



**TRAFFIC IMPACT STUDY
ILDERTON RETAIL & DAYCARE**

**13339 ILBERTON ROAD
ILDERTON, ONTARIO**

PROJECT NO. 22-061

DATED: SEPTEMBER 12, 2022



1350 Provincial Rd, Unit 700
Windsor, ON N8W 5W1
519.419.4965 TF 1.844.842.9188
bairdAE.ca

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1.0 INTRODUCTION

2.1 Background

Baird AE has been retained to prepare a Traffic Impact Assessment in support of the proposed retail and day-care development in Town of Ilderton, Municipality of Middlesex. The development is located on the south side of Ilderton Road, with existing housing to the west, and commercial development to the east and north. Figure 1 shows the location of the proposed development.

The development is approximately 0.27 hectares (ha) in size and will consist of day-care and ice-cream shop. The traffic flow from development is predicted to produce 57-morning and 58- evening peak vehicles.

One new access road will be utilized by the development. The analyses for this study are the traffic operations and recommend mitigation measure the future conditions at the key intersections in the development vicinity.



Exhibit 1 - Location Plan

2.2 Scope

It is anticipated that the proposed development will be built in 2024 and as a result following future horizon periods (conditions) are established as part of this study:

- 2024 Future Condition
- 2034 Future Condition – 10-year horizon

The study area intersections were determined through coordination with the County of Middlesex and consist of the following existing intersection:

- Ilderton Road and Access Road
- Ilderton Road and Hyde Park Road

2.3 Analysis Methodology

A transportation analysis was completed to determine the intersection's existing and future operating conditions and the individual turning movements. The operational analyses were primarily based on procedures set out in the Highway Capacity Manual (2010) with the assistance of Synchro 10. Several performance measures are used in the analysis of signalized and unsignalized intersections, including:

- Level of Service (LOS) – a measure of the average vehicle delay experienced by the motorists attempting to travel through the intersection. LOS is measured from “A” to “F” with peak hour LOS in the “A” to “D” range being considered acceptable by most and a LOS of F representing unacceptable delays;
- Delay – the additional travel time experienced by a driver compared to free-flow conditions; and
- Queue Lengths – the Synchro Software measures both the 50th percentile and 95th percentile maximum queue lengths. The 50th percentile queue (the median) is the maximum back of queue length during a typical traffic cycle. The 95th percentile queue is the maximum back of queue length during a typical traffic cycle with 95th percentile traffic volumes. The 95th percentile queue measures the queue length that 95 percent of the sample lies below. The 95th percentile critical queue lengths were identified for movements where the queue surpassed the estimated length of the storage bay.

These measures provide an indication of delay and the number of vehicles that can be accommodated through an intersection.

2.0 EXISTING CONDITION

2.1 Road Network Characteristics

The existing road network, lane configuration and existing traffic control for the study area are described below:

Hyde Park Road is designated as a arterial road under the jurisdiction of the Municipality of Middlesex and maintains the posted speed limit of 50km/h. The road has a two-lane urban cross-section running in a north-south fashion.

Ilderton Road is designated a arterial two-way roadway with a posted speed limits of 50km/h. It is signalized on its approach to the intersection with Hyde Park Road with no significant heavy vehicle traffic. The road has a two-lane urban cross-section running in a east-west fashion.

2.2 Key Existing Intersection

The intersection of Ilderton Road with Hyde Park Road is 4-leg signalized intersection. The intersection has the following configuration:

- Northbound approach has shared one left and one through/right shared lane.
- Southbound approach has shared one left and one through/right shared lane.
- Westbound approach has one left and one through/right shared lane.
- Eastbound approach has one left/through/right shared lane

2.3 Existing Traffic Volumes

A recent traffic count was conducted at the intersections of Ilderton Road with Hyde Park Road by sub-consultant Pyramid Inc. dated September 1, 2022. The existing traffic volumes are included in Appendix A.

3.0 FUTURE CONDITION

3.1 Growth Rate

The growth rate information was obtained from the Municipality of Middlesex Official Plan dated February 3, 2022. Based on the long-term population chart, the 30-year traffic growth (2016 to 2046) is approximately 2.3% high scenario, 2.0 medium scenario and 1.3 low scenario, hence a average growth rate of 2% per year was assumed to reflect growth in background traffic volumes. The projected traffic volumes are provided in Appendix B.

3.2 Future Background Development

It is almost impossible to ignore potential future development. From a conversation with Town of Ilderton, there is no new development within the site vicinity, therefore, we assumed no major residential/commercial/industrial development is taking place.

3.3 Future Infrastructure Improvements

Based on our review of the County of Middlesex planning department, there will be no notable infrastructure improvement in the study area.

4.0 PROPOSED DEVELOPMENT

The development site is approximately 0.27ha consisting of retail store of 210 m² and existing two-storey building of 239.5m². The retail building will have an ice-cream shop and the existing building is a day-care with a maximum capacity of 40 children.

Below describe the development accesses, trip generation, trip distribution and ultimate peak hour traffic.

4.1 Development Access

The proposed site access is provided from Ilderton Road. The future access road will be T-leg intersection. All approaches at the intersection will have one left-though-right shared lane.

4.2 Trip Generation

The number of vehicle trips anticipated to be generated by the proposed development was calculated based on trip generation rates published by The Institution of Transportation Engineers (ITE) Trip Generation 9th Edition. Higher ITE Code 932 (High Turn-over/Sit Down Restaurant) ice-cream shop and ITE Code 565 (Daycare Center) for day-care were used to estimate generated trips.

Description of Land use, ITE codes, unit sizes, trip generation rate and trip generation for daily and peak hours are provided in Table 1. Appendix B provides detailed calculations and all relevant charts.

Table 1: Trip Generation

| Use | ITE | AREA | AADT | Trip Generated | | | |
|-----------------------------|-----|----------------------|------------|----------------|-----------|-----------|-----------|
| | | | | AM Hour | | PM Hour | |
| | | | | In | Out | In | Out |
| Proposed Development | | | | | | | |
| Retail (Ice-cream Shop) | 210 | 2260 ft ² | 287 | 8 | 6 | 8 | 5 |
| Daycare (40 children) | 565 | 40 children | 175 | 17 | 15 | 15 | 17 |
| Subtotal Trips | | | 462 | 25 | 21 | 23 | 22 |
| Ice-Cream By-pass Trips | | | | 5 | 6 | 5 | 5 |
| Total Trips | | | 462 | 30 | 27 | 28 | 27 |

4.3 Trip Distribution and Assignment

The project trip distribution is based on the nearest access points to Hyde Park Road. It is therefore assumed that 70 percent of traffic will be from/to east and 30 percent from/to west of Ilderton Road. Existing travel patterns observed during data collection were also used at the intersecting road. The resulting distribution of projected traffic during the morning and evening peaks are provided in Figure 1.2, and Figure 2.2 (see Appendix B).

4.4 Future Condition

Development traffic volumes were added to the forecasted (2024 and 2034) background traffic volumes to obtain corresponding total traffic volumes at intersections. The projected total future volumes are provided in Figure 1.3 and Figure 2.3 (see Appendix B).

5.0 INTERSECTION OPERATIONS

The forecasted 2024 and 2034 traffic volumes for the study intersections are evaluated using the Synchro/Sim Traffic software version 10, which automates the procedures in the Highway Capacity Manual 2010.

5.1 2024 Traffic Condition

The 2024 future condition and future total conditions analysis results are included in Table 3 and corresponding worksheets are included in Appendix C.

Table 2: 2024 Total Conditions – Level of Service

| Intersection | A.M. Peak Hour | | | P.M. Peak Hour | | |
|---|----------------|------|-------------|----------------|------|-------------|
| | LOS | v/c | Delay (sec) | LOS | v/c | Delay (sec) |
| Ilderton Road and Hyde Park Road | | | | | | |
| EB L | B | 0.05 | 10.9 | B | 0.11 | 11.6 |
| EB TR | B | 0.44 | 11.3 | B | 0.54 | 12.6 |
| WB LTR | B | 0.33 | 12.7 | B | 0.52 | 15.4 |
| NB L | B | 0.17 | 12.4 | B | 0.41 | 16.3 |
| NB TR | B | 0.24 | 11.0 | B | 0.46 | 14.4 |
| SB L | B | 0.10 | 11.5 | B | 0.09 | 11.5 |
| SB TR | B | 0.29 | 12.0 | B | 0.38 | 13.3 |
| Overall LOS | B | | | B | | |
| Ilderton Road and Access Road | | | | | | |
| EB TR | A | 0.16 | 0.0 | A | 0.20 | 0.0 |
| WB LT | A | 0.02 | 1.2 | A | 0.02 | 0.7 |
| NB LR | B | 0.04 | 10.1 | B | 0.05 | 10.8 |
| Overall LOS | A | | | A | | |

Note: NB – Northbound SB – Southbound EB – Eastbound WB – Westbound; LTR – Left/Through/Right turn

The 2024 analysis indicates the intersection of Ilderton Road with Hyde Park Road is operating at an acceptable level of service. Hence, no intersection improvements are required.

