

Block 33, Belmont Road, Community of Belmont, Elgin County Transportation Impact Brief

Paradigm Transportation Solutions Limited

October 2023 230344





Project Summary



Project Number 230344

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Client Glenn Dolmage

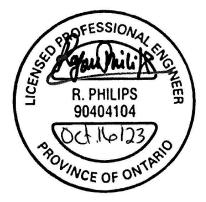
Client Contact

Katelyn Crowley **Zelinka Priamo Ltd.** 318 Wellington Road London ON N6C 4P4

Consultant Project Team

Rajan Philips, M.Sc. (PI), P.Eng. Patrick Neal, EIT

Block 33, Belmont Road, Community of Belmont, Elgin County Transportation Impact Brief



Rajan Philips, P.Eng.

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Paradigm Transportation

Solutions Limited 5A-150 Pinebush Road Cambridge ON N1R 8J8 p: 519.896.3163 905.381.2229 416.479.9684 www.ptsl.com

Executive Summary

Content

Paradigm Transportation Solutions Limited (Paradigm) has been retained to conduct this Transportation Impact Brief (TIB) for a proposed Residential Development located at Block 33, Belmont Road in the Community of Belmont, Municipality of Central Elgin, Elgin County.

This TIB includes an analysis of existing traffic conditions, a description of the proposed development, analysis of future traffic conditions, and assessment of development traffic impacts with recommendations as appropriate to accommodate the proposed development.

Development Concept

The subject site is located in the northeast corner of Belmont Road and Robin Ridge Drive, on the westerly edge of a residential area. The site consists of a single, rectangular parcel of land, and the proposed development will accommodate two 2-storey apartment buildings, each comprising eight units for a total of 16 units.

Vehicular access is proposed via a two-way, full-turns driveway from Robin Ridge Drive, which leads to an onsite parking area for the development.

TIB Scope

The scope of the Transportation Impact Brief for the proposed development includes:

- Study Area Intersections:
 - Belmont Road and Robin Ridge Drive; and
 - Driveway intersection on Robin Ridge Drive.
- Analysis Periods: Weekday AM and PM peak hours.
- Background Developments: Craigholme Estates Development, which comprises 157 single detached homes, 18 semi-detached homes, 16 street townhomes, and an elementary school.
- Traffic Conditions: Existing (2023) and ten years from date of application (2033).



Conclusions

Based on the investigations carried out, it is concluded that:

- Existing Traffic Conditions: The intersection of Belmont Road and Robin Ridge Drive is currently operating at acceptable levels of service.
- Development Trip Generation: The development is forecast to generate 28 and 27 trips during the AM and PM peak hours, respectively.
- 2033 Background Traffic Conditions: The intersection of Belmont Road and Robin Ridge Drive is forecast to operate at acceptable levels of service.
- 2033 Total Traffic Conditions: The intersections of Belmont Road and Robin Ridge Drive and the Site Driveway on Robin Ridge Drive are forecast to operate at acceptable levels of service.
- Roadway Traffic Volumes: The peak hour, peak direction traffic volumes on Belmont Road are currently less than 500 vph, within the lane capacity of 900 vph. Under the 2033 total traffic conditions, the peak hour, peak direction traffic volumes will increase to approximately 630 vph and will be within the lane capacity of 900 vph. The projected increase will have minimal impact on Belmont Road.
- Site Driveway: The Site Driveway on Robin Ridge Drive is forecast to operate at LOS A under 2033 total traffic conditions. It is noted that an eastbound left-turn lane is not warranted on Robin Ridge Drive at the Site Driveway under 2033 total traffic conditions.

The westbound queue lengths at Belmont Road and Robin Ridge Drive are projected to a maximum of three metres under 2033 total traffic conditions, which will not impede inbound/outbound traffic operations at the Site Driveway on Robin Ridge Drive.

Recommendations

Based on the findings and conclusions of this study, it is recommended that the development be considered for approval as proposed.



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1 Introduction

1.1 Overview

Paradigm Transportation Solutions Limited (Paradigm) has been retained to conduct this Transportation Impact Brief (TIB) for a proposed Residential Development located at Block 33, Belmont Road in the Community of Belmont, Municipality of Central Elgin, Elgin County. **Figure 1.1** details the subject development location.

The subject site is located in the northeast corner of Belmont Road and Robin Ridge Drive, on the westerly edge of a residential area. The site consists of a single, rectangular parcel of land, and the proposed development will accommodate two 2-storey apartment buildings, each comprising eight units for a total of 16 units.

Vehicular access is proposed via a two-way, full-turns driveway from Robin Ridge Drive, which leads to an onsite parking area for the development.

1.2 Purpose and Scope

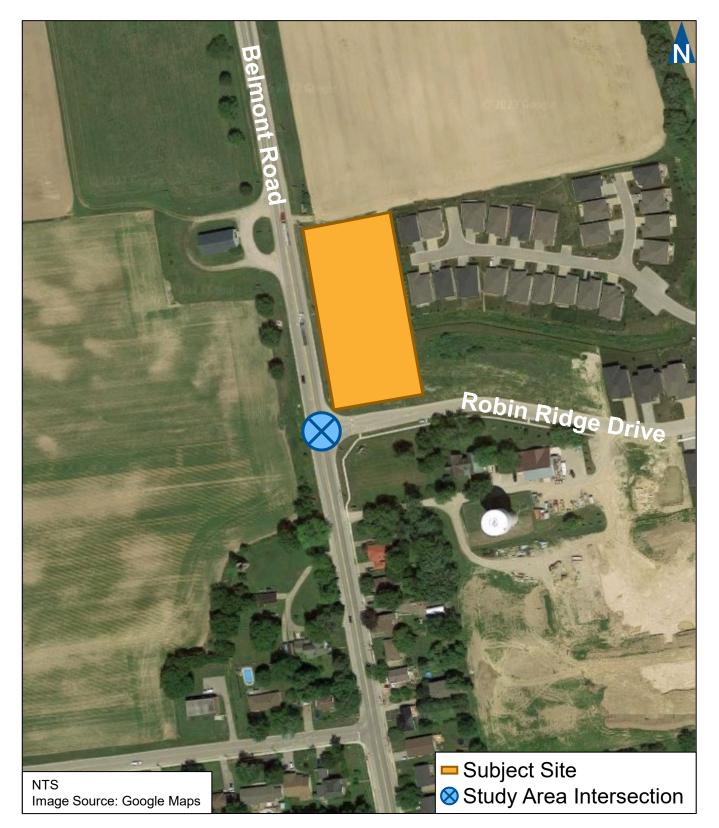
The purpose of this report is to identify and assess the potential traffic impact resulting from the proposed development. The scope of the study, developed in consultation with Elgin County staff via e-mail in July 2023, includes:

- assessment of the current traffic and site conditions within the study area;
- estimates of background traffic growth for ten years from date of application (2033);
- traffic volumes from the Craigholme Estates Development, which comprises 157 single detached homes, 18 semi-detached homes, 16 street townhomes, and an elementary school, are included in the background traffic forecasts;
- estimates of additional traffic generated by the subject site;
- analyses of the impact of the future traffic on the surrounding road network, including the following study area intersections:
 - Belmont Road and Robin Ridge Drive; and
 - Driveway intersection on Robin Ridge Drive.
- recommendations, if necessary, to mitigate the site generated traffic in a satisfactory manner.



Appendix A contains the pre-study consultation material and response from Elgin County.







Location of Subject Site

Block 33, Belmont Road, Elgin County TIB 230344

Figure 1.1

2 Existing Conditions

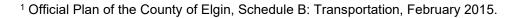
2.1 Existing Roadways

The main roadways near the subject development considered in assessing the traffic impacts of the development include:

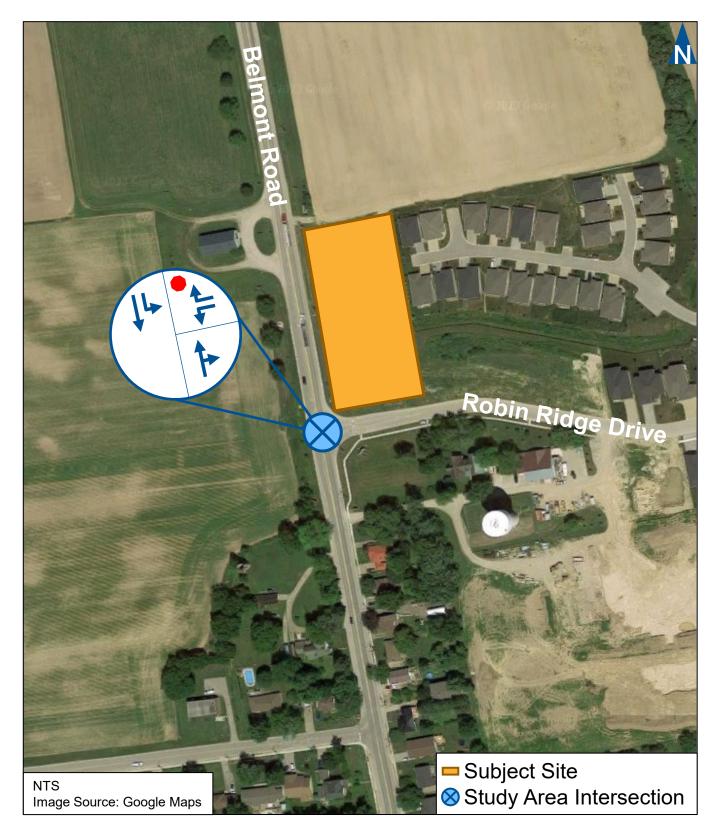
- Belmont Road (Elgin Road 74) is a north-south county minor arterial road¹ with a two-lane cross section and a posted speed limit of 50 km/h. Sidewalks are provided on the east side of the roadway south of Robin Ridge Drive.
- Robin Ridge Drive is an east-west local road with a two-lane cross section and a posted speed limit of 40 km/h. Sidewalks are provided on the south side of the roadway.

Stop control is provided on the Robin Ridge Drive approach at Belmont Road.

Figure 2.1 illustrates the traffic control and lane configuration at the Belmont Road and Robin Ridge Drive intersection.









Existing Lane Configuration and Traffic Control

Block 33, Belmont Road, Elgin County TIB 230344

Figure 2.1

2.2 Traffic Volumes

Paradigm conducted turning movement counts at the intersection of Belmont Road and Robin Ridge Drive on 25 May 2023.

Figure 2.2 illustrates the existing AM (7:15 – 8:15) and PM (4:30 – 5:30) weekday peak hour turning movement traffic volumes.

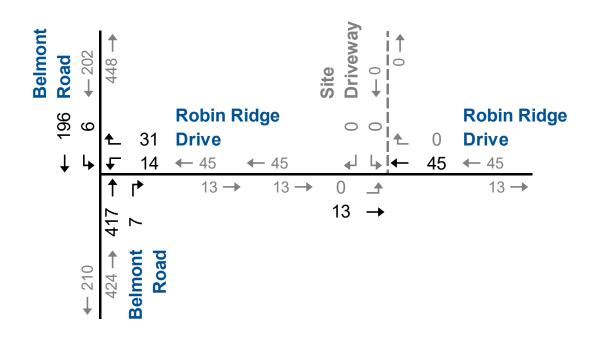
It is noted that the peak hour, peak direction traffic volume on Belmont Road is less than 500 vehicles per hour (vph) and within the lane capacity of 900 vph.

The peak hour, peak directional volume on Robin Ridge Drive is noted to be 45 vph.

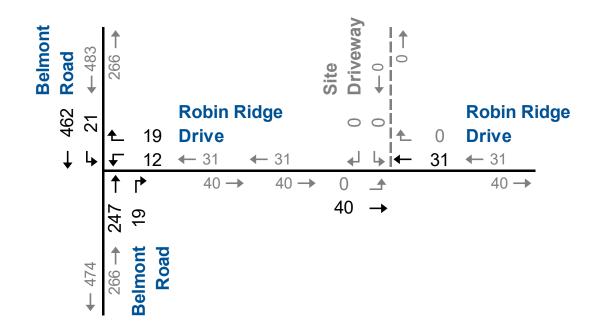
Appendix B contains the detailed traffic counts for the Belmont Road and Robin Ridge Drive intersection.



AM Peak Hour



PM Peak Hour





Existing Traffic Volumes

Block 33, Belmont Road, Elgin County TIB 230344

Figure 2.2

2.3 Traffic Operations

The level of service conditions at the intersection of Belmont Road and Robin Ridge Drive have been assessed through intersection operational analysis using Synchro 11.

Intersection level of service (LOS) is a recognized method of quantifying the average delay experienced by drivers at intersections. It is based on the delay experienced by individual vehicles executing the various movements. The delay is related to the number of vehicles intending to make a particular movement, compared to the estimated capacity for that movement. The capacity is based on several criteria related to the opposing traffic flows and intersection geometry.

The highest possible rating is LOS A, under which the average total delay is equal or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds for signalized intersections, 50 seconds for unsignalized intersections or when the volume to capacity (v/c) ratio is greater than 1.00, the movement is classed as LOS F and remedial measures are usually implemented if they are feasible. LOS E is usually used as a guideline for the determination of road improvement needs on through lanes, while LOS F may be acceptable for left-turn movements at peak times, depending on delays.

Movements are considered critical under the following conditions:

- v/c ratios for movements increased to 0.85 or above;
- movements that exceed LOS 'E'; and
- 95th percentile queue lengths that exceed available lane storage.

Table 2.1 summarizes the results of the intersection operational analysis under existing conditions, including the AM and PM peak hour LOS, v/c ratios, and 95th percentile queues experienced.

The results indicate that the intersection of Belmont Road and Robin Ridge Drive is operating at acceptable levels of service, and with no problem movements.

Appendix C contains the detailed Synchro 11 reports.



| σ | | | | | | | | | [| Directi | on/Mc | veme | nt/App | oroac | ı | | | | | |
|--------------|-------------------------------------|-----------------|---|------|---------|-------|----------|----------------------------------|-----------|---------------------------|----------|------------|--------------------------|-------------|----------|---------------------------------|-------------------------------|-------|----------|---------|
| Period | | | | | Eastb | ound | | | Westbound | | | Northbound | | | | Southbound | | | | |
| Analysis | Intersection | Control Type | MOE | Left | Through | Right | Approach | Left | Through | Right | Approach | Left | Through | Right | Approach | Left | Through | Right | Approach | Overall |
| AM Peak Hour | Belmont Road & Robin Ridge Drive | TWSC | LOS Delay V/C Q Stor. Avail. | | | | | B 14 0.04 1 20 19 | | B 11 0.05 2 - | B 12 | | A 0 0.00 0 - | ~ ~ ~ ~ ~ ~ | A 0 | A 8 0.01 0 60 60 | A 0 0.00 0 - - | | A 0 | |
| PM Peak Hour | Belmont Road & Robin Ridge Drive | TWSC | LOS Delay V/C Q Stor. Avail. | | | | | C 16 0.04 1 20 19 | | A 10 0.03 1 - | B 12 | | A 0 0.00 0 - | ~ ~ ~ ~ ~ ~ | A 0 | A 8 0.02 1 60 59 | A 0 0.00 0 - | | A 0 | |

TABLE 2.1: EXISTING TRAFFIC OPERATIONS

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds V/C - Volume to Capacity Ratio Q - 95th Percentile Queue Length (m) </> - Shared with through movement

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TWSC - Two-Way Stop Control



3 **Development Concept**

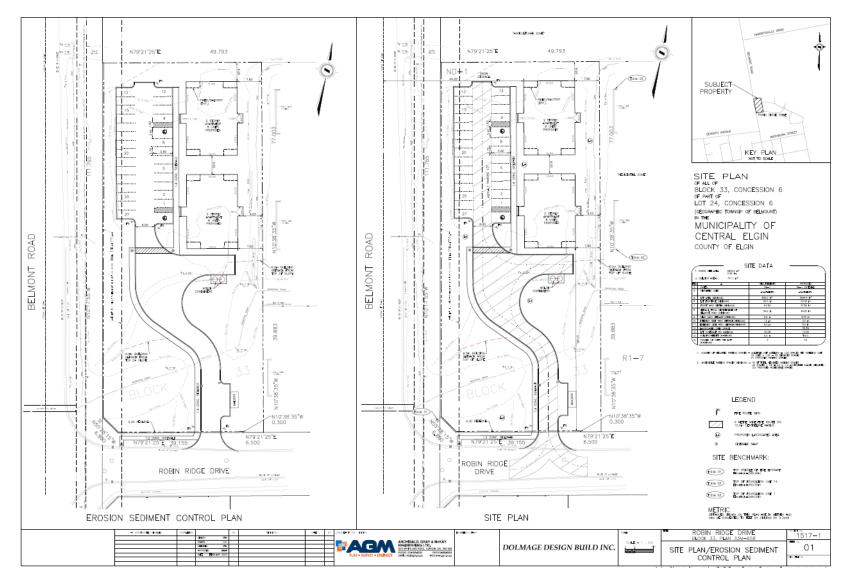
3.1 Development Description

The subject site is located in the northeast corner of Belmont Road and Robin Ridge Drive, on the westerly edge of a residential area. The site consists of a single, rectangular parcel of land, and the proposed development will accommodate two 2-storey apartment buildings, each comprising eight units for a total of 16 units.

