code	ITE Land Use	Unit of Measure	AM Peak Hr. of Adj. Street			PM Peak Hr. of Generator		
			Trips	In	Out	Trips	In	Out
210	Single-Family Detached Housing	29	24	6	18	31	20	11

Table 5: Estimation of Trips Generated by the Proposed Development.

According to the Trip Generation Manual, a ‘single-family detached housing site’ includes any single-family detached home on an individual lot. A typical site surveyed is a suburban subdivision.

At the time of the estimated build-out of the proposed development (2027), it is projected that the 29 single-family detached houses will generate:

- 24 trips (6 in, 18 out) during a typical weekday morning peak hour.
- 31 trips (20 in, 11 out) during a typical weekday afternoon peak hour.

4.3 Trip Distribution/Assignment

The trips generated by the proposed development are distributed proportional to the traffic patterns along County Road 10 as indicated by the projected background volumes. See the proportions used for each movement in *Appendix C – Traffic Volume Projections*. Vehicles will access the site via the new roadway planned to intersect with County Road 10.

The new trips generated by the subject site are shown in are shown in ***Exhibits 10 and 11***.

5 Future Traffic Volumes and Operations

5.1 Future Total Traffic Volumes

The future total traffic volumes are obtained by adding the background traffic volumes to the total new traffic volumes generated by the proposed development. The background volumes and total volumes are the basis for comparisons to identify any impacts on future projected traffic.

The analysis will review the peak hour intersection operations for the year 2027, and for the year 2032, five years after the build-out.

The total traffic volumes for the horizon years 2027 and 2032 are shown in ***Exhibits 12 to 15.***

Total Traffic Volumes, 2027 - AM Peak Hour

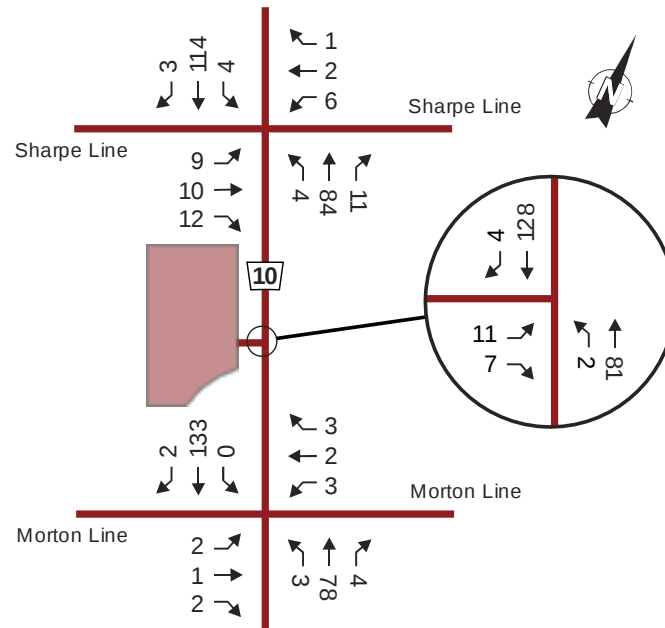


Exhibit 12: Total Traffic Volumes, 2027 – AM Peak Hour.

Total Traffic Volumes, 2027 - PM Peak Hour

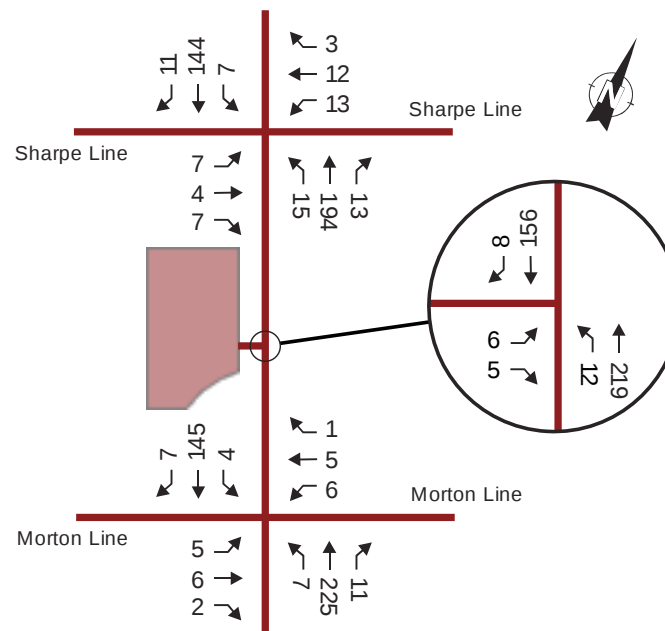


Exhibit 13: Total Traffic Volumes, 2027 – PM Peak Hour.

Total Traffic Volumes, 2032 - AM Peak Hour

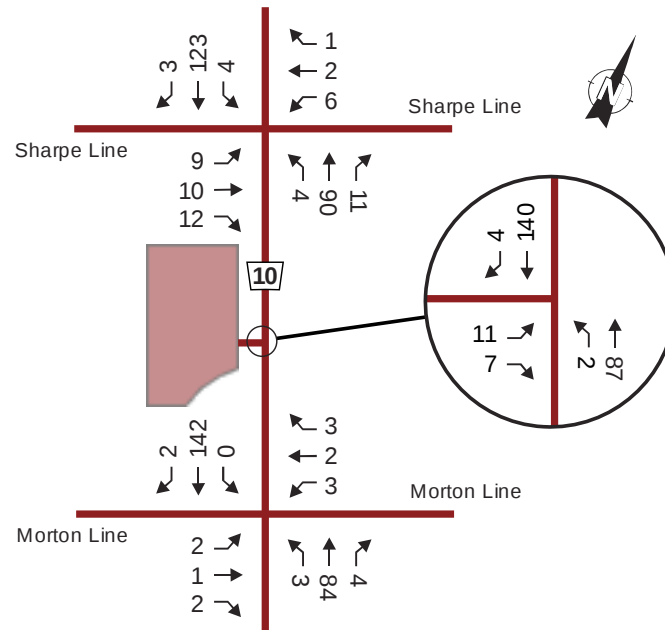


Exhibit 14: Total Traffic Volumes, 2032 – AM Peak Hour.

Total Traffic Volumes, 2032 - PM Peak Hour

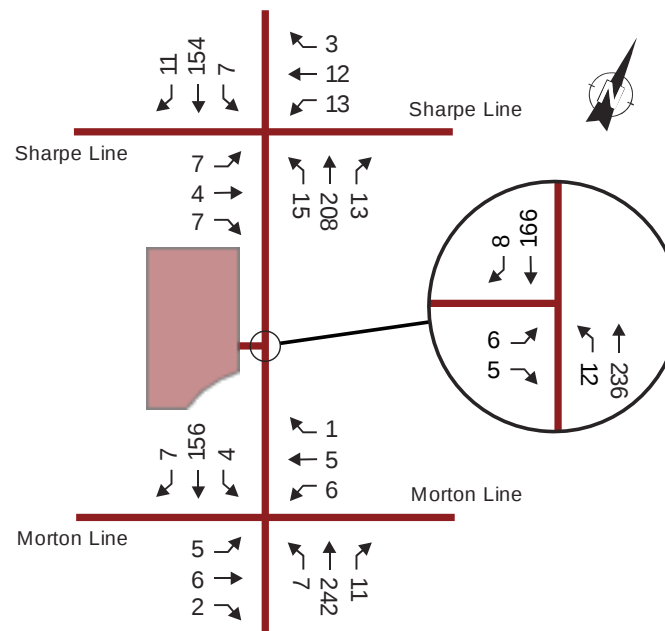


Exhibit 15: Total Traffic Volumes, 2032 – PM Peak Hour.