5.2 2034 Traffic Condition

The 2034 future condition and future total conditions analysis results are included in Table 3 and corresponding worksheets are included in Appendix C.

Table 3: 2034 Total Conditions – Level of Service

| Intersection | A.M. Peak Hour | | | P.M. Peak Hour | | |
|---|----------------|------|-------------|----------------|------|-------------|
| | LOS | v/c | Delay (sec) | LOS | v/c | Delay (sec) |
| Ilderton Road and Hyde Park Road | | | | | | |
| EB L | B | 0.06 | 11.1 | B | 0.14 | 12.0 |
| EB TR | B | 0.51 | 12.9 | B | 0.64 | 15.4 |
| WB LTR | B | 0.39 | 14.0 | B | 0.62 | 18.0 |
| NB L | B | 0.20 | 12.9 | B | 0.50 | 18.5 |
| NB TR | B | 0.29 | 11.6 | B | 0.54 | 16.3 |
| SB L | B | 0.12 | 11.8 | B | 0.11 | 11.8 |
| SB TR | B | 0.35 | 12.8 | B | 0.45 | 14.5 |
| Overall LOS | B | | | B | | |
| Ilderton Road and Access Road | | | | | | |
| EB TR | A | 0.19 | 0.0 | A | 0.24 | 0.0 |
| WB LT | A | 0.03 | 1.5 | A | 0.02 | 0.6 |
| NB LR | B | 0.04 | 10.4 | B | 0.05 | 11.3 |
| Overall LOS | A | | | A | | |

The 2034 analysis indicates the intersection of Ilderton Road with Hyde Park Road is operating at an acceptable level of service. Hence, no intersection improvements are required.

6.0 CONCLUSION AND RECOMMENDATION

The operating conditions were evaluated for 2024 and 2034 traffic conditions using the morning and evening traffic data. The findings from these evaluations are summarized below.

- The development site is approximately 0.27ha consisting of retail store of 210 m² and existing two-storey building of 239.5m². The retail building will have an ice-cream shop and the existing building is a day-care with a capacity of 40 maximum children.
- The development will generate 57-morning and 58- evening peak vehicles based on ITE Trips Generation Manual.

- The background growth rate is considered in the analysis as it represents average-case scenario i.e., 2%. One existing access roads will serve the development.
- The future access road will be a T-leg intersection. All approaches at the intersection will have one left-thought-right shared lane.
- The study area intersection in 2024 and 2034 future conditions are expected to operate at an acceptable level of service. Hence, no intersections improvement is required.
- An adequate sight line distance is provided for a safe departure from the development.

Based on the evaluation and findings in this report, the proposed development is expected to have a minimal impact on the conditions at the intersections of Ilderton Road with Hyde Park Road and the access Road.

7.0 CLOSURE

The information in this report is prepared for the Retail & Daycare Development in the County of Middlesex regarding potential traffic impact on Hyde Park Road and Ilderton Road.

We trust that the above meets your purpose. Should you have any questions, please do not hesitate to contact the undersigned. All of which is respectfully submitted.

All of which is respectfully submitted.

BAIRD AE INC.
27 PRINCESS STREET, UNIT 102
LEAMINGTON, ONTARIO N8H 2X8

Shurjeel Tunio, P.Eng.
Senior Project Manager
Baird AE



Appendix A

BACKGROUND TRAFFIC DATA AND OTHER RELATED INFORMATION

KEY PLAN

LEGEND

ISSUED

| DATE | DESCRIPTION | NO. |
|------|-------------|-----|
| | | |

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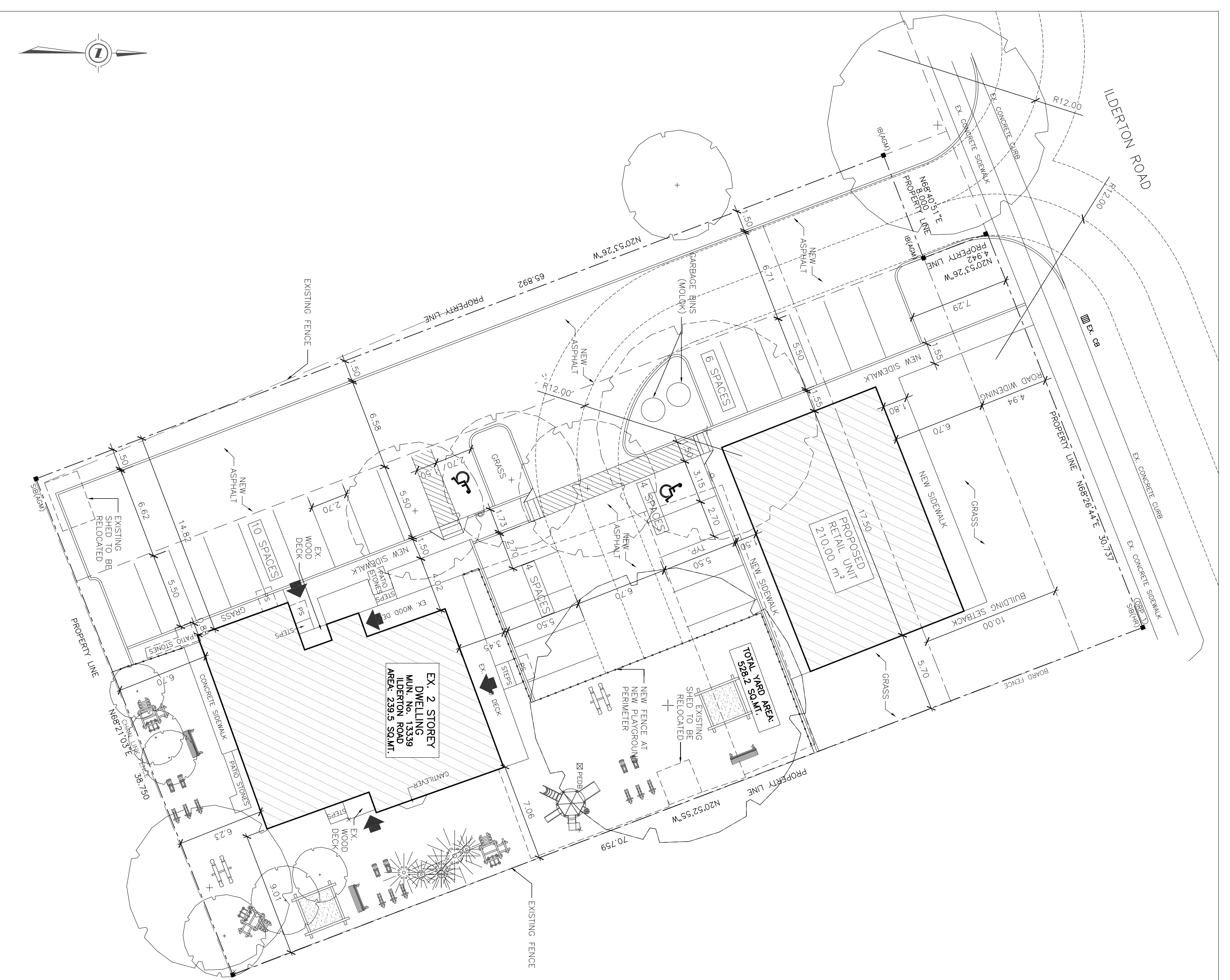
ILDERTON RETAIL & DAYCARE

13339 ILBERTON ROAD
 DRAWING TITLE
SITE PLAN

CHECKED: SD
 DRAWN: TAV
 PROJECT No: 2109

SCALE: AS NOTED

A010



1 SITE PLAN - OPTION 2
 1:200

Hyde Park Rd @ Ilderton Rd

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:45:00

To: 8:45:00

Municipality: Ilderton
Site #: 000000003
Intersection: Hyde Park Rd & Ilderton Rd
TFR File #: 3
Count date: 1-Sep-2022

