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2025-06-23
Project: (240745)

Ashley Graham
Regional Municipality of Waterloo
150 Frederick Street, 8th Floor
Kitchener, ON N2G 4J3

**RE: PROPOSED RESIDENTIAL DEVELOPMENT, 41 WESTHILL DRIVE, WATERLOO, ON TRANSPORTATION IMPACT BRIEF**

The Regional Municipality of Waterloo retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Impact Brief (TIB) for a proposed affordable housing development located at 41 Westhill Drive in Waterloo, Ontario. **Figure 1** (attached) illustrates the site location.

## Purpose and Scope

This study reviews the forecast impacts of the site-generated traffic at the proposed site accesses and identifies any remedial measures, if necessary, to support the development. The scope of the study, developed in consultation with the Region of Waterloo and the City of Waterloo via e-mail in February 2025, includes:

- An assessment of current traffic and site conditions within the study area;
- Estimates of future non-development (background) traffic growth;
- Estimates of the site-traffic generated by the development;
- An assessment of future traffic impacts near and at the proposed site access for five-years from the date the study is commissioned; and
- Identification of any necessary mitigation measures to support the proposed development.

**Appendix A** contains the pre-study consultation material and responses from the Region and City. This study has been prepared in general accordance with the Region of Waterloo Traffic Impact Study (TIS) Guidelines[1] and direction provided by the Region and City staff during pre-study consultation.

[1] Region of Waterloo, *Transportation Impact Study Guidelines*, (Kitchener: Region of Waterloo, 2014).

## Roadway Characteristics

**Ira Needles Boulevard** is a four-lane, 60 km/h regional arterial roadway within the study area.[2] The roadway has a centre median along with a multi-use path and a sidewalk provided on the east and west sides of the roadway, respectively.

**Westhill Drive** is a two-lane, 40 km/h local road within the study area. Along the frontages for The Westhill Retirement Residence and the apartment building at 7 Westhill Drive, a sidewalk is provided (west side of the roadway).

The intersection of Westhill Drive and Ira Needles Boulevard operates as right-in-right-out (RIRO) due to a centre median along Ira Needles Boulevard.

## Turning Movement Counts

Paradigm conducted turning movement counts (TMCs) at the intersection of Ira Needles Boulevard and Westhill Drive in January 2025. **Appendix B** contains the raw turning movement count data.

Land Use Code (LUC) 210 (Single-family Detached Housing) from the Institute of Transportation Engineers (ITE) Trip Generation manual[3] was used to estimate the trips entering/exiting the driveway for 36 Westhill Drive during the AM and PM peak hours. The single-family dwelling unit at 36 Westhill Drive is across from the proposed site access to Westhill Drive and is forecast to generate one trip during both the AM and PM peak hours. It is also noted that the 36 Westhill Drive trip generation is already captured at the intersection of Ira Needles Boulevard and Westhill Drive.

**Figure 2** (attached) illustrates the base year weekday AM and weekday PM traffic volumes.

## Development Concept

### Development Description

The subject site is proposed to be developed into a six-storey building with 56 units. Vehicle access is proposed via a new all-moves driveway connection to Westhill Drive and a Right-In Right-Out (RIRO) driveway to Ira Needles Boulevard. **Figure 3** (attached) illustrates the site concept plan.

### Site Trip Generation

The ITE Trip Generation manual methods forecast site-generated trips. As indicated by the limited ITE data for LUC 233 (Affordable Housing), LUC 221 (Multi-family Housing, Mid-Rise) was used to estimate the site trip generation. Although, LUC 221 trip rates could be

[2] City of Waterloo, *Official Plan Road Classification System Schedule E,* (Waterloo: City of Waterloo, 2018).
[3] Institute of Transportation Engineers, *Trip Generation Manual,* 11th ed., (Washington DC: ITE, 2021).

conservative as true LUC 221 developments are likely more passenger car dependent than affordable housing complexes.

**Table 1** summarizes the forecast site-generated trips indicating 13 trips in weekday AM peak hour and 22 trips in the weekday PM peak hour.

**TABLE 1: FORECAST SITE GENERATED TRIPS**

| LUC | Unit Count | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | In | Out | Total | In | Out | Total |
| 221 | 56 | 3 | 10 | 13 | 14 | 8 | 22 |

LUC 221 – AM: T = 0.44(X) – 11.61 | PM: T = 0.39(X) + 0.34

**Table 2** summarizes the estimated trip distribution which is based on the existing distribution and 2022 Transportation Tomorrow Survey (TTS) Data.[4] The trip distribution is appropriate for this study because both travel directions on Ira Needles Boulevard provide connections to employment areas.

**TABLE 2: ESTIMATED TRIP DISTRIBUTION**

| Origin/Destination | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|
| | In | Out | In | Out |
| North via Ira Needles Boulevard | 55% | 55% | 60% | 45% |
| South via Ira Needles Boulevard | 45% | 45% | 40% | 55% |
| **Total** | **100%** | **100%** | **100%** | **100%** |

**Figure 4** (attached) and **Figure 5** (attached) illustrate the weekday AM and weekday PM peak hour trip assignment with and without a driveway connection to Ira Needles Boulevard, respectively.

With the presence of a centre median on Ira Needles Boulevard, left-turn movements are not permitted under future traffic conditions at the proposed driveway connection to Ira Needles Boulevard or at Westhill Drive. The following assignment is assumed:

[4] Data Management Group, *Transportation Tomorrow Survey 2022,* University of Toronto, 2025, http://www.transportationtomorrow.on.ca/

- Trips entering the site from the north via Ira Needles Boulevard first travel south to make a U-turn at the Ira Needels Boulevard and Thorndale Drive roundabout then travel north on Ira Needles Boulevard to reach the site; and
- Trips leaving the site to the south via Ira Needles Boulevard first travel north to make a U-turn at the Ira Needles Boulevard and Erb Street West roundabout then travel south on Ira Needles Boulevard to complete the site departure.

It is noted that the centre median on Ira Needles Boulevard has no impact on travel arrangements for trips:

- Leaving the site to the north via Ira Needles Boulevard; and
- Entering the site from the south via Ira Needles Boulevard

## Future Traffic Volumes

Future background traffic volumes on Ira Needles Boulevard and Westhill Drive reflect a generalized growth rate of 1.5% per annum.

In addition, the following development was included in the background traffic volumes. Although, it is assumed that the generalized growth rate of 1.5% will capture traffic from other sources of remaining nearby background development:

- 635 Erb Street West and 12 Westhill Drive (414 Westhaven Street)[5]: The development is located north of the subject site between Westhill Drive and Westhaven Street along the south side of Erb Street West. The development is forecast to generate 137 and 161 trips during the AM and PM peak hours, respectively.

**Appendix C** contains future background traffic volumes.

**Figure 6** (attached) illustrates the forecast background traffic volumes at the five-year (2030), horizon. **Figure 7** (attached) and **Figure 8** (attached) illustrate the forecast total traffic volumes at the five-year horizon with and without a driveway connection to Ira Needles Boulevard, respectively.

## Traffic Operations

Level of service conditions on the existing road network have been assessed using Synchro 12 which implements the methodologies of the Highway Capacity Manual (HCM). The analysis reflects the existing lane configurations and traffic control at the driveway. The analysis considers three separate measures of performance: the level of service (LOS), volume to capacity (v/c) ratio, and 95th percentile queues for each movement.

[5] Paradigm Transportation Solutions Limited, *635 Erb Street West & 12 Westhill Drive Waterloo ON Transportation Impact Study,* (Cambridge: PTSL, 2021).

As noted in the Region of Waterloo TIS guidelines, movements are considered critical under the following conditions:

- Estimated 95th percentile queue length for an exclusive movement exceeds the available storage space;
- Exclusive turning lanes are inaccessible because of queue lengths in adjacent through lanes;
- Estimated 95th percentile queue length for an individual movement will block an existing access; and
- The average control delay for individual movements is greater that 55 seconds.

Intersections are considered critical under the following conditions:

- An unsignalized intersection has an average control delay larger than 35 seconds (LOS E or F); and
- A signalized intersection has an average control delay larger than 55 seconds (LOS E or F).

### Existing Traffic Operations

**Table 3** summarizes the level of service conditions for the weekday AM and PM peak hours under existing traffic conditions. All study area intersections are forecast to operate at acceptable levels of service during the weekday AM and weekday PM peak hours with no critical movements noted. **Appendix D** contains the detailed Synchro reports.

### Future Background Traffic Operations

**Table 4** summarizes the level of service conditions for the weekday AM and PM peak hours under future background traffic conditions. All study area intersections are forecast to operate at acceptable levels of service during the weekday AM and weekday PM peak hours with no critical movements noted. **Appendix E** contains the detailed Synchro reports.

### Future Total Traffic Operations

**Table 5** summarizes the level of service conditions for the weekday AM and PM peak hours under future total traffic conditions. All study area intersections are forecast to operate at acceptable levels of service during the weekday AM and weekday PM peak hours with no critical movements noted.

With the addition of the site-generated traffic volumes, the approach delays at the existing study area intersections increases by two seconds or less during the AM and PM peak hours. **Appendix F** contains the detailed Synchro reports.

## TABLE 3: EXISTING TRAFFIC OPERATIONS

| Analysis Period | Intersection | Control Type | MOE | Direction/Movement/Approach | | | | | | | | | | | | | | | | Overall |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | |
| | | | | Left | Through | Right | Approach | Left | Through | Right | Approach | Left | Through | Right | Approach | Left | Through | Right | Approach | |
| AM Peak Hour | Ira Needles Boulevard & Private Driveway/Westhill Drive | TWSC | LOS<br>Delay<br>V/C<br>Q | | | A<br>0<br>0.00<br>0 | **A**<br>**0** | | | B<br>11<br>0.03<br>1 | **B**<br>**11** | | A<br>0<br>0.00<br>0 | A<br>0<br>0.00<br>0 | **A**<br>**0** | | A<br>0<br>0.00<br>0 | A<br>0<br>0.00<br>0 | **A**<br>**0** | |
| | Westhill Drive & Private Driveway | TWSC | LOS<br>Delay<br>V/C<br>Q | | | | | A<br>9<br>0.00<br>0 | | ><br>><br>><br>> | **A**<br>**9** | | A<br>0<br>0.00<br>0 | A<br>0<br>0.00<br>0 | **A**<br>**0** | A<br>0<br>0.00<br>0 | A<br>0<br>0.00<br>0 | | **A**<br>**0** | |
| PM Peak Hour | Ira Needles Boulevard & Private Driveway/Westhill Drive | TWSC | LOS<br>Delay<br>V/C<br>Q | | | A<br>0<br>0.00<br>0 | **A**<br>**0** | | | B<br>13<br>0.08<br>2 | **B**<br>**13** | | A<br>0<br>0.00<br>0 | A<br>0<br>0.00<br>0 | **A**<br>**0** | | A<br>0<br>0.00<br>0 | A<br>0<br>0.00<br>0 | **A**<br>**0** | |
| | Westhill Drive & Private Driveway | TWSC | LOS<br>Delay<br>V/C<br>Q | | | | | A<br>0<br>0.00<br>0 | | ><br>><br>><br>> | **A**<br>**0** | | A<br>0<br>0.00<br>0 | A<br>0<br>0.00<br>0 | **A**<br>**0** | A<br>0<br>0.00<br>0 | A<br>0<br>0.00<br>0 | | **A**<br>**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)*
*TWSC - Two-Way Stop Control*
*< / > - Shared Movement*

## TABLE 4: BACKGROUND TRAFFIC OPERATIONS

| Analysis Period | Intersection | Control Type | MOE | Direction/Movement/Approach | | | | | | | | | | | | | | | | Overall |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | |
| | | | | Left | Through | Right | Approach | Left | Through | Right | Approach | Left | Through | Right | Approach | Left | Through | Right | Approach | |
| AM Peak Hour | Ira Needles Boulevard & Private Driveway/Westhill Drive | TWSC | LOS<br>Delay<br>V/C<br>Q | | | A<br>0<br>0.00<br>0 | **A**<br>**0** | | | B<br>11<br>0.04<br>1 | **B**<br>**11** | | A<br>0<br>0.00<br>0 | A<br>0<br>0.00<br>0 | **A**<br>**0** | | A<br>0<br>0.00<br>0 | A<br>0<br>0.00<br>0 | **A**<br>**0** | |
| | Westhill Drive & Private Driveway | TWSC | LOS<br>Delay<br>V/C<br>Q | | | | | A<br>9<br>0.00<br>0 | | ><br>><br>><br>> | **A**<br>**9** | | A<br>0<br>0.00<br>0 | A<br>0<br>0.00<br>0 | **A**<br>**0** | A<br>0<br>0.00<br>0 | A<br>0<br>0.00<br>0 | | **A**<br>**0** | |
| PM Peak Hour | Ira Needles Boulevard & Private Driveway/Westhill Drive | TWSC | LOS<br>Delay<br>V/C<br>Q | | | A<br>0<br>0.00<br>0 | **A**<br>**0** | | | B<br>14<br>0.09<br>2 | **B**<br>**13** | | A<br>0<br>0.00<br>0 | A<br>0<br>0.00<br>0 | **A**<br>**0** | | A<br>0<br>0.00<br>0 | A<br>0<br>0.00<br>0 | **A**<br>**0** | |
| | Westhill Drive & Private Driveway | TWSC | LOS<br>Delay<br>V/C<br>Q | | | | | A<br>0<br>0.00<br>0 | | ><br>><br>><br>> | **A**<br>**0** | | A<br>0<br>0.00<br>0 | A<br>0<br>0.00<br>0 | **A**<br>**0** | A<br>0<br>0.00<br>0 | A<br>0<br>0.00<br>0 | | **A**<br>**0** | |

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*V/C - Volume to Capacity Ratio*
*Q - 95th Percentile Queue Length (m)*
*TWSC - Two-Way Stop Control*
*< / > - Shared Movement*





## TABLE 5: TOTAL TRAFFIC OPERATIONS

| Analysis Period | Intersection | Control Type | MOE | Direction/Movement/Approach | | | | | | | | | | | | | | | | Overall |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | |
| | | | | Left | Through | Right | Approach | Left | Through | Right | Approach | Left | Through | Right | Approach | Left | Through | Right | Approach | |
| AM Peak Hour | Ira Needles Boulevard & Private Driveway/Westhill Drive | TWSC | LOS<br>Delay<br>V/C<br>Q | | | A<br>0<br>0.000 | **A**<br>**0** | | | B<br>11<br>0.041 | **B**<br>**11** | | A<br>0<br>0.000 | A<br>0<br>0.000 | **A**<br>**0** | | A<br>0<br>0.000 | A<br>0<br>0.000 | **A**<br>**0** | |
| | Westhill Drive & Site Access/Private Driveway | TWSC | LOS<br>Delay<br>V/C<br>Q | <<<<<br>A<br>0<br>0.000 | >>>>

having an access from Ira Needles Boulevard. Providing below grade parking is pivotal to ensure that there is enough parking to support the affordable and market rental units on the site. The RIRO access to Ira Needles Boulevard operates well and does not result in significant impact with the study area.

### TABLE 6: TOTAL TRAFFIC OPERATIONS – SENSITIVITY ANALYSIS

| Analysis Period | Intersection | Control Type | MOE | Direction/Movement/Approach | | | | | | | | | | | | | | | | Overall |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | |
| | | | | Left | Through | Right | Approach | Left | Through | Right | Approach | Left | Through | Right | Approach | Left | Through | Right | Approach | |
| AM Peak Hour | Ira Needles Boulevard & Private Driveway/Westhill Drive | TWSC | LOS | | | A | **A** | | | B | **B** | | A | A | **A** | | A | A | **A** | |
| | | | Delay | | | 0 | **0** | | | 12 | **12** | | 0 | 0 | **0** | | 0 | 0 | **0** | |
| | | | V/C | | | 0.000 | | | | 0.062 | | | 0.000 | 0.000 | | | 0.000 | 0.000 | | |
| | | | Q | | | | | | | | | | 0 | 0 | | | 0 | 0 | | |
| | Westhill Drive & Site Access/Private Driveway | TWSC | LOS | < | A | > | **A** | < | A | > | **A** | A | A | A | **A** | A | A | A | **A** | |
| | | | Delay | < | 8 | > | **8** | < | 9 | > | **9** | 7 | 0 | 0 | **1** | 0 | 0 | 0 | **0** | |
| | | | V/C | < | 0.010 | > | | < | 0.000 | > | | 0.000 | 0.000 | 0.000 | | 0.000 | 0.000 | 0.000 | | |
| | | | Q | < | 0 | > | | < | 0 | > | | 0 | 0 | 0 | | 0 | 0 | 0 | | |
| PM Peak Hour | Ira Needles Boulevard & Private Driveway/Westhill Drive | TWSC | LOS | | | A | **A** | | | B | **B** | | A | A | **A** | | A | A | **A** | |
| | | | Delay | | | 0 | **0** | | | 14 | **14** | | 0 | 0 | **0** | | 0 | 0 | **0** | |
| | | | V/C | | | 0.000 | | | | 0.113 | | | 0.000 | 0.000 | | | 0.000 | 0.000 | | |
| | | | Q | | | | | | | | | | 0 | 0 | | | 0 | 0 | | |
| | Westhill Drive & Site Access/Private Driveway | TWSC | LOS | < | A | > | **A** | < | A | > | **A** | A | A | A | **A** | A | A | A | **A** | |
| | | | Delay | < | 8 | > | **9** | < | 0 | > | **0** | 7 | 0 | 0 | **3** | 0 | 0 | 0 | **0** | |
| | | | V/C | < | 0.010 | > | | < | 0.000 | > | | 0.010 | 0.000 | 0.000 | | 0.000 | 0.000 | 0.000 | | |
| | | | Q | < | 0 | > | | < | 0 | > | | 0 | 0 | 0 | | 0 | 0 | 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)*
*TWSC - Two-Way Stop Control*
*< / > - Shared Movement*

## Transportation Demand Management

The following strategies and tools already exist in the surrounding area, including existing active transportation and transit facilities, or can be implemented into the site design to encourage the use of alternative modes of transportation.

### Walking

The landscaping plan should consider additional amenities such as lighting and soft landscaping to enhance the pedestrian realm and to prioritize pedestrian travel.

All on-site sidewalks should be well-lit and should conform to the Accessibility for Ontarians with Disabilities Act (AODA) design standards.

It is noted that the proposed site plan provides concreate walkways that provide connections to the adjacent walking and cycling facilities along Ira Needles Boulevard and Westhill Drive.

The Waterloo Commons, Westside Marketplace, and West Quarter shopping plazas are located at the roundabout intersection of Erb Street West and Erbsville Road/Ira Needles Boulevard (6-minute walk) north of the subject site. Future residents have an opportunity to access multiple commercial establishments within walking distance. Additionally, The Boardwalk shopping plaza (16-minute walk south of the subject site) also provides more potential on-foot access to commercial establishments for future residents.

### Cycling

**Figure 9** illustrates the existing cycling network. Cycle lanes are provided on both sides of Ira Needles Boulevard/Erbsville Road and Erb Street West.

Bicycle parking is also required at a rate of 0.6 spaces/unit (50/50 split between Type A and Type B).[6] Therefore, the development requires a total of 34 bicycle parking spaces (17 Type A and 17 Type B).

### Transit

Grand River Transit[7] (GRT) operates four bus routes and one light rail route within the study area. **Figure 10** illustrates the existing transit service. The routes include:

- Route 13 (Laurelwood);
- Route 29 (Keats-University); and
- Route 202 (iXpress University).

The closest transit stops to the subject site provide both seating and shelter and include:

- Stop 3903: Located in the northeast corner of the Ira Needles Boulevard and Thorndale Drive/The Boardwalk roundabout (350 m from the subject site, 5-minute walk);
- Stop 3904: Located in the northwest corner of the Ira Needles Boulevard and Thorndale Drive/The Boardwalk roundabout (450 m from the subject site, 6-minute walk);
- Stop 3905: Located on the east side of Ira Needles Boulevard in front of the 7 Westhill Drive apartment building (350 m from the subject site, 5-minute walk); and
- Stop 3906: Located on the west side of Ira Needles Boulevard directly south of the Waterloo Commons Plaza Access (550 m from the subject site, 8-minute walk).