5.2 Future Total Traffic Operations

Tables 6 and 7 show a summary of the capacity analysis results including the total volumes (background traffic growth + proposed development generated trips) for the horizon years 2027 and 2032.

The results show that, including the proposed development, much of the capacity and LOS for movements in the study area remain very similar when comparing the total traffic scenarios to the background traffic scenarios. Throughout the study years, no movement is close to exceeding LOS “B” during the peak hours, regardless of whether or not the subject development is or not in place.

As previously mentioned, it is planned to include a new roadway intersecting with County Road 10 to provide access to the internal development roadways. Similar to the existing CR 10 intersections with Sharpe Line and Morton Line, it is noted that the operations for the intersection of CR 10 with the new roadway are expected to perform well over time.

		Total Volumes 2027							
		AM Peak Hour				PM Peak Hour			
		V/C	Delay (s)	Q ₉₅ (m)	LOS	V/C	Delay (s)	Q ₉₅ (m)	LOS
County Road 10 & Sharpe Line	EB-LTR	0.05	10.0	1.2	B	0.03	10.9	0.7	B
	WB-LTR	0.02	10.5	0.4	B	0.05	11.8	1.3	B
	NB-LTR	0.00	0.4	0.1	A	0.01	0.6	0.3	A
	SB-LTR	0.00	0.3	0.1	A	0.01	0.4	0.1	A
County Road 10 & Morton Line	EB-LTR	0.01	10.0	0.2	B	0.03	11.9	0.7	B
	WB-LTR	0.01	9.9	0.3	A	0.03	12.1	0.7	B
	NB-LTR	0.00	0.3	0.0	A	0.01	0.3	0.1	A
	SB-LTR	0.00	0.0	0.0	A	0.00	0.2	0.1	A
County Road 10 & New Roadway	EB-LTR	0.02	9.6	0.6	A	0.02	10.5	0.4	B
	NB-LTR	0.00	0.2	0.0	A	0.01	0.5	0.2	A
	SB-LTR	0.08	0.0	0.0	A	0.11	0.0	0.0	A

Table 6: Intersection Capacity, Total Traffic Volumes, 2027.

		Total Volumes 2032							
		AM Peak Hour				PM Peak Hour			
		V/C	Delay (s)	Q ₉₅ (m)	LOS	V/C	Delay (s)	Q ₉₅ (m)	LOS
County Road 10 & Sharpe Line	EB-LTR	0.05	10.1	1.2	B	0.03	11.1	0.7	B
	WB-LTR	0.02	10.7	0.4	B	0.05	12.1	1.3	B
	NB-LTR	0.00	0.3	0.1	A	0.01	0.6	0.3	A
	SB-LTR	0.00	0.3	0.1	A	0.01	0.3	0.1	A
County Road 10 & Morton Line	EB-LTR	0.01	10.1	0.2	B	0.03	12.2	0.7	B
	WB-LTR	0.01	10.0	0.3	A	0.03	12.4	0.7	B
	NB-LTR	0.00	0.2	0.1	A	0.01	0.3	0.1	A
	SB-LTR	0.00	0.0	0.0	A	0.00	0.2	0.1	A
County Road 10 & New Roadway	EB-LTR	0.03	9.7	0.6	A	0.02	10.7	0.5	B
	NB-LTR	0.00	0.2	0.0	A	0.01	0.4	0.2	A
	SB-LTR	0.09	0.0	0.0	A	0.11	0.0	0.0	A

Table 7: Intersection Capacity, Total Traffic Volumes, 2032.

5.3 Auxiliary Lanes Review

The need for auxiliary lanes (right turn lane/taper and left turn lane) was reviewed for the planned new roadway location proposed along CR 10.

The MTO Design Supplement for the TAC Design Guide was consulted to evaluate the need for a left turn lane serving the CR 10 northbound left movement at the planned new roadway. The methodology is based on the number of vehicles turning left, and the number of vehicles opposing the left turn. It was concluded that a left turn lane is not warranted at this location throughout the study horizon, see *Appendix I* for the procedure.

The TAC Design Guide was consulted to evaluate the need for a right turn lane serving the CR 10 southbound right movement at the planned new roadway. According to the guide, a right turn volume warrant of 60 veh/h is often used as indicator that a more detailed capacity analysis of the intersection and geometric options for accommodating right turning traffic is required.

Based on the projected distribution of the estimated site trips generated, the highest right-turning volumes expected are 4 veh/h (during the AM peak hour) and 8 veh/h (during the PM peak hour); therefore, a right turn taper is not warranted at this location.

5.4 Sight Lines Review

The sight distance was reviewed based on the design speed of the roadways. When the road vertical or horizontal curve do not constrain the design speed, the design speed is assumed based on the following general practice:

- For low posted speeds of 60 km/h or less, increase by 10 km/h.
- For high posted speeds of 70 km/h or greater, increase by 20 km/h.

Therefore, on CR 10 at the proposed roadway location (80 km/h posted speed), the design speed is set to be 100 km/h.

According to the TAC 'Geometric Design Guide for Canadian Roads' (TAC Manual), the intersection sight distance considers the design speed of the road, a passenger car with a height of 1.3 m above the pavement, and a height of 1.05 m representing the driver's eye.

A site visit was conducted to determine the sight distance available from the proposed access location, for which full movements is intended. See **Table 8** for a summary of the relevant sight distance information.

				Min. Required	Field Measured
	Type of Speed	Posted Speed	Design Speed	Intersection Sight Distance	Intersection Sight Distance
County Road 10 & New Roadway (Left Turns)	Posted	80 km/h	100 km/h	210 m to the south (Looking Right)	~ 400 m to the south (Looking Right)
County Road 10 & New Roadway (Right Turns)	Posted	80 km/h	100 km/h	185 m to the north (Looking Left)	~ 240 m to the north (Looking Left)

Table 8: Summary of Sight Distances Required and Measured.

The sight distances measured from the proposed access roadway location comfortably exceed the sight distances required as per the TAC Guide; therefore, no issues were identified for sight lines.

6 Conclusions/Recommendations

As discussed throughout the report, a residential development consisting of 29 single-family homes is proposed along County Road 10 just south of the Ida hamlet settlement area, within the Township of Cavan-Monaghan.

Access to the internal development roadways will be provided via a new roadway planned to intersect with County Road 10. See the draft site plan in *Appendix A*.

A video-based traffic movement count performed by Asurza Engineers for the intersections of CR 10 with Sharpe Line and Morton Line on Sept. 4, 2025. The AM and PM peak hours were identified. See *Appendix B – Traffic Data*.

An intersection capacity analysis was undertaken for all relevant scenarios within the Synchro 11 software, based on the Highway Capacity Manual (HCM) methodology.

For the existing conditions (2025), the results show that all study intersections are currently operating with a Level of Service (LOS) “B” or better for all movements, representing no/minor delays.

In order to establish base conditions for the comparison and evaluation of future scenarios, it is necessary to review the results of traffic operations over time. Since the build-out of the development is expected for the year 2027, the traffic analysis was completed for 2027 and 2032, five years after the build-out.