Weather conditions:
Sunny/Dry
Person(s) who counted:
Carol

**** Signalized Intersection ****

Major Road: Hyde Park Rd runs N/S

North Leg Total: 323
 North Entering: 188
 North Peds: 1
 Peds Cross: \times

| | | | | |
|---------------|-----------|------------|-----------|-----|
| Heavys | 1 | 1 | 2 | 4 |
| Trucks | 0 | 1 | 0 | 1 |
| Cars | 17 | 133 | 33 | 183 |
| Totals | 18 | 135 | 35 | |



| | |
|---------------|------------|
| Heavys | 4 |
| Trucks | 3 |
| Cars | 128 |
| Totals | 135 |

East Leg Total: 307
 East Entering: 121
 East Peds: 1
 Peds Cross: \times

| | | | |
|--------|--------|------|--------|
| Heavys | Trucks | Cars | Totals |
| 10 | 2 | 122 | 134 |

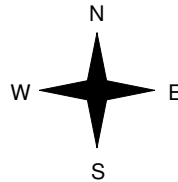


Hyde Park Rd

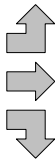
| | | | |
|------------|----------|-----------|--------|
| Cars | Trucks | Heavys | Totals |
| 16 | 0 | 1 | 17 |
| 58 | 1 | 8 | 67 |
| 30 | 1 | 6 | 37 |
| 104 | 2 | 15 | |



Ilderton Rd



| | | | |
|----------|----------|------------|--------|
| Heavys | Trucks | Cars | Totals |
| 0 | 1 | 15 | 16 |
| 5 | 3 | 123 | 131 |
| 1 | 0 | 88 | 89 |
| 6 | 4 | 226 | |



Ilderton Rd



Peds Cross: \times
 West Peds: 7
 West Entering: 236
 West Leg Total: 370

| | |
|---------------|------------|
| Cars | 251 |
| Trucks | 2 |
| Heavys | 8 |
| Totals | 261 |



| | | | | |
|---------------|-----------|------------|-----------|-----|
| Cars | 47 | 97 | 16 | 160 |
| Trucks | 1 | 2 | 0 | 3 |
| Heavys | 1 | 3 | 4 | 8 |
| Totals | 49 | 102 | 20 | |

Peds Cross: \times
 South Peds: 4
 South Entering: 171
 South Leg Total: 432

Comments

Hyde Park Rd @ Ilderton Rd

Mid-day Peak Diagram

Specified Period

From: 11:00:00

To: 14:00:00

One Hour Peak

From: 11:45:00

To: 12:45:00

Municipality: Ilderton
Site #: 000000003
Intersection: Hyde Park Rd & Ilderton Rd
TFR File #: 3
Count date: 1-Sep-2022

Weather conditions:
Sunny/Dry
Person(s) who counted:
Carol

**** Signalized Intersection ****

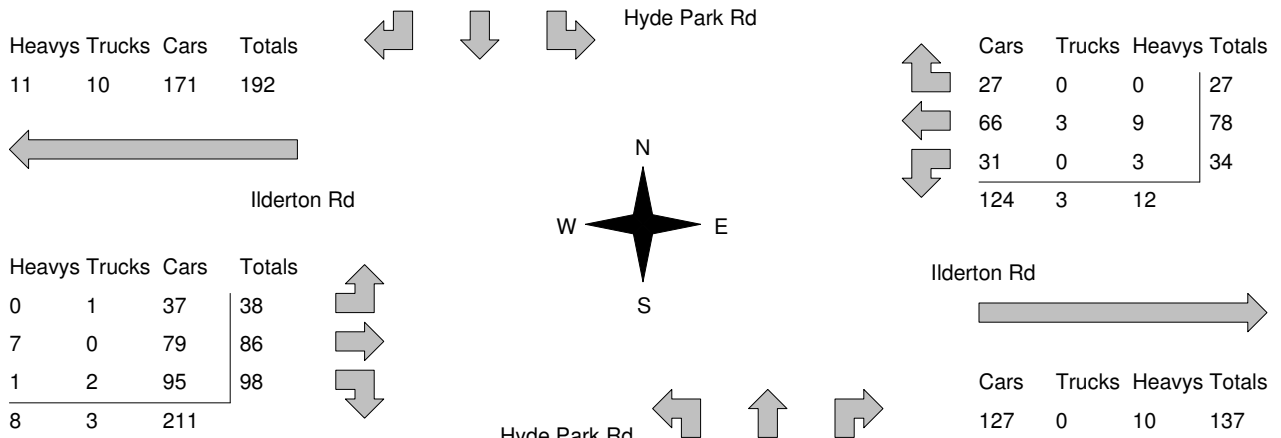
Major Road: Hyde Park Rd runs N/S

North Leg Total: 380
 North Entering: 185
 North Peds: 0
 Peds Cross: \times

| | | | | |
|---------------|-----------|------------|-----------|-----|
| Heavys | 1 | 2 | 1 | 4 |
| Trucks | 3 | 1 | 0 | 4 |
| Cars | 18 | 127 | 32 | 177 |
| Totals | 22 | 130 | 33 | |

| | |
|---------------|------------|
| Heavys | 1 |
| Trucks | 1 |
| Cars | 193 |
| Totals | 195 |

East Leg Total: 276
 East Entering: 139
 East Peds: 0
 Peds Cross: \times



Peds Cross: \times
 West Peds: 15
 West Entering: 222
 West Leg Total: 414

| | | | | | | |
|---------------|------------|---------------|-----------|------------|-----------|-----|
| Cars | 253 | Cars | 87 | 129 | 16 | 232 |
| Trucks | 3 | Trucks | 4 | 0 | 0 | 4 |
| Heavys | 6 | Heavys | 1 | 1 | 2 | 4 |
| Totals | 262 | Totals | 92 | 130 | 18 | |

Peds Cross: \times
 South Peds: 7
 South Entering: 240
 South Leg Total: 502

Comments

Hyde Park Rd @ Ilderton Rd

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:30:00

To: 17:30:00

Municipality: Ilderton
Site #: 000000003
Intersection: Hyde Park Rd & Ilderton Rd
TFR File #: 3
Count date: 1-Sep-2022

Weather conditions:
 Sunny/Dry
Person(s) who counted:
 Carol

**** Signalized Intersection ****

Major Road: Hyde Park Rd runs N/S

North Leg Total: 507

North Entering: 225

North Peds: 0

Peds Cross: \times

| | | | | |
|---------------|-----------|------------|-----------|-----|
| Heavys | 0 | 2 | 1 | 3 |
| Trucks | 0 | 2 | 0 | 2 |
| Cars | 20 | 173 | 27 | 220 |
| Totals | 20 | 177 | 28 | |



Heavys 2

Trucks 0

Cars 280

Totals 282

East Leg Total: 433

East Entering: 237

East Peds: 4

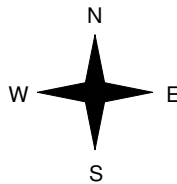
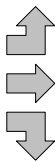
Peds Cross: \times

| | | | | | | | |
|--------|---|--------|---|------|-----|--------|-----|
| Heavys | 9 | Trucks | 0 | Cars | 291 | Totals | 300 |
|--------|---|--------|---|------|-----|--------|-----|



Ilderton Rd

| | | | | | | | |
|-----------|----------|------------|-----|------|----|--------|----|
| Heavys | 0 | Trucks | 0 | Cars | 34 | Totals | 34 |
| 9 | 1 | 129 | 139 | | | | |
| 3 | 1 | 123 | 127 | | | | |
| 12 | 2 | 286 | | | | | |



Hyde Park Rd

| | | | | | | | |
|------------|----------|----------|-----|--------|---|--------|----|
| Cars | 49 | Trucks | 0 | Heavys | 0 | Totals | 49 |
| 148 | 0 | 8 | 156 | | | | |
| 32 | 0 | 0 | 32 | | | | |
| 229 | 0 | 8 | | | | | |

Ilderton Rd



| | | | | | | | |
|------|-----|--------|---|--------|----|--------|-----|
| Cars | 183 | Trucks | 3 | Heavys | 10 | Totals | 196 |
|------|-----|--------|---|--------|----|--------|-----|