All routes that serve the subject site mostly operate with headways of 30 minutes or less during the weekday AM and weekday PM peak hours. The nearby transit routes also provide good connectivity to the broader network and key destinations within the Region including shopping centres, downtown areas, and post secondary educational institutions.

[6] City of Waterloo Zoning By-law 2018-050, *Section 6.6 Bicycle Parking Spaces.*
[7] "Grand River Transit Map," Region of Waterloo, 2024, https://www.grt.ca/en/schedules-maps/system-map.aspx.

Assistance for pedestrian access between the subject site and nearby transit stops is provided via Pedestrian Crossovers (PXOs) at the roundabouts of:

- Ira Needles Boulevard and Thorndale Drive/The Boardwalk; and
- Erb Street West and Erbsville Road/Ira Needles Boulevard.

**Travel Planning/Education/Promotion**

Increasing awareness of sustainable transportation opportunities for residents and visitors of the subject site should be considered by the developer. Residents should be provided with a welcome package that outlines the available transit routes and active transportation options such as the development's proximity to the existing bicycle network. A travel plan will engage and educate residents on the available sustainable modes of travel and how to overcome obstacles that maybe perceived.

General education of all modes of transportation, including their benefits and how to make the best use of them, are a key component to TDM success. The strategies require cooperation and coordination with several partners, including transit providers, building owners, area municipalities as well as residents.

By educating about sustainable modes of travel as well as providing travel demand management tools and incentives, TDM can be further integrated within the development to promote all modes of transportation.

## Conclusions and Recommendations

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

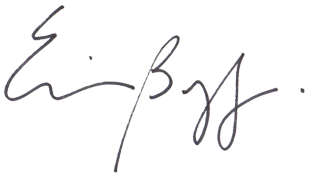
- **Site Trip Generation:** The development is forecast to generate 13 trips in the weekday AM peak hour and 22 trips in the weekday PM peak hour.
- **Existing and Future Traffic Conditions:** The study area intersection operate within acceptable levels of service with no critical movements for all horizon years.
- Connection to Ira Needles Boulevard (right-in-right-out) is required to maintain access to the underground parking due to grade change across the site.
- **Transportation Demand Management:** The site is well served by alternate mode infrastructure including:
  - Sidewalk/multi-use path and cycle lanes provided along Ira Needles Boulevard;
  - Multiple transit stops within a 10-minute walking distance from the subject site; and
  - Multiple commercial establishments within a 20-minute walking distance from the subject site.

Based on the findings of this study, it is recommended that the development be considered for approval along with the following provisions:

- Provision of a full-moves access to Westhill Drive and a right-in-right-out access to Ira Needles Boulevard to support grade change across the site; and
- Supply a total of 34 bicycle parking spaces (17 Type A and 17 Type B).

Yours very truly,

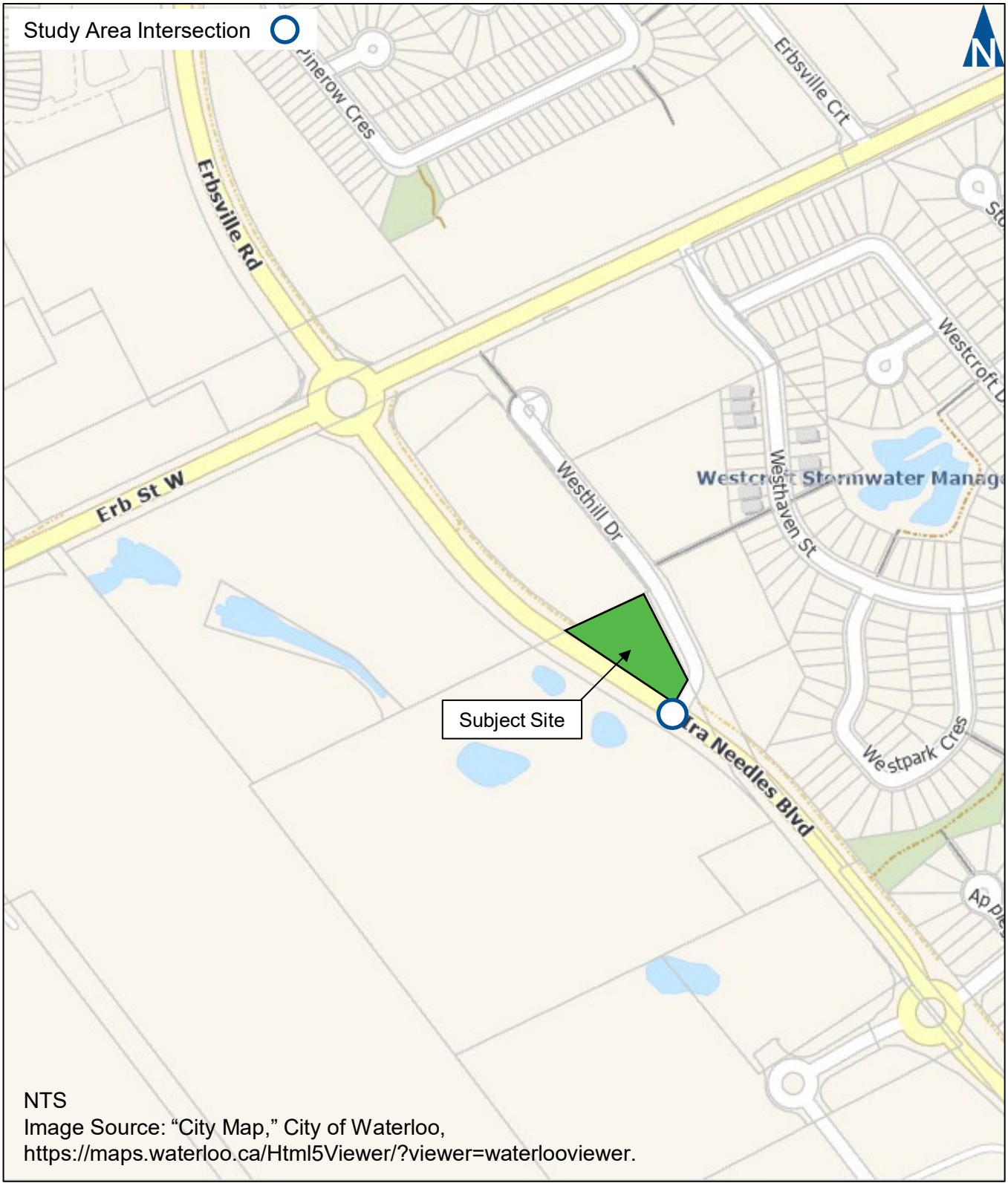
**PARADIGM TRANSPORTATION SOLUTIONS LIMITED**



**Erica Bayley**
P.Eng.
Senior Project Manager, Associate



# Attachments



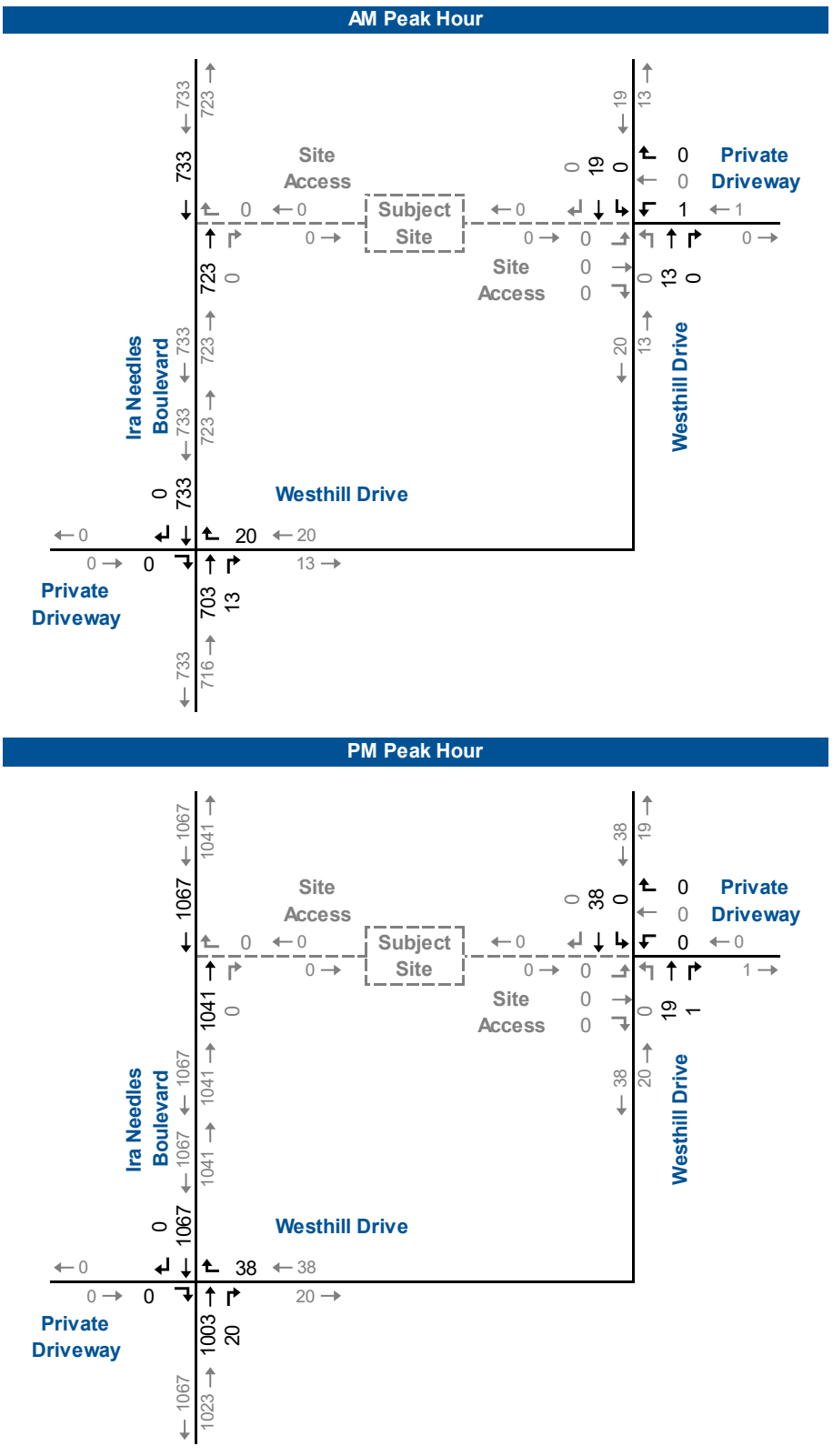

NTS
Image Source: "City Map," City of Waterloo, https://maps.waterloo.ca/Html5Viewer/?viewer=waterlooviewer.

paradigm TRANSPORTATION SOLUTIONS LIMITED

# Site Location

41 Westhill Drive, Waterloo TIB
240745

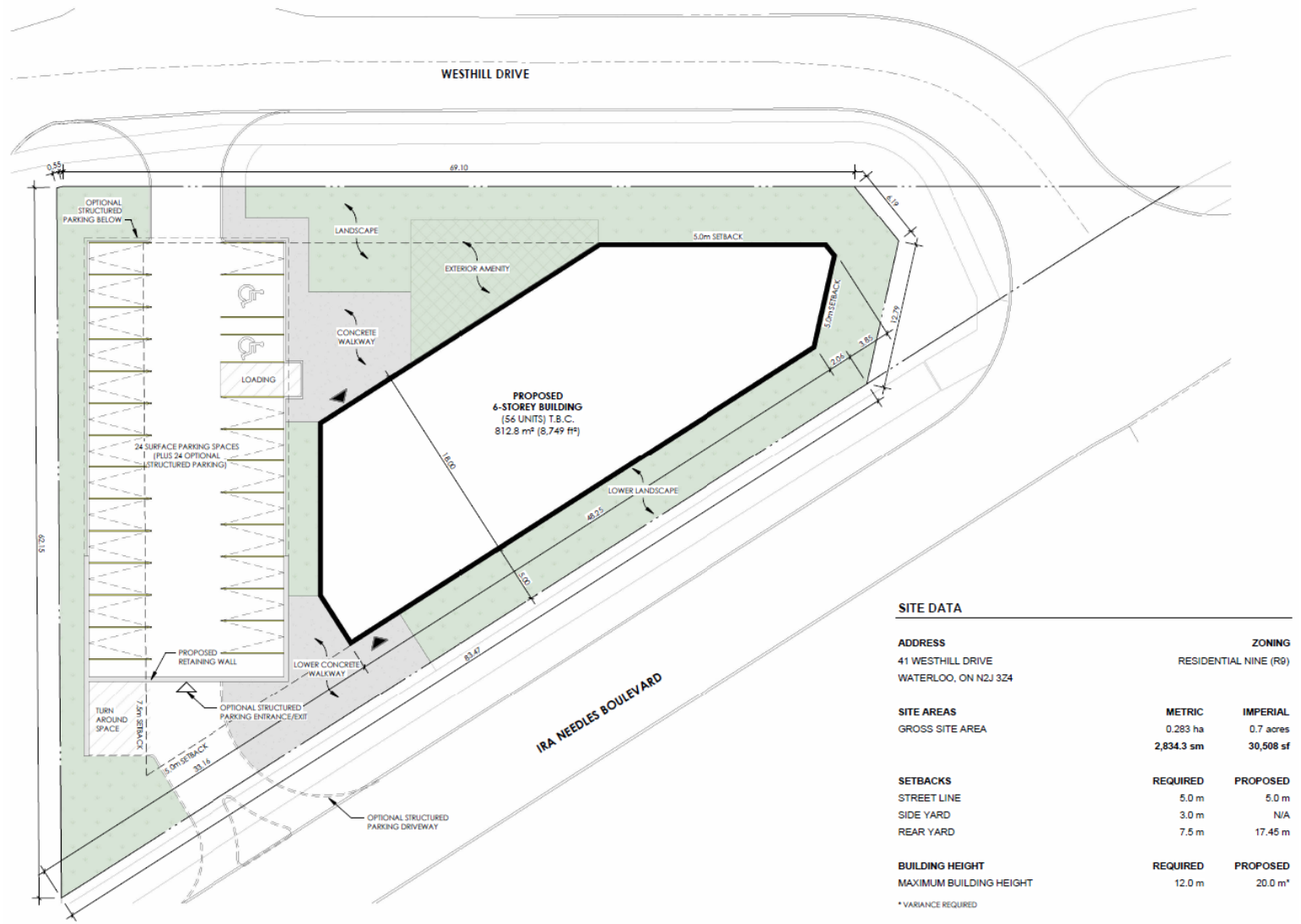
Figure 1




# Base Year Traffic Volumes

41 Westhill Drive, Waterloo TIB
240745

Figure 2




## SITE DATA

| ADDRESS | ZONING |
|---|---|
| 41 WESTHILL DRIVE<br>WATERLOO, ON N2J 3Z4 | RESIDENTIAL NINE (R9) |

| SITE AREAS | METRIC | IMPERIAL |
|---|---|---|
| GROSS SITE AREA | 0.283 ha | 0.7 acres |
| | **2,834.3 sm** | **30,508 sf** |

| SETBACKS | REQUIRED | PROPOSED |
|---|---|---|
| STREET LINE | 5.0 m | 5.0 m |
| SIDE YARD | 3.0 m | N/A |
| REAR YARD | 7.5 m | 17.45 m |