A projection of the future traffic was estimated by applying a 1.5% compounded annual growth rate to the existing traffic counts. See *Appendix C – Traffic Volume Projections*.

The results show that, when considering only the natural traffic growth, the operational delays for all movements remain very stable over time.

The land use which most closely describes the proposed development is ‘Single-Family Detached Housing – ITE Code 210’.

At the time of the build-out of the proposed development (2027), it is estimated that the 29 single-family homes will generate:

- 24 trips (6 in, 18 out) during a typical weekday morning peak hour.
- 31 trips (20 in, 11 out) during a typical weekday afternoon peak hour.

The trips generated by the proposed development are distributed proportional to the traffic patterns along County Road 10 as indicated by the projected background volumes. Vehicles will access the site via the new roadway planned to intersect with County Road 10.

The future total traffic volumes are obtained by adding the background traffic volumes to the total new traffic volumes generated by the proposed development. The background volumes and total volumes are the basis for comparisons to identify any impacts on future projected traffic.

The results show that, including the proposed development, much of the delays and LOS for movements in the study area remain very similar when comparing the total traffic scenarios to the background traffic scenarios. Throughout the study years, no movement is close to exceeding LOS “B” during the peak hours, regardless of whether or not the subject development is in place.

As previously mentioned, it is planned to include a new roadway intersecting with County Road 10 to provide access to the internal development roadways. Similar to the existing CR 10 intersections with Sharpe Line and Morton Line, it is noted that the operations for the intersection of CR 10 with the new roadway are expected to perform well over time.

The MTO Design Supplement for the TAC Design Guide was consulted to evaluate the need for a left turn lane serving the CR 10 northbound left movement at the planned new roadway. It was concluded that a left turn lane is not warranted at this location throughout the study horizon, see *Appendix I* for the procedure.

The TAC Design Guide was consulted to evaluate the need for a right turn lane serving the CR 10 southbound right movement at the planned new roadway. Based on the projected distribution of the estimated site trips generated, the highest right-turning volumes will be far from reaching the 60 veh/h threshold to indicate the necessity of a further review; therefore, a right turn taper is not warranted at this location.

The sight distance was reviewed based on the design speed of CR 10. A site visit was conducted to determine the sight distance available from both proposed new roadway location, for which full movements are intended.

The sight distances measured from the proposed roadway location comfortably exceed the sight distances required as per the TAC Guide; therefore, no issues were identified for sight lines.

Therefore, due the modest development in term of new generated trips, it is concluded that proposed residential development can take place without any significant impacts to the projected traffic operations.

Appendix A

Draft Site Plan

Appendix B

Traffic Data

Turning Movement Count (Morning)

Intersection Location: CR10 / Morton Ln

City: Cavan Monaghan

N/S Street CR10

E/W Street Morton Ln

Period Time: 6:15 am to 9:15 am

Date: 04-Sep-25

Controlled: Stop

Project: 2409-25

[illegible]

Turning Movement Count (Morning)

Intersection Location: CR10 / Sharpe Ln

City: Cavan Monaghan

N/S Street: CR10

E/W Street: Sharpe Ln

Period Time: 6:15 am to 9:15 am

Date: 04-Sep-25

Controlled: Stop

Project: 2409-25

[illegible]

Turning Movement Count (Afternoon)

Intersection Location: CR10 / Morton Ln

City: Cavan Monaghan

N/S Street: CR10

EW Street: Morton Ln

Period Time: 3:00 pm to 5:00 pm

Date: 04-Sep-25

Controlled: Stop

Project: 2409-25

[illegible]

Turning Movement Count (Afternoon)

Intersection Location: CR10 / Sharpe Ln

City: Cavan Monaghan

N/S Street: CR10

EW Street: Sharpe Ln

Period Time: 3:00 pm to 5:00 pm

Date: 04-Sep-25

Controlled: Stop

Project: 2409-25

Movement																																						
Time Period	Cars	Trucks	EBL	Cars	Trucks	EBT	Cars	Trucks	EBR	Cars	Trucks	NBL	Cars	Trucks	NBT	Cars	Trucks	NBR	Cars	Trucks	WBL	Cars	Trucks	WBT	Cars	Trucks	WBR	Cars	Trucks	SBL	Cars	Trucks	SBT	Cars	Trucks	SBR	Cars	Trucks
3:00 - 3:15	0	0		0	0	1	1	0	1	0	1	30	1	0	0	2	0	0	2	1	1	2	1	1	0	0	0	1	0	2	1	0	17	0	2	0		
3:15 - 3:30	2	0		1	0	1	1	0	0	0	38	1	0	0	3	0	0	0	1	0	0	1	0	0	0	0	0	2	0	0	27	0	1	0				
3:30 - 3:45	1	1		0	0	0	1	0	0	2	44	2	3	0	0	2	0	0	1	0	1	0	1	0	1	0	0	1	0	0	38	1	1	0				
3:45 - 4:00	2	0		0	0	0	0	0	0	1	45	1	0	0	3	0	0	0	2	0	1	0	0	2	0	0	2	0	0	21	0	2	0					
4:00 - 4:15	1	0		2	1	1	3	0	0	0	45	0	2	0	2	0	1	3	1	0	3	1	0	0	0	0	0	0	0	27	1	5	0					
4:15 - 4:30	5	0		1	0	1	0	0	7	0	34	1	5	1	5	0	1	0	1	0	0	1	0	1	0	0	0	0	0	34	1	3	0					
4:30 - 4:45	3	0		2	0	1	1	0	0	3	52	0	6	0	6	0	1	0	0	0	0	0	0	0	1	0	0	1	0	34	2	7	0					
4:45 - 5:00	2	0		2	0	0	3	0	0	3	42	0	3	0	4	0	3	0	0	5	0	4	0	0	0	0	3	0	0	35	0	0	0					
5:00 - 5:15	1	0		0	0	0	0	0	0	3	0	0	1	0	1	0	4	0	3	0	1	0	3	0	1	0	0	2	0	26	0	3	0					
5:15 - 5:30	1	0		0	0	0	0	0	6	0	45	0	3	0	0	5	0	0	4	0	0	4	0	1	0	0	1	0	1	0	34	1	1	0				
5:30 - 5:45	3	0		2	0	2	0	0	2	0	41	0	1	0	1	0	2	0	0	0	0	2	0	0	0	0	0	1	0	17	1	3	0					
5:45 - 6:00	1	0		2	0	0	0	0	0	0	39	0	5	0	5	0	1	0	1	0	2	0	1	0	0	0	0	0	0	26	0	2	0					
Pk Ht Vol (Veh/h)	7	0		4	0	0	7	0	15	0	182	0	13	0	13	0	12	0	3	0	7	0	129	3	11	0												
% Cars & Trucks	100.0%	0.0%		100.0%	0.0%	100.0%	100.0%	0.0%	100.0%	0.0%	100.0%	100.0%	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%	0.0%	97.7%	2.3%	100.0%														
Total Vehicles	7			4			7		15			182			13		13		3		7		132		11													