Peds Cross: \times

West Peds: 9

West Entering: 300

West Leg Total: 600

| | | | | | | |
|---------------|------------|---------------|------------|------------|-----------|-----|
| Cars | 328 | Cars | 123 | 197 | 27 | 347 |
| Trucks | 3 | Trucks | 0 | 0 | 2 | 2 |
| Heavys | 5 | Heavys | 1 | 2 | 0 | 3 |
| Totals | 336 | Totals | 124 | 199 | 29 | |



Peds Cross: \times

South Peds: 9

South Entering: 352

South Leg Total: 688

Comments

Hyde Park Rd @ Ilderton Rd

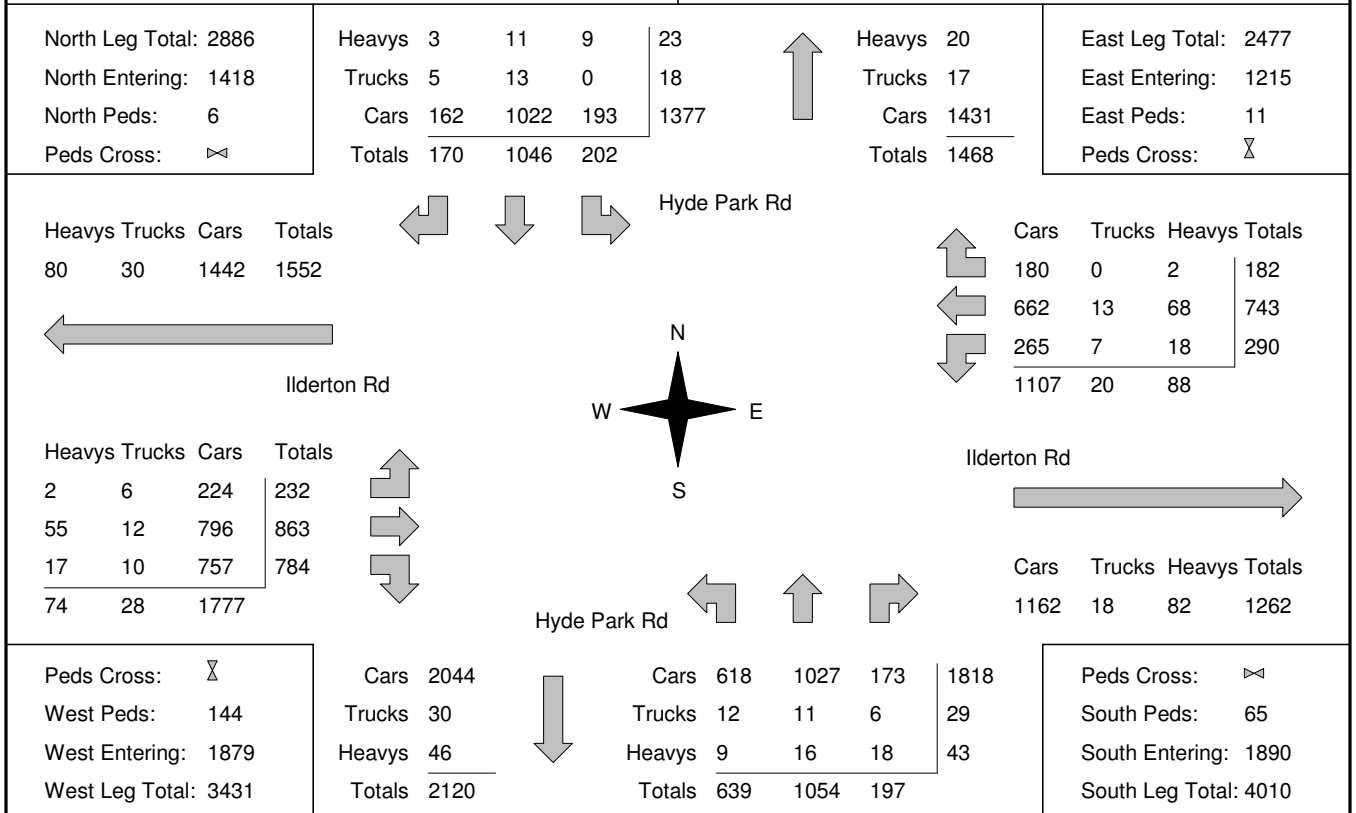
Total Count Diagram

Municipality: Ilderton
Site #: 000000003
Intersection: Hyde Park Rd & Ilderton Rd
TFR File #: 3
Count date: 1-Sep-2022

Weather conditions:
 Sunny/Dry
Person(s) who counted:
 Carol

**** Signalized Intersection ****

Major Road: Hyde Park Rd runs N/S



Comments

Shurjeel Tunio

From: Brad Linton <bradleyjlinton@gmail.com>
Sent: September 9, 2022 7:44 AM
To: Sam Rosa
Cc: Michael Juba; Shurjeel Tunio
Subject: Re: FW: Traffic impact study - 13339 ilderton Rd, Ilderton ON

Hi Shurjeel,

Could we please receive some expected timelines for this project ?

Thanks

Bradley

On Tue, Aug 30, 2022 at 3:53 PM Sam Rosa <samirrosa88@gmail.com> wrote:

Hi Shurjeel,

At the time of study it would be in the range of 5-10 (current) in the near future I would expect max 30-40.

Regards

Sam

On Tue, Aug 30, 2022 at 1:36 PM Shurjeel Tunio <STunio@bairdae.ca> wrote:

Hi Brad

We are working on the study. Can you please confirm how many kids will be registered in daycare.

Thanks

Shurjeel

From: Brad Linton <bradleyjlinton@gmail.com>
Sent: August 29, 2022 11:23 AM
To: Shurjeel Tunio <STunio@bairdae.ca>
Cc: Michael Juba <michaelajuba@gmail.com>; Sam Rosa <samirrosa88@gmail.com>
Subject: Re: FW: Traffic impact study - [13339 ilderton Rd, Ilderton ON](#)

Hi Shurjeel,

How is the progress on this?

Bradley

On Wed, Aug 3, 2022 at 11:04 AM Brad Linton <bradleyjinton@gmail.com> wrote:

Our names are Bradley Linton, Michael Juba, and Samir Rosanaly.

Our company is Cerberus inc.

Bill to Cerberus inc

This email.

My number is 226-268-2411

My address is [14 Mayapple Cres, Ilderton, ON.](#)

The project is called operation ice cream.

The project address is [13339 ilderton rd](#)

-
-
-
-



5. Middlesex Centre Population and Housing Growth Outlook to 2046

As previously mentioned, Middlesex County is currently updating their O.P., as part of the current O.P. update, the County has prepared long-term population and housing projections, which provided a range (i.e. low, reference and high scenario) that Council has endorsed.^[46]

In accordance with recent demographic, economic and socio-economic trends, as well as the regional and local growth drivers identified in Chapter 3, a range of long-term population, housing and employment forecasts have been prepared for the Municipality of Middlesex Centre to the year 2046 and are summarized below.^[47] In total, three long-term scenarios – low, medium and high (reference) – were developed and are described in this chapter. Further details on the approach to preparing the growth forecasts can be found in Appendices C and D.

5.1 Long-term Population and Housing Forecast, 2016 to 2046

The population forecast scenarios are based on a range of assumptions related to total net migration, net migration by age, natural increase (i.e. births less deaths), and employment growth opportunities throughout Middlesex County and the surrounding commuter-shed. These scenarios represent the potential range of future growth that can be anticipated for the Municipality over the next 25 years.