Vehicular access is proposed via a two-way, full-turns driveway from Robin Ridge Drive, which leads to an onsite parking area for the development.

Figure 3.1 shows the concept site plan.







Concept Site Plan

Block 33, Belmont Road, Elgin County TIB 230344

Figure 3.1

3.2 Development Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation Manual² equations were used to estimate the peak hour traffic volumes generated by the subject development based on ITE Land Use Code 220, Multifamily Housing (Low Rise).

Table 3.1 summarizes the forecast number of net new trips generatedby the proposed development.

TABLE 3.1: TRIP GENERATION

| Land Use Code | Units | | AM Pea | ak Hour | • | PM Peak Hour | | | | | |
|--|-------|------|--------|---------|-------|--------------|----|-----|-------|--|--|
| Land Use Code | | Rate | In | Out | Total | Rate | In | Out | Total | | |
| 220: Multifamily Housing (Low-Rise) | 16 | Eq | 7 | 21 | 28 | Eq | 17 | 10 | 27 | | |
| Total Trip Generatio | | 7 | 21 | 28 | | 17 | 10 | 27 | | | |

LUC 220 | AM: T = 0.31(X) + 22.85 | PM: T = 0.43(X) + 20.55

3.3 Development Trip Distribution and Assignment

The trip distribution was determined based on existing travel patterns at the intersection of Belmont Road and Robin Ridge Drive. **Table 3.2** displays the breakdown of trip distributions used in this study.

TABLE 3.2: ESTIMATED TRIP DISTRIBUTION

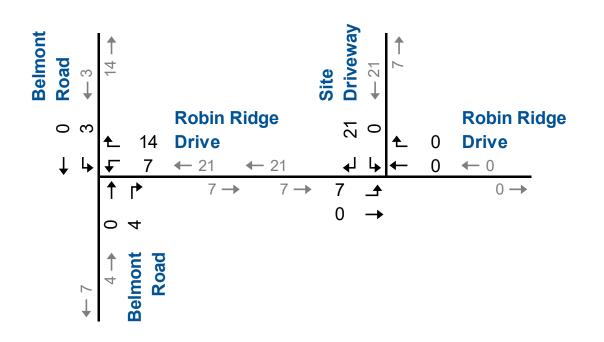
| Origin/Destination | AM Pe | ak Hour | PM Peak Hour | | | | |
|------------------------|---------|----------|--------------|----------|--|--|--|
| Ongin/Destination | Inbound | Outbound | Inbound | Outbound | | | |
| North via Belmont Road | 46% | 69% | 53% | 61% | | | |
| South via Belmont Road | 54% | 31% | 47% | 39% | | | |
| Total | 100% | 100% | 100% | 100% | | | |

Figure 3.2 illustrates the site-generated traffic volumes for the AM and PM peak hours.

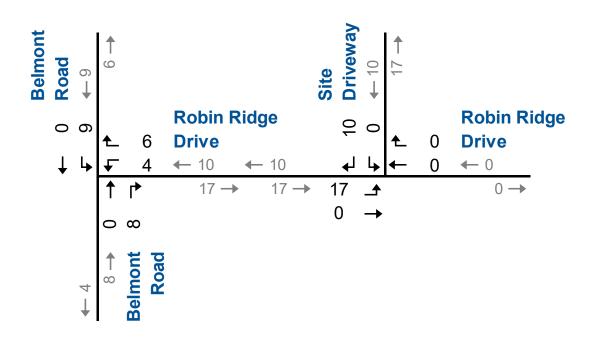
² Institute of Transportation Engineers, *Trip Generation Manual*, 11th ed., (Washington, DC: ITE, 2021).



AM Peak Hour



PM Peak Hour





Site Generated Traffic Volumes

Block 33, Belmont Road, Elgin County TIB 230344

Figure 3.2

4 Evaluation of Future Traffic Conditions

The assessment of future traffic conditions contained in this section includes estimates of future background and total traffic volumes, and the analyses for the traffic conditions ten years from the date of application (2033).

4.1 Background Traffic Forecasts

In order to derive the 2033 generalized background traffic volumes, a growth rate of 2.0% per annum was applied to the existing roadway traffic volumes. This growth rate was confirmed with County during the pre-study consultation.

4.1.1 Other Area Developments

The site traffic generated by the Criagholme Estates Development is included in the background traffic volumes.

The development is located on the south side of Seventh Avenue west of Snyders Avenue in the Community of Belmont. **Figure 4.1** illustrates the location of the background development.

The development comprises 157 single detached homes, 18 semidetached homes, 16 street townhomes, and an elementary school and is expected to be completed by 2032.

The TIS³ completed for this location indicates the development is forecast to generate 350 trips during the AM peak hour and 240 trips during the PM peak hour. The TIS includes the distribution of site traffic volumes at Belmont Road and Seventh Avenue. The volumes travelling on Belmont Road north of Seventh Avenue are assumed to travel north/south on Belmont Road through Robin Ridge Drive.

It is noted that the TIS includes an alternate scenario where the elementary school is instead developed as 56 semi-detached residential homes. However, the site traffic from the scenario including the elementary school is conservatively applied herein⁴.

Appendix D contains the background development traffic volumes.

⁴ According to the TIS, the elementary school is forecast to generate 173 and 1 more AM/PM peak hour trip than the 56 semi-detached homes.



³ Prepared by R.J. Burnside and Associates, *Craigholme Estates Development Transportation Study Belmont, ON*, July 2021.





Background Development Location

Block 33, Belmont Road, Elgin County TIB 230344

Figure 4.1

4.2 2033 Background Traffic Operations

Figure 4.2 illustrates the 2033 background traffic volumes, including road traffic growth and other area development traffic.

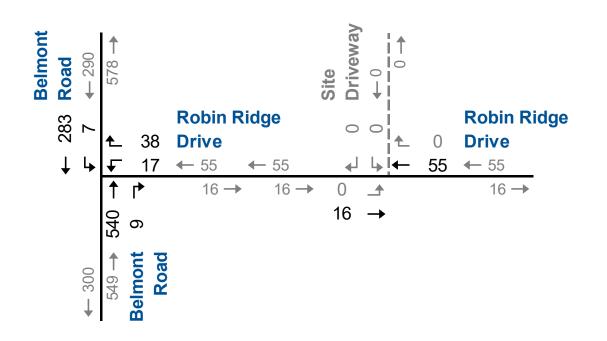
The 2033 background traffic volumes have been analyzed using the same methodology as under existing traffic conditions.

Table 4.1 summarizes the results of the 2033 background traffic operations. The results indicate that the intersection of Belmont Road and Robin Ridge Drive is forecast to operate at acceptable levels of service during the AM and PM peak hours.

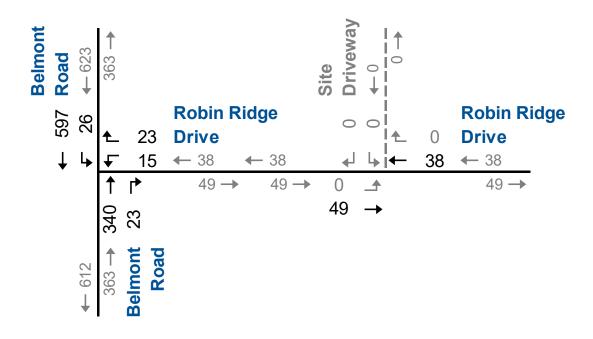
Appendix E contains the supporting detailed Synchro 11 reports.



AM Peak Hour



PM Peak Hour





2033 Background Traffic Volumes

Block 33, Belmont Road, Elgin County TIB 230344

Figure 4.2

TABLE 4.1: 2033 BACKGROUND TRAFFIC OPERATIONS

| σ | | | | | | | | | [| Directi | on/Mc | veme | nt/App | oroac | h | | | | | |
|--------------|-------------------------------------|-----------------|---|------|---------|-------|----------|----------------------------------|---------|---------------------------|----------|------|--------------------------|-------------|----------|---------------------------------|-------------------------------|-------|----------|---------|
| Period | | | | | Eastb | ound | | | West | oound | | | Northl | oounc | 1 | Southbound | | | | |
| sis Inters | Intersection | Control Type | MOE | Left | Through | Right | Approach | Left | Through | Right | Approach | Left | Through | Right | Approach | Left | Through | Right | Approach | Overall |
| AM Peak Hour | Belmont Road & Robin Ridge Drive | TWSC | LOS Delay V/C Q Stor. Avail. | | | | | C 18 0.06 2 20 18 | | B 13 0.08 2 - | B 14 | | A 0.00 0 - | ~ ~ ~ ~ ~ ~ | A 0 | A 9 0.01 0 60 60 | A 0.00 0 - | | A 0 | |
| PM Peak Hour | Belmont Road & Robin Ridge Drive | TWSC | LOS Delay V/C Q Stor. Avail. | | | | | C 21 0.07 2 20 18 | | B 11 0.04 1 - | B 15 | | A 0 0.00 0 - | ~ ~ ~ ~ ~ | A 0 | A 8 0.02 1 60 59 | A 0 0.00 0 - - | | A 0 | |

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds V/C - Volume to Capacity Ratio Q - 95th Percentile Queue Length (m) </> - Shared with through movement

Stor. - Existing Storage (m) Avail. - Available Storage (m)

TWSC - Two-Way Stop Control



4.3 2033 Total Traffic Operations

Figure 4.3 illustrates the 2033 total traffic volumes, including trips generated by the proposed development.

The 2033 total traffic volumes have been analyzed using the same methodology as under existing and background traffic conditions.

Table 4.2 summarizes the results of the 2033 total traffic operations. The results indicate that the study area intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours.

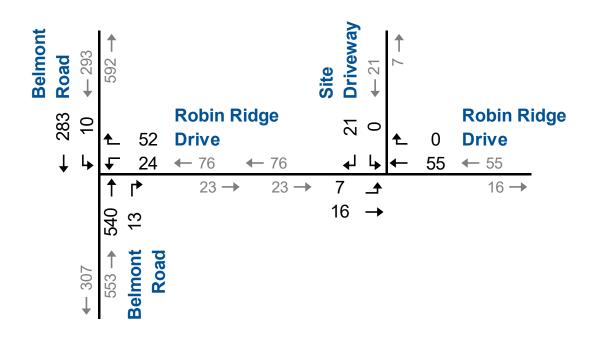
The Site Driveway intersection on Robin Ridge Drive is forecast to operate at LOS A during the AM and PM peak hours.

It is noted that the Site Driveway is proposed to be located approximately 35 metres east of the westbound stop bar at Belmont Road. The westbound queue lengths at Belmont Road and Robin Ridge Drive are projected to a maximum of three metres under 2033 total traffic conditions, which will not impede inbound/outbound traffic operations at the Site Driveway on Robin Ridge Drive.

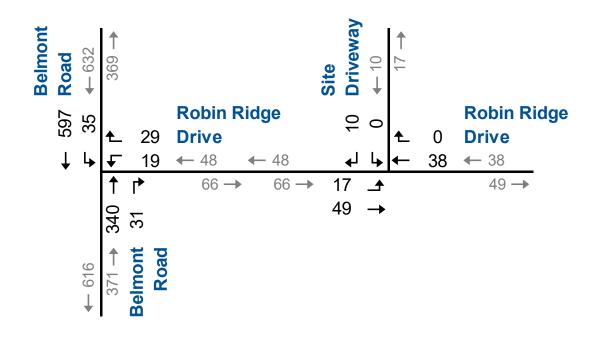
Appendix F contains the supporting detailed Synchro 11 reports.



AM Peak Hour



PM Peak Hour





2033 Total Traffic Volumes

Block 33, Belmont Road, Elgin County TIB 230344

Figure 4.3

| σ | | | | Direction/Movement/Approach | | | | | | | | | | | | | | | | |
|-----------------|--------------------------------------|-----------------|---|-----------------------------|---------------------|-------|----------|----------------------------------|---------------------|---------------------------|----------|------|--------------------------|-------------|----------|---------------------------------|-------------------------------|---------|----------|---------|
| erio | | | | | Eastb | ound | | | West | oound | | | Northl | oounc | 1 | ; | South | bound | 1 | |
| Analysis Period | Intersection | Control Type | MOE | Left | Through | Right | Approach | Left | Through | Right | Approach | Left | Through | Right | Approach | Left | Through | Right | Approach | Overall |
| AM Peak Hour | Belmont Road & Robin Ridge Drive | TWSC | LOS Delay V/C Q Stor. Avail. | | | | | C 18 0.09 2 20 18 | | B 13 0.11 3 - | B 14 | | A 0 0.00 0 - | ~ ~ ~ ~ ~ ~ | A 0 | A 9 0.01 0 60 60 | A 0 0.00 0 - | | A 0 | |
| AM P | Robin Ridge Drive & Site Driveway | TWSC | LOS Delay V/C Q | v v v v | A 7 0.01 0 | | A 2 | | A 0 0.00 0 | v v v v | 0 | | | | | A 9 0.02 1 | | v v v v | A 9 | |
| PM Peak Hour | Belmont Road & Robin Ridge Drive | TWSC | LOS Delay V/C Q Stor. Avail. | | | | | C 22 0.09 2 20 18 | | B 11 0.05 1 - | C 15 | | A 0 0.00 0 - | ~ ~ ~ ~ ~ ~ | A 0 | A 8 0.03 1 60 59 | A 0 0.00 0 - - | | A 0 | |
| PM | Robin Ridge Drive & Site Driveway | TWSC | LOS Delay V/C Q | ~ ~ ~ ~ | A 7 0.01 0 | | A 2 | | A 0 0.00 0 | ~ ~ ~ ~ | A 0 | | | | | A 8 0.01 0 | | ~ ~ ~ ~ | A 8 | |

TABLE 4.2: 2033 TOTAL TRAFFIC OPERATIONS

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds V/C - Volume to Capacity Ratio Q - 95th Percentile Queue Length (m)

</> - Shared with through movement

Stor. - Existing Storage (m) Avail. - Available Storage (m)

TWSC - Two-Way Stop Control



4.4 Roadway Traffic Volumes

As stated in **Section 2.3**, the peak hour, peak direction traffic volume on Belmont Road is less than 500 vph and within the lane capacity of 900 vph. The 2033 background peak hour, peak direction traffic volume on Belmont Road will be around 625 vph.