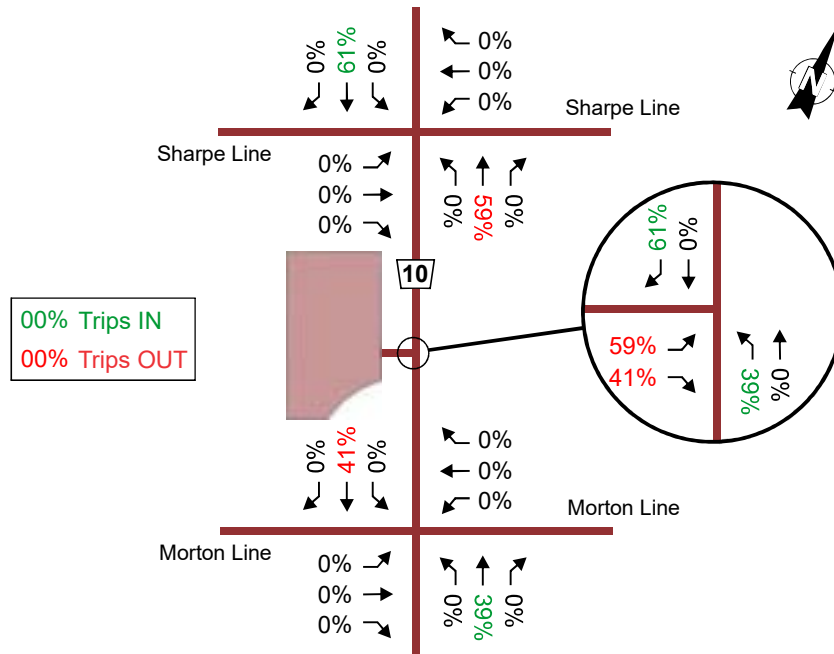
Appendix C

Traffic Volume Projections

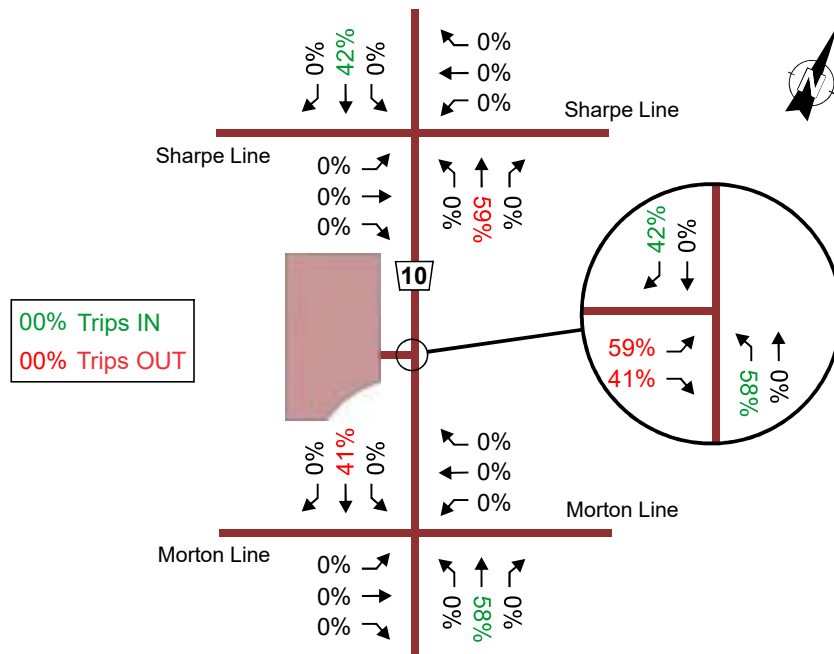
Volumes at AM and PM Peak Hours															
County Road 10 & Sharpe Line			Eastbound			Northbound			Westbound			Southbound			Volume Type
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Sept.	2025	AM	9	10	12	4	71	11	6	2	1	4	107	3	Registered Volumes
Sept.	2025	PM	7	4	7	15	182	13	13	12	3	7	132	11	
Annual Growth Rate 1.50%															
	2025	AM	9	10	12	4	71	11	6	2	1	4	107	3	Existing Volumes 2025
	2025	PM	7	4	7	15	182	13	13	12	3	7	132	11	
	2027	AM	9	10	12	4	73	11	6	2	1	4	110	3	Background Volumes 2027
	2027	PM	7	4	7	15	188	13	13	12	3	7	136	11	
	2027	AM	0	0	0	0	11	0	0	0	0	0	4	0	Subject Site Generated Volumes
	2027	PM	0	0	0	0	6	0	0	0	0	0	8	0	
	2027	AM	9	10	12	4	84	11	6	2	1	4	114	3	Total Volumes Year 2027
	2027	PM	7	4	7	15	194	13	13	12	3	7	144	11	
Annual Growth Rate 1.50%															
	2032	AM	9	10	12	4	79	11	6	2	1	4	119	3	Background Volumes 2032
	2032	PM	7	4	7	15	202	13	13	12	3	7	146	11	
	2032	AM	0	0	0	0	11	0	0	0	0	0	4	0	Subject Site Generated Volumes
	2032	PM	0	0	0	0	6	0	0	0	0	0	8	0	
	2032	AM	9	10	12	4	90	11	6	2	1	4	123	3	Total Volumes Year 2032
	2032	PM	7	4	7	15	208	13	13	12	3	7	154	11	

Volumes at AM and PM Peak Hours															
County Road 10 & Morton Line			Eastbound			Northbound			Westbound			Southbound			Volume Type
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Sept.	2025	AM	2	1	2	3	74	4	3	2	3	0	122	2	Registered Volumes
Sept.	2025	PM	5	6	2	7	207	11	6	5	1	4	136	7	
Annual Growth Rate 1.50%															
	2025	AM	2	1	2	3	74	4	3	2	3	0	122	2	Existing Volumes 2025 (Projected)
	2025	PM	5	6	2	7	207	11	6	5	1	4	136	7	
	2027	AM	2	1	2	3	76	4	3	2	3	0	126	2	Background Volumes 2027
	2027	PM	5	6	2	7	213	11	6	5	1	4	140	7	
	2027	AM	0	0	0	0	2	0	0	0	0	0	7	0	Subject Site Generated Volumes
	2027	PM	0	0	0	0	12	0	0	0	0	0	5	0	
	2027	AM	2	1	2	3	78	4	3	2	3	0	133	2	Total Volumes Year 2027
	2027	PM	5	6	2	7	225	11	6	5	1	4	145	7	
Annual Growth Rate 1.50%															
	2032	AM	2	1	2	3	82	4	3	2	3	0	135	2	Background Volumes 2032
	2032	PM	5	6	2	7	230	11	6	5	1	4	151	7	
	2032	AM	0	0	0	0	2	0	0	0	0	0	7	0	Subject Site Generated Volumes
	2032	PM	0	0	0	0	12	0	0	0	0	0	5	0	
	2032	AM	2	1	2	3	84	4	3	2	3	0	142	2	Total Volumes Year 2032
	2032	PM	5	6	2	7	242	11	6	5	1	4	156	7	