5.1.1 Population Forecast, 2016 to 2046

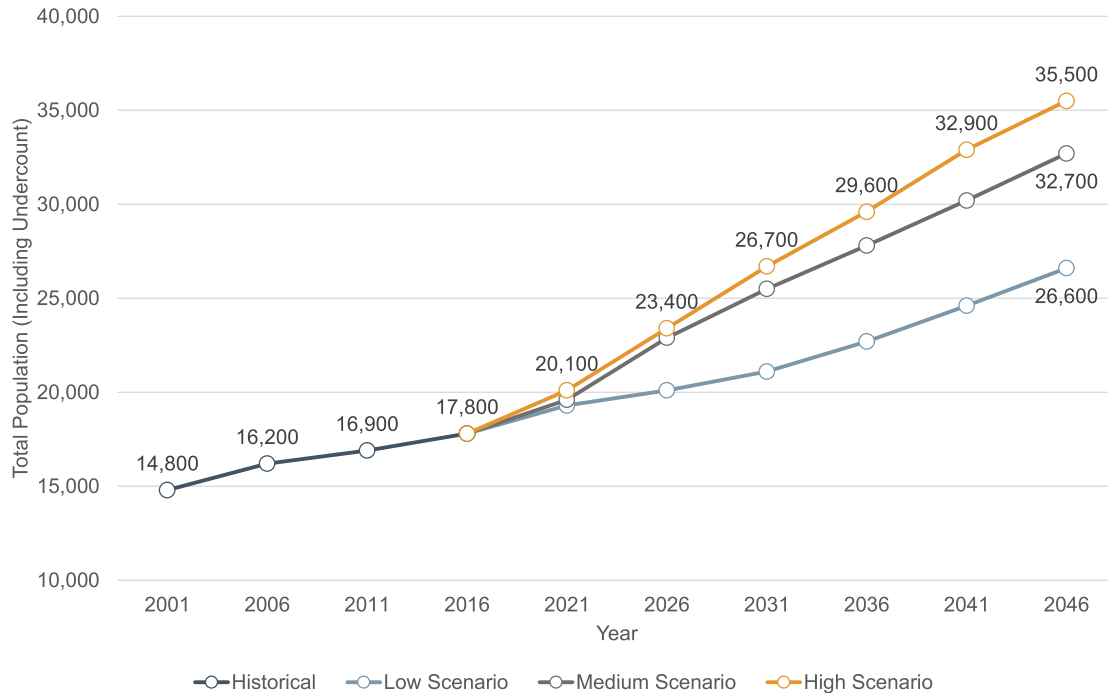
Each of the long-term growth scenarios represent a considerably higher average annual growth rate than achieved historically between 2001 to 2016 (1.2% annually). Figure 5-1, graphically compares the high (most likely), medium and low population growth scenarios for Middlesex Centre.

^[46] Population and Housing Projections for Middlesex County, Committee of the Whole, January 19, 2021.

^[47] It is noted that the population growth scenarios include the net Census undercount estimated at 2.5%.



**Figure 5-1a
Middlesex Centre
Long-Term Population Forecast Scenarios, 2016 to 2046**



| Scenarios | 2016 | 2046 | 2016 to 2046 | Annual Growth | Annual Growth Rate |
|-----------------|--------|--------|--------------|---------------|--------------------|
| High Scenario | 17,800 | 35,500 | 17,700 | 590 | 2.3% |
| Medium Scenario | 17,800 | 32,700 | 14,900 | 500 | 2.0% |
| Low Scenario | 17,800 | 26,600 | 8,800 | 290 | 1.3% |

Note: Population includes net Census undercount estimated at 3.5%
 Source: 2001 to 2016 from Statistics Canada Census, forecast by Watson & Associates Economists Ltd., 2022.

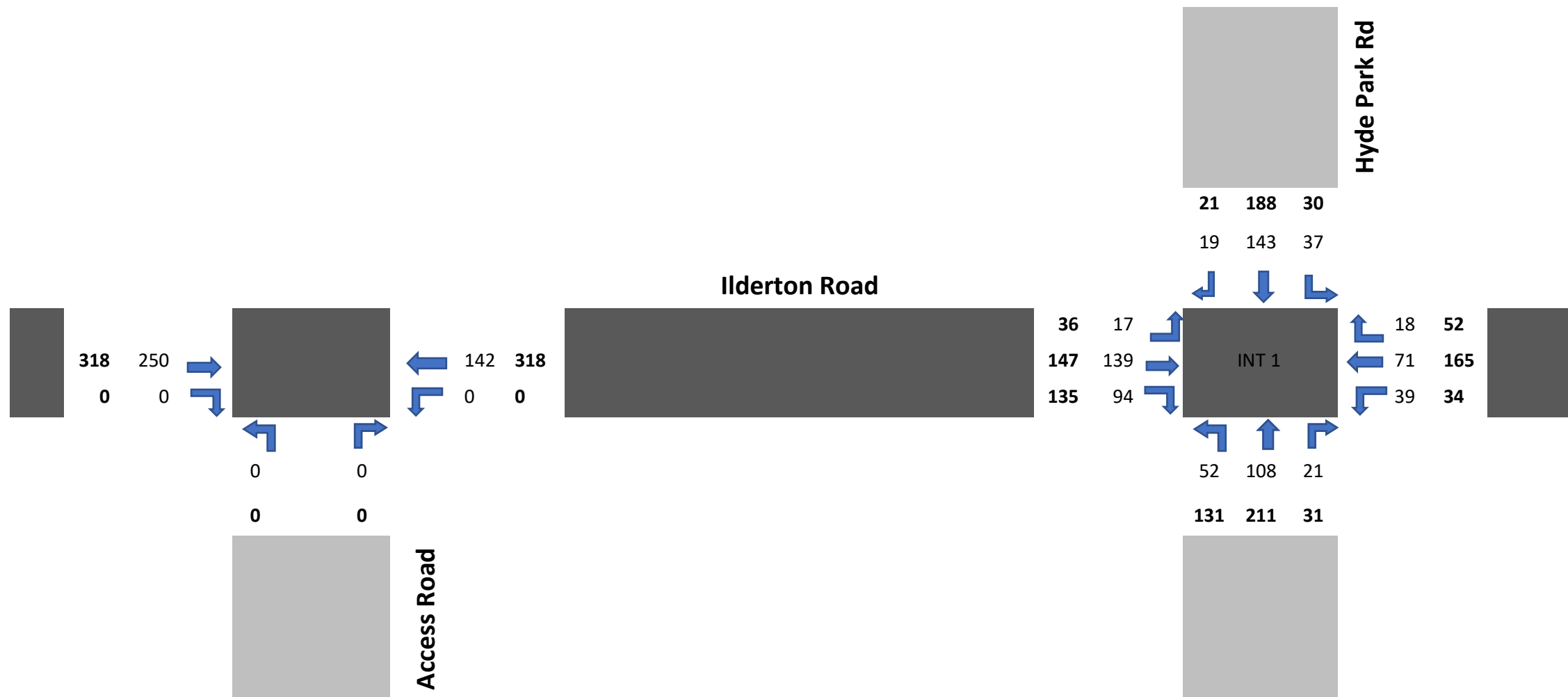
Low Population Forecast Scenario

Under this scenario, it is assumed that the population base in Middlesex Centre will grow at an average annual rate of 1.3% per year over the forecast period. This results in an incremental population increase of 8,800 between 2016 and 2046. Under the Low Population Forecast Scenario, the rate of forecast population growth is anticipated to be slower in the first half of the forecast period and gradually pick up in the later half of the planning horizon.