The additional traffic volumes generated by the subject development will be minimal. The peak hour, peak direction traffic volume on Belmont Road is expected to be around 630 vph. As under existing conditions, the directional peak will be within capacity of Belmont Road.

Similarly, the peak hour, peak directional volume on Robin Ridge Drive will be around 75 vph and well within capacity under the 2033 total traffic scenario.

The Average Daily Traffic (ADT) volume is a measurement of the twoway, daily traffic volumes along a road segment. When 24-hour traffic count data are not available, the ADT is typically estimated by assuming the daily PM peak hour traffic volume to be 10% of the ADT.

The current ADT volume along Belmont Road in vicinity of the subject site is 7,490 vehicles and is estimated to increase to 10,010 vehicles by 2033. Over a 10-year period, this is an average increase of approximately 252 vehicles per year. The increase will have minimal impacts on Belmont Road traffic flows.

4.5 Left-Turn Lanes

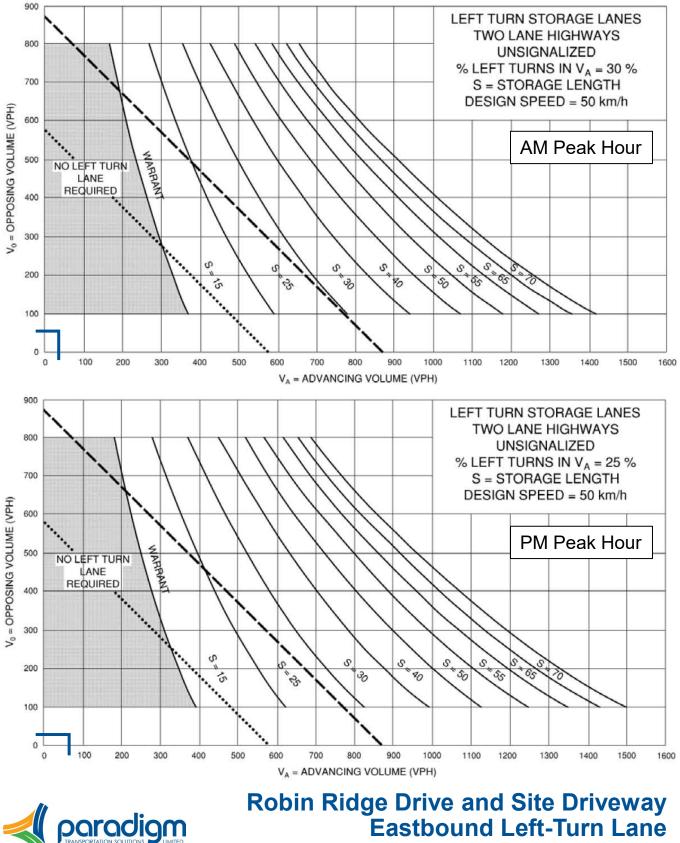
The need for an auxiliary eastbound left-turn turning lane on Robin Ridge Drive at the proposed driveway was assessed based on the requirements and procedures detailed in the Ministry of Transportation Design Supplement for the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads⁵. The assessment is based on the nomographs for left-turn lanes on a two-lane undivided highway at an unsignalized intersection with a design speed of 10 kilometres per hour over the posted speed limit (50 km/h).

Based on these criteria, an eastbound left-turn lane on Robin Ridge Drive at the proposed driveway is not warranted under 2033 total traffic conditions.

Figure 4.4 contains the warrant nomographs.

⁵ *MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads*, June 2017.





Eastbound Left-Turn Lane **2033 Total Traffic Conditions**

Block 33, Belmont Road, Elgin County TIB 230344

Figure 4.4

5 Conclusions and Recommendations

5.1 Conclusions

Based on the investigations carried out, it is concluded that:

- Existing Traffic Conditions: The intersection of Belmont Road and Robin Ridge Drive is currently operating at acceptable levels of service.
- Development Trip Generation: The development is forecast to generate 28 and 27 trips during the AM and PM peak hours, respectively.
- 2033 Background Traffic Conditions: The intersection of Belmont Road and Robin Ridge Drive is forecast to operate at acceptable levels of service.
- 2033 Total Traffic Conditions: The intersections of Belmont Road and Robin Ridge Drive and the Site Driveway on Robin Ridge Drive are forecast to operate at acceptable levels of service.
- Roadway Traffic Volumes: The peak hour, peak direction traffic volumes on Belmont Road are currently less than 500 vph, well within the lane capacity of 900 vph. Under the 2033 total traffic conditions, the peak hour, peak direction traffic volumes will increase to approximately 630 vph and will be within the lane capacity of 900 vph. The projected increase will have minimal impact on Belmont Road.
- Site Driveway: The Site Driveway on Robin Ridge Drive is forecast to operate at LOS A under 2033 total traffic conditions. It is noted that an eastbound left-turn lane is not warranted on Robin Ridge Drive at the Site Driveway under 2033 total traffic conditions.

It is noted that the westbound queue lengths at Belmont Road and Robin Ridge Drive are projected to a maximum of three metres under 2033 total traffic conditions, which will not impede inbound/outbound traffic operations at the Site Driveway on Robin Ridge Drive.

5.2 Recommendations

Based on the findings and conclusions of this study, it is recommended that the development be considered for approval as proposed.



Appendix A Pre-Study Consultation



| From: | Peter Dutchak |
|--------------|--|
| То: | Patrick Neal |
| Cc: | Rajan Philips |
| Subject: | RE: (230344) Block 33 Belmont Road, Central Elgin TIB - Pre-Study Consultation |
| Date: | July 13, 2023 9:24:19 AM |
| Attachments: | image001.png |
| | image003.png |

Thank you Patrick.

I can confirm your assumptions for traffic growth and existing TIS being accurate.

My only initial concern is a potential traffic cue that may develop as a result of vehicle's left turn movement into the development site and how that may affect drivers entering Robin Ridge Road. Ideally this entrance should be located to the east development property limits as much as possible.

Regards,

Peter Dutchak, CET, CRS

Acting Director, Engineering Services

County of Elgin 450 Sunset Drive, St. Thomas, Ontario N5R 5V1

(519)631-1460 ext. 124 pdutchak@elgin.ca

From: Patrick Neal <pneal@ptsl.com>
Sent: July 12, 2023 4:41 PM
To: Peter Dutchak <pdutchak@elgin.ca>
Cc: Rajan Philips <rphilips@ptsl.com>
Subject: (230344) Block 33 Belmont Road, Central Elgin TIB - Pre-Study Consultation

This email originated from outside of your organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Peter,

Paradigm has been retained to undertake a Transportation Impact Brief (TIB) for the proposed Residential development located at Block 33 Belmont Road in Central Elgin, Elgin County. The subject site is located in the northeast corner of Belmont Road and Robin Ridge Drive, on the westerly edge of the residential area.

The site consists of a single, rectangular parcel of lands, and the proposed development will accommodate two, 2-storey apartment buildings, each comprising eight units for a total

of 16 units.

Vehicle access is proposed via a two-way, full turns driveway from Robin Ridge Drive, which leads to an onsite parking area for the development.

The concept site plan is attached.

Based on the above information and requirements, we are proposing the following TIB scope of work, for your review and approval:

- Weekday AM and PM peak hour analysis of adjacent roadways.
- Study Area Intersections:
 - Belmont Road and Robin Ridge Drive; and
 - driveway intersection on Robin Ridge Drive.
- Traffic Data: We will undertake traffic counts at the intersection of Belmont Road and Robin Ridge Drive.
- Horizon Year: ten years from date of application (2033).
- Background Growth Rate: 2.0% per annum. Please confirm.
- Background Developments: We will include traffic from the Craigholme Estates Development, based on the July 2021 TIS prepared by R.J. Burnside and Associates. **Please confirm.**
- Trip Generation: ITE Trip Generation Manual 11th Edition.
- Trip Distribution: Existing traffic patterns.

Please let us know if you have any comments or questions.

Regards,

Patrick Neal, EIT Transportation Consultant



Paradigm Transportation Solutions Limited

5A-150 Pinebush Road, Cambridge ON N1R 8J8 p: 416.479.9684 x510 m: 416.688.7338 e: <u>pneal@ptsl.com</u> w: <u>www.ptsl.com</u>



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Appendix B Existing Traffic Data





Paradigm Transportation Solutions Limited 5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8 519-896-3163 cbowness@ptsl.com Count Name: Belmont Road & Robin Ridge Drive Site Code: 230344 Start Date: 05/25/2023 Page No: 1

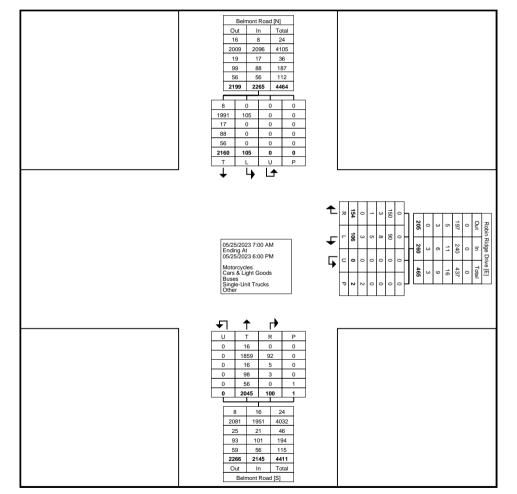
Turning Movement Data

| | | | Robin Ridge Drive | 9 | | | | Belmont Road | | | | | Belmont Road | | | |
|---------------|------|-------|-------------------|------|------------|------|-------|--------------|------|------------|------|------|--------------|------|------------|------------|
| Start Time | | | Westbound | | | | | Northbound | | | | | Southbound | | | |
| Start Time | Left | Right | U-Turn | Peds | App. Total | Thru | Right | U-Turn | Peds | App. Total | Left | Thru | U-Turn | Peds | App. Total | Int. Total |
| 7:00 AM | 4 | 6 | 0 | 0 | 10 | 82 | 1 | 0 | 0 | 83 | 0 | 37 | 0 | 0 | 37 | 130 |
| 7:15 AM | 3 | 7 | 0 | 0 | 10 | 108 | 0 | 0 | 0 | 108 | 0 | 44 | 0 | 0 | 44 | 162 |
| 7:30 AM | 2 | 9 | 0 | 0 | 11 | 115 | 1 | 0 | 0 | 116 | 3 | 50 | 0 | 0 | 53 | 180 |
| 7:45 AM | 3 | 4 | 0 | 0 | 7 | 107 | 3 | 0 | 0 | 110 | 1 | 49 | 0 | 0 | 50 | 167 |
| Hourly Total | 12 | 26 | 0 | 0 | 38 | 412 | 5 | 0 | 0 | 417 | 4 | 180 | 0 | 0 | 184 | 639 |
| 8:00 AM | 6 | 11 | 0 | 0 | 17 | 87 | 3 | 0 | 0 | 90 | 2 | 53 | 0 | 0 | 55 | 162 |
| 8:15 AM | 4 | 4 | 0 | 0 | 8 | 88 | 7 | 0 | 0 | 95 | 0 | 46 | 0 | 0 | 46 | 149 |
| 8:30 AM | 4 | 5 | 0 | 0 | 9 | 75 | 3 | 0 | 0 | 78 | 1 | 32 | 0 | 0 | 33 | 120 |
| 8:45 AM | 6 | 3 | 0 | 0 | 9 | 58 | 5 | 0 | 0 | 63 | 0 | 48 | 0 | 0 | 48 | 120 |
| Hourly Total | 20 | 23 | 0 | 0 | 43 | 308 | 18 | 0 | 0 | 326 | 3 | 179 | 0 | 0 | 182 | 551 |
| 9:00 AM | 6 | 3 | 0 | 0 | 9 | 60 | 2 | 0 | 0 | 62 | 2 | 46 | 0 | 0 | 48 | 119 |
| 9:15 AM | 1 | 6 | 0 | 0 | 7 | 72 | 3 | 0 | 0 | 75 | 0 | 39 | 0 | 0 | 39 | 121 |
| 9:30 AM | 3 | 9 | 0 | 0 | 12 | 63 | 0 | 0 | 0 | 63 | 0 | 43 | 0 | 0 | 43 | 118 |
| 9:45 AM | 2 | 8 | 0 | 0 | 10 | 45 | 3 | 0 | 0 | 48 | 4 | 45 | 0 | 0 | 49 | 107 |
| Hourly Total | 12 | 26 | 0 | 0 | 38 | 240 | 8 | 0 | 0 | 248 | 6 | 173 | 0 | 0 | 179 | 465 |
| *** BREAK *** | - | - | | - | - | - | - | - | - | - | - | - | | - | - | - |
| 11:00 AM | 3 | 5 | 0 | 2 | 8 | 38 | 2 | 0 | 0 | 40 | 3 | 37 | 0 | 0 | 40 | 88 |
| 11:15 AM | 4 | 3 | 0 | 0 | 7 | 52 | 3 | 0 | 0 | 55 | 2 | 36 | 0 | 0 | 38 | 100 |
| 11:30 AM | 1 | 3 | 0 | 0 | 4 | 52 | 2 | 0 | 0 | 54 | 4 | 35 | 0 | 0 | 39 | 97 |
| 11:45 AM | 2 | 0 | 0 | 0 | 2 | 41 | 1 | 0 | 0 | 42 | 4 | 35 | 0 | 0 | 39 | 83 |
| Hourly Total | 10 | 11 | 0 | 2 | 21 | 183 | 8 | 0 | 0 | 191 | 13 | 143 | 0 | 0 | 156 | 368 |
| 12:00 PM | 3 | 8 | 0 | 0 | 11 | 40 | 1 | 0 | 0 | 41 | 4 | 52 | 0 | 0 | 56 | 108 |
| 12:15 PM | 1 | 5 | 0 | 0 | 6 | 50 | 1 | 0 | 0 | 51 | 7 | 56 | 0 | 0 | 63 | 120 |
| 12:30 PM | 2 | 5 | 0 | 0 | 7 | 41 | 2 | 0 | 0 | 43 | 6 | 39 | 0 | 0 | 45 | 95 |
| 12:45 PM | 3 | 3 | 0 | 0 | 6 | 28 | 3 | 0 | 0 | 31 | 5 | 54 | 0 | 0 | 59 | 96 |
| Hourly Total | 9 | 21 | 0 | 0 | 30 | 159 | 7 | 0 | 0 | 166 | 22 | 201 | 0 | 0 | 223 | 419 |
| *** BREAK *** | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 3:00 PM | 5 | 3 | 0 | 0 | 8 | 59 | 6 | 0 | 0 | 65 | 9 | 81 | 0 | 0 | 90 | 163 |
| 3:15 PM | 3 | 5 | 0 | 0 | 8 | 60 | 1 | 0 | 1 | 61 | 3 | 105 | 0 | 0 | 108 | 177 |
| 3:30 PM | 2 | 4 | 0 | 0 | 6 | 56 | 5 | 0 | 0 | 61 | 2 | 91 | 0 | 0 | 93 | 160 |
| 3:45 PM | 2 | 6 | 0 | 0 | 8 | 69 | 6 | 0 | 0 | 75 | 9 | 85 | 0 | 0 | 94 | 177 |
| Hourly Total | 12 | 18 | 0 | 0 | 30 | 244 | 18 | 0 | 1 | 262 | 23 | 362 | 0 | 0 | 385 | 677 |
| 4:00 PM | 6 | 4 | 0 | 0 | 10 | 57 | 4 | 0 | 0 | 61 | 1 | 105 | 0 | 0 | 106 | 177 |
| 4:15 PM | 4 | 4 | 0 | 0 | 8 | 72 | 4 | 0 | 0 | 76 | 2 | 119 | 0 | 0 | 121 | 205 |
| 4:30 PM | 0 | 7 | 0 | 0 | 7 | 74 | 3 | 0 | 0 | 77 | 6 | 117 | 0 | 0 | 123 | 207 |
| 4:45 PM | 4 | 3 | 0 | 0 | 7 | 56 | 2 | 0 | 0 | 58 | 3 | 116 | 0 | 0 | 119 | 184 |