New Trips Generated, AM Peak Hour



New Trips Generated, PM Peak Hour



Appendix D

Synchro Reports,
Existing Volumes, 2025

HCM Unsignalized Intersection Capacity Analysis

3: County Road 10 & Sharpe Line

Existing Volumes 2025

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	10	12	6	2	1	4	71	11	4	107	3
Future Volume (Veh/h)	9	10	12	6	2	1	4	71	11	4	107	3
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	10	11	14	7	2	1	5	81	12	5	122	3
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	232	236	124	250	232	87	125				93	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	232	236	124	250	232	87	125				93	
tC, single (s)	7.1	6.5	6.2	7.1	7.0	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.5	3.3	2.2				2.2	
p0 queue free %	99	98	98	99	100	100	100				100	
cM capacity (veh/h)	720	663	933	685	589	977	1474				1514	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	35	10	98	130								
Volume Left	10	7	5	5								
Volume Right	14	1	12	3								
cSH	770	683	1474	1514								
Volume to Capacity	0.05	0.01	0.00	0.00								
Queue Length 95th (m)	1.1	0.4	0.1	0.1								
Control Delay (s)	9.9	10.4	0.4	0.3								
Lane LOS	A	B	A	A								
Approach Delay (s)	9.9	10.4	0.4	0.3								
Approach LOS	A	B										
Intersection Summary												
Average Delay				1.9								
Intersection Capacity Utilization				17.2%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

6: County Road 10 & Morton Line

Existing Volumes 2025

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	1	2	3	2	3	3	74	4	0	122	2
Future Volume (Veh/h)	2	1	2	3	2	3	3	74	4	0	122	2
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	1	2	3	2	3	3	80	4	0	133	2
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	226	224	134	224	223	82	135				84	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	226	224	134	224	223	82	135				84	
tC, single (s)	7.6	6.5	6.2	7.1	7.0	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	4.0	4.0	3.3	3.5	4.5	3.3	2.2				2.2	
p0 queue free %	100	100	100	100	100	100	100				100	
cM capacity (veh/h)	634	677	920	732	599	983	1462				1526	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	5	8	87	135								
Volume Left	2	3	3	0								
Volume Right	2	3	4	2								
cSH	735	763	1462	1526								
Volume to Capacity	0.01	0.01	0.00	0.00								
Queue Length 95th (m)	0.2	0.3	0.0	0.0								
Control Delay (s)	9.9	9.8	0.3	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	9.9	9.8	0.3	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay				0.6								
Intersection Capacity Utilization				16.6%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

3: County Road 10 & Sharpe Line

Existing Volumes 2025

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	4	7	13	12	3	15	182	13	7	132	11
Future Volume (Veh/h)	7	4	7	13	12	3	15	182	13	7	132	11
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	7	4	7	13	12	3	15	188	13	7	136	11
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	389	386	142	389	386	194	147				201	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	389	386	142	389	386	194	147				201	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	99	99	98	98	100	99				99	
cM capacity (veh/h)	555	542	912	559	543	852	1447				1383	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	18	28	216	154								
Volume Left	7	13	15	7								
Volume Right	7	3	13	11								
cSH	651	573	1447	1383								
Volume to Capacity	0.03	0.05	0.01	0.01								
Queue Length 95th (m)	0.7	1.2	0.3	0.1								
Control Delay (s)	10.7	11.6	0.6	0.4								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.7	11.6	0.6	0.4								
Approach LOS	B	B										
Intersection Summary												
Average Delay	1.7											
Intersection Capacity Utilization	25.8%			ICU Level of Service					A			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

6: County Road 10 & Morton Line

Existing Volumes 2025

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	6	2	6	5	1	7	207	11	4	136	7
Future Volume (Veh/h)	5	6	2	6	5	1	7	207	11	4	136	7
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	7	2	7	6	1	8	230	12	4	151	8
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	419	421	155	420	419	236	159				242	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	419	421	155	420	419	236	159				242	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	99	100	99	99	100	99				100	
cM capacity (veh/h)	539	522	896	536	524	808	1433				1336	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	15	14	250	163								
Volume Left	6	7	8	4								
Volume Right	2	1	12	8								
cSH	560	544	1433	1336								
Volume to Capacity	0.03	0.03	0.01	0.00								
Queue Length 95th (m)	0.7	0.6	0.1	0.1								
Control Delay (s)	11.6	11.8	0.3	0.2								
Lane LOS	B	B	A	A								
Approach Delay (s)	11.6	11.8	0.3	0.2								
Approach LOS	B	B										
Intersection Summary												
Average Delay				1.0								
Intersection Capacity Utilization				24.7%	ICU Level of Service				A			
Analysis Period (min)				15								

Appendix E

Synchro Reports,
Background Volumes, 2027

HCM Unsignalized Intersection Capacity Analysis

3: County Road 10 & Sharpe Line

Background Volumes 2027

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	10	12	6	2	1	4	73	11	4	110	3
Future Volume (Veh/h)	9	10	12	6	2	1	4	73	11	4	110	3
Sign Control	Stop				Stop				Free		Free	
Grade	0%				0%				0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	10	11	14	7	2	1	5	83	12	5	125	3
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	238	242	126	255	237	89	128				95	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	238	242	126	255	237	89	128				95	
tC, single (s)	7.1	6.5	6.2	7.1	7.0	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.5	3.3	2.2				2.2	
p0 queue free %	99	98	98	99	100	100	100				100	
cM capacity (veh/h)	715	659	929	679	585	975	1470				1512	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	35	10	100	133								
Volume Left	10	7	5	5								
Volume Right	14	1	12	3								
cSH	765	678	1470	1512								
Volume to Capacity	0.05	0.01	0.00	0.00								
Queue Length 95th (m)	1.1	0.4	0.1	0.1								
Control Delay (s)	9.9	10.4	0.4	0.3								
Lane LOS	A	B	A	A								
Approach Delay (s)	9.9	10.4	0.4	0.3								
Approach LOS	A	B										
Intersection Summary												
Average Delay				1.9								
Intersection Capacity Utilization				17.4%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis 6: County Road 10 & Morton Line

Background Volumes 2027
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	1	2	3	2	3	3	76	4	0	126	2
Future Volume (Veh/h)	2	1	2	3	2	3	3	76	4	0	126	2
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	1	2	3	2	3	3	83	4	0	137	2
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	233	231	138	232	230	85	139				87	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	233	231	138	232	230	85	139				87	
tC, single (s)	7.6	6.5	6.2	7.1	7.0	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	4.0	4.0	3.3	3.5	4.5	3.3	2.2				2.2	
p0 queue free %	100	100	100	100	100	100	100				100	
cM capacity (veh/h)	627	671	916	724	593	980	1457				1522	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	5	8	90	139								
Volume Left	2	3	3	0								
Volume Right	2	3	4	2								
cSH	728	756	1457	1522								
Volume to Capacity	0.01	0.01	0.00	0.00								
Queue Length 95th (m)	0.2	0.3	0.0	0.0								
Control Delay (s)	10.0	9.8	0.3	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	10.0	9.8	0.3	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay				0.6								
Intersection Capacity Utilization				16.8%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

3: County Road 10 & Sharpe Line

Background Volumes 2027

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	4	7	13	12	3	15	188	13	7	136	11
Future Volume (Veh/h)	7	4	7	13	12	3	15	188	13	7	136	11
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	7	4	7	13	12	3	15	194	13	7	140	11
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	399	396	146	399	396	200	151				207	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	399	396	146	399	396	200	151				207	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	99	99	98	98	100	99				99	
cM capacity (veh/h)	547	535	907	551	536	846	1442				1376	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	18	28	222	158								
Volume Left	7	13	15	7								
Volume Right	7	3	13	11								
cSH	643	565	1442	1376								
Volume to Capacity	0.03	0.05	0.01	0.01								
Queue Length 95th (m)	0.7	1.2	0.3	0.1								
Control Delay (s)	10.8	11.7	0.6	0.4								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.8	11.7	0.6	0.4								
Approach LOS	B	B										
Intersection Summary												
Average Delay				1.7								
Intersection Capacity Utilization				26.2%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