Appendix B

FUTURE TRAFFIC, DEVELOPMENT TRAFFIC AND TOTAL TRAFFIC VOLUMES

ILDERTON RETAIL AND DAYCARE



LEGEND

AM 33
PM 33

PROJECT NAME 13339 ILBERTON ROAD, ILBERTON

SHEET TITLE 2024 BACKGROUND TRAFFIC

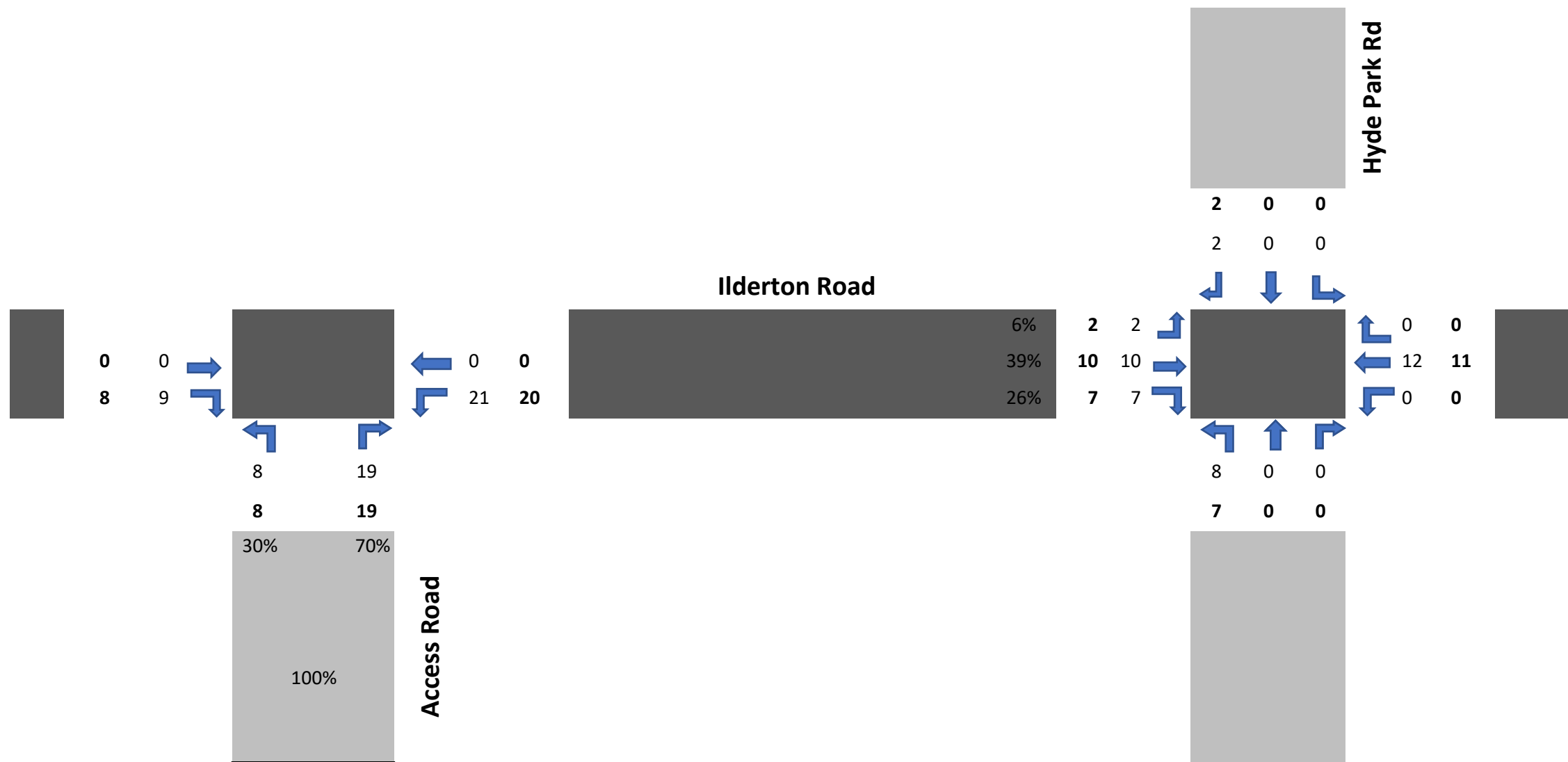


DATE: 12-Sep-22

PROJECT NO: 22-061

FIGURE NO: Figure 1.1

ILDERTON RETAIL AND DAYCARE



LEGEND

AM 33
PM 33

| | IN | OUT |
|----|----|-----|
| AM | 30 | 27 |
| PM | 28 | 27 |

PROJECT NAME 13339 ILBERTON ROAD,
ILDERTON

SHEET TITLE 2024 DEVELOPMENT
TRAFFIC

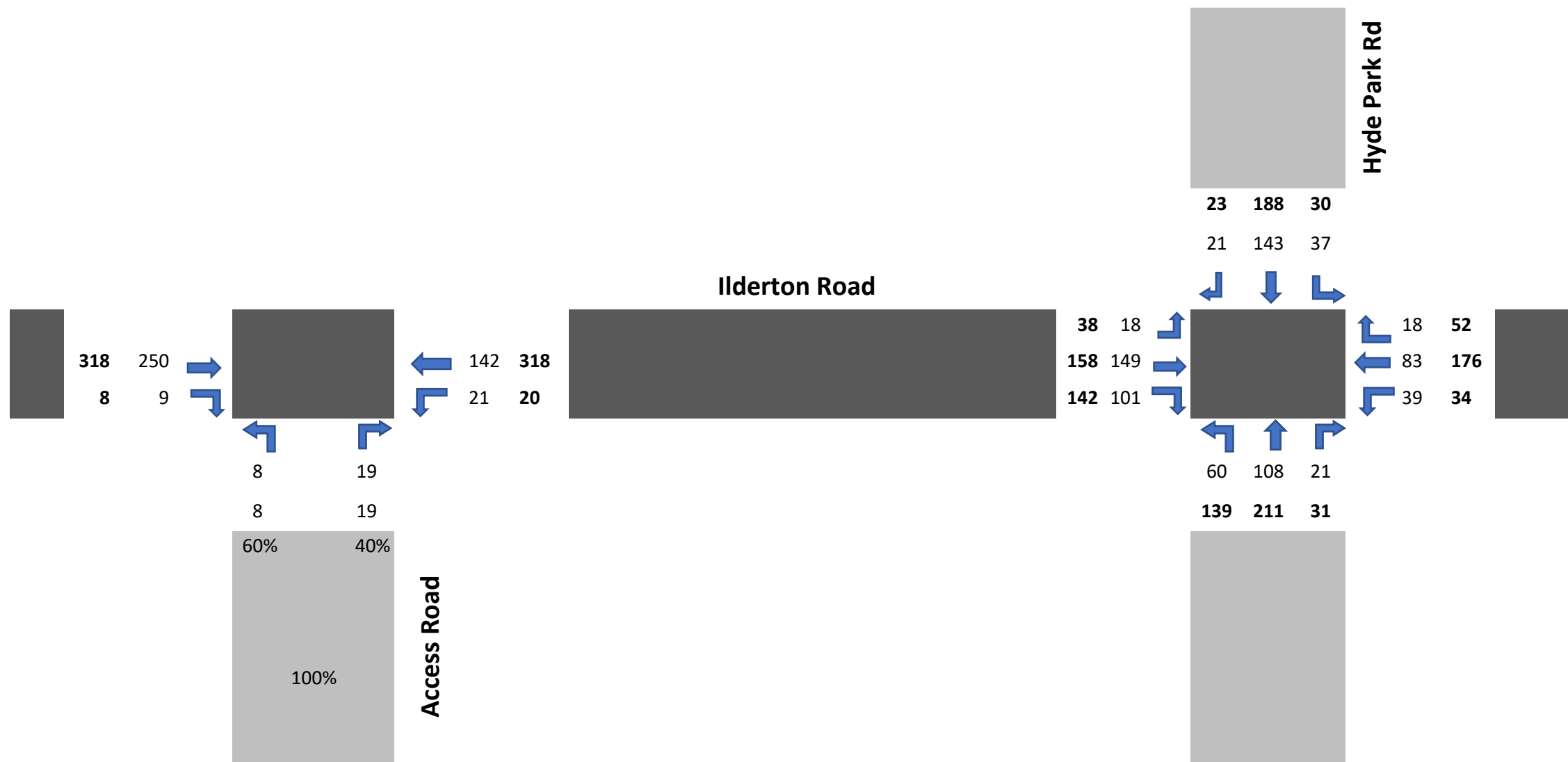


DATE: 12-Sep-22

PROJECT NO: 22-061

FIGURE NO: Figure 1.2

ILDERTON RETAIL AND DAYCARE



LEGEND

AM 33
PM 33

PROJECT NAME 13339 ILBERTON ROAD,
ILDERTON

SHEET TITLE 2024 TOTAL TRAFFIC

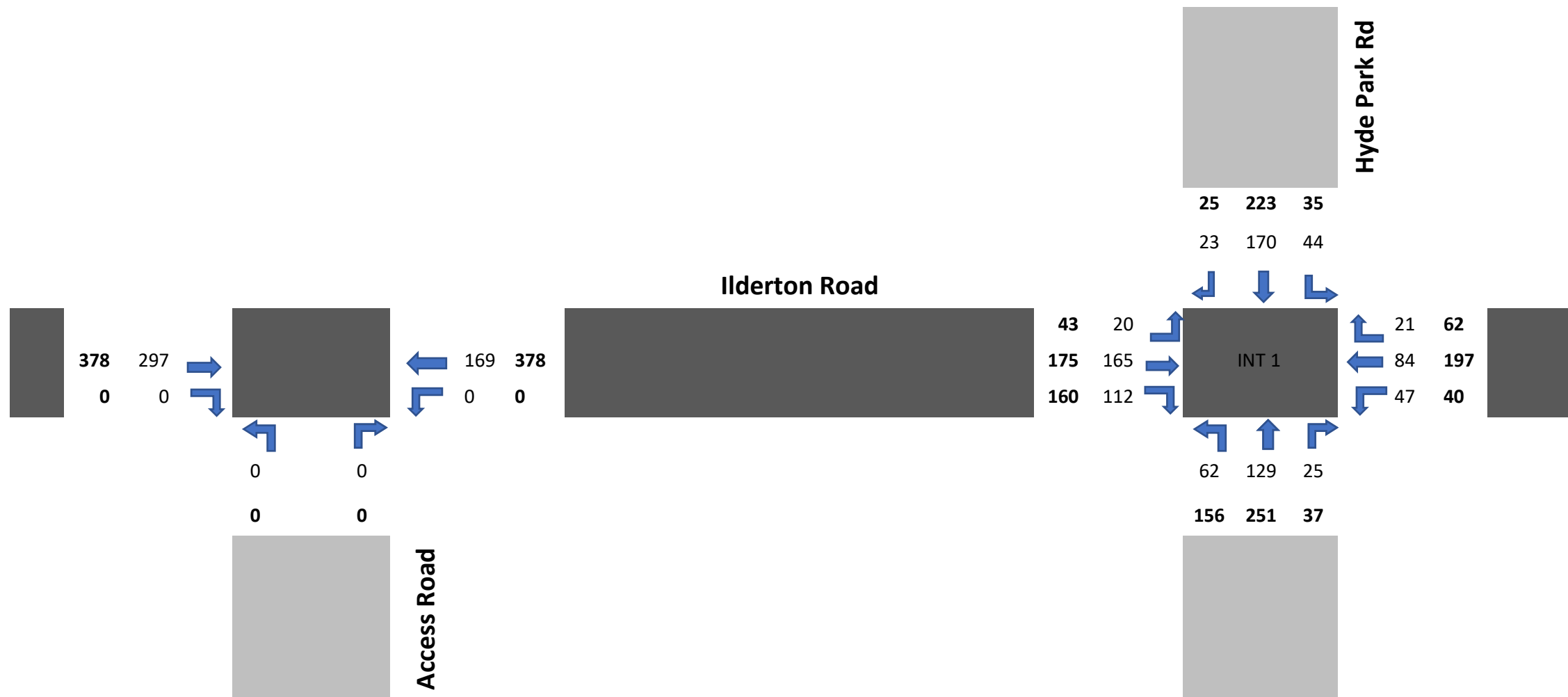


DATE: 12-Sep-22

PROJECT NO: 22-061

FIGURE NO: Figure 1.3

ILDERTON RETAIL AND DAYCARE



LEGEND

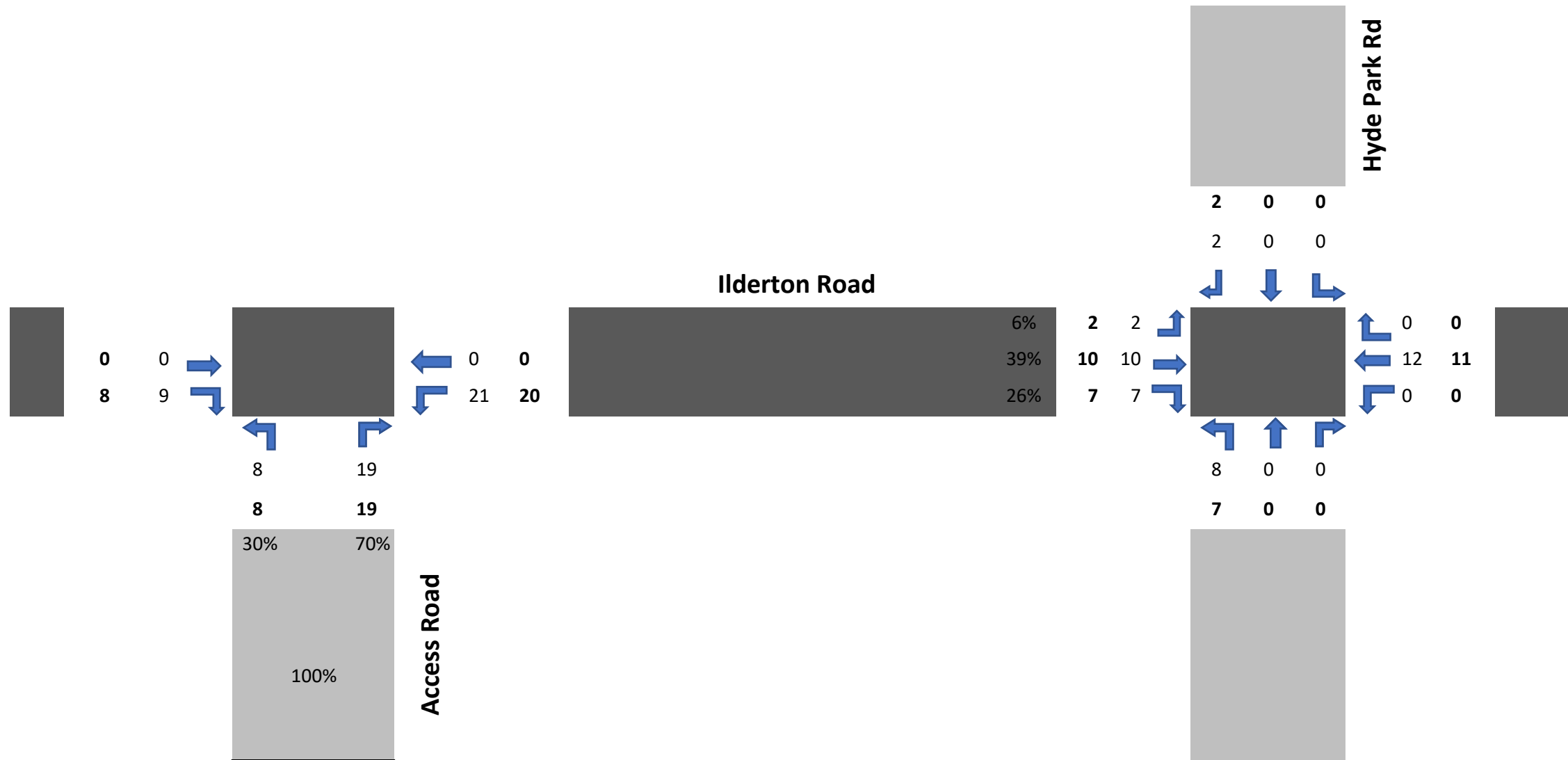
AM 33
 PM 33

PROJECT NAME 13339 ILBERTON ROAD, ILBERTON
SHEET TITLE 2034 BACKGROUND TRAFFIC



DATE: 12-Sep-22
PROJECT NO: 22-061
FIGURE NO: Figure 2.1

ILDERTON RETAIL AND DAYCARE



LEGEND

| | IN | OUT |
|----|----|-----|
| AM | 33 | 30 |
| PM | 33 | 27 |

PROJECT NAME 13339 ILBERTON ROAD,
ILDERTON

SHEET TITLE 2034 DEVELOPMENT
TRAFFIC

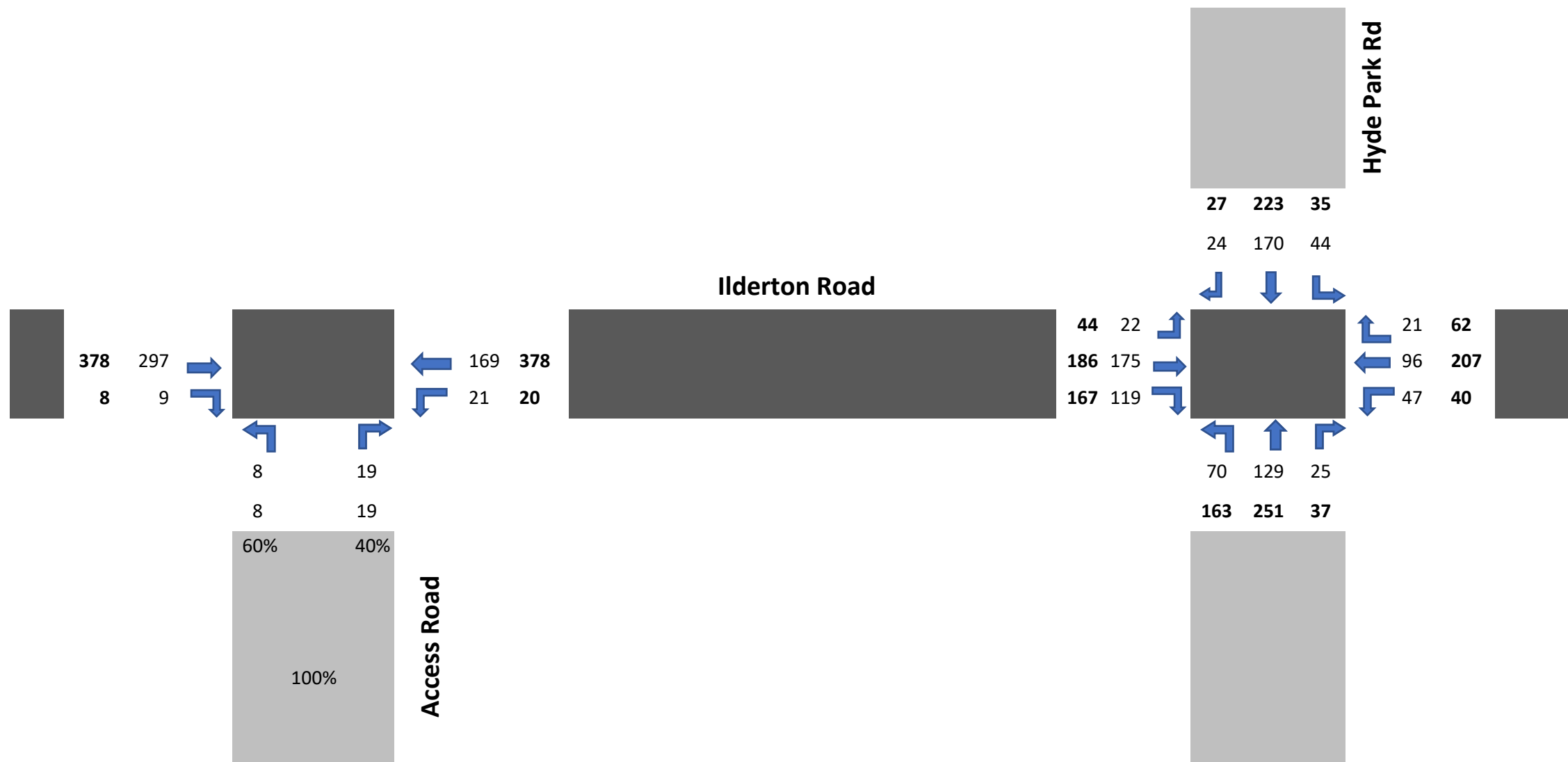


DATE: 12-Sep-22

PROJECT NO: 22-061

FIGURE NO: Figure 2.2

ILDERTON RETAIL AND DAYCARE



PROJECT NAME 13339 ILBERTON ROAD,
ILDERTON

SHEET TITLE 2034 TOTAL TRAFFIC



DATE: 12-Sep-22

PROJECT NO: 22-061

FIGURE NO: Figure 2.3

Appendix C

CAPACITY ANALYSIS

Lanes, Volumes, Timings
2: Ilderton Road & Hyde Park Road

2024 TOTAL AM TRAFFIC
09-12-2022