| BUILDING HEIGHT | REQUIRED | PROPOSED |
|---|---|---|
| MAXIMUM BUILDING HEIGHT | 12.0 m | 20.0 m* |

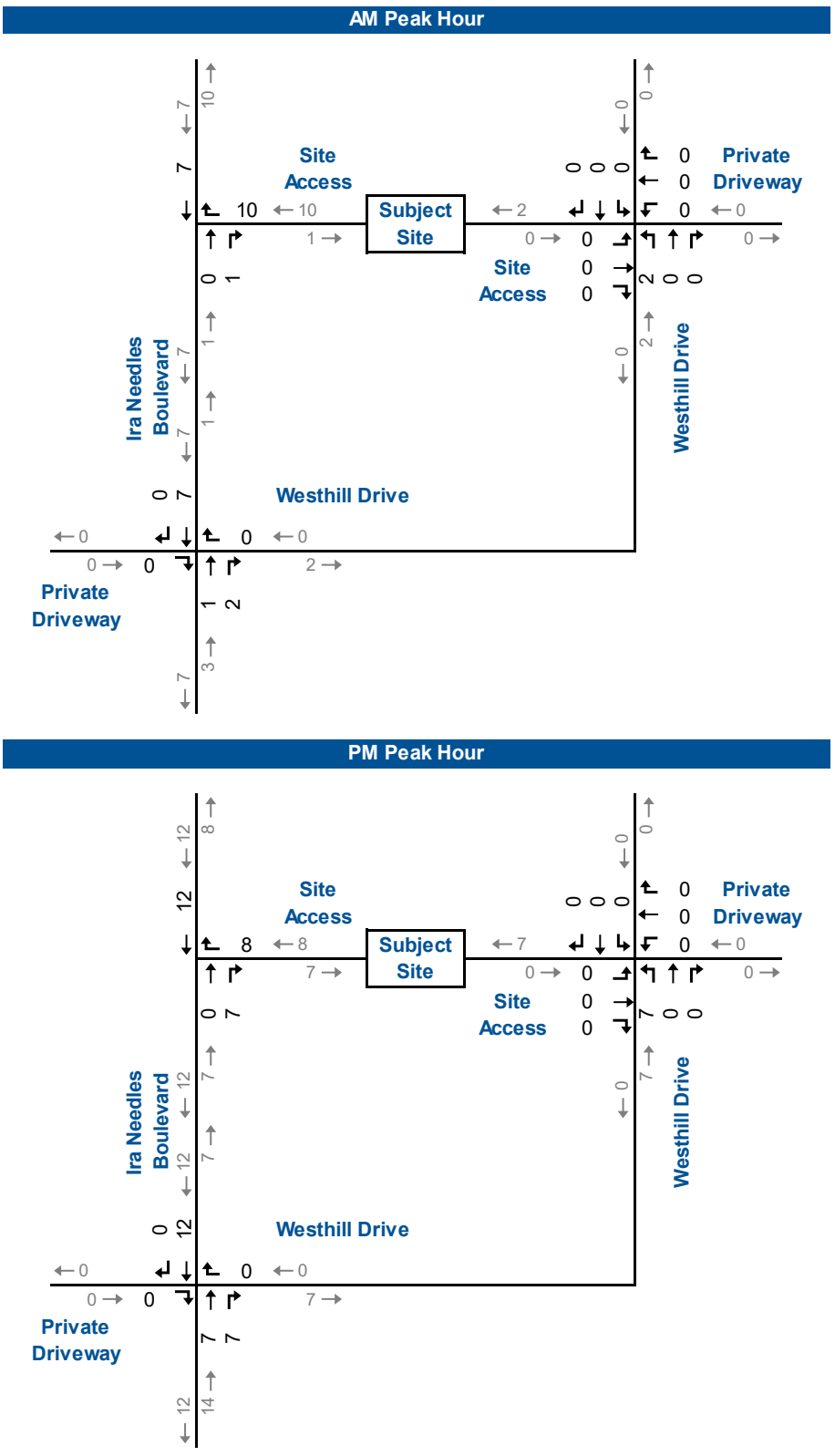
* VARIANCE REQUIRED

paradigm TRANSPORTATION SOLUTIONS LIMITED

# Concept Plan

41 Westhill Drive, Waterloo TIB
240745

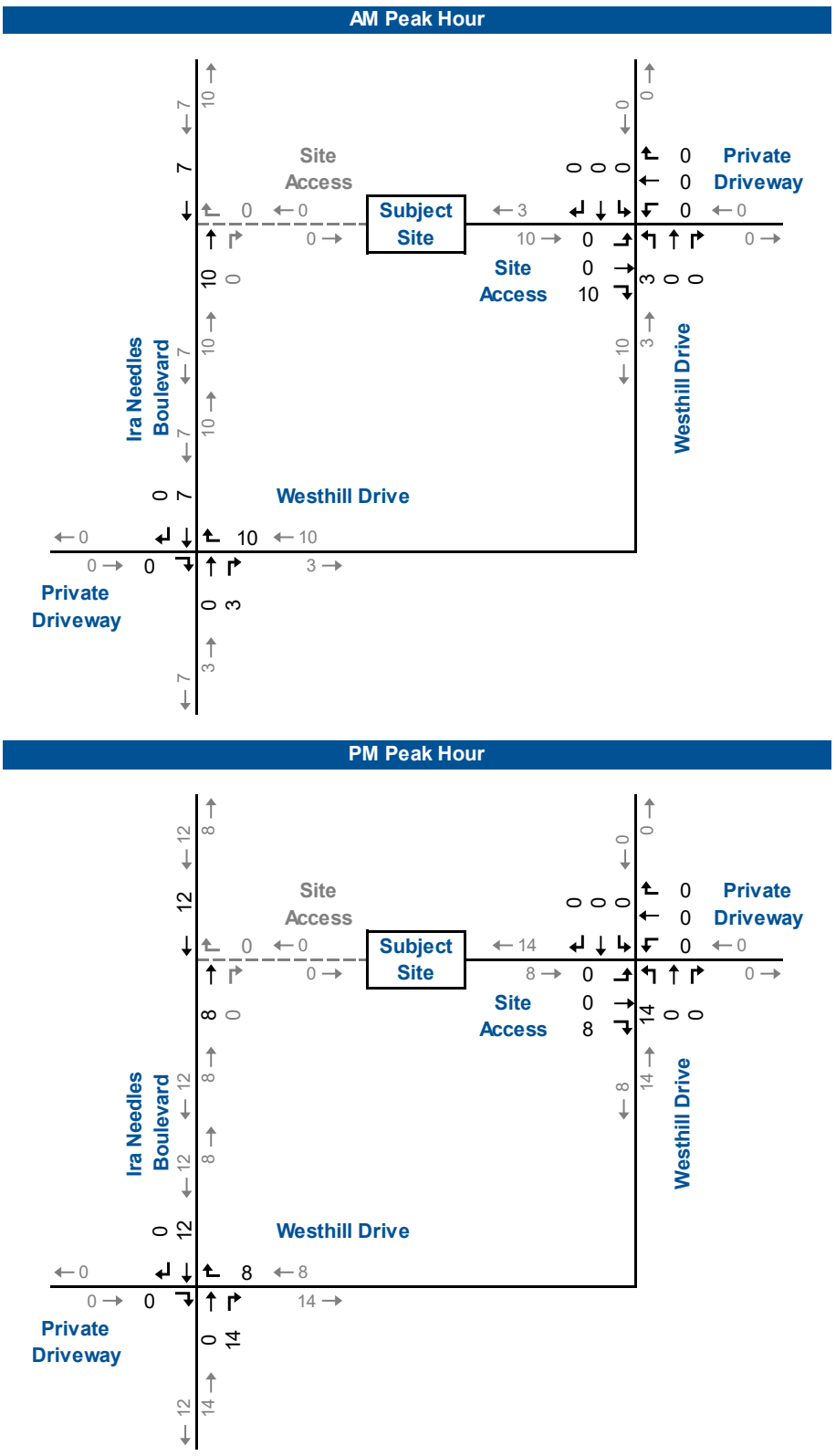
Figure 3




# Site-Generated Traffic Volumes

41 Westhill Drive, Waterloo TIB
240745

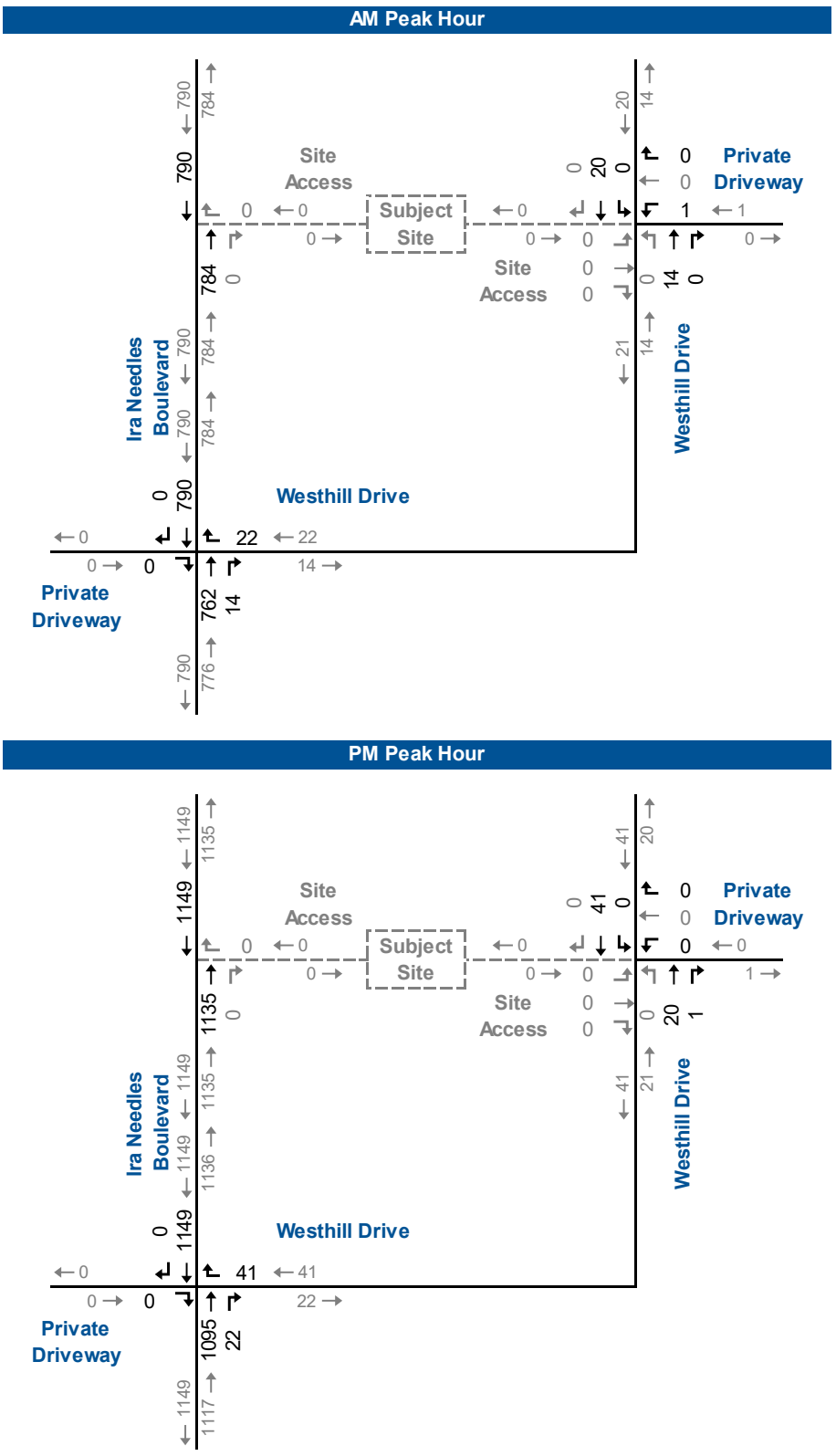
Figure 4




# Site-Generated Traffic Volumes (No Ira Needles Boulevard Driveway)

41 Westhill Drive, Waterloo TIB
240745

Figure 5

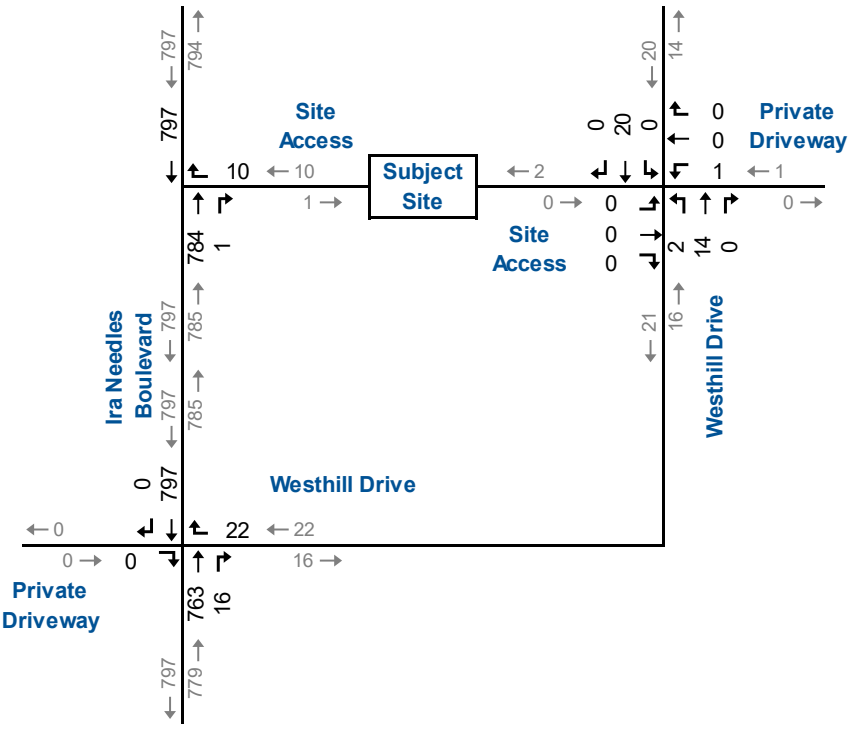



# Background Traffic Volumes

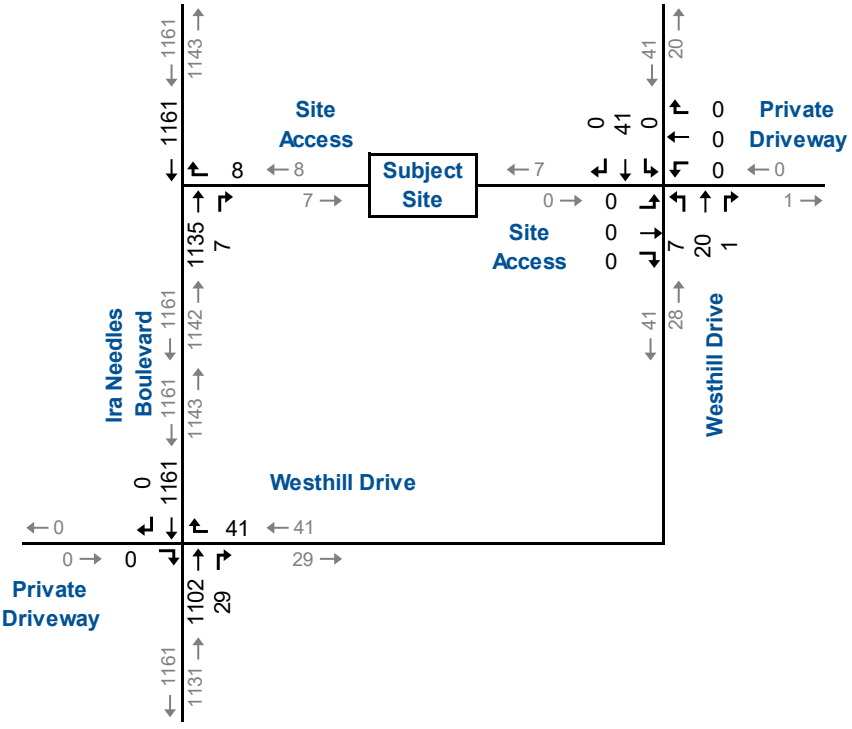
41 Westhill Drive, Waterloo TIB
240745

Figure 6

## AM Peak Hour



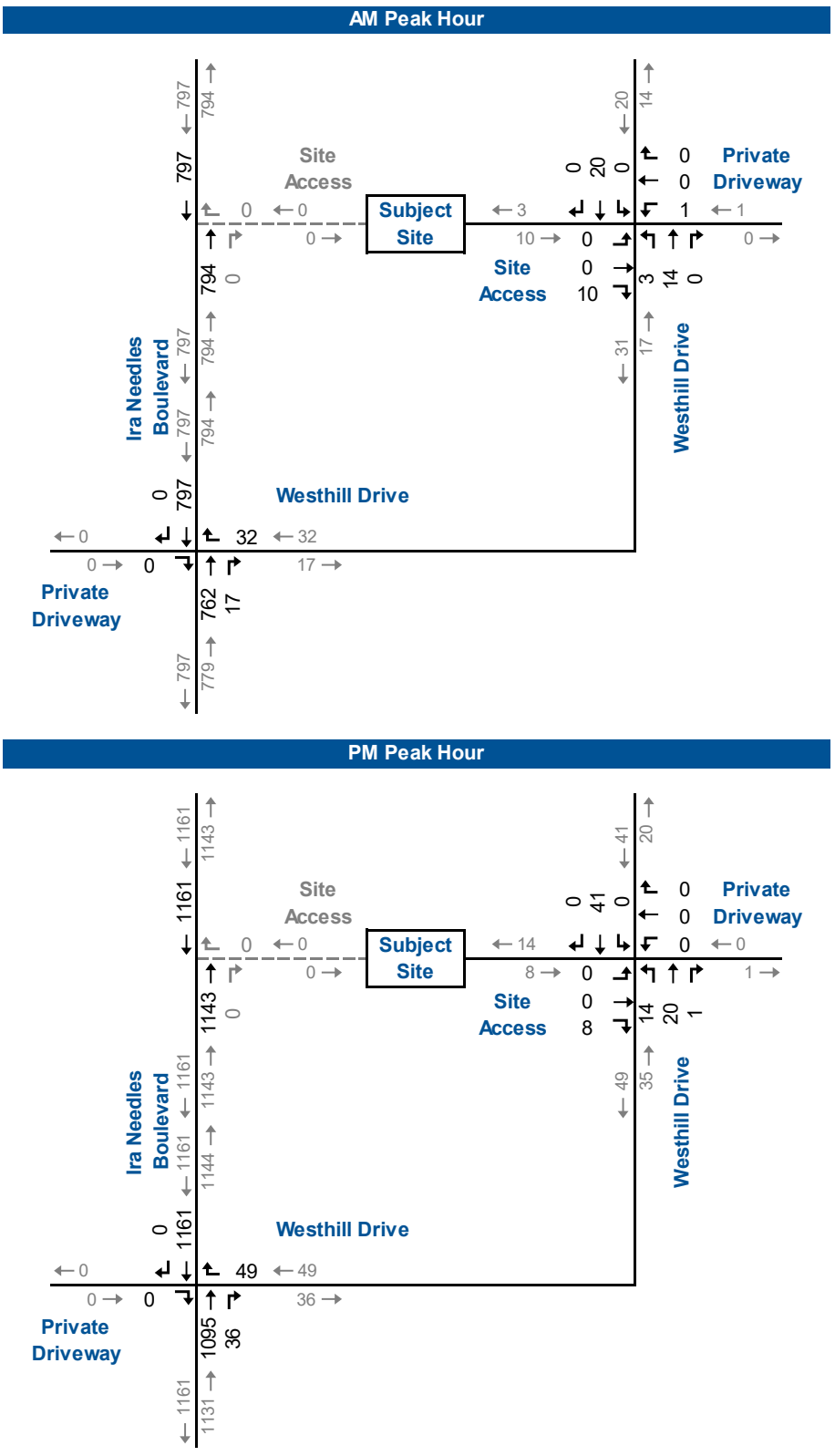

## PM Peak Hour




# Total Traffic Volumes

41 Westhill Drive, Waterloo TIB
240745

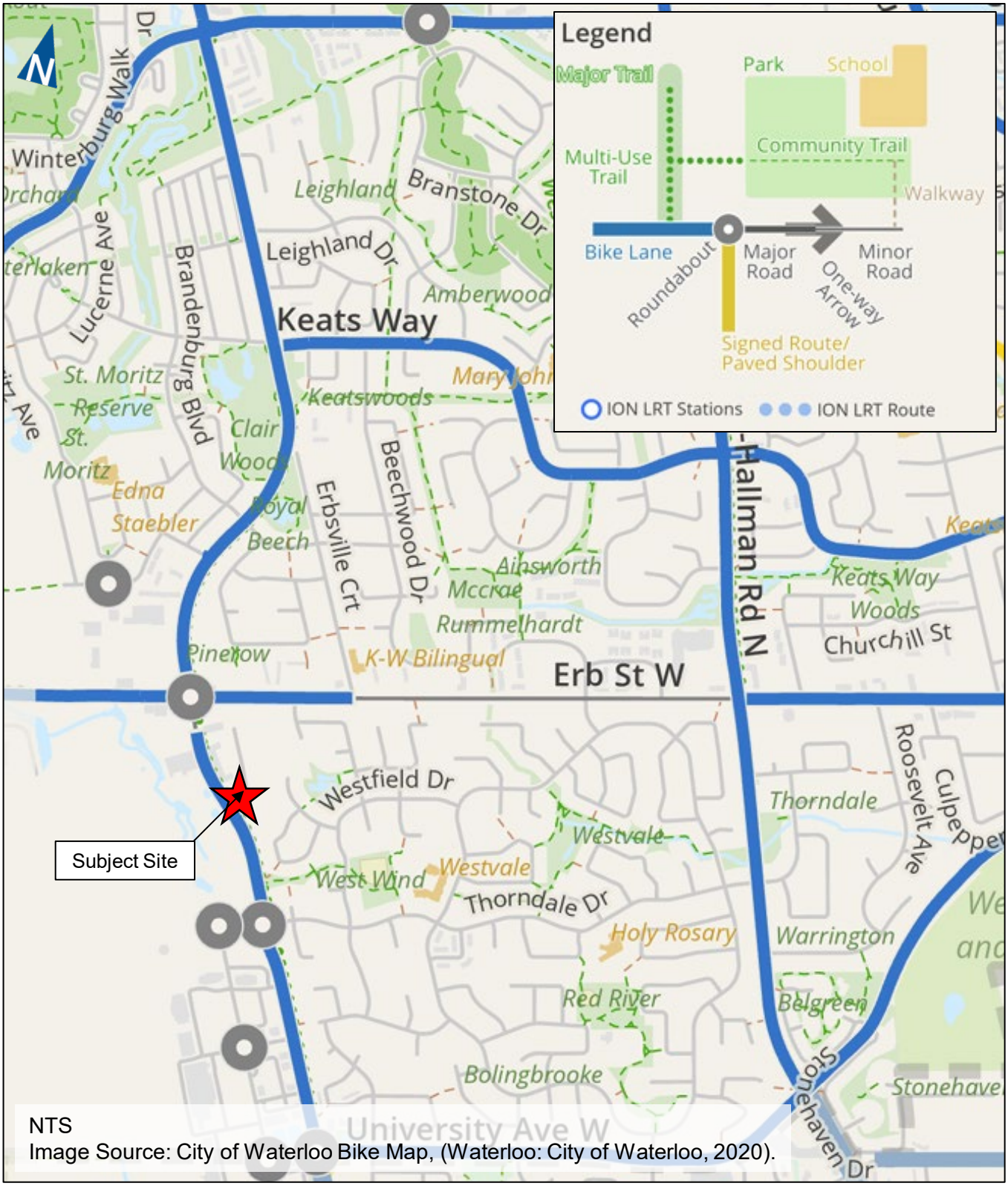
Figure 7




# Total Traffic Volumes (No Ira Needles Boulevard Driveway)

41 Westhill Drive, Waterloo TIB
240745

Figure 8




NTS
Image Source: City of Waterloo Bike Map, (Waterloo: City of Waterloo, 2020).

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# Cycling Network

41 Westhill Drive, Waterloo TIB
240745

Figure 9




NTS
Image Source: "GRT System Map," Grand River Transit, 2024, https://www.grt.ca/en/schedules-maps/system-map.aspx.

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# Transit Network

41 Westhill Drive, Waterloo TIB
240745

Figure 10

# Appendix A: Pre-Study Consultation Notes





## Andrew Orr

**From:** Tanikia Kinear <TKinear@regionofwaterloo.ca>
**Sent:** February 12, 2025 10:21 AM
**To:** Andrew Orr; Ainsley Rego
**Cc:** Erica Bayley
**Subject:** RE: 240745 (41 Westhill Drive, Waterloo) TIS

Hi Andrew,

Please apply a 1.5% annual growth rate for background traffic. Vehicle access to Ira Needles Boulevard will not be permitted unless the applicant can demonstrate a need for such access. However, walk and bike access to the active transportation facilities along Ira Needles Boulevard must be provided.