| Hourly Total | 14 | 18 | 0 | 0 | 32 | 259 | 13 | 0 | 0 | 272 | 12 | 457 | 0 | 0 | 469 | 773 |
|-------------------------|------|------|-----|-------|------|------|------|-----|-------|------|-------|------|-----|---|------|------|
| 5:00 PM | 1 | 2 | 0 | 0 | 3 | 58 | 8 | 0 | 0 | 66 | 6 | 108 | 0 | 0 | 114 | 183 |
| 5:15 PM | 7 | 7 | 0 | 0 | 14 | 59 | 6 | 0 | 0 | 65 | 6 | 121 | 0 | 0 | 127 | 206 |
| 5:30 PM | 5 | 2 | 0 | 0 | 7 | 58 | 6 | 0 | 0 | 64 | 4 | 129 | 0 | 0 | 133 | 204 |
| 5:45 PM | 4 | 0 | 0 | 0 | 4 | 65 | 3 | 0 | 0 | 68 | 6 | 107 | 0 | 0 | 113 | 185 |
| Hourly Total | 17 | 11 | 0 | 0 | 28 | 240 | 23 | 0 | 0 | 263 | 22 | 465 | 0 | 0 | 487 | 778 |
| Grand Total | 106 | 154 | 0 | 2 | 260 | 2045 | 100 | 0 | 1 | 2145 | 105 | 2160 | 0 | 0 | 2265 | 4670 |
| Approach % | 40.8 | 59.2 | 0.0 | - | - | 95.3 | 4.7 | 0.0 | - | - | 4.6 | 95.4 | 0.0 | - | - | - |
| Total % | 2.3 | 3.3 | 0.0 | - | 5.6 | 43.8 | 2.1 | 0.0 | - | 45.9 | 2.2 | 46.3 | 0.0 | - | 48.5 | - |
| Motorcycles | 0 | 0 | 0 | - | 0 | 16 | 0 | 0 | - | 16 | 0 | 8 | 0 | - | 8 | 24 |
| % Motorcycles | 0.0 | 0.0 | - | - | 0.0 | 0.8 | 0.0 | - | - | 0.7 | 0.0 | 0.4 | - | - | 0.4 | 0.5 |
| Cars & Light Goods | 90 | 150 | 0 | - | 240 | 1859 | 92 | 0 | - | 1951 | 105 | 1991 | 0 | - | 2096 | 4287 |
| % Cars & Light Goods | 84.9 | 97.4 | - | - | 92.3 | 90.9 | 92.0 | - | - | 91.0 | 100.0 | 92.2 | - | - | 92.5 | 91.8 |
| Buses | 8 | 3 | 0 | - | 11 | 16 | 5 | 0 | - | 21 | 0 | 17 | 0 | - | 17 | 49 |
| % Buses | 7.5 | 1.9 | - | - | 4.2 | 0.8 | 5.0 | - | - | 1.0 | 0.0 | 0.8 | - | - | 0.8 | 1.0 |
| Single-Unit Trucks | 5 | 1 | 0 | - | 6 | 98 | 3 | 0 | - | 101 | 0 | 88 | 0 | - | 88 | 195 |
| % Single-Unit Trucks | 4.7 | 0.6 | - | - | 2.3 | 4.8 | 3.0 | - | - | 4.7 | 0.0 | 4.1 | - | - | 3.9 | 4.2 |
| Articulated Trucks | 0 | 0 | 0 | - | 0 | 55 | 0 | 0 | - | 55 | 0 | 56 | 0 | - | 56 | 111 |
| % Articulated Trucks | 0.0 | 0.0 | - | - | 0.0 | 2.7 | 0.0 | - | - | 2.6 | 0.0 | 2.6 | - | - | 2.5 | 2.4 |
| Bicycles on Road | 3 | 0 | 0 | - | 3 | 1 | 0 | 0 | - | 1 | 0 | 0 | 0 | - | 0 | 4 |
| % Bicycles on Road | 2.8 | 0.0 | - | - | 1.2 | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 | - | - | 0.0 | 0.1 |
| Bicycles on Crosswalk | - | - | - | 0 | - | - | - | - | 0 | - | - | - | - | 0 | - | - |
| % Bicycles on Crosswalk | - | - | - | 0.0 | - | - | - | - | 0.0 | - | - | - | - | - | - | - |
| Pedestrians | - | - | - | 2 | - | - | - | - | 1 | - | - | - | - | 0 | - | - |
| % Pedestrians | - | - | - | 100.0 | - | - | - | - | 100.0 | - | - | - | - | - | - | - |



Count Name: Belmont Road & Robin Ridge Drive Site Code: 230344 Start Date: 05/25/2023 Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited 5A-150 Pinebush Rd

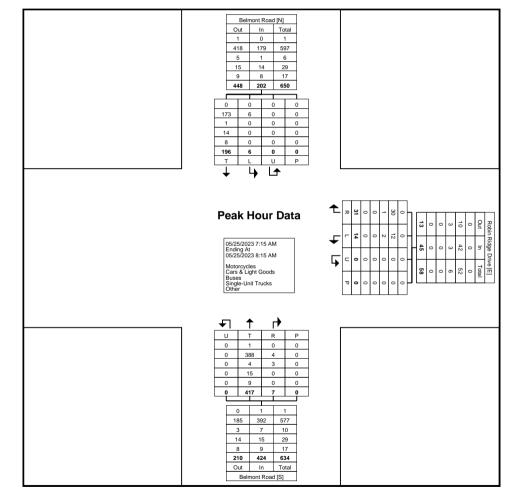
Cambridge, Ontario, Canada N1R 8J8 519-896-3163 cbowness@ptsl.com Count Name: Belmont Road & Robin Ridge Drive Site Code: 230344 Start Date: 05/25/2023 Page No: 4

Turning Movement Peak Hour Data (7:15 AM)

| | | I | Robin Ridge Driv | e | | , | | Belmont Road | , | , | | | Belmont Road | | | |
|-------------------------|-------|-------|------------------|------|------------|-------|-------|--------------|------|------------|-------|-------|--------------|------|------------|------------|
| Start Time | | | Westbound | | | | | Northbound | | | | | Southbound | | | |
| Start Time | Left | Right | U-Turn | Peds | App. Total | Thru | Right | U-Turn | Peds | App. Total | Left | Thru | U-Turn | Peds | App. Total | Int. Total |
| 7:15 AM | 3 | 7 | 0 | 0 | 10 | 108 | 0 | 0 | 0 | 108 | 0 | 44 | 0 | 0 | 44 | 162 |
| 7:30 AM | 2 | 9 | 0 | 0 | 11 | 115 | 1 | 0 | 0 | 116 | 3 | 50 | 0 | 0 | 53 | 180 |
| 7:45 AM | 3 | 4 | 0 | 0 | 7 | 107 | 3 | 0 | 0 | 110 | 1 | 49 | 0 | 0 | 50 | 167 |
| 8:00 AM | 6 | 11 | 0 | 0 | 17 | 87 | 3 | 0 | 0 | 90 | 2 | 53 | 0 | 0 | 55 | 162 |
| Total | 14 | 31 | 0 | 0 | 45 | 417 | 7 | 0 | 0 | 424 | 6 | 196 | 0 | 0 | 202 | 671 |
| Approach % | 31.1 | 68.9 | 0.0 | - | - | 98.3 | 1.7 | 0.0 | - | - | 3.0 | 97.0 | 0.0 | - | - | - |
| Total % | 2.1 | 4.6 | 0.0 | - | 6.7 | 62.1 | 1.0 | 0.0 | - | 63.2 | 0.9 | 29.2 | 0.0 | - | 30.1 | - |
| PHF | 0.583 | 0.705 | 0.000 | - | 0.662 | 0.907 | 0.583 | 0.000 | - | 0.914 | 0.500 | 0.925 | 0.000 | - | 0.918 | 0.932 |
| Motorcycles | 0 | 0 | 0 | - | 0 | 1 | 0 | 0 | - | 1 | 0 | 0 | 0 | - | 0 | 1 |
| % Motorcycles | 0.0 | 0.0 | - | - | 0.0 | 0.2 | 0.0 | - | - | 0.2 | 0.0 | 0.0 | - | - | 0.0 | 0.1 |
| Cars & Light Goods | 12 | 30 | 0 | - | 42 | 388 | 4 | 0 | - | 392 | 6 | 173 | 0 | - | 179 | 613 |
| % Cars & Light Goods | 85.7 | 96.8 | - | - | 93.3 | 93.0 | 57.1 | - | - | 92.5 | 100.0 | 88.3 | - | - | 88.6 | 91.4 |
| Buses | 2 | 1 | 0 | - | 3 | 4 | 3 | 0 | - | 7 | 0 | 1 | 0 | - | 1 | 11 |
| % Buses | 14.3 | 3.2 | - | - | 6.7 | 1.0 | 42.9 | - | - | 1.7 | 0.0 | 0.5 | - | - | 0.5 | 1.6 |
| Single-Unit Trucks | 0 | 0 | 0 | - | 0 | 15 | 0 | 0 | - | 15 | 0 | 14 | 0 | - | 14 | 29 |
| % Single-Unit Trucks | 0.0 | 0.0 | - | - | 0.0 | 3.6 | 0.0 | - | - | 3.5 | 0.0 | 7.1 | - | - | 6.9 | 4.3 |
| Articulated Trucks | 0 | 0 | 0 | - | 0 | 9 | 0 | 0 | - | 9 | 0 | 8 | 0 | - | 8 | 17 |
| % Articulated Trucks | 0.0 | 0.0 | - | - | 0.0 | 2.2 | 0.0 | - | - | 2.1 | 0.0 | 4.1 | - | - | 4.0 | 2.5 |
| Bicycles on Road | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | - | 0 | 0 |
| % Bicycles on Road | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 | - | - | 0.0 | 0.0 |
| Bicycles on Crosswalk | - | - | - | 0 | - | - | - | - | 0 | - | - | - | - | 0 | - | - |
| % Bicycles on Crosswalk | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pedestrians | - | - | - | 0 | - | - | - | - | 0 | - | - | - | - | 0 | - | - |
| % Pedestrians | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Count Name: Belmont Road & Robin Ridge Drive Site Code: 230344 Start Date: 05/25/2023 Page No: 5



Turning Movement Peak Hour Data Plot (7:15 AM)



Paradigm Transportation Solutions Limited 5A-150 Pinebush Rd

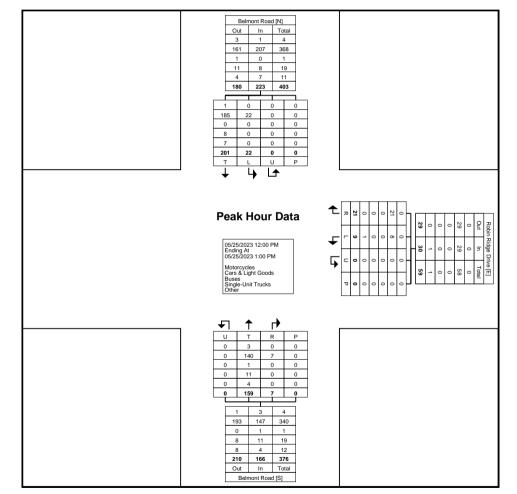
Cambridge, Ontario, Canada N1R 8J8 519-896-3163 cbowness@ptsl.com Count Name: Belmont Road & Robin Ridge Drive Site Code: 230344 Start Date: 05/25/2023 Page No: 6

Turning Movement Peak Hour Data (12:00 PM)

| | | I | Robin Ridge Drive Westbound | Э | 0 | | | Belmont Road Northbound | , | , | | | Belmont Road Southbound | | | |
|-------------------------|-------|-------|--------------------------------|------|------------|-------|-------|----------------------------|------|------------|-------|-------|----------------------------|------|------------|------------|
| Start Time | Left | Right | U-Turn | Peds | App. Total | Thru | Right | U-Turn | Peds | App. Total | Left | Thru | U-Turn | Peds | App. Total | Int. Total |
| 12:00 PM | 3 | 8 | 0 | 0 | 11 | 40 | 1 | 0 | 0 | 41 | 4 | 52 | 0 | 0 | 56 | 108 |
| 12:15 PM | 1 | 5 | 0 | 0 | 6 | 50 | 1 | 0 | 0 | 51 | 7 | 56 | 0 | 0 | 63 | 120 |
| 12:30 PM | 2 | 5 | 0 | 0 | 7 | 41 | 2 | 0 | 0 | 43 | 6 | 39 | 0 | 0 | 45 | 95 |
| 12:45 PM | 3 | 3 | 0 | 0 | 6 | 28 | 3 | 0 | 0 | 31 | 5 | 54 | 0 | 0 | 59 | 96 |
| Total | 9 | 21 | 0 | 0 | 30 | 159 | 7 | 0 | 0 | 166 | 22 | 201 | 0 | 0 | 223 | 419 |
| Approach % | 30.0 | 70.0 | 0.0 | - | - | 95.8 | 4.2 | 0.0 | - | - | 9.9 | 90.1 | 0.0 | - | - | - |
| Total % | 2.1 | 5.0 | 0.0 | - | 7.2 | 37.9 | 1.7 | 0.0 | - | 39.6 | 5.3 | 48.0 | 0.0 | - | 53.2 | - |
| PHF | 0.750 | 0.656 | 0.000 | - | 0.682 | 0.795 | 0.583 | 0.000 | - | 0.814 | 0.786 | 0.897 | 0.000 | - | 0.885 | 0.873 |
| Motorcycles | 0 | 0 | 0 | - | 0 | 3 | 0 | 0 | - | 3 | 0 | 1 | 0 | - | 1 | 4 |
| % Motorcycles | 0.0 | 0.0 | - | - | 0.0 | 1.9 | 0.0 | - | - | 1.8 | 0.0 | 0.5 | - | - | 0.4 | 1.0 |
| Cars & Light Goods | 8 | 21 | 0 | - | 29 | 140 | 7 | 0 | - | 147 | 22 | 185 | 0 | - | 207 | 383 |
| % Cars & Light Goods | 88.9 | 100.0 | - | - | 96.7 | 88.1 | 100.0 | - | - | 88.6 | 100.0 | 92.0 | - | - | 92.8 | 91.4 |
| Buses | 0 | 0 | 0 | - | 0 | 1 | 0 | 0 | - | 1 | 0 | 0 | 0 | - | 0 | 1 |
| % Buses | 0.0 | 0.0 | - | - | 0.0 | 0.6 | 0.0 | - | - | 0.6 | 0.0 | 0.0 | - | - | 0.0 | 0.2 |
| Single-Unit Trucks | 0 | 0 | 0 | - | 0 | 11 | 0 | 0 | - | 11 | 0 | 8 | 0 | - | 8 | 19 |
| % Single-Unit Trucks | 0.0 | 0.0 | - | - | 0.0 | 6.9 | 0.0 | - | - | 6.6 | 0.0 | 4.0 | - | - | 3.6 | 4.5 |
| Articulated Trucks | 0 | 0 | 0 | - | 0 | 4 | 0 | 0 | - | 4 | 0 | 7 | 0 | - | 7 | 11 |
| % Articulated Trucks | 0.0 | 0.0 | - | - | 0.0 | 2.5 | 0.0 | - | - | 2.4 | 0.0 | 3.5 | - | - | 3.1 | 2.6 |
| Bicycles on Road | 1 | 0 | 0 | - | 1 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | - | 0 | 1 |
| % Bicycles on Road | 11.1 | 0.0 | - | - | 3.3 | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 | - | - | 0.0 | 0.2 |
| Bicycles on Crosswalk | - | - | - | 0 | - | - | - | - | 0 | - | - | - | - | 0 | - | - |
| % Bicycles on Crosswalk | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pedestrians | - | - | - | 0 | - | - | - | - | 0 | - | - | - | - | 0 | - | - |
| % Pedestrians | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Count Name: Belmont Road & Robin Ridge Drive Site Code: 230344 Start Date: 05/25/2023 Page No: 7