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-------------------------|-------|-------|------|-------|-------|------|-------|-------|------|-------|-------|-------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 18 | 149 | 101 | 39 | 83 | 18 | 60 | 108 | 21 | 37 | 143 | 21 |
| Future Volume (vph) | 18 | 149 | 101 | 39 | 83 | 18 | 60 | 108 | 21 | 37 | 143 | 21 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (m) | 15.0 | | 0.0 | 0.0 | | 0.0 | 40.0 | | 0.0 | 40.0 | | 81.0 |
| Storage Lanes | 1 | | 0 | 0 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (m) | 15.0 | | | 7.5 | | | 15.0 | | | 15.0 | | |
| 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 | | 0.939 | | | 0.982 | | | 0.975 | | | 0.981 | |
| Flt Protected | 0.950 | | | | 0.986 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1610 | 1592 | 0 | 0 | 1482 | 0 | 1579 | 1557 | 0 | 1564 | 1657 | 0 |
| Flt Permitted | 0.660 | | | | 0.842 | | 0.645 | | | 0.668 | | |
| Satd. Flow (perm) | 1119 | 1592 | 0 | 0 | 1266 | 0 | 1072 | 1557 | 0 | 1100 | 1657 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 76 | | | 17 | | | 22 | | | | 17 |
| Link Speed (k/h) | | 50 | | | 50 | | | 50 | | | | 50 |
| Link Distance (m) | | 108.1 | | | 264.8 | | | 206.5 | | | | 290.3 |
| Travel Time (s) | | 7.8 | | | 19.1 | | | 14.9 | | | | 20.9 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 18% | 13% | 2% | 4% | 5% | 25% | 5% | 2% | 5% |
| Adj. Flow (vph) | 20 | 162 | 110 | 42 | 90 | 20 | 65 | 117 | 23 | 40 | 155 | 23 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 20 | 272 | 0 | 0 | 152 | 0 | 65 | 140 | 0 | 40 | 178 | 0 |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | | 6 |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | |
| Minimum Split (s) | 25.0 | 25.0 | | 25.0 | 25.0 | | 25.0 | 25.0 | | 25.0 | 25.0 | |
| Total Split (s) | 25.0 | 25.0 | | 25.0 | 25.0 | | 25.0 | 25.0 | | 25.0 | 25.0 | |