Thanks,

**Tanikia Kinear, C.E.T.**
Senior Transportation Planner (Corridor Development)
Region of Waterloo
150 Frederick Street, 8th Floor, Kitchener ON N2G 4J3
519-897-5691
www.regionofwaterloo.ca

---

**From:** Andrew Orr <aorr@ptsl.com>
**Sent:** February 11, 2025 7:46 AM
**To:** Ainsley Rego <Ainsley.Rego@waterloo.ca>; Tanikia Kinear <TKinear@regionofwaterloo.ca>
**Cc:** Erica Bayley <ebayley@ptsl.com>
**Subject:** RE: 240745 (41 Westhill Drive, Waterloo) TIS

**CAUTION! EXTERNAL SENDER**
Were you expecting this email? TAKE A CLOSER LOOK. Is the sender legitimate?
DO NOT click links or open attachments unless you are 100% sure that the email is safe.

Thanks Ainsley for your response!

Tanikia, I wanted to check if the Region has any comments to add to the terms of reference sent on 2025-01-21?

Best Regards,

**Andrew Orr, M.A.Sc., EIT**
Transportation Consultant, Associate
(He/Him)

5A-150 Pinebush Road, Cambridge ON, N1R 8J8
p: 519.896.3163 x210
m: 289-808-8997
e: aorr@ptsl.com
w: www.ptsl.com

**From:** Ainsley Rego <Ainsley.Rego@waterloo.ca>
**Sent:** February 6, 2025 8:33 AM
**To:** Andrew Orr <aorr@ptsl.com>; Tanikia Kinear <TKinear@regionofwaterloo.ca>
**Cc:** Erica Bayley <ebayley@ptsl.com>
**Subject:** RE: 240745 (41 Westhill Drive, Waterloo) TIS

Good morning Andrew,

Thank you for your e-mail. It is my understanding that the construction at 28 Westhill Drive is complete. The development includes 86 units (125 bedrooms). I am not aware of the current occupancy but I know tenants started moving in last year. I can check with our Building department for more information.

As you mentioned below, the traffic from 28 Westhill Drive will be captured in new traffic counts.

Thank you,
Ainsley

**Ainsley Rego, BES, RSP1** (she/her)
Engineering Technologist – Traffic
Transportation Engineering, Integrated Planning & Public Works, City of Waterloo
265 Lexington Court PO Box 337 Station Waterloo Waterloo, ON N2J 4A8
**P:** 1.519.886.2310 ext. 30336 **F:** 1.519.886.5788 **TTY:** 1.866.786.3941 **E:** ainsley.rego@waterloo.ca

**From:** Andrew Orr <aorr@ptsl.com>
**Sent:** February 5, 2025 8:24 AM
**To:** Ainsley Rego <Ainsley.Rego@waterloo.ca>; Tanikia Kinear <TKinear@regionofwaterloo.ca>
**Cc:** Erica Bayley <ebayley@ptsl.com>
**Subject:** [EXTERNAL] RE: 240745 (41 Westhill Drive, Waterloo) TIS

**CAUTION:**
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Hi Ainsley,

I was wondering if you know the construction status of the apartment building at 28 Westhill Drive? The construction looks to be complete (or almost complete) so I'm assuming that's why you never suggested the apartment building at 28 Westhill Drive as a background development for the 41 Westhill Drive TIS.

If the 28 Westhill Drive apartment building construction is in fact complete (or nearly complete), do you happen to know the current occupancy rate? My understanding the apartment building contains 86/87 units?

Best Regards,

**Andrew Orr, M.A.Sc., EIT**
Transportation Consultant, Associate
(He/Him)

5A-150 Pinebush Road, Cambridge ON, N1R 8J8
p: 519.896.3163 x210
m: 289-808-8997
e: aorr@ptsl.com
w: www.ptsl.com

---

**From:** Andrew Orr
**Sent:** February 3, 2025 8:43 AM
**To:** Ainsley Rego <Ainsley.Rego@waterloo.ca>; Tanikia Kinear <TKinear@regionofwaterloo.ca>
**Cc:** Erica Bayley <ebayley@ptsl.com>
**Subject:** RE: 240745 (41 Westhill Drive, Waterloo) TIS

Hi Tanikia,

I was wondering if you have anything to add to the terms of reference below.

Best Regards,

**Andrew Orr, M.A.Sc., EIT**
Transportation Consultant, Associate
(He/Him)

5A-150 Pinebush Road, Cambridge ON, N1R 8J8
p: 519.896.3163 x210
m: 289-808-8997
e: aorr@ptsl.com
w: www.ptsl.com

**From:** Ainsley Rego <Ainsley.Rego@waterloo.ca>
**Sent:** January 22, 2025 8:14 AM
**To:** Andrew Orr <aorr@ptsl.com>; Tanikia Kinear <TKinear@regionofwaterloo.ca>
**Cc:** Erica Bayley <ebayley@ptsl.com>
**Subject:** RE: 240745 (41 Westhill Drive, Waterloo) TIS

Good morning Andrew,

Thank you for providing the below scope of work. Please see City comments below in red.

Let me know if you have any questions or concerns.

Best Regards,

**Ainsley Rego, BES, RSP1** (she/her)
Engineering Technologist – Traffic
Transportation Engineering, Integrated Planning & Public Works, City of Waterloo
265 Lexington Court PO Box 337 Station Waterloo Waterloo, ON N2J 4A8
**P:** 1.519.886.2310 ext. 30336 **F:** 1.519.886.5788 **TTY:** 1.866.786.3941 **E:** ainsley.rego@waterloo.ca

**From:** Andrew Orr <aorr@ptsl.com>
**Sent:** January 21, 2025 1:45 PM
**To:** Ainsley Rego <Ainsley.Rego@waterloo.ca>; Tanikia Kinear <TKinear@regionofwaterloo.ca>
**Cc:** Erica Bayley <ebayley@ptsl.com>
**Subject:** [EXTERNAL] 240745 (41 Westhill Drive, Waterloo) TIS

**CAUTION:**
This email originated from outside the organization. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Hello Ainsley and Tanikia,

Paradigm Transportation Solutions Limited (Paradigm) has been retained to conduct this Transportation Impact Study (TIS) for a proposed affordable housing development located at 41 Westhill Drive in Waterloo. The subject site is proposed to be developed into a six-storey building with 50 units (option 1) or 60 units (option 2). Vehicle access is proposed via a new all-moves driveway connection to Westhill Drive and a Right-In Right-Out (RIRO) driveway to Ira Needles Boulevard (PSC form and concept plan attached).

We'd like to prepare our report based on the following scope, subject to your comments:

## PROPOSED TERMS OF REFERENCE

Study Area Intersections:

- Ira Needles Boulevard and Westhill Drive (RIRO and unsignalized);
- Proposed driveway connection to Westhill Drive (unsignalized); and
- Proposed driveway connection to Ira Needles Boulevard (RIRO and unsignalized).

Analysis Periods:

- Weekday AM peak hour; and
- Weekday PM peak hour.

Existing Data:

- Existing 8-hour TMC data to be collected at Ira Needles Boulevard and Westhill Drive.

Horizon Year:

- Five years from the date the study is commissioned (2030).

Analysis:

- Synchro 11, HCM 6 analysis.

Background Traffic:

- Background traffic annual growth rate **Please confirm** – 1% on city streets. Region to confirm.
- Approved developments to include in background. **Please confirm** – Staff note that there is development nearby at 414 Westhaven Street. However, this site only has emergency access to Westhill Drive.

Future Road Improvements:

- **Please confirm –** No identified road improvements along Westhill Drive.

Trip Generation:

- ITE Trip Generation Data 11th Edition.

Trip Distribution:

- Existing Distribution; and
- 2022 Transportation Tomorrow Survey (TTS) data.

Best Regards,

**Andrew Orr, M.A.Sc., EIT**
Transportation Consultant, Associate
(He/Him)

paradigm TRANSPORTATION SOLUTIONS LIMITED

Great Place To Work. Certified NOV 2023 - NOV 2024 CANADA

5A-150 Pinebush Road, Cambridge ON, N1R 8J8
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m: 289-808-8997
e: aorr@ptsl.com
w: www.ptsl.com

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# Appendix B: Traffic Data

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada  N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Ira Needles Blvd & Westhill Drive
Site Code: 240745
Start Date: 01/28/2025


# Turning Movement Data

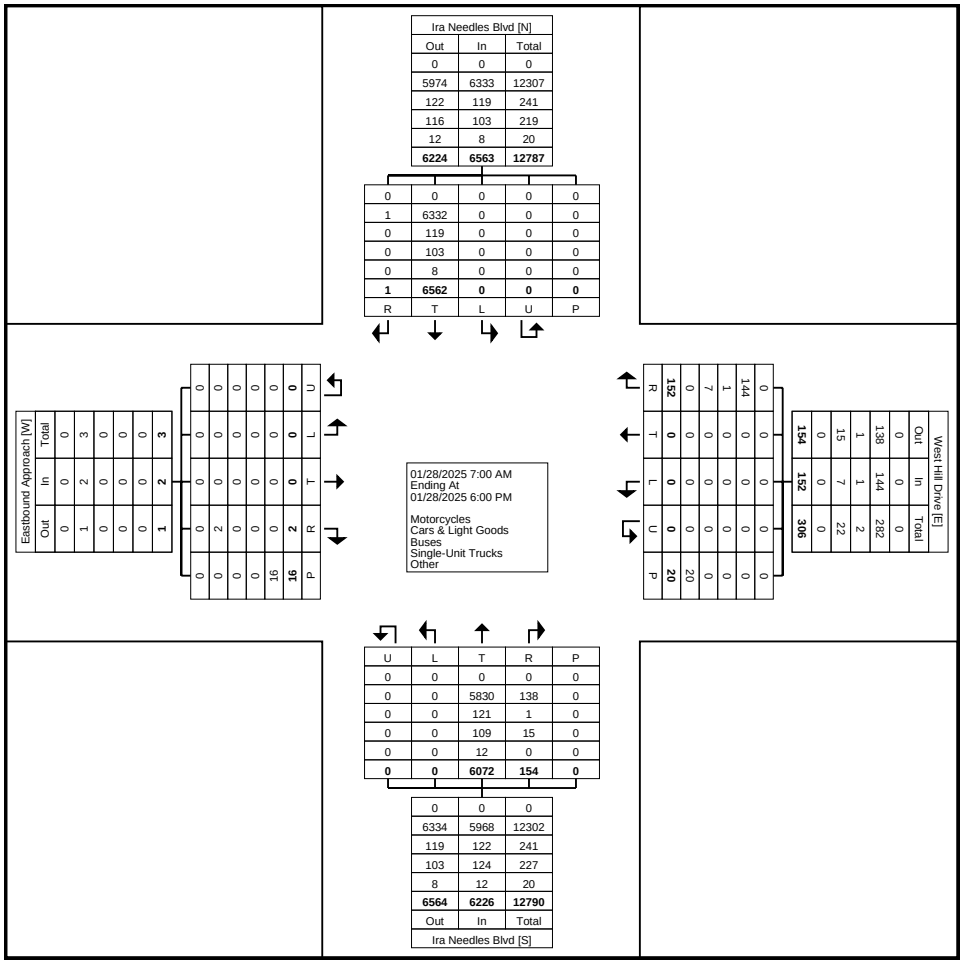
| Start Time | Eastbound Approach Eastbound | | | | | | West Hill Drive Westbound | | | | | | Ira Needles Blvd Northbound | | | | | | Ira Needles Blvd Southbound | | | | | | Int. Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | U-Turn | Peds | App. Total | Left | Thru | Right | U-Turn | Peds | App. Total | Left | Thru | Right | U-Turn | Peds | App. Total | Left | Thru | Right | U-Turn | Peds | App. Total | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 77 | 5 | 0 | 0 | 82 | 0 | 107 | 0 | 0 | 0 | 107 | 189 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 74 | 4 | 0 | 0 | 78 | 0 | 133 | 0 | 0 | 0 | 133 | 212 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 102 | 7 | 0 | 0 | 109 | 0 | 140 | 0 | 0 | 0 | 140 | 252 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 143 | 1 | 0 | 0 | 144 | 0 | 162 | 0 | 0 | 0 | 162 | 307 |
| Hourly Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 396 | 17 | 0 | 0 | 413 | 0 | 542 | 0 | 0 | 0 | 542 | 960 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 3 | 0 | 158 | 2 | 0 | 0 | 160 | 0 | 156 | 0 | 0 | 0 | 156 | 319 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 167 | 3 | 0 | 0 | 170 | 0 | 180 | 0 | 0 | 0 | 180 | 355 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 181 | 6 | 0 | 0 | 187 | 0 | 178 | 0 | 0 | 0 | 178 | 375 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 198 | 2 | 0 | 0 | 200 | 0 | 205 | 0 | 0 | 0 | 205 | 406 |
| Hourly Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 0 | 2 | 19 | 0 | 704 | 13 | 0 | 0 | 717 | 0 | 719 | 0 | 0 | 0 | 719 | 1455 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 157 | 2 | 0 | 0 | 159 | 0 | 170 | 0 | 0 | 0 | 170 | 333 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 150 | 3 | 0 | 0 | 153 | 0 | 167 | 0 | 0 | 0 | 167 | 322 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 1 | 7 | 0 | 146 | 8 | 0 | 0 | 154 | 0 | 166 | 0 | 0 | 0 | 166 | 327 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 138 | 5 | 0 | 0 | 143 | 0 | 182 | 0 | 0 | 0 | 182 | 327 |
| Hourly Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 2 | 15 | 0 | 591 | 18 | 0 | 0 | 609 | 0 | 685 | 0 | 0 | 0 | 685 | 1309 |
| *** BREAK *** | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:30 AM | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 2 | 2 | 0 | 222 | 8 | 0 | 0 | 230 | 0 | 174 | 1 | 0 | 0 | 175 | 407 |
| 11:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 6 | 0 | 209 | 7 | 0 | 0 | 216 | 0 | 188 | 0 | 0 | 0 | 188 | 410 |
| Hourly Total | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 8 | 0 | 2 | 8 | 0 | 431 | 15 | 0 | 0 | 446 | 0 | 362 | 1 | 0 | 0 | 363 | 817 |
| 12:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 208 | 7 | 0 | 0 | 215 | 0 | 197 | 0 | 0 | 0 | 197 | 414 |
| 12:15 PM | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 192 | 6 | 0 | 0 | 198 | 0 | 205 | 0 | 0 | 0 | 205 | 408 |
| 12:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 8 | 0 | 193 | 6 | 0 | 0 | 199 | 0 | 223 | 0 | 0 | 0 | 223 | 430 |
| 12:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 3 | 6 | 0 | 212 | 5 | 0 | 0 | 217 | 0 | 218 | 0 | 0 | 0 | 218 | 441 |
| Hourly Total | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 20 | 0 | 3 | 20 | 0 | 805 | 24 | 0 | 0 | 829 | 0 | 843 | 0 | 0 | 0 | 843 | 1693 |
| 1:00 PM | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 11 | 0 | 1 | 11 | 0 | 186 | 4 | 0 | 0 | 190 | 0 | 242 | 0 | 0 | 0 | 242 | 443 |
| 1:15 PM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 183 | 6 | 0 | 0 | 189 | 0 | 233 | 0 | 0 | 0 | 233 | 423 |
| *** BREAK *** | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hourly Total | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 12 | 0 | 2 | 12 | 0 | 369 | 10 | 0 | 0 | 379 | 0 | 475 | 0 | 0 | 0 | 475 | 866 |
| 3:00 PM | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 5 | 0 | 3 | 5 | 0 | 239 | 8 | 0 | 0 | 247 | 0 | 223 | 0 | 0 | 0 | 223 | 475 |
| 3:15 PM | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 204 | 5 | 0 | 0 | 209 | 0 | 243 | 0 | 0 | 0 | 243 | 454 |
| 3:30 PM | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 10 | 0 | 2 | 10 | 0 | 267 | 5 | 0 | 0 | 272 | 0 | 236 | 0 | 0 | 0 | 236 | 519 |
| 3:45 PM | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 15 | 0 | 0 | 15 | 0 | 229 | 9 | 0 | 0 | 238 | 0 | 248 | 0 | 0 | 0 | 248 | 501 |
| Hourly Total | 0 | 0 | 1 | 0 | 9 | 1 | 0 | 0 | 32 | 0 | 6 | 32 | 0 | 939 | 27 | 0 | 0 | 966 | 0 | 950 | 0 | 0 | 0 | 950 | 1949 |
| 4:00 PM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 9 | 0 | 2 | 9 | 0 | 273 | 5 | 0 | 0 | 278 | 0 | 265 | 0 | 0 | 0 | 265 | 552 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 6 | 0 | 258 | 1 | 0 | 0 | 259 | 0 | 271 | 0 | 0 | 0 | 271 | 536 |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 1 | 8 | 0 | 243 | 5 | 0 | 0 | 248 | 0 | 283 | 0 | 0 | 0 | 283 | 539 |
| 4:45 PM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 6 | 0 | 0 | 6 | 0 | 209 | 5 | 0 | 0 | 214 | 0 | 256 | 0 | 0 | 0 | 256 | 476 |
| Hourly Total | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 29 | 0 | 3 | 29 | 0 | 983 | 16 | 0 | 0 | 999 | 0 | 1075 | 0 | 0 | 0 | 1075 | 2103 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 6 | 0 | 233 | 1 | 0 | 0 | 234 | 0 | 253 | 0 | 0 | 0 | 253 | 493 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 222 | 6 | 0 | 0 | 228 | 0 | 239 | 0 | 0 | 0 | 239 | 467 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 201 | 6 | 0 | 0 | 207 | 0 | 217 | 0 | 0 | 0 | 217 | 426 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 198 | 1 | 0 | 0 | 199 | 0 | 202 | 0 | 0 | 0 | 202 | 405 |
| Hourly Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 0 | 12 | 0 | 854 | 14 | 0 | 0 | 868 | 0 | 911 | 0 | 0 | 0 | 911 | 1791 |
| Grand Total | 0 | 0 | 2 | 0 | 16 | 2 | 0 | 0 | 152 | 0 | 20 | 152 | 0 | 6072 | 154 | 0 | 0 | 6226 | 0 | 6562 | 1 | 0 | 0 | 6563 | 12943 |
| Approach % | 0.0 | 0.0 | 100.0 | 0.0 | - | - | 0.0 | 0.0 | 100.0 | 0.0 | - | - | 0.0 | 97.5 | 2.5 | 0.0 | - | - | 0.0 | 100.0 | 0.0 | 0.0 | - | - | - |
| Total % | 0.0 | 0.0 | 0.0 | 0.0 | - | 0.0 | 0.0 | 0.0 | 1.2 | 0.0 | - | 1.2 | 0.0 | 46.9 | 1.2 | 0.0 | - | 48.1 | 0.0 | 50.7 | 0.0 | 0.0 | - | 50.7 | - |
| Motorcycles | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 |
| % Motorcycles | - | - | 0.0 | - | - | 0.0 | - | - | 0.0 | - | - | 0.0 | - | 0.0 | 0.0 | - | - | 0.0 | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 |
| Cars & Light Goods | 0 | 0 | 2 | 0 | - | 2 | 0 | 0 | 144 | 0 | - | 144 | 0 | 5830 | 138 | 0 | - | 5968 | 0 | 6332 | 1 | 0 | - | 6333 | 12447 |
| % Cars & Light Goods | - | - | 100.0 | - | - | 100.0 | - | - | 94.7 | - | - | 94.7 | - | 96.0 | 89.6 | - | - | 95.9 | - | 96.5 | 100.0 | - | - | 96.5 | 96.2 |
| Buses | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 1 | 0 | - | 1 | 0 | 121 | 1 | 0 | - | 122 | 0 | 119 | 0 | 0 | - | 119 | 242 |
| % Buses | - | - | 0.0 | - | - | 0.0 | - | - | 0.7 | - | - | 0.7 | - | 2.0 | 0.6 | - | - | 2.0 | - | 1.8 | 0.0 | - | - | 1.8 | 1.9 |
| Single-Unit Trucks | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 7 | 0 | - | 7 | 0 | 109 | 15 | 0 | - | 124 | 0 | 103 | 0 | 0 | - | 103 | 234 |
| % Single-Unit Trucks | - | - | 0.0 | - | - | 0.0 | - | - | 4.6 | - | - | 4.6 | - | 1.8 | 9.7 | - | - | 2.0 | - | 1.6 | 0.0 | - | - | 1.6 | 1.8 |
| Articulated Trucks | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 12 | 0 | 0 | - | 12 | 0 | 8 | 0 | 0 | - | 8 | 20 |
| % Articulated Trucks | - | - | 0.0 | - | - | 0.0 | - | - | 0.0 | - | - | 0.0 | - | 0.2 | 0.0 | - | - | 0.2 | - | 0.1 | 0.0 | - | - | 0.1 | 0.2 |
| Bicycles on Road | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 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 | 0.0 |
| Bicycles on Crosswalk | - | - | - | - | 0 | - | - | - | - | - | 1 | - | - | - | - | - | 0 | - | - | - | - | - | 0 | - | - |
| % Bicycles on Crosswalk | - | - | - | - | 0.0 | - | - | - | - | - | 5.0 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pedestrians | - | - | - | - | 16 | - | - | - | - | - | 19 | - | - | - | - | - | 0 | - | - | - | - | - | 0 | - | - |
| % Pedestrians | - | - | - | - | 100.0 | - | - | - | - | - | 95.0 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada  N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Ira Needles Blvd & Westhill Drive
Site Code: 240745
Start Date: 01/28/2025