6: County Road 10 & Morton Line

Background Volumes 2027

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	6	2	6	5	1	7	213	11	4	140	7
Future Volume (Veh/h)	5	6	2	6	5	1	7	213	11	4	140	7
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	7	2	7	6	1	8	237	12	4	156	8
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	431	433	160	432	431	243	164				249	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	431	433	160	432	431	243	164				249	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	99	100	99	99	100	99				100	
cM capacity (veh/h)	529	514	890	527	516	801	1427				1328	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	15	14	257	168								
Volume Left	6	7	8	4								
Volume Right	2	1	12	8								
cSH	552	535	1427	1328								
Volume to Capacity	0.03	0.03	0.01	0.00								
Queue Length 95th (m)	0.7	0.6	0.1	0.1								
Control Delay (s)	11.7	11.9	0.3	0.2								
Lane LOS	B	B	A	A								
Approach Delay (s)	11.7	11.9	0.3	0.2								
Approach LOS	B	B										
Intersection Summary												
Average Delay				1.0								
Intersection Capacity Utilization				25.1%	ICU Level of Service				A			
Analysis Period (min)				15								

Appendix F

Synchro Reports,
Background Volumes, 2032

HCM Unsignalized Intersection Capacity Analysis

3: County Road 10 & Sharpe Line

Background Volumes 2032

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	10	12	6	2	1	4	79	11	4	119	3
Future Volume (Veh/h)	9	10	12	6	2	1	4	79	11	4	119	3
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	10	11	14	7	2	1	5	90	12	5	135	3
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	254	258	136	272	254	96	138				102	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	254	258	136	272	254	96	138				102	
tC, single (s)	7.1	6.5	6.2	7.1	7.0	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.5	3.3	2.2				2.2	
p0 queue free %	99	98	98	99	100	100	100				100	
cM capacity (veh/h)	697	645	917	662	571	966	1458				1503	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	35	10	107	143								
Volume Left	10	7	5	5								
Volume Right	14	1	12	3								
cSH	750	662	1458	1503								
Volume to Capacity	0.05	0.02	0.00	0.00								
Queue Length 95th (m)	1.2	0.4	0.1	0.1								
Control Delay (s)	10.0	10.5	0.4	0.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.0	10.5	0.4	0.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay				1.8								
Intersection Capacity Utilization				17.9%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

6: County Road 10 & Morton Line

Background Volumes 2032

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	1	2	3	2	3	3	82	4	0	135	2
Future Volume (Veh/h)	2	1	2	3	2	3	3	82	4	0	135	2
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	1	2	3	2	3	3	89	4	0	147	2
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	249	247	148	248	246	91	149				93	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	249	247	148	248	246	91	149				93	
tC, single (s)	7.6	6.5	6.2	7.1	7.0	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	4.0	4.0	3.3	3.5	4.5	3.3	2.2				2.2	
p0 queue free %	100	100	100	100	100	100	100				100	
cM capacity (veh/h)	611	657	904	707	580	972	1445				1514	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	5	8	96	149								
Volume Left	2	3	3	0								
Volume Right	2	3	4	2								
cSH	714	742	1445	1514								
Volume to Capacity	0.01	0.01	0.00	0.00								
Queue Length 95th (m)	0.2	0.3	0.0	0.0								
Control Delay (s)	10.1	9.9	0.3	0.0								
Lane LOS	B	A	A									
Approach Delay (s)	10.1	9.9	0.3	0.0								
Approach LOS	B	A										
Intersection Summary												
Average Delay				0.6								
Intersection Capacity Utilization				17.2%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

3: County Road 10 & Sharpe Line

Background Volumes 2032

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	4	7	13	12	3	15	202	13	7	146	11
Future Volume (Veh/h)	7	4	7	13	12	3	15	202	13	7	146	11
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	7	4	7	13	12	3	15	208	13	7	151	11
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	424	422	156	424	420	214	162				221	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	424	422	156	424	420	214	162				221	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	99	99	98	98	100	99				99	
cM capacity (veh/h)	526	518	894	530	519	831	1429				1360	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	18	28	236	169								
Volume Left	7	13	15	7								
Volume Right	7	3	13	11								
cSH	624	546	1429	1360								
Volume to Capacity	0.03	0.05	0.01	0.01								
Queue Length 95th (m)	0.7	1.3	0.3	0.1								
Control Delay (s)	10.9	11.9	0.6	0.4								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.9	11.9	0.6	0.4								
Approach LOS	B	B										
Intersection Summary												
Average Delay				1.6								
Intersection Capacity Utilization				27.1%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis 6: County Road 10 & Morton Line

Background Volumes 2032
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	6	2	6	5	1	7	230	11	4	151	7
Future Volume (Veh/h)	5	6	2	6	5	1	7	230	11	4	151	7
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	7	2	7	6	1	8	256	12	4	168	8
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	462	464	172	464	462	262	176				268	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	462	464	172	464	462	262	176				268	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	99	100	99	99	100	99				100	
cM capacity (veh/h)	505	494	877	502	495	782	1412				1307	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	15	14	276	180								
Volume Left	6	7	8	4								
Volume Right	2	1	12	8								
cSH	529	512	1412	1307								
Volume to Capacity	0.03	0.03	0.01	0.00								
Queue Length 95th (m)	0.7	0.7	0.1	0.1								
Control Delay (s)	12.0	12.2	0.3	0.2								
Lane LOS	B	B	A	A								
Approach Delay (s)	12.0	12.2	0.3	0.2								
Approach LOS	B	B										
Intersection Summary												
Average Delay				1.0								
Intersection Capacity Utilization				26.1%	ICU Level of Service				A			
Analysis Period (min)				15								

Appendix G

Synchro Reports,
Total Volumes, 2027

HCM Unsignalized Intersection Capacity Analysis

3: County Road 10 & Sharpe Line

Total Volumes 2027
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	10	12	6	2	1	4	84	11	4	114	3
Future Volume (Veh/h)	9	10	12	6	2	1	4	84	11	4	114	3
Sign Control	Stop		Stop		Free		Free		Free		Free	
Grade	0%		0%		0%		0%		0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	10	11	14	7	2	1	5	95	12	5	130	3
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	254	258	132	272	254	101	133				107	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	254	258	132	272	254	101	133				107	
tC, single (s)	7.1	6.5	6.2	7.1	7.0	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.5	3.3	2.2				2.2	
p0 queue free %	99	98	98	99	100	100	100				100	
cM capacity (veh/h)	697	645	923	662	571	960	1464				1497	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	35	10	112	138								
Volume Left	10	7	5	5								
Volume Right	14	1	12	3								
cSH	751	662	1464	1497								
Volume to Capacity	0.05	0.02	0.00	0.00								
Queue Length 95th (m)	1.2	0.4	0.1	0.1								
Control Delay (s)	10.0	10.5	0.4	0.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.0	10.5	0.4	0.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay	1.8											
Intersection Capacity Utilization	17.7%			ICU Level of Service					A			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