Turning Movement Peak Hour Data Plot (12:00 PM)



Paradigm Transportation Solutions Limited 5A-150 Pinebush Rd

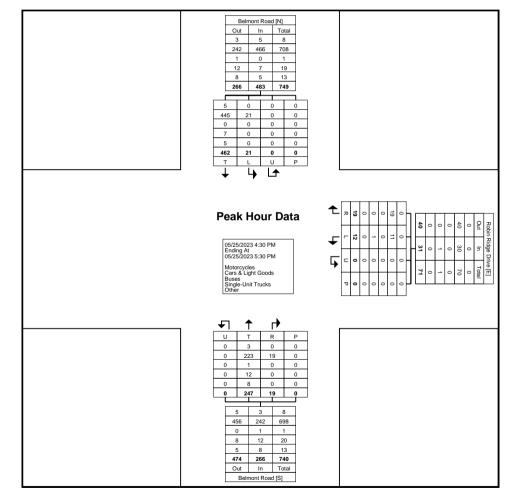
Cambridge, Ontario, Canada N1R 8J8 519-896-3163 cbowness@ptsl.com Count Name: Belmont Road & Robin Ridge Drive Site Code: 230344 Start Date: 05/25/2023 Page No: 8

Turning Movement Peak Hour Data (4:30 PM)

| | | F | Robin Ridge Driv Westbound | е | | | | Belmont Road Northbound | , | , | | | Belmont Road Southbound | | | |
|-------------------------|-------|-------|-------------------------------|------|------------|-------|-------|----------------------------|------|------------|-------|-------|----------------------------|------|------------|------------|
| Start Time | Left | Right | U-Turn | Peds | App. Total | Thru | Right | U-Turn | Peds | App. Total | Left | Thru | U-Turn | Peds | App. Total | Int. Total |
| 4:30 PM | 0 | 7 | 0 | 0 | 7 | 74 | 3 | 0 | 0 | 77 | 6 | 117 | 0 | 0 | 123 | 207 |
| 4:45 PM | 4 | 3 | 0 | 0 | 7 | 56 | 2 | 0 | 0 | 58 | 3 | 116 | 0 | 0 | 119 | 184 |
| 5:00 PM | 1 | 2 | 0 | 0 | 3 | 58 | 8 | 0 | 0 | 66 | 6 | 108 | 0 | 0 | 114 | 183 |
| 5:15 PM | 7 | 7 | 0 | 0 | 14 | 59 | 6 | 0 | 0 | 65 | 6 | 121 | 0 | 0 | 127 | 206 |
| Total | 12 | | 0 | 0 | 31 | 247 | 19 | 0 | 0 | 266 | 21 | 462 | 0 | 0 | 483 | 780 |
| Approach % | 38.7 | 61.3 | 0.0 | - | - | 92.9 | 7.1 | 0.0 | - | - | 4.3 | 95.7 | 0.0 | - | - | - |
| Total % | 1.5 | 2.4 | 0.0 | - | 4.0 | 31.7 | 2.4 | 0.0 | - | 34.1 | 2.7 | 59.2 | 0.0 | - | 61.9 | - |
| PHF | 0.429 | 0.679 | 0.000 | - | 0.554 | 0.834 | 0.594 | 0.000 | - | 0.864 | 0.875 | 0.955 | 0.000 | - | 0.951 | 0.942 |
| Motorcycles | 0 | 0 | 0 | - | 0 | 3 | 0 | 0 | - | 3 | 0 | 5 | 0 | - | 5 | 8 |
| % Motorcycles | 0.0 | 0.0 | - | - | 0.0 | 1.2 | 0.0 | - | - | 1.1 | 0.0 | 1.1 | - | - | 1.0 | 1.0 |
| Cars & Light Goods | 11 | 19 | 0 | - | 30 | 223 | 19 | 0 | - | 242 | 21 | 445 | 0 | - | 466 | 738 |
| % Cars & Light Goods | 91.7 | 100.0 | - | - | 96.8 | 90.3 | 100.0 | - | - | 91.0 | 100.0 | 96.3 | - | - | 96.5 | 94.6 |
| Buses | 0 | 0 | 0 | _ | 0 | 1 | 0 | 0 | | 1 | 0 | 0 | 0 | - | 0 | 1 |
| % Buses | 0.0 | 0.0 | - | - | 0.0 | 0.4 | 0.0 | - | - | 0.4 | 0.0 | 0.0 | - | - | 0.0 | 0.1 |
| Single-Unit Trucks | 1 | 0 | 0 | - | 1 | 12 | 0 | 0 | - | 12 | 0 | 7 | 0 | - | 7 | 20 |
| % Single-Unit Trucks | 8.3 | 0.0 | - | - | 3.2 | 4.9 | 0.0 | - | - | 4.5 | 0.0 | 1.5 | - | - | 1.4 | 2.6 |
| Articulated Trucks | 0 | 0 | 0 | - | 0 | 7 | 0 | 0 | - | 7 | 0 | 5 | 0 | - | 5 | 12 |
| % Articulated Trucks | 0.0 | 0.0 | - | - | 0.0 | 2.8 | 0.0 | - | - | 2.6 | 0.0 | 1.1 | - | - | 1.0 | 1.5 |
| Bicycles on Road | 0 | 0 | 0 | - | 0 | 1 | 0 | 0 | - | 1 | 0 | 0 | 0 | - | 0 | 1 |
| % Bicycles on Road | 0.0 | 0.0 | - | - | 0.0 | 0.4 | 0.0 | - | - | 0.4 | 0.0 | 0.0 | - | - | 0.0 | 0.1 |
| Bicycles on Crosswalk | - | - | - | 0 | - | - | - | - | 0 | - | - | | - | 0 | - | - |
| % Bicycles on Crosswalk | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pedestrians | - | - | - | 0 | - | - | - | - | 0 | - | - | - | - | 0 | - | - |
| % Pedestrians | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Count Name: Belmont Road & Robin Ridge Drive Site Code: 230344 Start Date: 05/25/2023 Page No: 9



Turning Movement Peak Hour Data Plot (4:30 PM)

Appendix C

Existing Traffic Operations Reports



| Traffic Volume (vph) 14 2 Future Volume (vph) 14 3 Ideal Flow (vphpl) 1900 190 Storage Length (m) 20.0 0 Storage Lanes 1 1 Taper Length (m) 30.0 1.00 1.0 Lane Util. Factor 1.00 1.0 1.7 Fit Protected 0.950 Satd. Flow (prot) 1805 167 Fit Perotected 0.950 Satd. Flow (perm) 1805 167 Link Distance (m) 52.6 Travel Time (s) 4.7 Peak Hour Factor 0.93 0.5 Heavy Vehicles (%) 0% 0 Adj. Flow (vph) 15 3 | 1 417 1 417 0 1900 0 1 0 1.00 0 0.998 | NBR 7 1900 0.0 0 1.00 | SBL 6 6 1900 60.0 1 60.0 1.00 0.950 1805 | SBT 196 196 190 1900 1.00 1712 | | |
|--|---|--------------------------------------|---|--|--|--|
| Traffic Volume (vph) 14 2 Future Volume (vph) 14 3 Ideal Flow (vphp) 1900 1900 Storage Length (m) 20.0 0 Storage Lanes 1 1 Taper Length (m) 30.0 1.00 1.0 Lane Util. Factor 1.00 1.0 1.0 Fit The Composition (m) 30.0 1.00 1.0 Sato Flow (prot) 1805 16' 16' 16' Fit Protected 0.950 Satd. Flow (prot) 1805 16' Link Speed (k/h) 40 11' 16' 11' Link Speed (k/h) 40 11' 16' 11' Peak Hour Factor 0.93 0.5 16' 14' 10' Link Distance (m) 52.6 17' 19' 10' 14' 10' Link Distance (m) 0.93 0.5 4.7 10' 10' 10' 10' 10' 10' Peak Hour Factor | 1 417 1 417 0 1900 0 1 0 1.00 0 0.998 | 7 1900 0.0 0 1.00 | 6 6 1900 60.0 1 60.0 1.00 0.950 1805 | 196 1900 1.00 | | |
| Future Volume (vph) 14 3 Ideal Flow (vphpl) 1900 190 Storage Length (m) 20.0 0 Storage Length (m) 20.0 190 Storage Length (m) 30.0 1 Lane Util. Factor 1.00 1.0 Frt 0.850 6 Fit Protected 0.950 5 Satd. Flow (port) 1805 16' Link Speed (k/h) 40 1 Link Speed (k/h) 40 1 Peak Hour Factor 0.93 0.5 Heavy Vehicles (%) 0% 0 Adj. Flow (vph) 15 3 Lane Group Flow (vph) 15 3 | 1 417 0 1900 0 1 0 1.00 0 0.998 | 7 1900 0.0 0 1.00 | 6 1900 60.0 1 60.0 1.00 0.950 1805 | 196 1900 1.00 | | |
| Ideal Flow (vphpl) 1900 190 Storage Length (m) 20.0 0 Storage Lanes 1 1 Taper Length (m) 30.0 0 Lane Util. Factor 1.00 1.0 Fit 0.85 167 Fit Protected 0.950 5 Satd. Flow (prot) 1805 167 Fit Permitted 0.950 5 Satd. Flow (perm) 1805 167 Link Distance (m) 52.6 Travel Time (s) 4.7 Peak Hour Factor 0.93 0.5 163 Heavy Vehicles (%) 0% 0 0 Adj. Flow (vph) 15 5 3 Shared Lane Traffic (%) Lane Group Flow (vph) 15 5 | 0 1900 0 1 0 1.00 0 0.998 | 1900 0.0 0 1.00 | 1900 60.0 1 60.0 1.00 0.950 1805 | 1900 1.00 | | |
| Storage Length (m) 20.0 0 Storage Lanes 1 Taper Length (m) 30.0 Lane Util. Factor 1.00 Enne Util. Factor 1.00 Fit 0.85 Fit Protected 0.950 Satd. Flow (prot) 1805 167 Link Distance (m) 52.6 Travel Time (s) 4.7 Peak Hour Factor 0.93 0.9 168 Heavy Vehicles (%) 0% 0 40 Lane Group Flow (vph) 15 53 157 | 0 1 0 1.00 0 0.998 | 0.0 0 | 60.0 1 60.0 1.00 0.950 1805 | 1.00 | | |
| Storage Lanes 1 Taper Length (m) 30.0 Lane Util. Factor 1.00 1.0. Fit 0.85 5 Fit Protected 0.950 5 Satd. Flow (prot) 1805 16' Fit Permitted 0.950 5 Satd. Flow (perm) 1805 16' Link Speed (k/h) 40 1 Link Distance (m) 52.6 1 Travel Time (s) 4.7 7 Peak Hour Factor 0.93 0.5 Heavy Vehicles (%) 0% 0 Adj. Flow (vph) 15 5 Lane Group Flow (vph) 15 5 | 1 0 1.00 0 0.998 | 0 | 1 60.0 1.00 0.950 1805 | | | |
| Taper Length (m) 30.0 Lane Util. Factor 1.00 1.0 Frt 0.85 1.00 Stdt. Flow (prot) 1805 16' FI Protected 0.950 54d. Satd. Flow (perm) 1805 16' Link Speed (k/h) 40 1 Link Speed (k/h) 40 1 Peak Hour Factor 0.93 0.5 Heavy Vehicles (%) 0% 0 Adj. Flow (vph) 15 3 Shared Lane Traffic (%) Lane Group Flow (vph) 15 3 | 0 1.00 0 0.998 | 1.00 | 60.0 1.00 0.950 1805 | | | |
| Lane Util. Factor 1.00 1.0 Frt 0.85 Filt Protected 0.950 Satd. Flow (port) 1805 167 FIP Permitted 0.950 Satd. Flow (pert) 1805 167 Link Speed (k/h) 40 Link Distance (m) 52.6 Travel Time (s) 4.7 Peak Hour Factor 0.93 0.5 Heavy Vehicles (%) 0% 0 Adj. Flow (vph) 15 53 Shared Lane Traffic (%) Lane Group Flow (vph) 15 53 | 0 0.998 | | 1.00 0.950 1805 | | | |
| Frit 0.88 Fit Protected 0.950 Satd. Flow (port) 1805 167 Fit Permitted 0.950 Satd. Flow (perm) 1805 167 Link Speed (k/h) 40 Link Distance (m) 52.6 Travel Time (s) 4.7 Peak Hour Factor 0.93 0.5 Heavy Vehicles (%) 0% 0 Adj. Flow (vph) 15 53 Shared Lane Traffic (%) Lane Group Flow (vph) 15 | 0 0.998 | | 0.950 1805 | | | |
| Fit Protected 0.950 Satd. Flow (prot) 1805 16' Fit Permitted 0.950 Satd. Flow (perm) 1805 16' Link Speed (k/h) 40 Link Distance (m) 52.6 Travel Time (s) 4.7 Peak Hour Factor 0.93 0.5 Heavy Vehicles (%) 0% 0 Adj. Flow (vph) 15 3 Shared Lane Traffic (%) Lane Group Flow (vph) 15 3 | | 0 | 1805 | 1712 | | |
| Satd. Flow (prot) 1805 167 FIt Permitted 0.950 Satd. Flow (perm) 1805 167 Link Speed (k/h) 40 Link Distance (m) 52.6 Travel Time (s) 4.7 Peak Hour Factor 0.93 0.5 Heavy Vehicles (%) 0% 0 Adj. Flow (vph) 15 53 Shared Lane Traffic (%) Lane Group Flow (vph) 15 53 | 5 1791 | 0 | 1805 | 1712 | | |
| Fit Permitted 0.950 Satd. Flow (perm) 1805 161 Link Speed (k/h) 40 161 Link Distance (m) 52.6 7 Travel Time (s) 4.7 7 Peak Hour Factor 0.93 0.5 Heavy Vehicles (%) 0% 0 Adj. Flow (vph) 15 55 Shared Lane Traffic (%) 15 55 | 5 1791 | 0 | | 1712 | | |
| Satd. Flow (perm) 1805 161 Link Speed (k/h) 40 161 Link Distance (m) 52.6 7 Travel Time (s) 4.7 7 Peak Hour Factor 0.93 0.5 Heavy Vehicles (%) 0% 0 Adj. Flow (vph) 15 53 Shared Lane Traffic (%) 15 53 | | | | | | |
| Link Speed (k/h) 40 Link Distance (m) 52.6 Travel Time (s) 4.7 Peak Hour Factor 0.93 0.5 Heavy Vehicles (%) 0% 0 Adj. Flow (vph) 15 3 Shared Lane Traffic (%) Lane Group Flow (vph) 15 3 | | | 0.950 | | | |
| Link Distance (m) 52.6 Travel Time (s) 4.7 Peak Hour Factor 0.93 0.9 Heavy Vehicles (%) 0% 0 Adj. Flow (vph) 15 53 Shared Lane Traffic (%) Lane Group Flow (vph) 15 53 | | 0 | 1805 | 1712 | | |
| Travel Time (s) 4.7 Peak Hour Factor 0.93 0.5 Heavy Vehicles (%) 0% 0 Adj. Flow (vph) 15 3 Shared Lane Traffic (%) Lane Group Flow (vph) 15 3 | 50 | | | 50 | | |
| Peak Hour Factor 0.93 0.5 Heavy Vehicles (%) 0% 0 Adj. Flow (vph) 15 3 Shared Lane Traffic (%) Lane Group Flow (vph) 15 3 | 145.0 | | | 149.0 | | |
| Heavy Vehicles (%) 0% 0 Adj. Flow (vph) 15 3 Shared Lane Traffic (%) 15 3 Lane Group Flow (vph) 15 3 | 10.4 | | | 10.7 | | |
| Adj. Flow (vph) 15 3 Shared Lane Traffic (%) Lane Group Flow (vph) 15 3 | | 0.93 | 0.93 | 0.93 | | |
| Shared Lane Traffic (%) Lane Group Flow (vph) 15 3 | | 0% | 0% | 11% | | |
| Lane Group Flow (vph) 15 3 | 3 448 | 8 | 6 | 211 | | |
| | | | | | | |
| Sign Control Ston | 3 456 | 0 | 6 | 211 | | |
| oigh oona oi | Free | | | Free | | |
| Intersection Summary | | | | | | |
| Area Type: Other | | | | | | |
| Control Type: Unsignalized | | | | | | |