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: Ira Needles Blvd & Westhill Drive
Site Code: 240745
Start Date: 01/28/2025


# Turning Movement Peak Hour Data (8:15 AM)

| Start Time | Eastbound Approach Eastbound | | | | | | West Hill Drive Westbound | | | | | | Ira Needles Blvd Northbound | | | | | | Ira Needles Blvd Southbound | | | | | | Int. Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | U-Turn | Peds | App. Total | Left | Thru | Right | U-Turn | Peds | App. Total | Left | Thru | Right | U-Turn | Peds | App. Total | Left | Thru | Right | U-Turn | Peds | App. Total | |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 167 | 3 | 0 | 0 | 170 | 0 | 180 | 0 | 0 | 0 | 180 | 355 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 181 | 6 | 0 | 0 | 187 | 0 | 178 | 0 | 0 | 0 | 178 | 375 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 198 | 2 | 0 | 0 | 200 | 0 | 205 | 0 | 0 | 0 | 205 | 406 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 157 | 2 | 0 | 0 | 159 | 0 | 170 | 0 | 0 | 0 | 170 | 333 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 1 | 20 | 0 | 703 | 13 | 0 | 0 | 716 | 0 | 733 | 0 | 0 | 0 | 733 | 1469 |
| Approach % | 0.0 | 0.0 | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 100.0 | 0.0 | - | - | 0.0 | 98.2 | 1.8 | 0.0 | - | - | 0.0 | 100.0 | 0.0 | 0.0 | - | - | - |
| Total % | 0.0 | 0.0 | 0.0 | 0.0 | - | 0.0 | 0.0 | 0.0 | 1.4 | 0.0 | - | 1.4 | 0.0 | 47.9 | 0.9 | 0.0 | - | 48.7 | 0.0 | 49.9 | 0.0 | 0.0 | - | 49.9 | - |
| PHF | 0.000 | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.500 | 0.000 | - | 0.500 | 0.000 | 0.888 | 0.542 | 0.000 | - | 0.895 | 0.000 | 0.894 | 0.000 | 0.000 | - | 0.894 | 0.905 |
| Motorcycles | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 |
| % Motorcycles | - | - | - | - | - | - | - | - | 0.0 | - | - | 0.0 | - | 0.0 | 0.0 | - | - | 0.0 | - | 0.0 | - | - | - | 0.0 | 0.0 |
| Cars & Light Goods | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 18 | 0 | - | 18 | 0 | 666 | 12 | 0 | - | 678 | 0 | 696 | 0 | 0 | - | 696 | 1392 |
| % Cars & Light Goods | - | - | - | - | - | - | - | - | 90.0 | - | - | 90.0 | - | 94.7 | 92.3 | - | - | 94.7 | - | 95.0 | - | - | - | 95.0 | 94.8 |
| Buses | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 18 | 0 | 0 | - | 18 | 0 | 25 | 0 | 0 | - | 25 | 43 |
| % Buses | - | - | - | - | - | - | - | - | 0.0 | - | - | 0.0 | - | 2.6 | 0.0 | - | - | 2.5 | - | 3.4 | - | - | - | 3.4 | 2.9 |
| Single-Unit Trucks | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 2 | 0 | - | 2 | 0 | 16 | 1 | 0 | - | 17 | 0 | 10 | 0 | 0 | - | 10 | 29 |
| % Single-Unit Trucks | - | - | - | - | - | - | - | - | 10.0 | - | - | 10.0 | - | 2.3 | 7.7 | - | - | 2.4 | - | 1.4 | - | - | - | 1.4 | 2.0 |
| Articulated Trucks | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 3 | 0 | 0 | - | 3 | 0 | 2 | 0 | 0 | - | 2 | 5 |
| % Articulated Trucks | - | - | - | - | - | - | - | - | 0.0 | - | - | 0.0 | - | 0.4 | 0.0 | - | - | 0.4 | - | 0.3 | - | - | - | 0.3 | 0.3 |
| Bicycles on Road | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 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 |
| Bicycles on Crosswalk | - | - | - | - | 0 | - | - | - | - | - | 0 | - | - | - | - | - | 0 | - | - | - | - | - | 0 | - | - |
| % Bicycles on Crosswalk | - | - | - | - | - | - | - | - | - | - | 0.0 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pedestrians | - | - | - | - | 0 | - | - | - | - | - | 1 | - | - | - | - | - | 0 | - | - | - | - | - | 0 | - | - |
| % Pedestrians | - | - | - | - | - | - | - | - | - | - | 100.0 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

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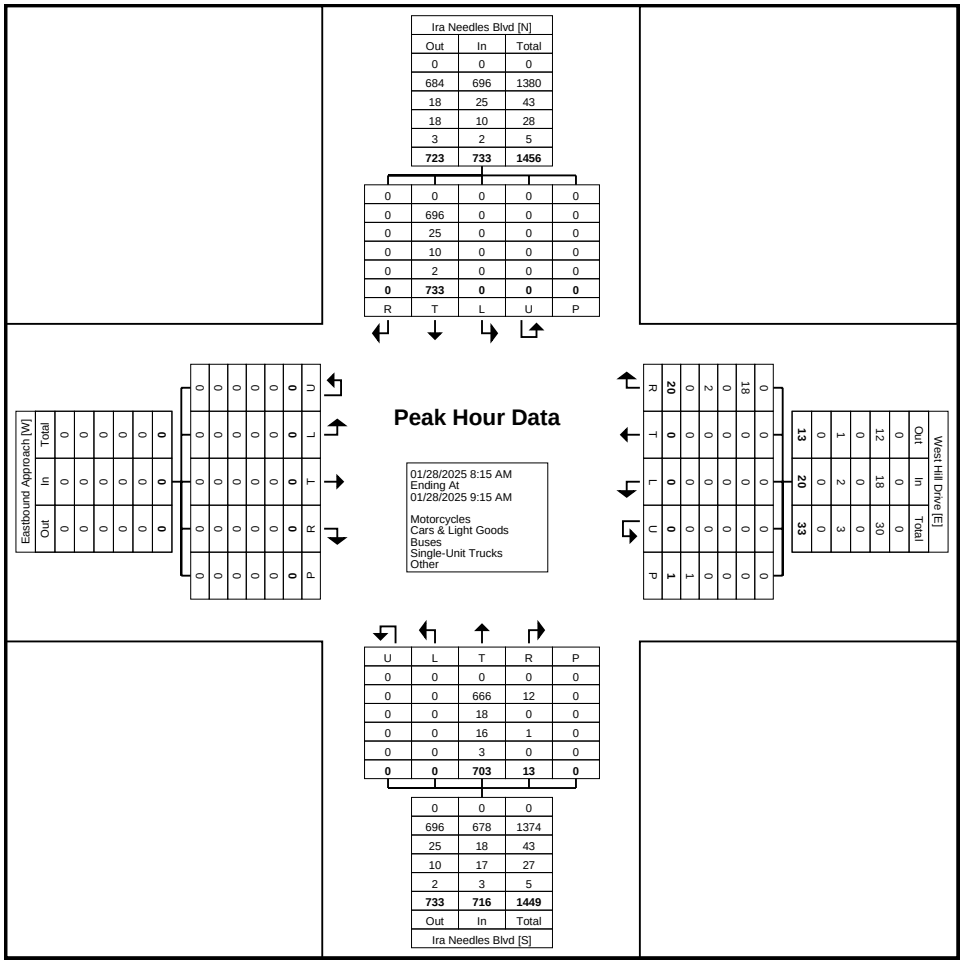
Start Date: 01/28/2025


Turning Movement Peak Hour Data Plot (8:15 AM)

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Count Name: Ira Needles Blvd & Westhill Drive
Site Code: 240745
Start Date: 01/28/2025


# Turning Movement Peak Hour Data (12:30 PM)

| Start Time | Eastbound Approach Eastbound | | | | | | West Hill Drive Westbound | | | | | | Ira Needles Blvd Northbound | | | | | | Ira Needles Blvd Southbound | | | | | | Int. Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | U-Turn | Peds | App. Total | Left | Thru | Right | U-Turn | Peds | App. Total | Left | Thru | Right | U-Turn | Peds | App. Total | Left | Thru | Right | U-Turn | Peds | App. Total | |
| 12:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 8 | 0 | 193 | 6 | 0 | 0 | 199 | 0 | 223 | 0 | 0 | 0 | 223 | 430 |
| 12:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 3 | 6 | 0 | 212 | 5 | 0 | 0 | 217 | 0 | 218 | 0 | 0 | 0 | 218 | 441 |
| 1:00 PM | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 11 | 0 | 1 | 11 | 0 | 186 | 4 | 0 | 0 | 190 | 0 | 242 | 0 | 0 | 0 | 242 | 443 |
| 1:15 PM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 183 | 6 | 0 | 0 | 189 | 0 | 233 | 0 | 0 | 0 | 233 | 423 |
| Total | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 26 | 0 | 5 | 26 | 0 | 774 | 21 | 0 | 0 | 795 | 0 | 916 | 0 | 0 | 0 | 916 | 1737 |
| Approach % | 0.0 | 0.0 | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 100.0 | 0.0 | - | - | 0.0 | 97.4 | 2.6 | 0.0 | - | - | 0.0 | 100.0 | 0.0 | 0.0 | - | - | - |
| Total % | 0.0 | 0.0 | 0.0 | 0.0 | - | 0.0 | 0.0 | 0.0 | 1.5 | 0.0 | - | 1.5 | 0.0 | 44.6 | 1.2 | 0.0 | - | 45.8 | 0.0 | 52.7 | 0.0 | 0.0 | - | 52.7 | - |
| PHF | 0.000 | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.591 | 0.000 | - | 0.591 | 0.000 | 0.913 | 0.875 | 0.000 | - | 0.916 | 0.000 | 0.946 | 0.000 | 0.000 | - | 0.946 | 0.980 |
| Motorcycles | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 |
| % Motorcycles | - | - | - | - | - | - | - | - | 0.0 | - | - | 0.0 | - | 0.0 | 0.0 | - | - | 0.0 | - | 0.0 | - | - | - | 0.0 | 0.0 |
| Cars & Light Goods | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 25 | 0 | - | 25 | 0 | 749 | 20 | 0 | - | 769 | 0 | 882 | 0 | 0 | - | 882 | 1676 |
| % Cars & Light Goods | - | - | - | - | - | - | - | - | 96.2 | - | - | 96.2 | - | 96.8 | 95.2 | - | - | 96.7 | - | 96.3 | - | - | - | 96.3 | 96.5 |
| Buses | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 1 | 0 | - | 1 | 0 | 12 | 0 | 0 | - | 12 | 0 | 11 | 0 | 0 | - | 11 | 24 |
| % Buses | - | - | - | - | - | - | - | - | 3.8 | - | - | 3.8 | - | 1.6 | 0.0 | - | - | 1.5 | - | 1.2 | - | - | - | 1.2 | 1.4 |
| Single-Unit Trucks | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 13 | 1 | 0 | - | 14 | 0 | 21 | 0 | 0 | - | 21 | 35 |
| % Single-Unit Trucks | - | - | - | - | - | - | - | - | 0.0 | - | - | 0.0 | - | 1.7 | 4.8 | - | - | 1.8 | - | 2.3 | - | - | - | 2.3 | 2.0 |
| Articulated Trucks | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 2 | 0 | 0 | - | 2 | 2 |
| % Articulated Trucks | - | - | - | - | - | - | - | - | 0.0 | - | - | 0.0 | - | 0.0 | 0.0 | - | - | 0.0 | - | 0.2 | - | - | - | 0.2 | 0.1 |
| Bicycles on Road | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 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 |
| Bicycles on Crosswalk | - | - | - | - | 0 | - | - | - | - | - | 0 | - | - | - | - | - | 0 | - | - | - | - | - | 0 | - | - |
| % Bicycles on Crosswalk | - | - | - | - | 0.0 | - | - | - | - | - | 0.0 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pedestrians | - | - | - | - | 3 | - | - | - | - | - | 5 | - | - | - | - | - | 0 | - | - | - | - | - | 0 | - | - |
| % Pedestrians | - | - | - | - | 100.0 | - | - | - | - | - | 100.0 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

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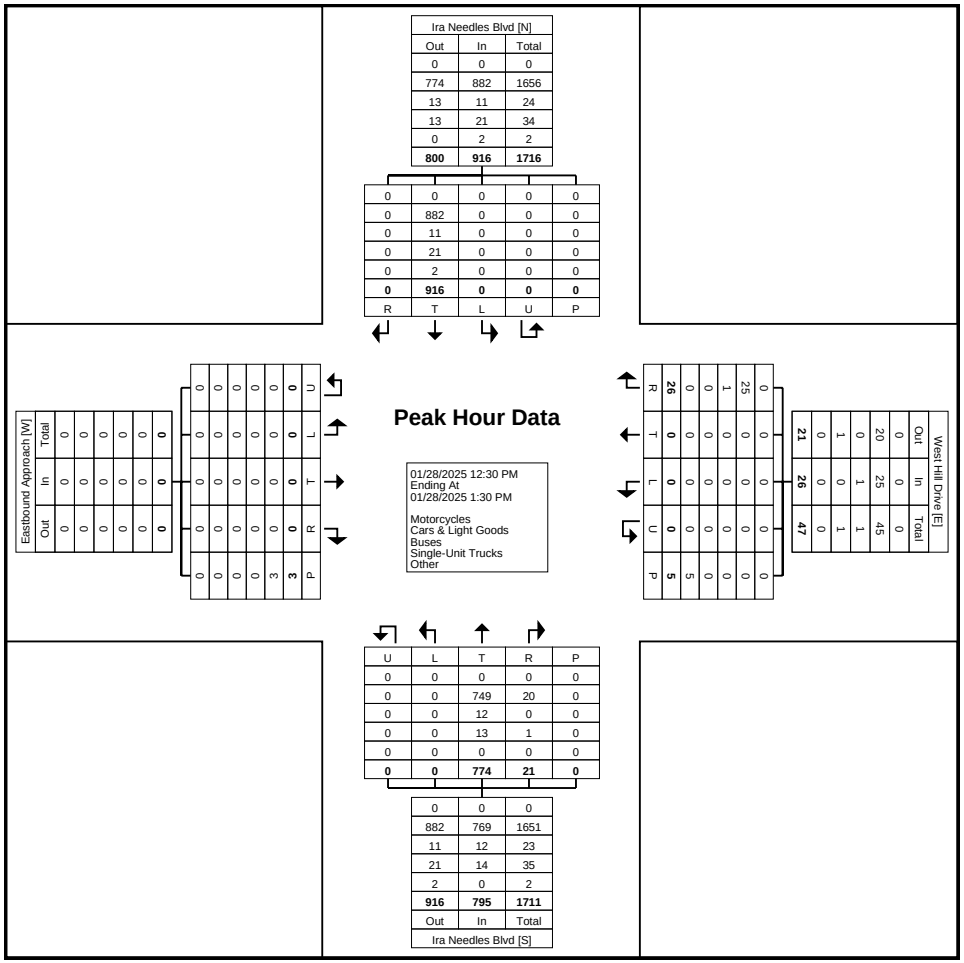


Turning Movement Peak Hour Data Plot (12:30 PM)

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Start Date: 01/28/2025


# Turning Movement Peak Hour Data (3:45 PM)

| Start Time | Eastbound Approach Eastbound | | | | | | West Hill Drive Westbound | | | | | | Ira Needles Blvd Northbound | | | | | | Ira Needles Blvd Southbound | | | | | | Int. Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | U-Turn | Peds | App. Total | Left | Thru | Right | U-Turn | Peds | App. Total | Left | Thru | Right | U-Turn | Peds | App. Total | Left | Thru | Right | U-Turn | Peds | App. Total | |
| 3:45 PM | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 15 | 0 | 0 | 15 | 0 | 229 | 9 | 0 | 0 | 238 | 0 | 248 | 0 | 0 | 0 | 248 | 501 |
| 4:00 PM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 9 | 0 | 2 | 9 | 0 | 273 | 5 | 0 | 0 | 278 | 0 | 265 | 0 | 0 | 0 | 265 | 552 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 6 | 0 | 258 | 1 | 0 | 0 | 259 | 0 | 271 | 0 | 0 | 0 | 271 | 536 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 1 | 8 | 0 | 243 | 5 | 0 | 0 | 248 | 0 | 283 | 0 | 0 | 0 | 283 | 539 |
| Total | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 38 | 0 | 3 | 38 | 0 | 1003 | 20 | 0 | 0 | 1023 | 0 | 1067 | 0 | 0 | 0 | 1067 | 2128 |
| Approach % | 0.0 | 0.0 | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 100.0 | 0.0 | - | - | 0.0 | 98.0 | 2.0 | 0.0 | - | - | 0.0 | 100.0 | 0.0 | 0.0 | - | - | - |
| Total % | 0.0 | 0.0 | 0.0 | 0.0 | - | 0.0 | 0.0 | 0.0 | 1.8 | 0.0 | - | 1.8 | 0.0 | 47.1 | 0.9 | 0.0 | - | 48.1 | 0.0 | 50.1 | 0.0 | 0.0 | - | 50.1 | - |
| PHF | 0.000 | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.633 | 0.000 | - | 0.633 | 0.000 | 0.918 | 0.556 | 0.000 | - | 0.920 | 0.000 | 0.943 | 0.000 | 0.000 | - | 0.943 | 0.964 |
| Motorcycles | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 |
| % Motorcycles | - | - | - | - | - | - | - | - | 0.0 | - | - | 0.0 | - | 0.0 | 0.0 | - | - | 0.0 | - | 0.0 | - | - | - | 0.0 | 0.0 |
| Cars & Light Goods | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 37 | 0 | - | 37 | 0 | 973 | 20 | 0 | - | 993 | 0 | 1043 | 0 | 0 | - | 1043 | 2073 |
| % Cars & Light Goods | - | - | - | - | - | - | - | - | 97.4 | - | - | 97.4 | - | 97.0 | 100.0 | - | - | 97.1 | - | 97.8 | - | - | - | 97.8 | 97.4 |
| Buses | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 17 | 0 | 0 | - | 17 | 0 | 12 | 0 | 0 | - | 12 | 29 |
| % Buses | - | - | - | - | - | - | - | - | 0.0 | - | - | 0.0 | - | 1.7 | 0.0 | - | - | 1.7 | - | 1.1 | - | - | - | 1.1 | 1.4 |
| Single-Unit Trucks | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 1 | 0 | - | 1 | 0 | 11 | 0 | 0 | - | 11 | 0 | 12 | 0 | 0 | - | 12 | 24 |
| % Single-Unit Trucks | - | - | - | - | - | - | - | - | 2.6 | - | - | 2.6 | - | 1.1 | 0.0 | - | - | 1.1 | - | 1.1 | - | - | - | 1.1 | 1.1 |
| Articulated Trucks | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 2 | 0 | 0 | - | 2 | 0 | 0 | 0 | 0 | - | 0 | 2 |
| % Articulated Trucks | - | - | - | - | - | - | - | - | 0.0 | - | - | 0.0 | - | 0.2 | 0.0 | - | - | 0.2 | - | 0.0 | - | - | - | 0.0 | 0.1 |
| Bicycles on Road | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 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 |
| Bicycles on Crosswalk | - | - | - | - | 0 | - | - | - | - | - | 0 | - | - | - | - | - | 0 | - | - | - | - | - | 0 | - | - |
| % Bicycles on Crosswalk | - | - | - | - | 0.0 | - | - | - | - | - | 0.0 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pedestrians | - | - | - | - | 4 | - | - | - | - | - | 3 | - | - | - | - | - | 0 | - | - | - | - | - | 0 | - | - |
| % Pedestrians | - | - | - | - | 100.0 | - | - | - | - | - | 100.0 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