6: County Road 10 & Morton Line

Total Volumes 2027
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	1	2	3	2	3	3	78	4	0	133	2
Future Volume (Veh/h)	2	1	2	3	2	3	3	78	4	0	133	2
Sign Control	Stop		Stop		Free		Free		Free		Free	
Grade	0%		0%		0%		0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	1	2	3	2	3	3	85	4	0	145	2
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	243	241	146	242	240	87	147				89	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	243	241	146	242	240	87	147				89	
tC, single (s)	7.6	6.5	6.2	7.1	7.0	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	4.0	4.0	3.3	3.5	4.5	3.3	2.2				2.2	
p0 queue free %	100	100	100	100	100	100	100				100	
cM capacity (veh/h)	617	663	906	713	585	977	1447				1519	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	5	8	92	147								
Volume Left	2	3	3	0								
Volume Right	2	3	4	2								
cSH	719	748	1447	1519								
Volume to Capacity	0.01	0.01	0.00	0.00								
Queue Length 95th (m)	0.2	0.3	0.0	0.0								
Control Delay (s)	10.0	9.9	0.3	0.0								
Lane LOS	B	A	A									
Approach Delay (s)	10.0	9.9	0.3	0.0								
Approach LOS	B	A										
Intersection Summary												
Average Delay			0.6									
Intersection Capacity Utilization			17.1%	ICU Level of Service				A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

9: County Road 10 & New Roadway

Total Volumes 2027
AM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	7	2	81	128	4
Future Volume (Veh/h)	11	7	2	81	128	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	8	2	88	139	4
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	233	141	143			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	233	141	143			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	100			
cM capacity (veh/h)	754	907	1440			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	20	90	143			
Volume Left	12	2	0			
Volume Right	8	0	4			
cSH	809	1440	1700			
Volume to Capacity	0.02	0.00	0.08			
Queue Length 95th (m)	0.6	0.0	0.0			
Control Delay (s)	9.6	0.2	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.6	0.2	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization		17.0%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

3: County Road 10 & Sharpe Line

Total Volumes 2027

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	4	7	13	12	3	15	194	13	7	144	11
Future Volume (Veh/h)	7	4	7	13	12	3	15	194	13	7	144	11
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	7	4	7	13	12	3	15	200	13	7	148	11
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	413	410	154	413	410	206	159				213	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	413	410	154	413	410	206	159				213	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	99	99	98	98	100	99				99	
cM capacity (veh/h)	535	526	898	539	527	839	1433				1369	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	18	28	228	166								
Volume Left	7	13	15	7								
Volume Right	7	3	13	11								
cSH	632	555	1433	1369								
Volume to Capacity	0.03	0.05	0.01	0.01								
Queue Length 95th (m)	0.7	1.3	0.3	0.1								
Control Delay (s)	10.9	11.8	0.6	0.4								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.9	11.8	0.6	0.4								
Approach LOS	B	B										
Intersection Summary												
Average Delay				1.6								
Intersection Capacity Utilization				26.6%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

6: County Road 10 & Morton Line

Total Volumes 2027
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	6	2	6	5	1	7	225	11	4	145	7
Future Volume (Veh/h)	5	6	2	6	5	1	7	225	11	4	145	7
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	7	2	7	6	1	8	250	12	4	161	8
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	449	451	165	450	449	256	169				262	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	449	451	165	450	449	256	169				262	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	99	100	99	99	100	99				100	
cM capacity (veh/h)	515	502	885	512	504	788	1421				1314	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	15	14	270	173								
Volume Left	6	7	8	4								
Volume Right	2	1	12	8								
cSH	539	522	1421	1314								
Volume to Capacity	0.03	0.03	0.01	0.00								
Queue Length 95th (m)	0.7	0.7	0.1	0.1								
Control Delay (s)	11.9	12.1	0.3	0.2								
Lane LOS	B	B	A	A								
Approach Delay (s)	11.9	12.1	0.3	0.2								
Approach LOS	B	B										
Intersection Summary												
Average Delay				1.0								
Intersection Capacity Utilization				25.8%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

9: County Road 10 & New Roadway

Total Volumes 2027
PM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	5	12	219	156	8
Future Volume (Veh/h)	6	5	12	219	156	8
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	5	13	238	170	9
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	438	174	179			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	438	174	179			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	99			
cM capacity (veh/h)	570	869	1397			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	12	251	179			
Volume Left	7	13	0			
Volume Right	5	0	9			
cSH	666	1397	1700			
Volume to Capacity	0.02	0.01	0.11			
Queue Length 95th (m)	0.4	0.2	0.0			
Control Delay (s)	10.5	0.5	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.5	0.5	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization		31.3%		ICU Level of Service		A
Analysis Period (min)		15				

Appendix H

Synchro Reports,
Total Volumes, 2032

HCM Unsignalized Intersection Capacity Analysis

3: County Road 10 & Sharpe Line

Total Volumes 2032

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	10	12	6	2	1	4	90	11	4	123	3
Future Volume (Veh/h)	9	10	12	6	2	1	4	90	11	4	123	3
Sign Control	Stop				Stop				Free		Free	
Grade	0%				0%				0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	10	11	14	7	2	1	5	102	12	5	140	3
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	272	276	142	289	271	108	143				114	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	272	276	142	289	271	108	143				114	
tC, single (s)	7.1	6.5	6.2	7.1	7.0	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.5	3.3	2.2				2.2	
p0 queue free %	99	98	98	99	100	100	100				100	
cM capacity (veh/h)	679	631	912	645	558	951	1452				1488	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	35	10	119	148								
Volume Left	10	7	5	5								
Volume Right	14	1	12	3								
cSH	737	646	1452	1488								
Volume to Capacity	0.05	0.02	0.00	0.00								
Queue Length 95th (m)	1.2	0.4	0.1	0.1								
Control Delay (s)	10.1	10.7	0.3	0.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.1	10.7	0.3	0.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay				1.7								
Intersection Capacity Utilization				18.2%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

6: County Road 10 & Morton Line

Total Volumes 2032

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	1	2	3	2	3	3	84	4	0	142	2
Future Volume (Veh/h)	2	1	2	3	2	3	3	84	4	0	142	2
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	1	2	3	2	3	3	91	4	0	154	2
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	258	256	155	256	255	93	156				95	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	258	256	155	256	255	93	156				95	
tC, single (s)	7.6	6.5	6.2	7.1	7.0	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	4.0	4.0	3.3	3.5	4.5	3.3	2.2				2.2	
p0 queue free %	100	100	100	100	100	100	100				100	
cM capacity (veh/h)	603	650	896	697	573	970	1436				1512	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	5	8	98	156								
Volume Left	2	3	3	0								
Volume Right	2	3	4	2								
cSH	705	735	1436	1512								
Volume to Capacity	0.01	0.01	0.00	0.00								
Queue Length 95th (m)	0.2	0.3	0.1	0.0								
Control Delay (s)	10.1	10.0	0.2	0.0								
Lane LOS	B	A	A									
Approach Delay (s)	10.1	10.0	0.2	0.0								
Approach LOS	B	A										
Intersection Summary												
Average Delay				0.6								
Intersection Capacity Utilization				17.6%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

10: County Road 10 & New Roadway

Total Volumes 2032
AM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	7	2	87	140	4
Future Volume (Veh/h)	11	7	2	87	140	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	8	2	95	152	4
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	253	154	156			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	253	154	156			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	100			
cM capacity (veh/h)	735	892	1424			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	20	97	156			
Volume Left	12	2	0			
Volume Right	8	0	4			
cSH	790	1424	1700			
Volume to Capacity	0.03	0.00	0.09			
Queue Length 95th (m)	0.6	0.0	0.0			
Control Delay (s)	9.7	0.2	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.7	0.2	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization		17.6%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