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Synchro 11 Report Page 1 HCM 6th TWSC 1: Belmont Road & Robin Ridge Drive Existing AM Peak Hour (230344) Block 33, Belmont Rd TIB

| Intersection | | | | | | |
|------------------------|---------|----------------|-------------|--------|--------|-----------------|
| Int Delay, s/veh | 0.9 | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations | VVDL | | | NDR | | <u>361</u> |
| Traffic Vol. veh/h | 14 | r 31 | 4 17 | 7 | ר 6 | T 196 |
| Future Vol. veh/h | 14 | 31 | 417 | 7 | 6 | 196 |
| | 14 | 0 | 417 | 0 | 0 | 190 |
| Conflicting Peds, #/hr | • | - | - | - | Free | Free |
| Sign Control | Stop | Stop | Free | Free | | |
| RT Channelized | - | None | - | | - | None |
| Storage Length | 20 | 0 | - | - | 60 | - |
| Veh in Median Storage, | | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 93 | 93 | 93 | 93 | 93 | 93 |
| Heavy Vehicles, % | 0 | 0 | 6 | 0 | 0 | 11 |
| Mvmt Flow | 15 | 33 | 448 | 8 | 6 | 211 |
| | | | | | | |
| Major/Minor N | /linor1 | | Major1 | | Major2 | |
| | | | | | | 0 |
| Conflicting Flow All | 675 | 452 | 0 | 0 | 456 | 0 |
| Stage 1 | 452 | - | - | - | - | - |
| Stage 2 | 223 | - | - | - | - | - |
| Critical Hdwy | 6.4 | 6.2 | - | - | 4.1 | - |
| Critical Hdwy Stg 1 | 5.4 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.4 | - | - | - | - | - |
| Follow-up Hdwy | 3.5 | 3.3 | - | - | 2.2 | - |
| Pot Cap-1 Maneuver | 422 | 612 | - | - | 1115 | - |
| Stage 1 | 645 | - | - | - | - | - |
| Stage 2 | 819 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 420 | 612 | - | - | 1115 | - |
| Mov Cap-2 Maneuver | 420 | | - | | | |
| Stage 1 | 645 | - | - | - | - | - |
| Stage 2 | 815 | - | - | | - | - |
| Stage 2 | 010 | - | - | - | - | - |
| | | | | | | |
| Approach | WB | | NB | | SB | |
| HCM Control Delay, s | 12 | | 0 | | 0.2 | |
| HCM LOS | В | | | | | |
| | | | | | | |
| | | | | | | |
| Minor Lane/Major Mvmt | t | NBT | NBR | NBLn1V | | SBL |
| Capacity (veh/h) | | - | - | 420 | 612 | 1115 |
| HCM Lane V/C Ratio | | - | - | 0.036 | | |
| HCM Control Delay (s) | | - | - | 13.9 | 11.2 | 8.2 |
| HCM Lane LOS | | - | - | В | В | Α |
| HCM 95th %tile Q(veh) | | - | - | 0.1 | 0.2 | 0 |
| () | | | | | | |

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| | ✓ | • | 1 | 1 | 1 | Ŧ | |
|--------------------------------|------------|-------|-------|------|---------|------------|---|
| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT | |
| Lane Configurations | ۲ | 1 | 1 | | ۲. | • | |
| Traffic Volume (vph) | 12 | 19 | 247 | 19 | 21 | 462 | |
| Future Volume (vph) | 12 | 19 | 247 | 19 | 21 | 462 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Storage Length (m) | 20.0 | 0.0 | | 0.0 | 60.0 | | |
| Storage Lanes | 1 | 1 | | 0 | 1 | | |
| Taper Length (m) | 30.0 | | | | 60.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | | 0.850 | 0.990 | | | | |
| Flt Protected | 0.950 | | | | 0.950 | | |
| Satd. Flow (prot) | 1671 | 1615 | 1751 | 0 | 1805 | 1845 | |
| Flt Permitted | 0.950 | | | | 0.950 | | |
| Satd. Flow (perm) | 1671 | 1615 | 1751 | 0 | 1805 | 1845 | |
| Link Speed (k/h) | 40 | | 50 | | | 50 | |
| Link Distance (m) | 52.6 | | 145.0 | | | 149.0 | |
| Travel Time (s) | 4.7 | | 10.4 | | | 10.7 | |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | |
| Heavy Vehicles (%) | 8% | 0% | 8% | 0% | 0% | 3% | |
| Adj. Flow (vph) | 13 | 20 | 263 | 20 | 22 | 491 | |
| Shared Lane Traffic (%) | | | | | | | |
| Lane Group Flow (vph) | 13 | 20 | 283 | 0 | 22 | 491 | |
| Sign Control | Stop | | Free | | | Free | |
| Intersection Summary | | | | | | | |
| Area Type: (| Other | | | | | | |
| Control Type: Unsignalized | | | | | | | |
| Intersection Capacity Utilizat | tion 34.3% | | | IC | U Level | of Service | A |

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Synchro 11 Report Page 1 HCM 6th TWSC 1: Belmont Road & Robin Ridge Drive Existing PM Peak Hour (230344) Block 33, Belmont Rd TIB

| Intersection | | _ | _ | _ | _ | _ |
|------------------------|------------|------------|---------|--------|----------|-----------------|
| Int Delay, s/veh | 0.7 | | | | | |
| | - | | NDT | NDD | CD/ | CDT |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations | | | 247 | 19 | أ | ↑ 462 |
| Traffic Vol, veh/h | 12 | 19 | 247 | | 21 | |
| Future Vol, veh/h | 12 | 19 | 247 | 19 | 21 | 462 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 20 | 0 | - | - | 60 | - |
| Veh in Median Storage | | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 94 | 94 | 94 | 94 | 94 | 94 |
| Heavy Vehicles, % | 8 | 0 | 8 | 0 | 0 | 3 |
| Mvmt Flow | 13 | 20 | 263 | 20 | 22 | 491 |
| | | | | | | |
| Major/Minor | Minor1 | Ν | /lajor1 | | Major2 | |
| Conflicting Flow All | 808 | 273 | 0 | 0 | 283 | 0 |
| Stage 1 | 273 | - 215 | - | 0 | 200 | 0 |
| Stage 2 | 535 | | | | | |
| Critical Hdwy | 6.48 | 6.2 | - | - | 4.1 | - |
| Critical Hdwy Stg 1 | 5.48 | 0.2 | - | - | 4.1 | - |
| Critical Hdwy Stg 1 | 5.48 | - | - | - | - | - |
| Follow-up Hdwy | 3.572 | 3.3 | - | - | 2.2 | - |
| | 342 | 3.3 771 | - | - | 1291 | - |
| Pot Cap-1 Maneuver | 342 759 | - | - | - | 1291 | - |
| Stage 1 | | | - | - | - | - |
| Stage 2 | 575 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | 1001 | - |
| Mov Cap-1 Maneuver | 336 | 771 | - | - | 1291 | - |
| Mov Cap-2 Maneuver | 336 | - | - | - | - | - |
| Stage 1 | 759 | - | - | - | - | - |
| Stage 2 | 565 | - | - | - | - | - |
| | | | | | | |
| Approach | WB | | NB | | SB | |
| HCM Control Delay, s | 12.2 | | 0 | | 0.3 | |
| HCM LOS | 12.2 B | | U | | 0.0 | |
| | U | | | | | |
| | | | | | | |
| Minor Lane/Major Mvm | t | NBT | NBR\ | VBLn1V | VBLn2 | SBL |
| Capacity (veh/h) | | - | - | 336 | 771 | 1291 |
| HCM Lane V/C Ratio | | - | - | 0.038 | 0.026 | 0.017 |
| HCM Control Delay (s) | | - | - | 16.1 | 9.8 | 7.8 |
| HCM Lane LOS | | - | - | С | Α | А |
| HCM 95th %tile Q(veh) | | - | - | 0.1 | 0.1 | 0.1 |
| | | | | | | |

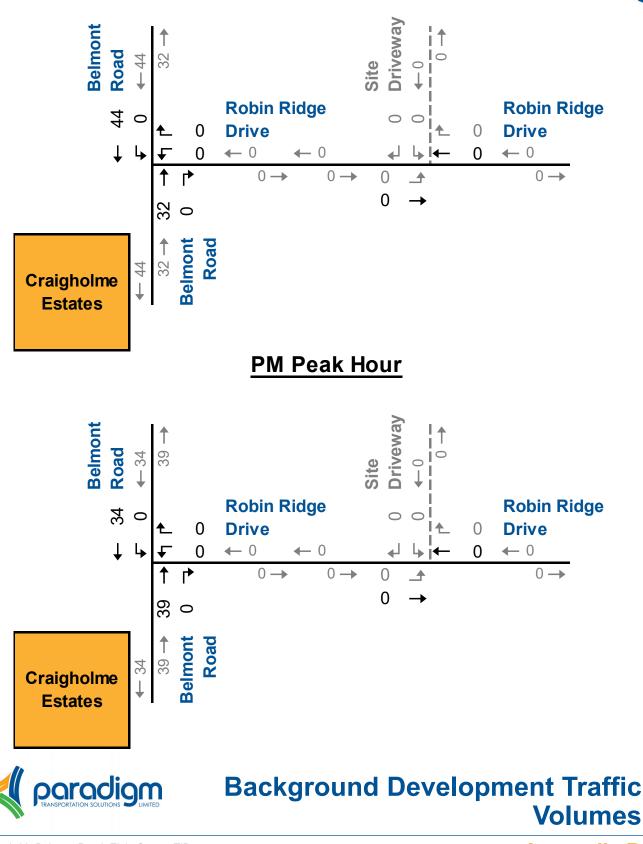
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Appendix D

Background Development Traffic Volumes



AM Peak Hour



Block 33, Belmont Road, Elgin County TIB 230344

Appendix D

Appendix E

2033 Background Traffic Operations Reports



| Lanes, Volumes, Timings | |
|-------------------------------------|--|
| 1: Belmont Road & Robin Ridge Drive | |

2033 Background AM Peak Hour (230344) Block 33, Belmont Rd TIB

| | | • | 1 | 1 | 1 | ŧ | | |
|------------------------------|-------------|-------|-------|------|----------|------------|---|--|
| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT | | |
| Lane Configurations | ۲. | 1 | 4Î | | ٦ | • | | |
| Traffic Volume (vph) | 17 | 38 | 540 | 9 | 7 | 283 | | |
| Future Volume (vph) | 17 | 38 | 540 | 9 | 7 | 283 | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | |
| Storage Length (m) | 20.0 | 0.0 | | 0.0 | 60.0 | | | |
| Storage Lanes | 1 | 1 | | 0 | 1 | | | |
| Taper Length (m) | 30.0 | | | | 60.0 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Frt | | 0.850 | 0.998 | | | | | |
| Flt Protected | 0.950 | | | | 0.950 | | | |
| Satd. Flow (prot) | 1805 | 1615 | 1791 | 0 | 1805 | 1712 | | |
| Flt Permitted | 0.950 | | | | 0.950 | | | |
| Satd. Flow (perm) | 1805 | 1615 | 1791 | 0 | 1805 | 1712 | | |
| Link Speed (k/h) | 40 | | 50 | | | 50 | | |
| Link Distance (m) | 52.6 | | 145.0 | | | 149.0 | | |
| Travel Time (s) | 4.7 | | 10.4 | | | 10.7 | | |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | | |
| Heavy Vehicles (%) | 0% | 0% | 6% | 0% | 0% | 11% | | |
| Adj. Flow (vph) | 18 | 41 | 581 | 10 | 8 | 304 | | |
| Shared Lane Traffic (%) | | | | | | | | |
| Lane Group Flow (vph) | 18 | 41 | 591 | 0 | 8 | 304 | | |
| Sign Control | Stop | | Free | | | Free | | |
| Intersection Summary | | | | | | | | |
| Area Type: | Other | | | | | | | |
| Control Type: Unsignalized | | | | | | | | |
| Intersection Capacity Utiliz | ation 39.0% | | | IC | CU Level | of Service | Α | |
| Analysis Period (min) 15 | | | | | | | | |

Analysis Period (min) 15

HCM 6th TWSC 1: Belmont Road & Robin Ridge Drive 2033 Background AM Peak Hour (230344) Block 33, Belmont Rd TIB

| Intersection | | | | | | | |
|---|------------|----------|------------|--------|---------|-------|---|
| Int Delay, s/veh | 0.9 | | | | | | Ĩ |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT | 1 |
| | | | | INDR | | | |
| Lane Configurations | 1 7 | 1 | 1 | 0 | <u></u> | 1000 | |
| Traffic Vol, veh/h Future Vol, veh/h | 17 | 38 38 | 540 540 | 9 | 7 | 283 | |
| | 17 | 38 0 | | 9 | | 283 | |
| Conflicting Peds, #/hr | 0 | • | 0 | • | 0 | 0 | |
| Sign Control | Stop | Stop | Free | Free | Free | Free | |
| RT Channelized | - | None | - | None | - | None | |
| Storage Length | 20 | 0 | - | - | 60 | - | |
| Veh in Median Storage | | - | 0 | - | - | 0 | |
| Grade, % | 0 | - | 0 | - | - | 0 | |
| Peak Hour Factor | 93 | 93 | 93 | 93 | 93 | 93 | |
| Heavy Vehicles, % | 0 | 0 | 6 | 0 | 0 | 11 | |
| Mvmt Flow | 18 | 41 | 581 | 10 | 8 | 304 | |
| | | | | | | | |
| Major/Minor M | Minor1 | Ν | Major1 | | Major2 | | ļ |
| Conflicting Flow All | 906 | 586 | 0 | 0 | 591 | 0 | |
| Stage 1 | 586 | - | - | - | - | - | |
| Stage 2 | 320 | - | | - | | | |
| Critical Hdwy | 6.4 | 6.2 | - | - | 4.1 | - | |
| Critical Hdwy Stg 1 | 5.4 | | | | - | | |
| Critical Hdwy Stg 2 | 5.4 | - | - | - | - | - | |
| Follow-up Hdwy | 3.5 | 3.3 | - | - | 2.2 | - | |
| Pot Cap-1 Maneuver | 309 | 514 | - | - | 995 | - | |
| Stage 1 | 560 | - | - | - | - | - | |
| Stage 2 | 741 | - | - | - | - | - | |
| Platoon blocked, % | | | - | - | | - | |
| Mov Cap-1 Maneuver | 307 | 514 | - | - | 995 | - | |
| Mov Cap-2 Maneuver | 307 | - | | | - | - | |
| Stage 1 | 560 | - | - | - | - | - | |
| Stage 2 | 735 | - | | | | | |
| Oldge 2 | 100 | | | | | | |
| Approach | WB | | NB | | SB | | ľ |
| | 14.1 | | 0 | | 0.2 | | ľ |
| HCM Control Delay, s HCM LOS | 14.1 B | | U | | 0.2 | | |
| HOM LOS | В | | | | | | |
| | | | | | | | |
| Minor Lane/Major Mvm | t | NBT | NBRV | VBLn1V | VBLn2 | SBL | |
| Capacity (veh/h) | | - | - | 307 | 514 | 995 | |
| HCM Lane V/C Ratio | | - | - | 0.06 | 0.079 | 0.008 | |
| HCM Control Delay (s) | | - | - | 17.5 | 12.6 | 8.6 | |
| HCM Lane LOS | | - | - | С | В | А | |
| HCM 95th %tile Q(veh) | | - | - | 0.2 | 0.3 | 0 | |
| | | | | 0.2 | 0.0 | 5 | |