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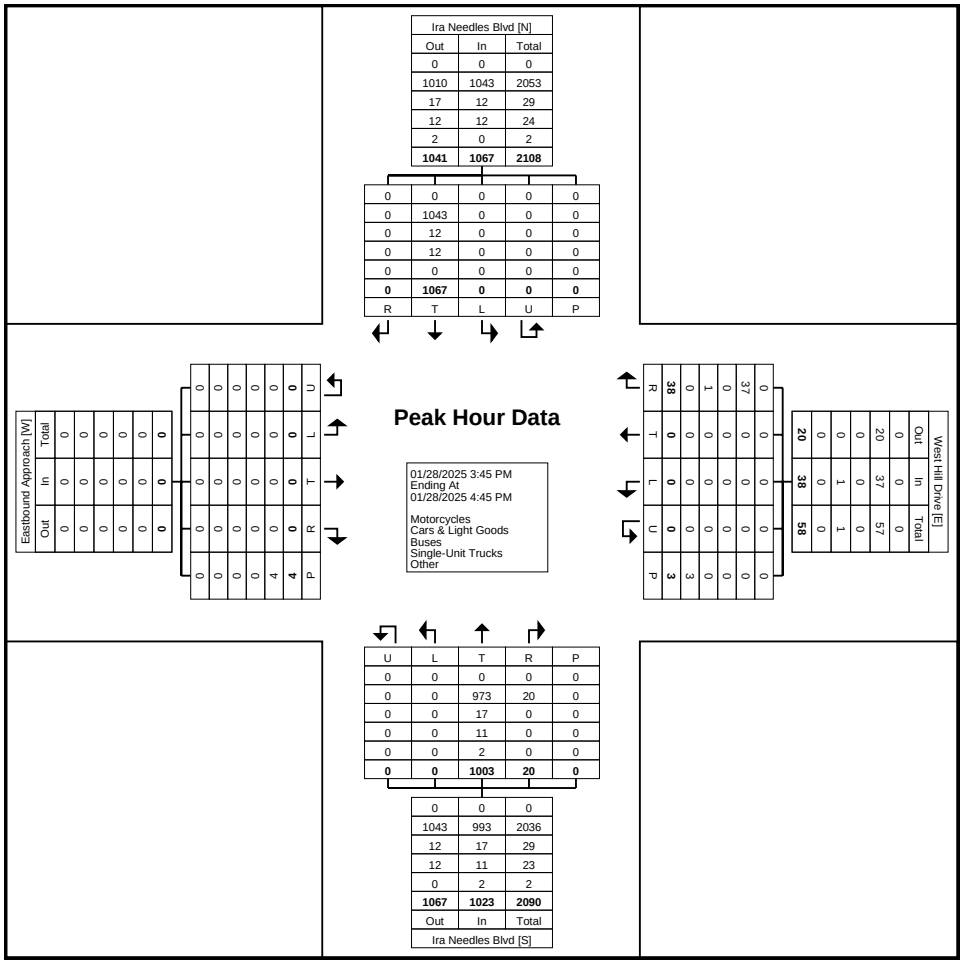


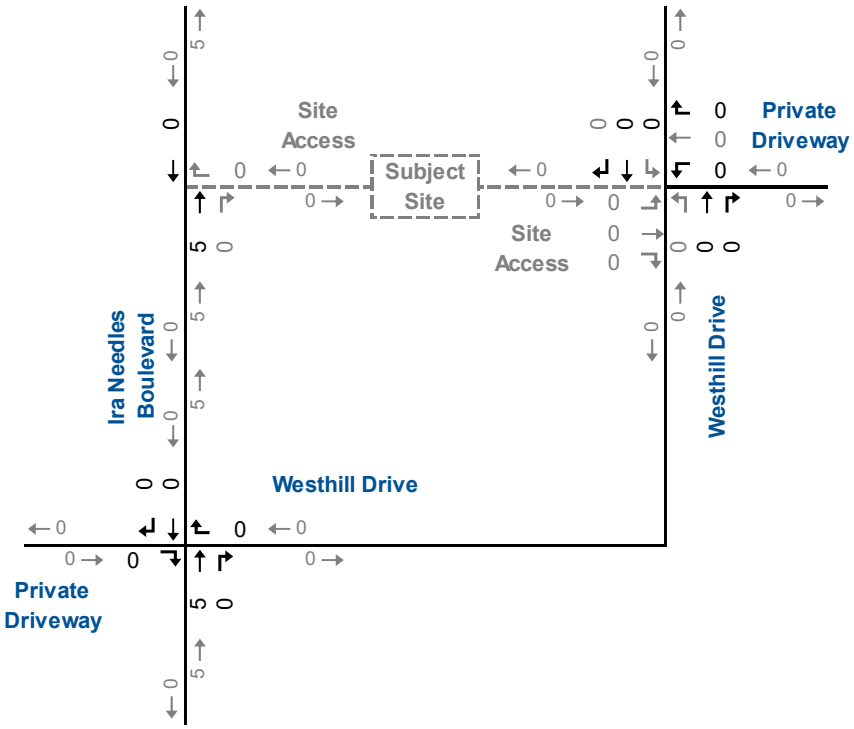

Turning Movement Peak Hour Data Plot (3:45 PM)

# Appendix C: Background Development Traffic

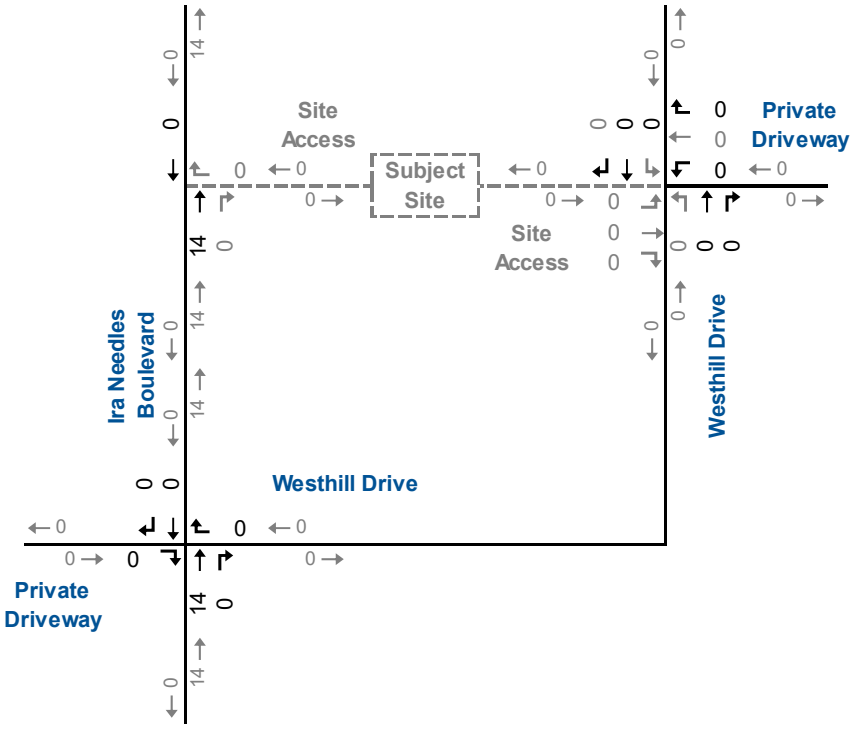




## AM Peak Hour




## PM Peak Hour



# Appendix D: Existing Traffic Operations







| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 703 | 13 | 0 | 733 | 0 |
| Future Volume (vph) | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 703 | 13 | 0 | 733 | 0 |
| Ideal Flow (vphpl) | 1000 | 1000 | 1750 | 1000 | 1000 | 1750 | 1000 | 1775 | 1775 | 1000 | 1775 | 1775 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 |
| Ped Bike Factor | | | | | | | | | | | | |
| Frt | | | | | | 0.865 | | 0.997 | | | | |
| Flt Protected | | | | | | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 1731 | 0 | 0 | 1361 | 0 | 3165 | 0 | 0 | 3176 | 0 |
| Flt Permitted | | | | | | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 1731 | 0 | 0 | 1361 | 0 | 3165 | 0 | 0 | 3176 | 0 |
| Link Speed (k/h) | | 40 | | | 40 | | | 60 | | | 60 | |
| Link Distance (m) | | 63.3 | | | 101.5 | | | 185.2 | | | 83.2 | |
| Travel Time (s) | | 5.7 | | | 9.1 | | | 11.1 | | | 5.0 | |
| Confl. Peds. (#/hr) | | | | | | | | | 1 | 1 | | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 0% | 0% | 10% | 0% | 5% | 8% | 0% | 5% | 0% |
| Adj. Flow (vph) | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 703 | 13 | 0 | 733 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 716 | 0 | 0 | 733 | 0 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 31.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |





| Intersection | |
|---|---|
| Int Delay, s/veh | 0.2 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 703 | 13 | 0 | 733 | 0 |
| Future Vol, veh/h | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 703 | 13 | 0 | 733 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | 0 | - | - | 0 | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 5 | 8 | 0 | 5 | 0 |
| Mvmt Flow | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 703 | 13 | 0 | 733 | 0 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | - | - | 367 | - | - | 359 | - | 0 | 0 | - | - | 0 |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy | - | - | 6.9 | - | - | 7.1 | - | - | - | - | - | - |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Follow-up Hdwy | - | - | 3.3 | - | - | 3.4 | - | - | - | - | - | - |
| Pot Cap-1 Maneuver | 0 | 0 | 636 | 0 | 0 | 615 | 0 | - | - | 0 | - | - |
| Stage 1 | 0 | 0 | - | 0 | 0 | - | 0 | - | - | 0 | - | - |
| Stage 2 | 0 | 0 | - | 0 | 0 | - | 0 | - | - | 0 | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | - | - | 636 | - | - | 614 | - | - | - | - | - | - |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 11.06 | 0 | 0 |
| HCM LOS | A | B | | |

| Minor Lane/Major Mvmt | NBT | NBR | EBLn1 | WBLn1 | SBT | SBR |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | - | 614 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.033 | - | - |
| HCM Ctrl Dly (s/v) | - | - | 0 | 11.1 | - | - |
| HCM Lane LOS | - | - | A | B | - | - |
| HCM 95th %tile Q(veh) | - | - | - | 0.1 | - | - |



| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 1 | 0 | 13 | 0 | 0 | 19 |
| Future Volume (vph) | 1 | 0 | 13 | 0 | 0 | 19 |
| Ideal Flow (vphpl) | 1765 | 1765 | 1650 | 1650 | 1650 | 1650 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | |
| Flt Protected | 0.950 | | | | | |
| Satd. Flow (prot) | 1626 | 0 | 1511 | 0 | 0 | 1470 |
| Flt Permitted | 0.950 | | | | | |
| Satd. Flow (perm) | 1626 | 0 | 1511 | 0 | 0 | 1470 |
| Link Speed (k/h) | 40 | | 40 | | | 40 |
| Link Distance (m) | 25.0 | | 101.5 | | | 99.0 |
| Travel Time (s) | 2.3 | | 9.1 | | | 8.9 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 2% | 2% | 8% | 2% | 2% | 11% |
| Adj. Flow (vph) | 1 | 0 | 13 | 0 | 0 | 19 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 1 | 0 | 13 | 0 | 0 | 19 |
| Sign Control | Stop | | Free | | | Free |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 13.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |





| Intersection | |
|---|---|
| Int Delay, s/veh | 0.3 |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 1 | 0 | 13 | 0 | 0 | 19 |
| Future Vol, veh/h | 1 | 0 | 13 | 0 | 0 | 19 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 8 | 2 | 2 | 11 |
| Mvmt Flow | 1 | 0 | 13 | 0 | 0 | 19 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 32 | 13 | 0 | 0 | 13 | 0 |
| Stage 1 | 13 | - | - | - | - | - |
| Stage 2 | 19 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 982 | 1067 | - | - | 1606 | - |
| Stage 1 | 1010 | - | - | - | - | - |
| Stage 2 | 1004 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 982 | 1067 | - | - | 1606 | - |
| Mov Cap-2 Maneuver | 982 | - | - | - | - | - |
| Stage 1 | 1010 | - | - | - | - | - |
| Stage 2 | 1004 | - | - | - | - | - |

| Approach | WB | NB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 8.67 | 0 | 0 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBT | NBR | WBLn1 | SBL | SBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | 982 | 1606 | - |
| HCM Lane V/C Ratio | - | - | 0.001 | - | - |
| HCM Ctrl Dly (s/v) | - | - | 8.7 | 0 | - |
| HCM Lane LOS | - | - | A | A | - |
| HCM 95th %tile Q(veh) | - | - | 0 | 0 | - |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 0 | 0 | 0 | 38 | 0 | 1003 | 20 | 0 | 1067 | 0 |
| Future Volume (vph) | 0 | 0 | 0 | 0 | 0 | 38 | 0 | 1003 | 20 | 0 | 1067 | 0 |
| Ideal Flow (vphpl) | 1000 | 1000 | 1750 | 1000 | 1000 | 1750 | 1000 | 1775 | 1775 | 1000 | 1775 | 1775 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 |
| Ped Bike Factor | | | | | | | | | | | | |
| Frt | | | | | | 0.865 | | 0.997 | | | | |
| Flt Protected | | | | | | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 1731 | 0 | 0 | 1453 | 0 | 3230 | 0 | 0 | 3270 | 0 |
| Flt Permitted | | | | | | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 1731 | 0 | 0 | 1453 | 0 | 3230 | 0 | 0 | 3270 | 0 |
| Link Speed (k/h) | | 40 | | | 40 | | | 60 | | | 60 | |
| Link Distance (m) | | 63.3 | | | 101.5 | | | 185.2 | | | 83.2 | |
| Travel Time (s) | | 5.7 | | | 9.1 | | | 11.1 | | | 5.0 | |
| Confl. Peds. (#/hr) | | | | | | | 4 | | 3 | 3 | | 4 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 0% | 0% | 3% | 0% | 3% | 0% | 0% | 2% | 0% |
| Adj. Flow (vph) | 0 | 0 | 0 | 0 | 0 | 38 | 0 | 1003 | 20 | 0 | 1067 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 0 | 0 | 0 | 38 | 0 | 1023 | 0 | 0 | 1067 | 0 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 40.4% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |





| Intersection | |
|---|---|
| Int Delay, s/veh | 0.2 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 0 | 0 | 0 | 0 | 0 | 38 | 0 | 1003 | 20 | 0 | 1067 | 0 |
| Future Vol, veh/h | 0 | 0 | 0 | 0 | 0 | 38 | 0 | 1003 | 20 | 0 | 1067 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 3 | 3 | 0 | 4 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | 0 | - | - | 0 | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 0 | 0 | 2 | 0 |
| Mvmt Flow | 0 | 0 | 0 | 0 | 0 | 38 | 0 | 1003 | 20 | 0 | 1067 | 0 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | - | - | 538 | - | - | 515 | - | 0 | 0 | - | - | 0 |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy | - | - | 6.9 | - | - | 6.96 | - | - | - | - | - | - |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Follow-up Hdwy | - | - | 3.3 | - | - | 3.33 | - | - | - | - | - | - |
| Pot Cap-1 Maneuver | 0 | 0 | 493 | 0 | 0 | 502 | 0 | - | - | 0 | - | - |
| Stage 1 | 0 | 0 | - | 0 | 0 | - | 0 | - | - | 0 | - | - |
| Stage 2 | 0 | 0 | - | 0 | 0 | - | 0 | - | - | 0 | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | - | - | 491 | - | - | 501 | - | - | - | - | - | - |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 12.77 | 0 | 0 |
| HCM LOS | A | B | | |

| Minor Lane/Major Mvmt | NBT | NBR | EBLn1 | WBLn1 | SBT | SBR |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | - | 501 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.076 | - | - |
| HCM Ctrl Dly (s/v) | - | - | 0 | 12.8 | - | - |
| HCM Lane LOS | - | - | A | B | - | - |
| HCM 95th %tile Q(veh) | - | - | - | 0.2 | - | - |



| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 19 | 1 | 0 | 38 |
| Future Volume (vph) | 0 | 0 | 19 | 1 | 0 | 38 |
| Ideal Flow (vphpl) | 1765 | 1765 | 1650 | 1650 | 1650 | 1650 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.993 | | | |
| Flt Protected | | | | | | |
| Satd. Flow (prot) | 1711 | 0 | 1619 | 0 | 0 | 1584 |
| Flt Permitted | | | | | | |
| Satd. Flow (perm) | 1711 | 0 | 1619 | 0 | 0 | 1584 |
| Link Speed (k/h) | 40 | | 40 | | | 40 |
| Link Distance (m) | 25.0 | | 101.5 | | | 99.0 |
| Travel Time (s) | 2.3 | | 9.1 | | | 8.9 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 2% | 2% | 0% | 2% | 2% | 3% |
| Adj. Flow (vph) | 0 | 0 | 19 | 1 | 0 | 38 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 20 | 0 | 0 | 38 |
| Sign Control | Stop | | Free | | | Free |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 6.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |





| Intersection | |
|---|---|
| Int Delay, s/veh | 0 |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 0 | 19 | 1 | 0 | 38 |
| Future Vol, veh/h | 0 | 0 | 19 | 1 | 0 | 38 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 0 | 2 | 2 | 3 |
| Mvmt Flow | 0 | 0 | 19 | 1 | 0 | 38 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 58 | 20 | 0 | 0 | 20 | 0 |
| Stage 1 | 20 | - | - | - | - | - |
| Stage 2 | 38 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 950 | 1058 | - | - | 1596 | - |
| Stage 1 | 1003 | - | - | - | - | - |
| Stage 2 | 984 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 950 | 1058 | - | - | 1596 | - |
| Mov Cap-2 Maneuver | 950 | - | - | - | - | - |
| Stage 1 | 1003 | - | - | - | - | - |
| Stage 2 | 984 | - | - | - | - | - |

| Approach | WB | NB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 0 | 0 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBT | NBRWBLn1 | SBL | SBT |
|---|---|---|---|---|
| Capacity (veh/h) | - | - | 1596 | - |
| HCM Lane V/C Ratio | - | - | - | - |
| HCM Ctrl Dly (s/v) | - | 0 | 0 | - |
| HCM Lane LOS | - | A | A | - |
| HCM 95th %tile Q(veh) | - | - | 0 | - |