3: County Road 10 & Sharpe Line

Total Volumes 2032

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	4	7	13	12	3	15	208	13	7	154	11
Future Volume (Veh/h)	7	4	7	13	12	3	15	208	13	7	154	11
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	7	4	7	13	12	3	15	214	13	7	159	11
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	438	436	164	438	434	220	170				227	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	438	436	164	438	434	220	170				227	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	99	99	97	98	100	99				99	
cM capacity (veh/h)	515	509	885	519	510	824	1420				1353	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	18	28	242	177								
Volume Left	7	13	15	7								
Volume Right	7	3	13	11								
cSH	613	536	1420	1353								
Volume to Capacity	0.03	0.05	0.01	0.01								
Queue Length 95th (m)	0.7	1.3	0.3	0.1								
Control Delay (s)	11.1	12.1	0.6	0.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	11.1	12.1	0.6	0.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay				1.6								
Intersection Capacity Utilization				27.5%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

6: County Road 10 & Morton Line

Total Volumes 2032

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	6	2	6	5	1	7	242	11	4	156	7
Future Volume (Veh/h)	5	6	2	6	5	1	7	242	11	4	156	7
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	7	2	7	6	1	8	269	12	4	173	8
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	480	482	177	482	480	275	181				281	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	480	482	177	482	480	275	181				281	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	99	100	99	99	100	99				100	
cM capacity (veh/h)	491	483	871	488	484	769	1407				1293	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	15	14	289	185								
Volume Left	6	7	8	4								
Volume Right	2	1	12	8								
cSH	517	499	1407	1293								
Volume to Capacity	0.03	0.03	0.01	0.00								
Queue Length 95th (m)	0.7	0.7	0.1	0.1								
Control Delay (s)	12.2	12.4	0.3	0.2								
Lane LOS	B	B	A	A								
Approach Delay (s)	12.2	12.4	0.3	0.2								
Approach LOS	B	B										
Intersection Summary												
Average Delay	0.9											
Intersection Capacity Utilization	26.7%			ICU Level of Service					A			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

10: County Road 10 & New Roadway

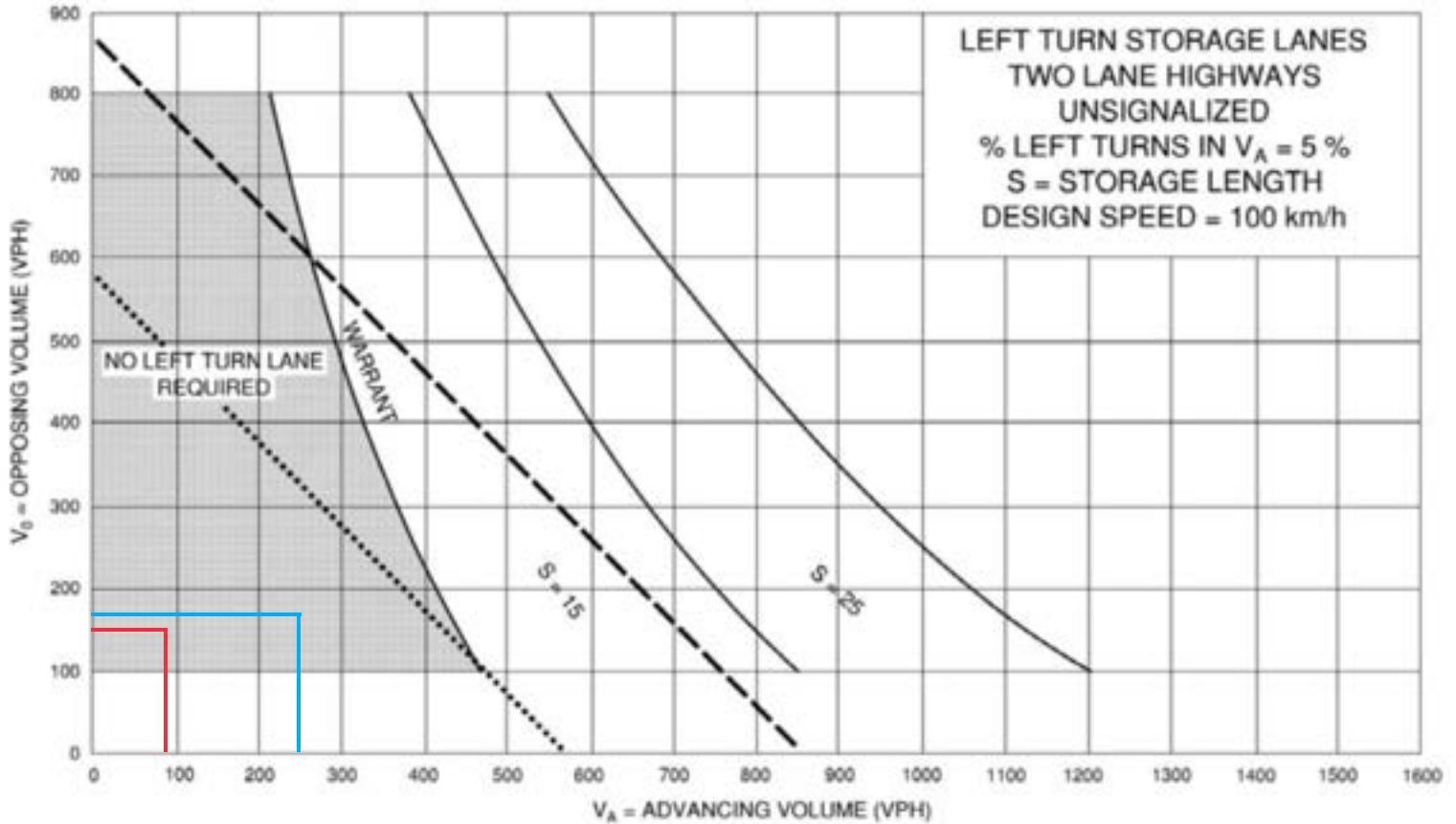
Total Volumes 2032
PM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	5	12	236	166	8
Future Volume (Veh/h)	6	5	12	236	166	8
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	5	13	257	180	9
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	468	184	189			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	468	184	189			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	99			
cM capacity (veh/h)	549	858	1385			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	12	270	189			
Volume Left	7	13	0			
Volume Right	5	0	9			
cSH	646	1385	1700			
Volume to Capacity	0.02	0.01	0.11			
Queue Length 95th (m)	0.5	0.2	0.0			
Control Delay (s)	10.7	0.4	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.7	0.4	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization		32.2%		ICU Level of Service		A
Analysis Period (min)		15				

Appendix I

Left Turn Warrant Procedure

Procedure: Left Turn Lane Warrant
Methodology: MTO Supplement to the TAC Design Guide
Location: Proposed new roadway intersecting CR 10



Worst Case Scenario: Total Traffic Volumes 2032

	CR 10 & New Roadway	
	NB-AM	NB-PM
Advance Volume (V_A)	89	248
Opposing Volume (V_O)	144	174
Left Turn Volume (V_L)	2	12
% Left Turns in V_A	2.2% (5%)	4.8% (5%)
Legend	—	—