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Synchro 11 Report Page 1

Paradigm Transportation Solutions Limited

| Lanes, Volumes, Ti 1: Belmont Road & | | Ridge | Drive | | | | 2033 Background PM Peak Hou (230344) Block 33, Belmont Rd TII |
|---|-------|-------|-------|------|-------|-------|--|
| | 4 | ×. | Ť | 1 | 1 | ţ | |
| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT | |
| Lane Configurations | ۲ | 1 | 4Î | | ۲ | • | |
| Traffic Volume (vph) | 15 | 23 | 340 | 23 | 26 | 597 | |
| Future Volume (vph) | 15 | 23 | 340 | 23 | 26 | 597 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Storage Length (m) | 20.0 | 0.0 | | 0.0 | 60.0 | | |
| Storage Lanes | 1 | 1 | | 0 | 1 | | |
| Taper Length (m) | 30.0 | | | | 60.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | | 0.850 | 0.991 | | | | |
| Flt Protected | 0.950 | | | | 0.950 | | |
| Satd. Flow (prot) | 1805 | 1615 | 1783 | 0 | 1805 | 1712 | |
| Flt Permitted | 0.950 | | | | 0.950 | | |
| Satd. Flow (perm) | 1805 | 1615 | 1783 | 0 | 1805 | 1712 | |
| Link Speed (k/h) | 40 | | 50 | | | 50 | |
| Link Distance (m) | 52.6 | | 145.0 | | | 149.0 | |
| Travel Time (s) | 4.7 | | 10.4 | | | 10.7 | |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | |
| Heavy Vehicles (%) | 0% | 0% | 6% | 0% | 0% | 11% | |
| Adj. Flow (vph) | 16 | 25 | 366 | 25 | 28 | 642 | |
| Shared Lane Traffic (%) | | | | | | | |
| Lane Group Flow (vph) | 16 | 25 | 391 | 0 | 28 | 642 | |
| Sign Control | Stop | | Free | | | Free | |
| Intersection Summary | | | | | | | |

Area Type: Other Control Type: Unsignalized Intersection Capacity Utilization 41.4% Analysis Period (min) 15 ICU Level of Service A

HCM 6th TWSC 1: Belmont Road & Robin Ridge Drive 2033 Background PM Peak Hour (230344) Block 33, Belmont Rd TIB

| Intersection | | _ | | _ | | _ |
|--|------------|----------|---------|----------------------|----------------------|----------------------|
| Int Delay, s/veh | 0.7 | | | | | |
| Movement | WBL | | NDT | | CDI | SBT |
| | VVBL | WBR | NBT | NBR | SBL | |
| Lane Configurations Traffic Vol. veh/h | 1 5 | 23 | 340 | 23 | ר 26 | ↑ 597 |
| Future Vol. veh/h | 15 | 23 | 340 | 23 | 26 | 597 597 |
| Conflicting Peds, #/hr | 0 | 23 | 0 0 | 23 | 20 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | Stop - | None | - | None | - | |
| Storage Length | 20 | 0 | - | NUTIE - | 60 | NUTIE - |
| Veh in Median Storage | | - | 0 | - | - 00 | 0 |
| Grade, % | , # 0 0 | - | 0 | _ | | 0 |
| Peak Hour Factor | 93 | 93 | 93 | 93 | 93 | 93 |
| Heavy Vehicles, % | 93 0 | 93 | 93 6 | 93 | 93 0 | 93 11 |
| Mymt Flow | 16 | 25 | 366 | 25 | 28 | 642 |
| | 10 | 20 | 300 | 20 | 20 | 042 |
| | | | | | | |
| | Minor1 | | Major1 | | Major2 | |
| Conflicting Flow All | 1077 | 379 | 0 | 0 | 391 | 0 |
| Stage 1 | 379 | - | - | - | - | - |
| Stage 2 | 698 | - | - | - | - | - |
| Critical Hdwy | 6.4 | 6.2 | - | - | 4.1 | - |
| Critical Hdwy Stg 1 | 5.4 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.4 | - | - | - | - | - |
| Follow-up Hdwy | 3.5 | 3.3 | - | - | 2.2 | - |
| Pot Cap-1 Maneuver | 245 | 672 | - | - | 1179 | - |
| Stage 1 | 696 | - | - | - | - | - |
| Stage 2 | 497 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 239 | 672 | - | - | 1179 | - |
| Mov Cap-2 Maneuver | 239 | - | - | - | - | - |
| Stage 1 | 696 | - | - | - | - | - |
| Stage 2 | 485 | - | - | - | - | - |
| | | | | | | |
| Approach | WB | | NB | | SB | |
| HCM Control Delay, s | 14.8 | | 0 | | 0.3 | |
| | 14.0 B | | U | | 0.5 | |
| | | | | | | |
| HCM LOS | 5 | | | | | |
| HCM LOS | | | | | | |
| | | NBT | NBR | VBLn1V | VBLn2 | SBL |
| HCM LOS | | NBT - | - | 239 | 672 | 1179 |
| HCM LOS Minor Lane/Major Mvm | | NBT - | - | 239 0.067 | 672 0.037 | 1179 0.024 |
| HCM LOS Minor Lane/Major Mvm Capacity (veh/h) HCM Lane V/C Ratio HCM Control Delay (s) | t | - | - | 239 0.067 21.2 | 672 0.037 10.6 | 1179 0.024 8.1 |
| HCM LOS Minor Lane/Major Mvm Capacity (veh/h) HCM Lane V/C Ratio | t | - | - | 239 0.067 | 672 0.037 | 1179 0.024 |

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Synchro 11 Report Page 1

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Appendix F 2033 Total Traffic Operations Reports



| | | ~ | T. | 1 | × | .↓ | |
|--------------------------------|------------|-------|-------|------|-------------|------------|---|
| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT | |
| Lane Configurations | 5 | 1 | ¢Î, | | 5 | • | |
| Traffic Volume (vph) | 24 | 52 | 540 | 13 | 10 | 283 | |
| Future Volume (vph) | 24 | 52 | 540 | 13 | 10 | 283 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Storage Length (m) | 20.0 | 0.0 | | 0.0 | 60.0 | | |
| Storage Lanes | 1 | 1 | | 0 | 1 | | |
| Taper Length (m) | 30.0 | | | | 60.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | | 0.850 | 0.997 | | | | |
| Flt Protected | 0.950 | | | | 0.950 | | |
| Satd. Flow (prot) | 1805 | 1615 | 1789 | 0 | 1805 | 1712 | |
| Flt Permitted | 0.950 | | | | 0.950 | | |
| Satd. Flow (perm) | 1805 | 1615 | 1789 | 0 | 1805 | 1712 | |
| Link Speed (k/h) | 40 | | 50 | | | 50 | |
| Link Distance (m) | 52.6 | | 145.0 | | | 149.0 | |
| Travel Time (s) | 4.7 | | 10.4 | | | 10.7 | |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | |
| Heavy Vehicles (%) | 0% | 0% | 6% | 0% | 0% | 11% | |
| Adj. Flow (vph) | 26 | 56 | 581 | 14 | 11 | 304 | |
| Shared Lane Traffic (%) | | | | | | | |
| Lane Group Flow (vph) | 26 | 56 | 595 | 0 | 11 | 304 | |
| Sign Control | Stop | | Free | | | Free | |
| Intersection Summary | | | | | | | |
| Area Type: (| Other | | | | | | |
| Control Type: Unsignalized | | | | | | | |
| Intersection Capacity Utilizat | tion 39.2% | | | IC | CU Level of | of Service | A |

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Synchro 11 Report Page 1 HCM 6th TWSC 1: Belmont Road & Robin Ridge Drive 2033 Total AM Peak Hour (230344) Block 33, Belmont Rd TIB

| | _ | _ | _ | _ | _ | _ | |
|---|-----------|------|--------|----------------|------------------|---------------|--|
| Intersection | 4.0 | | | | | | |
| Int Delay, s/veh | 1.3 | | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT | |
| Lane Configurations | ኘ | 7 | f, | | ٦ | 1 | |
| Traffic Vol, veh/h | 24 | 52 | 540 | 13 | 10 | 283 | |
| Future Vol, veh/h | 24 | 52 | 540 | 13 | 10 | 283 | |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | |
| Sign Control | Stop | Stop | Free | Free | Free | Free | |
| RT Channelized | - | None | - | None | - | None | |
| Storage Length | 20 | 0 | - | - | 60 | - | |
| Veh in Median Storage, | | - | 0 | - | - | 0 | |
| Grade, % | 0 | - | 0 | - | - | 0 | |
| Peak Hour Factor | 93 | 93 | 93 | 93 | 93 | 93 | |
| Heavy Vehicles, % | 0 | 0 | 6 | 0 | 0 | 11 | |
| Mvmt Flow | 26 | 56 | 581 | 14 | 11 | 304 | |
| | | | | | | | |
| Major/Minor N | linor1 | N | Major1 | | Major2 | | |
| Conflicting Flow All | 914 | 588 | 0 | 0 | 595 | 0 | |
| Stage 1 | 588 | - | - | - | - | - | |
| Stage 2 | 326 | - | - | - | - | - | |
| Critical Hdwy | 6.4 | 6.2 | - | - | 4.1 | - | |
| Critical Hdwy Stg 1 | 5.4 | - | - | - | - | - | |
| Critical Hdwy Stg 2 | 5.4 | - | - | - | - | - | |
| Follow-up Hdwy | 3.5 | 3.3 | - | - | 2.2 | - | |
| Pot Cap-1 Maneuver | 306 | 513 | - | - | 991 | - | |
| Stage 1 | 559 | - | - | - | - | - | |
| Stage 2 | 736 | - | - | - | - | - | |
| Platoon blocked, % | | | - | - | | - | |
| Mov Cap-1 Maneuver | 303 | 513 | - | - | 991 | - | |
| Mov Cap-2 Maneuver | 303 | - | - | - | - | - | |
| Stage 1 | 559 | - | - | - | - | - | |
| Stage 2 | 728 | - | - | - | - | - | |
| | | | | | | | |
| Approach | WB | | NB | | SB | | |
| HCM Control Delay, s | 14.5 | | 0 | | 0.3 | | |
| HCM LOS | 14.5 B | | U | | 0.3 | | |
| | D | | | | | | |
| | | | | | | | |
| Minor Lane/Major Mvmt | 1 | NBT | NBR\ | VBLn1V | VBLn2 | SBL | |
| Capacity (veh/h) | | - | - | 303 | 513 | 991 | |
| | | - | - | 0.085 | | | |
| HCM Lane V/C Ratio | | - | | | | | |
| HCM Lane V/C Ratio HCM Control Delay (s) | | - | - | 18 | 12.9 | 8.7 | |
| HCM Lane V/C Ratio | | - | | 18 C 0.3 | 12.9 B 0.4 | 8.7 A 0 | |

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| Lanes, Volumes, 1 2: Robin Ridge Dri | • | e Drive | ewav | | | | 2033 Total AM Peak Hour (230344) Block 33, Belmont Rd TIB |
|---|-------------|---------|-------|------|----------|------------|--|
| 5 | ۶ | - | - | × | 1 | ~ | |
| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR | |
| Lane Configurations | | ŧ | 4Î | | ¥ | | |
| Traffic Volume (vph) | 7 | 16 | 55 | 0 | 0 | 21 | |
| Future Volume (vph) | 7 | 16 | 55 | 0 | 0 | 21 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | | | | | 0.865 | | |
| Flt Protected | | 0.984 | | | | | |
| Satd. Flow (prot) | 0 | 1833 | 1863 | 0 | 1611 | 0 | |
| Flt Permitted | | 0.984 | | | | | |
| Satd. Flow (perm) | 0 | 1833 | 1863 | 0 | 1611 | 0 | |
| Link Speed (k/h) | | 40 | 40 | | 50 | | |
| Link Distance (m) | | 52.6 | 141.9 | | 81.8 | | |
| Travel Time (s) | | 4.7 | 12.8 | | 5.9 | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | |
| Adj. Flow (vph) | 8 | 17 | 60 | 0 | 0 | 23 | |
| Shared Lane Traffic (%) | | | | | | | |
| Lane Group Flow (vph) | 0 | 25 | 60 | 0 | 23 | 0 | |
| Sign Control | | Free | Free | | Stop | | |
| Intersection Summary | | | | | | | |
| Area Type: | Other | | | | | | |
| Control Type: Unsignalized | 1 | | | | | | |
| Intersection Capacity Utiliz | ation 17.0% | | | IC | CU Level | of Service | eΑ |
| Analysis Period (min) 15 | | | | | | | |