# Appendix E: Background Traffic Operations







| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 762 | 14 | 0 | 790 | 0 |
| Future Volume (vph) | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 762 | 14 | 0 | 790 | 0 |
| Ideal Flow (vphpl) | 1000 | 1000 | 1750 | 1000 | 1000 | 1750 | 1000 | 1775 | 1775 | 1000 | 1775 | 1775 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 |
| Ped Bike Factor | | | | | | | | | | | | |
| Frt | | | | | | 0.865 | | 0.997 | | | | |
| Flt Protected | | | | | | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 1731 | 0 | 0 | 1361 | 0 | 3165 | 0 | 0 | 3176 | 0 |
| Flt Permitted | | | | | | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 1731 | 0 | 0 | 1361 | 0 | 3165 | 0 | 0 | 3176 | 0 |
| Link Speed (k/h) | | 40 | | | 40 | | | 60 | | | 60 | |
| Link Distance (m) | | 63.3 | | | 101.5 | | | 185.2 | | | 83.2 | |
| Travel Time (s) | | 5.7 | | | 9.1 | | | 11.1 | | | 5.0 | |
| Confl. Peds. (#/hr) | | | | | | | | | 1 | 1 | | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 0% | 0% | 10% | 0% | 5% | 8% | 0% | 5% | 0% |
| Adj. Flow (vph) | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 762 | 14 | 0 | 790 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 776 | 0 | 0 | 790 | 0 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 33.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |





| Intersection | |
|---|---|
| Int Delay, s/veh | 0.2 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 762 | 14 | 0 | 790 | 0 |
| Future Vol, veh/h | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 762 | 14 | 0 | 790 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | 0 | - | - | 0 | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 5 | 8 | 0 | 5 | 0 |
| Mvmt Flow | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 762 | 14 | 0 | 790 | 0 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | - | - | 395 | - | - | 389 | - | 0 | 0 | - | - | 0 |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy | - | - | 6.9 | - | - | 7.1 | - | - | - | - | - | - |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Follow-up Hdwy | - | - | 3.3 | - | - | 3.4 | - | - | - | - | - | - |
| Pot Cap-1 Maneuver | 0 | 0 | 610 | 0 | 0 | 587 | 0 | - | - | 0 | - | - |
| Stage 1 | 0 | 0 | - | 0 | 0 | - | 0 | - | - | 0 | - | - |
| Stage 2 | 0 | 0 | - | 0 | 0 | - | 0 | - | - | 0 | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | - | - | 610 | - | - | 587 | - | - | - | - | - | - |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 11.37 | 0 | 0 |
| HCM LOS | A | B | | |

| Minor Lane/Major Mvmt | NBT | NBR | EBLn1 | WBLn1 | SBT | SBR |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | - | 587 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.037 | - | - |
| HCM Ctrl Dly (s/v) | - | - | 0 | 11.4 | - | - |
| HCM Lane LOS | - | - | A | B | - | - |
| HCM 95th %tile Q(veh) | - | - | - | 0.1 | - | - |



| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 1 | 0 | 14 | 0 | 0 | 20 |
| Future Volume (vph) | 1 | 0 | 14 | 0 | 0 | 20 |
| Ideal Flow (vphpl) | 1765 | 1765 | 1650 | 1650 | 1650 | 1650 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | |
| Flt Protected | 0.950 | | | | | |
| Satd. Flow (prot) | 1626 | 0 | 1511 | 0 | 0 | 1470 |
| Flt Permitted | 0.950 | | | | | |
| Satd. Flow (perm) | 1626 | 0 | 1511 | 0 | 0 | 1470 |
| Link Speed (k/h) | 40 | | 40 | | | 40 |
| Link Distance (m) | 25.0 | | 101.5 | | | 99.0 |
| Travel Time (s) | 2.3 | | 9.1 | | | 8.9 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 2% | 2% | 8% | 2% | 2% | 11% |
| Adj. Flow (vph) | 1 | 0 | 14 | 0 | 0 | 20 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 1 | 0 | 14 | 0 | 0 | 20 |
| Sign Control | Stop | | Free | | | Free |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 13.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |





| Intersection | |
|---|---|
| Int Delay, s/veh | 0.2 |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 1 | 0 | 14 | 0 | 0 | 20 |
| Future Vol, veh/h | 1 | 0 | 14 | 0 | 0 | 20 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 8 | 2 | 2 | 11 |
| Mvmt Flow | 1 | 0 | 14 | 0 | 0 | 20 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 34 | 14 | 0 | 0 | 14 | 0 |
| Stage 1 | 14 | - | - | - | - | - |
| Stage 2 | 20 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 979 | 1066 | - | - | 1604 | - |
| Stage 1 | 1009 | - | - | - | - | - |
| Stage 2 | 1003 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 979 | 1066 | - | - | 1604 | - |
| Mov Cap-2 Maneuver | 979 | - | - | - | - | - |
| Stage 1 | 1009 | - | - | - | - | - |
| Stage 2 | 1003 | - | - | - | - | - |

| Approach | WB | NB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 8.68 | 0 | 0 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBT | NBR | WBLn1 | SBL | SBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | 979 | 1604 | - |
| HCM Lane V/C Ratio | - | - | 0.001 | - | - |
| HCM Ctrl Dly (s/v) | - | - | 8.7 | 0 | - |
| HCM Lane LOS | - | - | A | A | - |
| HCM 95th %tile Q(veh) | - | - | 0 | 0 | - |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 1095 | 22 | 0 | 1149 | 0 |
| Future Volume (vph) | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 1095 | 22 | 0 | 1149 | 0 |
| Ideal Flow (vphpl) | 1000 | 1000 | 1750 | 1000 | 1000 | 1750 | 1000 | 1775 | 1775 | 1000 | 1775 | 1775 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 |
| Ped Bike Factor | | | | | | | | | | | | |
| Frt | | | | | | 0.865 | | 0.997 | | | | |
| Flt Protected | | | | | | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 1731 | 0 | 0 | 1453 | 0 | 3230 | 0 | 0 | 3270 | 0 |
| Flt Permitted | | | | | | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 1731 | 0 | 0 | 1453 | 0 | 3230 | 0 | 0 | 3270 | 0 |
| Link Speed (k/h) | | 40 | | | 40 | | | 60 | | | 60 | |
| Link Distance (m) | | 63.3 | | | 101.5 | | | 185.2 | | | 83.2 | |
| Travel Time (s) | | 5.7 | | | 9.1 | | | 11.1 | | | 5.0 | |
| Confl. Peds. (#/hr) | | | | | | | 4 | | 3 | 3 | | 4 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 0% | 0% | 3% | 0% | 3% | 0% | 0% | 2% | 0% |
| Adj. Flow (vph) | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 1095 | 22 | 0 | 1149 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 1117 | 0 | 0 | 1149 | 0 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 43.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |





| Intersection | |
|---|---|
| Int Delay, s/veh | 0.2 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 1095 | 22 | 0 | 1149 | 0 |
| Future Vol, veh/h | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 1095 | 22 | 0 | 1149 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 3 | 3 | 0 | 4 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | 0 | - | - | 0 | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 0 | 0 | 2 | 0 |
| Mvmt Flow | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 1095 | 22 | 0 | 1149 | 0 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | - | - | 579 | - | - | 562 | - | 0 | 0 | - | - | 0 |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy | - | - | 6.9 | - | - | 6.96 | - | - | - | - | - | - |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Follow-up Hdwy | - | - | 3.3 | - | - | 3.33 | - | - | - | - | - | - |
| Pot Cap-1 Maneuver | 0 | 0 | 464 | 0 | 0 | 468 | 0 | - | - | 0 | - | - |
| Stage 1 | 0 | 0 | - | 0 | 0 | - | 0 | - | - | 0 | - | - |
| Stage 2 | 0 | 0 | - | 0 | 0 | - | 0 | - | - | 0 | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | - | - | 462 | - | - | 467 | - | - | - | - | - | - |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 13.45 | 0 | 0 |
| HCM LOS | A | B | | |

| Minor Lane/Major Mvmt | NBT | NBR | EBLn1 | WBLn1 | SBT | SBR |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | - | 467 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.088 | - | - |
| HCM Ctrl Dly (s/v) | - | - | 0 | 13.5 | - | - |
| HCM Lane LOS | - | - | A | B | - | - |
| HCM 95th %tile Q(veh) | - | - | - | 0.3 | - | - |



| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 20 | 1 | 0 | 41 |
| Future Volume (vph) | 0 | 0 | 20 | 1 | 0 | 41 |
| Ideal Flow (vphpl) | 1765 | 1765 | 1650 | 1650 | 1650 | 1650 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.994 | | | |
| Flt Protected | | | | | | |
| Satd. Flow (prot) | 1711 | 0 | 1620 | 0 | 0 | 1584 |
| Flt Permitted | | | | | | |
| Satd. Flow (perm) | 1711 | 0 | 1620 | 0 | 0 | 1584 |
| Link Speed (k/h) | 40 | | 40 | | | 40 |
| Link Distance (m) | 25.0 | | 101.5 | | | 99.0 |
| Travel Time (s) | 2.3 | | 9.1 | | | 8.9 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 2% | 2% | 0% | 2% | 2% | 3% |
| Adj. Flow (vph) | 0 | 0 | 20 | 1 | 0 | 41 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 21 | 0 | 0 | 41 |
| Sign Control | Stop | | Free | | | Free |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 6.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |





| Intersection | |
|---|---|
| Int Delay, s/veh | 0 |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 0 | 20 | 1 | 0 | 41 |
| Future Vol, veh/h | 0 | 0 | 20 | 1 | 0 | 41 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 0 | 2 | 2 | 3 |
| Mvmt Flow | 0 | 0 | 20 | 1 | 0 | 41 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 62 | 21 | 0 | 0 | 21 | 0 |
| Stage 1 | 21 | - | - | - | - | - |
| Stage 2 | 41 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 945 | 1057 | - | - | 1595 | - |
| Stage 1 | 1002 | - | - | - | - | - |
| Stage 2 | 981 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 945 | 1057 | - | - | 1595 | - |
| Mov Cap-2 Maneuver | 945 | - | - | - | - | - |
| Stage 1 | 1002 | - | - | - | - | - |
| Stage 2 | 981 | - | - | - | - | - |

| Approach | WB | NB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 0 | 0 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBT | NBR | WBLn1 | SBL | SBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | - | 1595 | - |
| HCM Lane V/C Ratio | - | - | - | - | - |
| HCM Ctrl Dly (s/v) | - | - | 0 | 0 | - |
| HCM Lane LOS | - | - | A | A | - |
| HCM 95th %tile Q(veh) | - | - | - | 0 | - |

# Appendix F: Total Traffic Operations





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 763 | 16 | 0 | 797 | 0 |
| Future Volume (vph) | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 763 | 16 | 0 | 797 | 0 |
| Ideal Flow (vphpl) | 1000 | 1000 | 1750 | 1000 | 1000 | 1750 | 1000 | 1775 | 1775 | 1000 | 1775 | 1775 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 |
| Ped Bike Factor | | | | | | | | | | | | |
| Frt | | | | | | 0.865 | | 0.997 | | | | |
| Flt Protected | | | | | | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 1731 | 0 | 0 | 1361 | 0 | 3165 | 0 | 0 | 3176 | 0 |
| Flt Permitted | | | | | | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 1731 | 0 | 0 | 1361 | 0 | 3165 | 0 | 0 | 3176 | 0 |
| Link Speed (k/h) | | 40 | | | 40 | | | 60 | | | 60 | |
| Link Distance (m) | | 63.3 | | | 101.5 | | | 185.2 | | | 83.2 | |
| Travel Time (s) | | 5.7 | | | 9.1 | | | 11.1 | | | 5.0 | |
| Confl. Peds. (#/hr) | | | | | | | | | 1 | 1 | | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 0% | 0% | 10% | 0% | 5% | 8% | 0% | 5% | 0% |
| Adj. Flow (vph) | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 763 | 16 | 0 | 797 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 779 | 0 | 0 | 797 | 0 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 33.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |





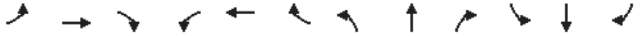
| Intersection | |
|---|---|
| Int Delay, s/veh | 0.2 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 763 | 16 | 0 | 797 | 0 |
| Future Vol, veh/h | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 763 | 16 | 0 | 797 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | 0 | - | - | 0 | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 5 | 8 | 0 | 5 | 0 |
| Mvmt Flow | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 763 | 16 | 0 | 797 | 0 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | - | - | 399 | - | - | 391 | - | 0 | 0 | - | - | 0 |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy | - | - | 6.9 | - | - | 7.1 | - | - | - | - | - | - |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Follow-up Hdwy | - | - | 3.3 | - | - | 3.4 | - | - | - | - | - | - |
| Pot Cap-1 Maneuver | 0 | 0 | 607 | 0 | 0 | 586 | 0 | - | - | 0 | - | - |
| Stage 1 | 0 | 0 | - | 0 | 0 | - | 0 | - | - | 0 | - | - |
| Stage 2 | 0 | 0 | - | 0 | 0 | - | 0 | - | - | 0 | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | - | - | 607 | - | - | 586 | - | - | - | - | - | - |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 11.39 | 0 | 0 |
| HCM LOS | A | B | | |

| Minor Lane/Major Mvmt | NBT | NBR | EBLn1 | WBLn1 | SBT | SBR |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | - | 586 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.038 | - | - |
| HCM Ctrl Dly (s/v) | - | - | 0 | 11.4 | - | - |
| HCM Lane LOS | - | - | A | B | - | - |
| HCM 95th %tile Q(veh) | - | - | - | 0.1 | - | - |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 14 | 0 | 0 | 20 | 0 |
| Future Volume (vph) | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 14 | 0 | 0 | 20 | 0 |
| Ideal Flow (vphpl) | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | | | | | | | |
| Flt Protected | | | | | 0.950 | | | 0.994 | | | | |
| Satd. Flow (prot) | 0 | 1503 | 0 | 0 | 1428 | 0 | 0 | 1421 | 0 | 0 | 1381 | 0 |
| Flt Permitted | | | | | 0.950 | | | 0.994 | | | | |
| Satd. Flow (perm) | 0 | 1503 | 0 | 0 | 1428 | 0 | 0 | 1421 | 0 | 0 | 1381 | 0 |
| Link Speed (k/h) | | 40 | | | 40 | | | 40 | | | 40 | |
| Link Distance (m) | | 30.4 | | | 25.0 | | | 101.5 | | | 99.0 | |
| Travel Time (s) | | 2.7 | | | 2.3 | | | 9.1 | | | 8.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 8% | 2% | 2% | 11% | 2% |
| Adj. Flow (vph) | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 14 | 0 | 0 | 20 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 16 | 0 | 0 | 20 | 0 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 13.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |





| Intersection | |
|---|---|
| Int Delay, s/veh | 0.6 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 14 | 0 | 0 | 20 | 0 |
| Future Vol, veh/h | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 14 | 0 | 0 | 20 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 8 | 2 | 2 | 11 | 2 |
| Mvmt Flow | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 14 | 0 | 0 | 20 | 0 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 38 | 38 | 20 | 38 | 38 | 14 | 20 | 0 | 0 | 14 | 0 | 0 |
| Stage 1 | 20 | 20 | - | 18 | 18 | - | - | - | - | - | - | - |
| Stage 2 | 18 | 18 | - | 20 | 20 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 967 | 854 | 1058 | 967 | 854 | 1066 | 1596 | - | - | 1604 | - | - |
| Stage 1 | 999 | 879 | - | 1001 | 880 | - | - | - | - | - | - | - |
| Stage 2 | 1001 | 880 | - | 999 | 879 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 966 | 853 | 1058 | 966 | 853 | 1066 | 1596 | - | - | 1604 | - | - |
| Mov Cap-2 Maneuver | 966 | 853 | - | 966 | 853 | - | - | - | - | - | - | - |
| Stage 1 | 999 | 879 | - | 1000 | 879 | - | - | - | - | - | - | - |
| Stage 2 | 1000 | 879 | - | 999 | 879 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 8.73 | 0.91 | 0 |
| HCM LOS | A | A | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 225 | - | - | - | 966 | 1604 | - | - |
| HCM Lane V/C Ratio | 0.001 | - | - | - | 0.001 | - | - | - |
| HCM Ctrl Dly (s/v) | 7.3 | 0 | - | 0 | 8.7 | 0 | - | - |
| HCM Lane LOS | A | A | - | A | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0 | 0 | - | - |



| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 0 | 10 | 784 | 1 | 0 | 797 |
| Future Volume (vph) | 0 | 10 | 784 | 1 | 0 | 797 |
| Ideal Flow (vphpl) | 1000 | 1750 | 1775 | 1775 | 1000 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 |
| Ped Bike Factor | | | | | | |
| Frt | | 0.865 | | | | |
| Flt Protected | | | | | | |
| Satd. Flow (prot) | 0 | 1468 | 3176 | 0 | 0 | 3400 |
| Flt Permitted | | | | | | |
| Satd. Flow (perm) | 0 | 1468 | 3176 | 0 | 0 | 3400 |
| Link Speed (k/h) | 40 | | 60 | | | 60 |
| Link Distance (m) | 30.6 | | 83.2 | | | 145.4 |
| Travel Time (s) | 2.8 | | 5.0 | | | 8.7 |
| Confl. Peds. (#/hr) | | | | 1 | 1 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 2% | 2% | 5% | 2% | 2% | 5% |
| Adj. Flow (vph) | 0 | 10 | 784 | 1 | 0 | 797 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 0 | 10 | 785 | 0 | 0 | 797 |
| Sign Control | Stop | | Free | | | Free |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 33.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |





| Intersection | |
|---|---|
| Int Delay, s/veh | 0.1 |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 10 | 784 | 1 | 0 | 797 |
| Future Vol, veh/h | 0 | 10 | 784 | 1 | 0 | 797 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 1 | 1 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | 0 | - | - | - | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 5 | 2 | 2 | 5 |
| Mvmt Flow | 0 | 10 | 784 | 1 | 0 | 797 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | - | 394 | 0 | 0 | - | - |
| Stage 1 | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |
| Critical Hdwy | - | 6.94 | - | - | - | - |
| Critical Hdwy Stg 1 | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - |
| Follow-up Hdwy | - | 3.32 | - | - | - | - |
| Pot Cap-1 Maneuver | 0 | 606 | - | - | 0 | - |
| Stage 1 | 0 | - | - | - | 0 | - |
| Stage 2 | 0 | - | - | - | 0 | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | - | 605 | - | - | - | - |
| Mov Cap-2 Maneuver | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |

| Approach | WB | NB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 11.05 | 0 | 0 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBT | NBR | WBLn1 | SBT |
|---|---|---|---|---|
| Capacity (veh/h) | - | - | 605 | - |
| HCM Lane V/C Ratio | - | - | 0.017 | - |
| HCM Ctrl Dly (s/v) | - | - | 11.1 | - |
| HCM Lane LOS | - | - | B | - |
| HCM 95th %tile Q(veh) | - | - | 0.1 | - |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 1102 | 29 | 0 | 1161 | 0 |
| Future Volume (vph) | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 1102 | 29 | 0 | 1161 | 0 |
| Ideal Flow (vphpl) | 1000 | 1000 | 1750 | 1000 | 1000 | 1750 | 1000 | 1775 | 1775 | 1000 | 1775 | 1775 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 |
| Ped Bike Factor | | | | | | | | | | | | |
| Frt | | | | | | 0.865 | | 0.996 | | | | |
| Flt Protected | | | | | | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 1731 | 0 | 0 | 1453 | 0 | 3227 | 0 | 0 | 3270 | 0 |
| Flt Permitted | | | | | | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 1731 | 0 | 0 | 1453 | 0 | 3227 | 0 | 0 | 3270 | 0 |
| Link Speed (k/h) | | 40 | | | 40 | | | 60 | | | 60 | |
| Link Distance (m) | | 63.3 | | | 101.5 | | | 185.2 | | | 83.2 | |
| Travel Time (s) | | 5.7 | | | 9.1 | | | 11.1 | | | 5.0 | |
| Confl. Peds. (#/hr) | | | | | | | 4 | | 3 | 3 | | 4 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 0% | 0% | 3% | 0% | 3% | 0% | 0% | 2% | 0% |
| Adj. Flow (vph) | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 1102 | 29 | 0 | 1161 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 1131 | 0 | 0 | 1161 | 0 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 43.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |





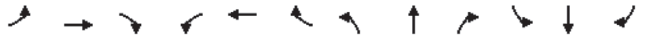
| Intersection | |
|---|---|
| Int Delay, s/veh | 0.2 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 1102 | 29 | 0 | 1161 | 0 |
| Future Vol, veh/h | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 1102 | 29 | 0 | 1161 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 3 | 3 | 0 | 4 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | 0 | - | - | 0 | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 0 | 0 | 2 | 0 |
| Mvmt Flow | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 1102 | 29 | 0 | 1161 | 0 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | - | - | 585 | - | - | 569 | - | 0 | 0 | - | - | 0 |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy | - | - | 6.9 | - | - | 6.96 | - | - | - | - | - | - |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Follow-up Hdwy | - | - | 3.3 | - | - | 3.33 | - | - | - | - | - | - |
| Pot Cap-1 Maneuver | 0 | 0 | 460 | 0 | 0 | 463 | 0 | - | - | 0 | - | - |
| Stage 1 | 0 | 0 | - | 0 | 0 | - | 0 | - | - | 0 | - | - |
| Stage 2 | 0 | 0 | - | 0 | 0 | - | 0 | - | - | 0 | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | - | - | 458 | - | - | 462 | - | - | - | - | - | - |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 13.55 | 0 | 0 |
| HCM LOS | A | B | | |

| Minor Lane/Major Mvmt | NBT | NBR | EBLn1 | WBLn1 | SBT | SBR |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | - | 462 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.089 | - | - |
| HCM Ctrl Dly (s/v) | - | - | 0 | 13.6 | - | - |
| HCM Lane LOS | - | - | A | B | - | - |
| HCM 95th %tile Q(veh) | - | - | - | 0.3 | - | - |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ✣ | | | ✣ | | | ✣ | | | ✣ | |
| Traffic Volume (vph) | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 20 | 1 | 0 | 41 | 0 |
| Future Volume (vph) | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 20 | 1 | 0 | 41 | 0 |
| Ideal Flow (vphpl) | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | | | 0.995 | | | | |
| Flt Protected | | | | | | | | 0.988 | | | | |
| Satd. Flow (prot) | 0 | 1503 | 0 | 0 | 1503 | 0 | 0 | 1498 | 0 | 0 | 1488 | 0 |
| Flt Permitted | | | | | | | | 0.988 | | | | |
| Satd. Flow (perm) | 0 | 1503 | 0 | 0 | 1503 | 0 | 0 | 1498 | 0 | 0 | 1488 | 0 |
| Link Speed (k/h) | | 40 | | | 40 | | | 40 | | | 40 | |
| Link Distance (m) | | 30.4 | | | 25.0 | | | 101.5 | | | 99.0 | |
| Travel Time (s) | | 2.7 | | | 2.3 | | | 9.1 | | | 8.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 0% | 2% | 2% | 3% | 2% |
| Adj. Flow (vph) | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 20 | 1 | 0 | 41 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28 | 0 | 0 | 41 | 0 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 11.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |





| Intersection | |
|---|---|
| Int Delay, s/veh | 0.7 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ✣ | | | ✣ | | | ✣ | | | ✣ | |
| Traffic Vol, veh/h | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 20 | 1 | 0 | 41 | 0 |
| Future Vol, veh/h | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 20 | 1 | 0 | 41 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 2 | 2 | 3 | 2 |
| Mvmt Flow | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 20 | 1 | 0 | 41 | 0 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 75 | 76 | 41 | 76 | 76 | 21 | 41 | 0 | 0 | 21 | 0 | 0 |
| Stage 1 | 41 | 41 | - | 35 | 35 | - | - | - | - | - | - | - |
| Stage 2 | 34 | 35 | - | 41 | 41 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 915 | 814 | 1030 | 914 | 815 | 1057 | 1568 | - | - | 1595 | - | - |
| Stage 1 | 974 | 861 | - | 981 | 866 | - | - | - | - | - | - | - |
| Stage 2 | 982 | 866 | - | 974 | 861 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 911 | 811 | 1030 | 910 | 811 | 1057 | 1568 | - | - | 1595 | - | - |
| Mov Cap-2 Maneuver | 911 | 811 | - | 910 | 811 | - | - | - | - | - | - | - |
| Stage 1 | 974 | 861 | - | 977 | 862 | - | - | - | - | - | - | - |
| Stage 2 | 978 | 862 | - | 974 | 861 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 0 | 1.83 | 0 |
| HCM LOS | A | A | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 446 | - | - | - | - | 1595 | - | - |
| HCM Lane V/C Ratio | 0.004 | - | - | - | - | - | - | - |
| HCM Ctrl Dly (s/v) | 7.3 | 0 | - | 0 | 0 | 0 | - | - |
| HCM Lane LOS | A | A | - | A | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | - | - | 0 | - | - |



| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 0 | 8 | 1135 | 7 | 0 | 1161 |
| Future Volume (vph) | 0 | 8 | 1135 | 7 | 0 | 1161 |
| Ideal Flow (vphpl) | 1000 | 1750 | 1775 | 1775 | 1000 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 |
| Ped Bike Factor | | | | | | |
| Frt | | 0.865 | 0.999 | | | |
| Flt Protected | | | | | | |
| Satd. Flow (prot) | 0 | 1468 | 3235 | 0 | 0 | 3500 |
| Flt Permitted | | | | | | |
| Satd. Flow (perm) | 0 | 1468 | 3235 | 0 | 0 | 3500 |
| Link Speed (k/h) | 40 | | 60 | | | 60 |
| Link Distance (m) | 30.6 | | 83.2 | | | 145.4 |
| Travel Time (s) | 2.8 | | 5.0 | | | 8.7 |
| Confl. Peds. (#/hr) | | | | 3 | 3 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 2% | 2% | 3% | 2% | 2% | 2% |
| Adj. Flow (vph) | 0 | 8 | 1135 | 7 | 0 | 1161 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 0 | 8 | 1142 | 0 | 0 | 1161 |
| Sign Control | Stop | | Free | | | Free |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 43.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |





| Intersection | |
|---|---|
| Int Delay, s/veh | 0 |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 8 | 1135 | 7 | 0 | 1161 |
| Future Vol, veh/h | 0 | 8 | 1135 | 7 | 0 | 1161 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 3 | 3 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | 0 | - | - | - | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 3 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 8 | 1135 | 7 | 0 | 1161 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | - | 574 | 0 | 0 | - | - |
| Stage 1 | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |
| Critical Hdwy | - | 6.94 | - | - | - | - |
| Critical Hdwy Stg 1 | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - |
| Follow-up Hdwy | - | 3.32 | - | - | - | - |
| Pot Cap-1 Maneuver | 0 | 462 | - | - | 0 | - |
| Stage 1 | 0 | - | - | - | 0 | - |
| Stage 2 | 0 | - | - | - | 0 | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | - | 461 | - | - | - | - |
| Mov Cap-2 Maneuver | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |

| Approach | WB | NB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 12.95 | 0 | 0 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBT | NBR | WBLn1 | SBT |
|---|---|---|---|---|
| Capacity (veh/h) | - | - | 461 | - |
| HCM Lane V/C Ratio | - | - | 0.017 | - |
| HCM Ctrl Dly (s/v) | - | - | 13 | - |
| HCM Lane LOS | - | - | B | - |
| HCM 95th %tile Q(veh) | - | - | 0.1 | - |

# Appendix G: Total Traffic Operations – Sensitivity Analysis







| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 0 | 0 | 0 | 32 | 0 | 762 | 17 | 0 | 797 | 0 |
| Future Volume (vph) | 0 | 0 | 0 | 0 | 0 | 32 | 0 | 762 | 17 | 0 | 797 | 0 |
| Ideal Flow (vphpl) | 1000 | 1000 | 1750 | 1000 | 1000 | 1750 | 1000 | 1775 | 1775 | 1000 | 1775 | 1775 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 |
| Ped Bike Factor | | | | | | | | | | | | |
| Frt | | | | | | 0.865 | | 0.997 | | | | |
| Flt Protected | | | | | | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 1731 | 0 | 0 | 1361 | 0 | 3165 | 0 | 0 | 3176 | 0 |
| Flt Permitted | | | | | | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 1731 | 0 | 0 | 1361 | 0 | 3165 | 0 | 0 | 3176 | 0 |
| Link Speed (k/h) | | 40 | | | 40 | | | 60 | | | 60 | |
| Link Distance (m) | | 63.3 | | | 101.5 | | | 185.2 | | | 83.2 | |
| Travel Time (s) | | 5.7 | | | 9.1 | | | 11.1 | | | 5.0 | |
| Confl. Peds. (#/hr) | | | | | | | | | 1 | 1 | | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 0% | 0% | 10% | 0% | 5% | 8% | 0% | 5% | 0% |
| Adj. Flow (vph) | 0 | 0 | 0 | 0 | 0 | 32 | 0 | 762 | 17 | 0 | 797 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 0 | 0 | 0 | 32 | 0 | 779 | 0 | 0 | 797 | 0 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 33.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |





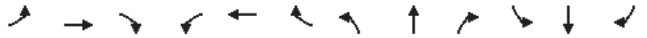
| Intersection | |
|---|---|
| Int Delay, s/veh | 0.2 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 0 | 0 | 0 | 0 | 0 | 32 | 0 | 762 | 17 | 0 | 797 | 0 |
| Future Vol, veh/h | 0 | 0 | 0 | 0 | 0 | 32 | 0 | 762 | 17 | 0 | 797 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | 0 | - | - | 0 | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 5 | 8 | 0 | 5 | 0 |
| Mvmt Flow | 0 | 0 | 0 | 0 | 0 | 32 | 0 | 762 | 17 | 0 | 797 | 0 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | - | - | 399 | - | - | 391 | - | 0 | 0 | - | - | 0 |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy | - | - | 6.9 | - | - | 7.1 | - | - | - | - | - | - |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Follow-up Hdwy | - | - | 3.3 | - | - | 3.4 | - | - | - | - | - | - |
| Pot Cap-1 Maneuver | 0 | 0 | 607 | 0 | 0 | 586 | 0 | - | - | 0 | - | - |
| Stage 1 | 0 | 0 | - | 0 | 0 | - | 0 | - | - | 0 | - | - |
| Stage 2 | 0 | 0 | - | 0 | 0 | - | 0 | - | - | 0 | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | - | - | 607 | - | - | 586 | - | - | - | - | - | - |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 11.5 | 0 | 0 |
| HCM LOS | A | B | | |

| Minor Lane/Major Mvmt | NBT | NBR | EBLn1 | WBLn1 | SBT | SBR |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | - | 586 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.055 | - | - |
| HCM Ctrl Dly (s/v) | - | - | 0 | 11.5 | - | - |
| HCM Lane LOS | - | - | A | B | - | - |
| HCM 95th %tile Q(veh) | - | - | - | 0.2 | - | - |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 10 | 1 | 0 | 0 | 3 | 14 | 0 | 0 | 20 | 0 |
| Future Volume (vph) | 0 | 0 | 10 | 1 | 0 | 0 | 3 | 14 | 0 | 0 | 20 | 0 |
| Ideal Flow (vphpl) | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.865 | | | | | | | | | | |
| Flt Protected | | | | | 0.950 | | | 0.991 | | | | |
| Satd. Flow (prot) | 0 | 1300 | 0 | 0 | 1428 | 0 | 0 | 1420 | 0 | 0 | 1381 | 0 |
| Flt Permitted | | | | | 0.950 | | | 0.991 | | | | |
| Satd. Flow (perm) | 0 | 1300 | 0 | 0 | 1428 | 0 | 0 | 1420 | 0 | 0 | 1381 | 0 |
| Link Speed (k/h) | | 40 | | | 40 | | | 40 | | | 40 | |
| Link Distance (m) | | 30.4 | | | 25.0 | | | 101.5 | | | 99.0 | |
| Travel Time (s) | | 2.7 | | | 2.3 | | | 9.1 | | | 8.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 8% | 2% | 2% | 11% | 2% |
| Adj. Flow (vph) | 0 | 0 | 10 | 1 | 0 | 0 | 3 | 14 | 0 | 0 | 20 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 10 | 0 | 0 | 1 | 0 | 0 | 17 | 0 | 0 | 20 | 0 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 14.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |





| Intersection | |
|---|---|
| Int Delay, s/veh | 2.4 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 0 | 0 | 10 | 1 | 0 | 0 | 3 | 14 | 0 | 0 | 20 | 0 |
| Future Vol, veh/h | 0 | 0 | 10 | 1 | 0 | 0 | 3 | 14 | 0 | 0 | 20 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 8 | 2 | 2 | 11 | 2 |
| Mvmt Flow | 0 | 0 | 10 | 1 | 0 | 0 | 3 | 14 | 0 | 0 | 20 | 0 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 40 | 40 | 20 | 40 | 40 | 14 | 20 | 0 | 0 | 14 | 0 | 0 |
| Stage 1 | 20 | 20 | - | 20 | 20 | - | - | - | - | - | - | - |
| Stage 2 | 20 | 20 | - | 20 | 20 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 964 | 852 | 1058 | 964 | 852 | 1066 | 1596 | - | - | 1604 | - | - |
| Stage 1 | 999 | 879 | - | 999 | 879 | - | - | - | - | - | - | - |
| Stage 2 | 999 | 879 | - | 999 | 879 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 962 | 850 | 1058 | 953 | 850 | 1066 | 1596 | - | - | 1604 | - | - |
| Mov Cap-2 Maneuver | 962 | 850 | - | 953 | 850 | - | - | - | - | - | - | - |
| Stage 1 | 999 | 879 | - | 997 | 877 | - | - | - | - | - | - | - |
| Stage 2 | 997 | 877 | - | 989 | 879 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Ctrl Dly, s/v | 8.44 | 8.78 | 1.28 | 0 |
| HCM LOS | A | A | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 318 | - | - | 1058 | 953 | 1604 | - | - |
| HCM Lane V/C Ratio | 0.002 | - | - | 0.009 | 0.001 | - | - | - |
| HCM Ctrl Dly (s/v) | 7.3 | 0 | - | 8.4 | 8.8 | 0 | - | - |
| HCM Lane LOS | A | A | - | A | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0 | 0 | 0 | - | - |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 0 | 0 | 0 | 49 | 0 | 1095 | 36 | 0 | 1161 | 0 |
| Future Volume (vph) | 0 | 0 | 0 | 0 | 0 | 49 | 0 | 1095 | 36 | 0 | 1161 | 0 |
| Ideal Flow (vphpl) | 1000 | 1000 | 1750 | 1000 | 1000 | 1750 | 1000 | 1775 | 1775 | 1000 | 1775 | 1775 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 |
| Ped Bike Factor | | | | | | | | | | | | |
| Frt | | | | | | 0.865 | | 0.995 | | | | |
| Flt Protected | | | | | | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 1731 | 0 | 0 | 1453 | 0 | 3225 | 0 | 0 | 3270 | 0 |
| Flt Permitted | | | | | | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 1731 | 0 | 0 | 1453 | 0 | 3225 | 0 | 0 | 3270 | 0 |
| Link Speed (k/h) | | 40 | | | 40 | | | 60 | | | 60 | |
| Link Distance (m) | | 63.3 | | | 101.5 | | | 185.2 | | | 83.2 | |
| Travel Time (s) | | 5.7 | | | 9.1 | | | 11.1 | | | 5.0 | |
| Confl. Peds. (#/hr) | | | | | | | 4 | | 3 | 3 | | 4 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 0% | 0% | 3% | 0% | 3% | 0% | 0% | 2% | 0% |
| Adj. Flow (vph) | 0 | 0 | 0 | 0 | 0 | 49 | 0 | 1095 | 36 | 0 | 1161 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 0 | 0 | 0 | 49 | 0 | 1131 | 0 | 0 | 1161 | 0 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 43.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |





| Intersection | |
|---|---|
| Int Delay, s/veh | 0.3 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 0 | 0 | 0 | 0 | 0 | 49 | 0 | 1095 | 36 | 0 | 1161 | 0 |
| Future Vol, veh/h | 0 | 0 | 0 | 0 | 0 | 49 | 0 | 1095 | 36 | 0 | 1161 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 3 | 3 | 0 | 4 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | 0 | - | - | 0 | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 0 | 0 | 2 | 0 |
| Mvmt Flow | 0 | 0 | 0 | 0 | 0 | 49 | 0 | 1095 | 36 | 0 | 1161 | 0 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | - | - | 585 | - | - | 569 | - | 0 | 0 | - | - | 0 |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy | - | - | 6.9 | - | - | 6.96 | - | - | - | - | - | - |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Follow-up Hdwy | - | - | 3.3 | - | - | 3.33 | - | - | - | - | - | - |
| Pot Cap-1 Maneuver | 0 | 0 | 460 | 0 | 0 | 463 | 0 | - | - | 0 | - | - |
| Stage 1 | 0 | 0 | - | 0 | 0 | - | 0 | - | - | 0 | - | - |
| Stage 2 | 0 | 0 | - | 0 | 0 | - | 0 | - | - | 0 | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | - | - | 458 | - | - | 462 | - | - | - | - | - | - |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 13.72 | 0 | 0 |
| HCM LOS | A | B | | |

| Minor Lane/Major Mvmt | NBT | NBR | EBLn1 | WBLn1 | SBT | SBR |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | - | 462 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.106 | - | - |
| HCM Ctrl Dly (s/v) | - | - | 0 | 13.7 | - | - |
| HCM Lane LOS | - | - | A | B | - | - |
| HCM 95th %tile Q(veh) | - | - | - | 0.4 | - | - |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 8 | 0 | 0 | 0 | 14 | 20 | 1 | 0 | 41 | 0 |
| Future Volume (vph) | 0 | 0 | 8 | 0 | 0 | 0 | 14 | 20 | 1 | 0 | 41 | 0 |
| Ideal Flow (vphpl) | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.865 | | | | | | 0.996 | | | | |
| Flt Protected | | | | | | | | 0.980 | | | | |
| Satd. Flow (prot) | 0 | 1300 | 0 | 0 | 1503 | 0 | 0 | 1483 | 0 | 0 | 1488 | 0 |
| Flt Permitted | | | | | | | | 0.980 | | | | |
| Satd. Flow (perm) | 0 | 1300 | 0 | 0 | 1503 | 0 | 0 | 1483 | 0 | 0 | 1488 | 0 |
| Link Speed (k/h) | | 40 | | | 40 | | | 40 | | | 40 | |
| Link Distance (m) | | 30.4 | | | 25.0 | | | 101.5 | | | 99.0 | |
| Travel Time (s) | | 2.7 | | | 2.3 | | | 9.1 | | | 8.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 0% | 2% | 2% | 3% | 2% |
| Adj. Flow (vph) | 0 | 0 | 8 | 0 | 0 | 0 | 14 | 20 | 1 | 0 | 41 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 35 | 0 | 0 | 41 | 0 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 19.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |





| Intersection | |
|---|---|
| Int Delay, s/veh | 2 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 0 | 0 | 8 | 0 | 0 | 0 | 14 | 20 | 1 | 0 | 41 | 0 |
| Future Vol, veh/h | 0 | 0 | 8 | 0 | 0 | 0 | 14 | 20 | 1 | 0 | 41 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 2 | 2 | 3 | 2 |
| Mvmt Flow | 0 | 0 | 8 | 0 | 0 | 0 | 14 | 20 | 1 | 0 | 41 | 0 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 89 | 90 | 41 | 90 | 90 | 21 | 41 | 0 | 0 | 21 | 0 | 0 |
| Stage 1 | 41 | 41 | - | 49 | 49 | - | - | - | - | - | - | - |
| Stage 2 | 48 | 49 | - | 41 | 41 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 896 | 800 | 1030 | 895 | 801 | 1057 | 1568 | - | - | 1595 | - | - |
| Stage 1 | 974 | 861 | - | 965 | 854 | - | - | - | - | - | - | - |
| Stage 2 | 965 | 854 | - | 974 | 861 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 888 | 793 | 1030 | 880 | 793 | 1057 | 1568 | - | - | 1595 | - | - |
| Mov Cap-2 Maneuver | 888 | 793 | - | 880 | 793 | - | - | - | - | - | - | - |
| Stage 1 | 974 | 861 | - | 956 | 847 | - | - | - | - | - | - | - |
| Stage 2 | 957 | 846 | - | 966 | 861 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Ctrl Dly, s/v | 8.52 | 0 | 2.93 | 0 |
| HCM LOS | A | A | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 713 | - | - | 1030 | - | 1595 | - | - |
| HCM Lane V/C Ratio | 0.009 | - | - | 0.008 | - | - | - | - |
| HCM Ctrl Dly (s/v) | 7.3 | 0 | - | 8.5 | 0 | 0 | - | - |
| HCM Lane LOS | A | A | - | A | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0 | - | 0 | - | - |