HCM 6th TWSC 2: Robin Ridge D

2: Robin Ridge Drive & Site Driveway

2033 Total AM Peak Hour (230344) Block 33, Belmont Rd TIB

| Intersection Int Delay, s/veh Movement Lane Configurations Traffic Vol, veh/h Future Vol, veh/h Conflicting Peds, #/hn Sign Control RT Channelized Storage Length Veh in Median Storag Grade, % Peak Hour Factor Heavy Vehicles, % Mvmt Flow Major/Minor Conflicting Flow All Stage 1 Stage 1 Stage 2 Critical Hdwy Stg 1 | Free - | - 0 0 92 2 17 | WBT 55 55 0 Free - 0 0 0 0 92 2 60 Major2 - | 0 | SBL 0 0 Stop - 0 0 0 92 2 0 92 2 0 | 92 2 23 |
|---|--|--|---|---|---|---|
| Movement Lane Configurations Traffic Vol, veh/h Future Vol, veh/h Conflicting Peds, #/h Sign Control RT Channelized Storage Length Veh in Median Storag Grade, % Peak Hour Factor Heavy Vehicles, % Mvmt Flow Major/Minor Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 | EBL 7 7 7 9 9 9 2 8 <u>Major1</u> 60 - | 4 16 16 0 Free None - 0 0 92 2 17 | | 0 0 Free None - - - 92 2 0 | •••••••••••••••••••••••••••••••••••••• | 21 21 0 Stop None - - - 92 2 2 3 |
| Lane Configurations Traffic Vol, veh/h Future Vol, veh/h Conflicting Peds, #/hh Sign Control RT Channelized Storage Length Veh in Median Storag Grade, % Peak Hour Factor Heavy Vehicles, % Mvmt Flow Major/Minor Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 | 7 7 Free - ge, # 92 2 8 <u>Major1</u> 60 - | 4 16 16 0 Free None - 0 0 92 2 17 | | 0 0 Free None - - - 92 2 0 | •••••••••••••••••••••••••••••••••••••• | 21 21 0 Stop None - - - 92 2 2 3 |
| Traffic Vol, veh/h Future Vol, veh/h Conflicting Peds, #/h Sign Control RT Channelized Storage Length Veh in Median Storag Grade, % Peak Hour Factor Heavy Vehicles, % Mvmt Flow Major/Minor Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 | 7 r 0 Free - - - - - - - - - - - - - - - - - - | 16 16 0 Free None - 0 0 92 2 17 | 55 55 0 Free - 0 0 0 92 2 60 Major2 | 0 0 Free None - - - 92 2 0 | 0 0 Stop - 0 0 0 92 2 0 4 | 21 0 Stop None - - - - 92 2 23 |
| Future Vol, veh/h Conflicting Peds, #/h Sign Control RT Channelized Storage Length Veh in Median Storag Grade, % Peak Hour Factor Heavy Vehicles, % Mwnt Flow Major/Minor Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 | 7 r 0 Free - - - - - - - - - - - - - - - - - - | 16 0 Free None - 0 0 92 2 17 | 55 0 Free - 0 0 0 92 2 60 Major2 | 0 0 Free None - - - 92 2 0 | 0 Stop - 0 0 0 0 92 2 0 Minor2 | 21 0 Stop None - - - - 92 2 23 |
| Conflicting Peds, #/h Sign Control RT Channelized Storage Length Veh in Median Storag Grade, % Peak Hour Factor Heavy Vehicles, % Mvmt Flow Major/Minor Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 | r 0 Free - ge, # - 92 2 8 <u>Major1</u> 60 - | 0 Free None 0 0 92 2 17 | 0 Free - 0 0 0 92 2 60 Major2 | 0 Free None - - - 92 2 0 | 0 Stop - 0 0 92 2 0 0 Minor2 | 0 Stop None - - - - 92 2 23 |
| Sign Control RT Channelized Storage Length Veh in Median Storag Grade, % Peak Hour Factor Heavy Vehicles, % Mvmt Flow Major/Minor Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 | Free - - - - - - - - - - - - - - - - - - | Free None 0 0 92 2 17 17 | Free - - 0 0 92 2 60 Major2 - | Free None - - - 92 2 0 | Stop 0 0 0 92 2 0 Minor2 | Stop None - - - - - - - - - - - - - - - - - - - |
| RŤ Channelized Storage Length Veh in Median Storag Grade, % Peak Hour Factor Heavy Vehicles, % Mvmt Flow Major/Minor Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 | - | None - 0 0 92 2 17 N 0 - | - 0 92 2 60 <u>Major2</u> | None - - 92 2 0 | 0 0 92 2 0 Minor2 | None - - 92 2 23 |
| Storage Length Veh in Median Storag Grade, % Peak Hour Factor Heavy Vehicles, % Mvmt Flow Major/Minor Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 | - ge, # - - 92 2 8 <u>Major1</u> 60 - | 0 0 92 2 17 | - 0 92 2 60 <u>Major2</u> | - - 92 2 0 | 0 0 92 2 0 Minor2 | 92 2 23 |
| Veh in Median Storag Grade, % Peak Hour Factor Heavy Vehicles, % Mwmt Flow Major/Minor Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 | ge, # - - 92 2 8 <u>Major1</u> 60 - | 0 0 92 2 17 0 | 0 0 92 2 60 Major2 | - 92 2 0 | 0 0 92 2 0 Minor2 | 92 2 23 |
| Grade, % Peak Hour Factor Heavy Vehicles, % Mvmt Flow Major/Minor Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 | 92 2 8 <u>Major1</u> 60 - | 0 92 2 17 0 | 0 92 2 60 <u>Major2</u> | 92 2 0 | 0 92 2 0 Minor2 | 92 2 23 |
| Peak Hour Factor Heavy Vehicles, % Mvmt Flow Major/Minor Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 | 92 2 8 <u>Major1</u> 60 - | 92 2 17 0 - | 92 2 60 Major2 | 92 2 0 • | 92 2 0 Minor2 | 92 2 23 |
| Heavy Vehicles, % Mvmt Flow Major/Minor Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 | 2 8 <u>Major1</u> 60 | 2 17 0 - | 2 60 <u>Major2</u> | 2 0 | 2 0 <u>/linor2</u> | 2 |
| Mvmt Flow Major/Minor Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 | 8 <u>Major1</u> 60 - | 17 17 0 - | 60 Major2 | 0 1 0 | 0 Vinor2 | 23 |
| Major/Minor Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 | Major1 60 - | 0 - | Major2 | 1 0 | vinor2 | |
| Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 | 60 - - | 0 | - | 0 | | |
| Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 | 60 - - | 0 | - | 0 | | |
| Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 | 60 - - | 0 | - | | 93 | |
| Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 | - | | - | | | 60 |
| Stage 2 Critical Hdwy Critical Hdwy Stg 1 | | | | - | 60 | - |
| Critical Hdwy Critical Hdwy Stg 1 | 1 10 | - | - | - | 33 | - |
| Critical Hdwy Stg 1 | 4.12 | - | - | - | 6.42 | 6.22 |
| | | - | | - | 5.42 | - |
| | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | | | - | 3.518 | 3 318 |
| Pot Cap-1 Maneuver | | - | - | - | | 1005 |
| Stage 1 | - | - | - | - | 963 | - |
| Stage 2 | | _ | | _ | 989 | - |
| Platoon blocked, % | | - | _ | - | 505 | _ |
| Mov Cap-1 Maneuve | r 1511 | - | - | - | 902 | 1005 |
| Mov Cap-1 Maneuve Mov Cap-2 Maneuve | | - | - | | 902 | 1005 |
| | | | | | | |
| Stage 1 | - | - | - | - | 958 | - |
| Stage 2 | - | - | - | - | 989 | - |
| | | | | | | |
| Approach | EB | | WB | | SB | |
| HCM Control Delay, | s 2.2 | | 0 | | 8.7 | |
| HCM LOS | | | | | А | |
| | | | | | | |
| Minor Lane/Major Mv | mt | EBL | EBT | WBT | | SBLn1 |
| | m | 1544 | <u>EDI</u> | - | WDR | - |
| Capacity (veh/h) | | | | | | |
| HCM Lane V/C Ratio | | 0.005 | - | - | | 0.023 |
| HCM Control Delay (| s) | 7.3 | 0 | - | - | 8.7 |
| HCM Lane LOS | | A | A | - | - | A |
| HCM 95th %tile Q(ve | n) | 0 | - | - | - | 0.1 |

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Synchro 11 Report Page 3 Paradigm Transportation Solutions Limited

| | 4 | ×. | t | * | 1 | Ļ | |
|----------------------------|-------|-------|-------|------|-------|-------|--|
| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT | |
| Lane Configurations | ۲. | 1 | î, | | ۲ | • | |
| Traffic Volume (vph) | 19 | 29 | 340 | 31 | 35 | 597 | |
| Future Volume (vph) | 19 | 29 | 340 | 31 | 35 | 597 | |
| deal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Storage Length (m) | 20.0 | 0.0 | | 0.0 | 60.0 | | |
| Storage Lanes | 1 | 1 | | 0 | 1 | | |
| Taper Length (m) | 30.0 | | | | 60.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | | 0.850 | 0.989 | | | | |
| Flt Protected | 0.950 | | | | 0.950 | | |
| Satd. Flow (prot) | 1805 | 1615 | 1781 | 0 | 1805 | 1712 | |
| Flt Permitted | 0.950 | | | | 0.950 | | |
| Satd. Flow (perm) | 1805 | 1615 | 1781 | 0 | 1805 | 1712 | |
| Link Speed (k/h) | 40 | | 50 | | | 50 | |
| Link Distance (m) | 52.6 | | 145.0 | | | 149.0 | |
| Travel Time (s) | 4.7 | | 10.4 | | | 10.7 | |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | |
| Heavy Vehicles (%) | 0% | 0% | 6% | 0% | 0% | 11% | |
| Adj. Flow (vph) | 20 | 31 | 366 | 33 | 38 | 642 | |
| Shared Lane Traffic (%) | | | | | | | |
| Lane Group Flow (vph) | 20 | 31 | 399 | 0 | 38 | 642 | |
| Sign Control | Stop | | Free | | | Free | |
| Intersection Summary | | | | | | | |
| Area Type: | Other | | | | | | |
| Control Type: Unsignalized | | | | | | | |

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Synchro 11 Report Page 1 HCM 6th TWSC 1: Belmont Road & Robin Ridge Drive 2033 Total PM Peak Hour (230344) Block 33, Belmont Rd TIB

| Intersection | | _ | | | _ | | |
|------------------------|------------|------|----------|--------|---------|----------|--|
| Int Delay, s/veh | 1 | | | | | | |
| | | | NIDT | NDD | 001 | 0.07 | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT | |
| Lane Configurations | 1 | 1 | • | 24 | <u></u> | † | |
| Traffic Vol, veh/h | 19 | 29 | 340 | 31 | 35 | 597 | |
| Future Vol, veh/h | 19 | 29 | 340 | 31 | 35 | 597 | |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | |
| Sign Control | Stop | Stop | Free | Free | Free | Free | |
| RT Channelized | - | None | - | None | - | None | |
| Storage Length | 20 | 0 | - | - | 60 | - | |
| Veh in Median Storage | | - | 0 | - | - | 0 | |
| Grade, % | 0 | - | 0 | - | - | 0 | |
| Peak Hour Factor | 93 | 93 | 93 | 93 | 93 | 93 | |
| Heavy Vehicles, % | 0 | 0 | 6 | 0 | 0 | 11 | |
| Mvmt Flow | 20 | 31 | 366 | 33 | 38 | 642 | |
| | | | | | | | |
| Major/Minor | Minor1 | Ν | Major1 | | Major2 | | |
| Conflicting Flow All | 1101 | 383 | 0 | 0 | 399 | 0 | |
| Stage 1 | 383 | - | - | - | - | - | |
| Stage 2 | 718 | - | _ | | | _ | |
| Critical Hdwy | 6.4 | 6.2 | - | - | 4.1 | - | |
| Critical Hdwy Stg 1 | 5.4 | 0.2 | - | | 4.1 | - | |
| Critical Hdwy Stg 2 | 5.4 | - | - | - | - | - | |
| | 5.4 3.5 | 3.3 | | | 2.2 | - | |
| Follow-up Hdwy | | | - | - | | - | |
| Pot Cap-1 Maneuver | 237 | 669 | - | - | 1171 | - | |
| Stage 1 | 694 | - | - | - | - | - | |
| Stage 2 | 487 | - | - | - | - | - | |
| Platoon blocked, % | | | - | - | | - | |
| Mov Cap-1 Maneuver | 229 | 669 | - | - | 1171 | - | |
| Mov Cap-2 Maneuver | 229 | - | - | - | - | - | |
| Stage 1 | 694 | - | - | - | - | - | |
| Stage 2 | 471 | - | - | - | - | - | |
| | | | | | | | |
| Approach | WB | | NB | | SB | | |
| | 15.2 | | 0 | | | | |
| HCM Control Delay, s | | | 0 | | 0.5 | | |
| HCM LOS | С | | | | | | |
| | | | | | | | |
| Minor Lane/Major Mvm | it | NBT | NBR\ | NBLn1V | WBLn2 | SBL | |
| Capacity (veh/h) | | - | - | 229 | 669 | 1171 | |
| HCM Lane V/C Ratio | | - | - | 0.089 | 0.047 | 0.032 | |
| HCM Control Delay (s) | | - | - | 22.3 | 10.6 | 8.2 | |
| HCM Lane LOS | | | | | B | A | |
| | | | | 0.3 | 0.1 | 0.1 | |
| HCM 95th %tile Q(veh) | | | | | | | |

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| Lanes, Volumes, 2: Robin Ridge Di | • | e Drive | eway | | | | 2033 Total PM Peak Hour (230344) Block 33, Belmont Rd TIB |
|--------------------------------------|--------------|---------|-------|------|----------|------------|--|
| Ŭ | ۶ | - | - | • | 1 | ~ | |
| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR | |
| Lane Configurations | | ę | f, | | Y | | |
| Traffic Volume (vph) | 17 | 49 | 38 | 0 | 0 | 10 | |
| Future Volume (vph) | 17 | 49 | 38 | 0 | 0 | 10 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | | | | | 0.865 | | |
| Flt Protected | | 0.987 | | | | | |
| Satd. Flow (prot) | 0 | 1839 | 1863 | 0 | 1611 | 0 | |
| Flt Permitted | | 0.987 | | | | | |
| Satd. Flow (perm) | 0 | 1839 | 1863 | 0 | 1611 | 0 | |
| Link Speed (k/h) | | 40 | 40 | | 50 | | |
| Link Distance (m) | | 52.6 | 141.9 | | 81.8 | | |
| Travel Time (s) | | 4.7 | 12.8 | | 5.9 | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | |
| Adj. Flow (vph) | 18 | 53 | 41 | 0 | 0 | 11 | |
| Shared Lane Traffic (%) | | | | | | | |
| Lane Group Flow (vph) | 0 | 71 | 41 | 0 | 11 | 0 | |
| Sign Control | | Free | Free | | Stop | | |
| Intersection Summary | | | | | | | |
| Area Type: | Other | | | | | | |
| Control Type: Unsignalize | d | | | | | | |
| Intersection Capacity Utili | zation 20.2% | | | IC | CU Level | of Service | e A |
| Analysis Period (min) 15 | | | | | | | |

ur HCM 6t IB 2: Robi

HCM 6th TWSC 2: Robin Ridge Drive & Site Driveway 2033 Total PM Peak Hour (230344) Block 33, Belmont Rd TIB

| Intersection | | _ | _ | | _ | |
|---------------------------------------|--------|-----------|--------|--------|------------|--------|
| Int Delay, s/veh | 1.8 | | | | | |
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations | | <u>دی</u> | 1 | WDIX | Y | ODIX |
| Traffic Vol, veh/h | 17 | 49 | 38 | 0 | - T | 10 |
| Future Vol, veh/h | 17 | 49 | 38 | 0 | 0 | 10 |
| Conflicting Peds, #/hr | 0 | 49 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | | None | - | | Stop - | None |
| | | None - | | None - | - 0 | None |
| Storage Length | - | | - | | - | |
| Veh in Median Storage | | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 18 | 53 | 41 | 0 | 0 | 11 |
| | | | | | | |
| Major/Minor I | Major1 | Ν | Major2 | Ν | Minor2 | |
| Conflicting Flow All | 41 | 0 | | 0 | 130 | 41 |
| Stage 1 | - | - | - | - | 41 | - |
| Stage 2 | | | | | 89 | |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | 4.1Z | - | - | - | 5.42 | 0.22 |
| | | | - | | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | | - |
| Follow-up Hdwy | 2.218 | - | - | | 3.518 | |
| Pot Cap-1 Maneuver | 1568 | - | - | - | 864 | 1030 |
| Stage 1 | - | - | - | - | 981 | - |
| Stage 2 | - | - | - | - | 934 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1568 | - | - | - | 854 | 1030 |
| Mov Cap-2 Maneuver | - | - | - | - | 854 | - |
| Stage 1 | - | - | - | - | 969 | - |
| Stage 2 | - | - | | - | 934 | - |
| olago 2 | | | | | | |
| | | | | | | |
| Approach | EB | | WB | | SB | |
| HCM Control Delay, s | 1.9 | | 0 | | 8.5 | |
| HCM LOS | | | | | Α | |
| | | | | | | |
| Minor Lane/Major Mvm | nt | EBL | EBT | WBT | WBR | SBLn1 |
| Capacity (veh/h) | | 1568 | - | - | - | |
| HCM Lane V/C Ratio | | 0.012 | - | - | | 0.011 |
| HCM Control Delay (s) | | 7.3 | 0 | - | - | 8.5 |
| | | | - | | | 0.J |
| | | A | | | | |
| HCM Lane LOS HCM 95th %tile Q(veh) | ۱ ۱ | A 0 | A | - | - | A 0 |

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