| Total Split (%) | 50.0% | 50.0% | | 50.0% | 50.0% | | 50.0% | 50.0% | | 50.0% | 50.0% | |
| Maximum Green (s) | 18.0 | 18.0 | | 18.0 | 18.0 | | 18.0 | 18.0 | | 18.0 | 18.0 | |
| Yellow Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Lost Time (s) | 7.0 | 7.0 | | | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | |
| Lead/Lag | | | | | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Walk Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | |
| Flash Dont Walk (s) | 11.0 | 11.0 | | 11.0 | 11.0 | | 11.0 | 11.0 | | 11.0 | 11.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 18.0 | 18.0 | | 18.0 | 18.0 | | 18.0 | 18.0 | | 18.0 | 18.0 | |
| Actuated g/C Ratio | 0.36 | 0.36 | | 0.36 | 0.36 | | 0.36 | 0.36 | | 0.36 | 0.36 | |
| v/c Ratio | 0.05 | 0.44 | | 0.33 | 0.33 | | 0.17 | 0.24 | | 0.10 | 0.29 | |
| Control Delay | 10.9 | 11.3 | | 12.7 | 12.7 | | 12.4 | 11.0 | | 11.5 | 12.0 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 10.9 | 11.3 | | 12.7 | 12.7 | | 12.4 | 11.0 | | 11.5 | 12.0 | |
| LOS | B | B | | B | B | | B | B | | B | B | |
| Approach Delay | | 11.3 | | 12.7 | 12.7 | | | 11.4 | | | 11.9 | |
| Approach LOS | | B | | B | B | | | B | | | B | |
| Queue Length 50th (m) | 1.2 | 12.9 | | 8.7 | 8.7 | | 4.0 | 7.4 | | 2.4 | 10.3 | |

Lanes, Volumes, Timings
2: Ilderton Road & Hyde Park Road

2024 TOTAL AM TRAFFIC
09-12-2022

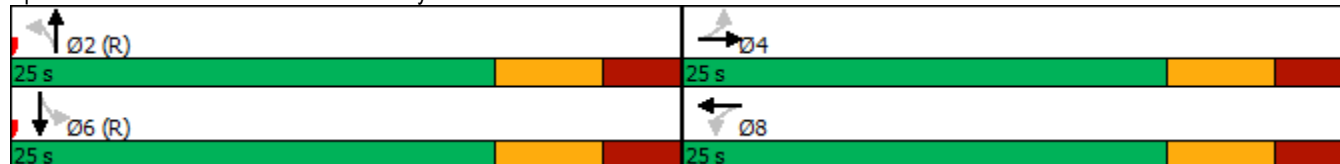


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|-----|-----|-------|-----|------|-------|-----|------|-------|-----|
| Queue Length 95th (m) | 4.6 | 29.0 | | | 20.4 | | 10.9 | 17.5 | | 7.4 | 22.2 | |
| Internal Link Dist (m) | | 84.1 | | | 240.8 | | | 182.5 | | | 266.3 | |
| Turn Bay Length (m) | 15.0 | | | | | | 40.0 | | | 40.0 | | |
| Base Capacity (vph) | 402 | 621 | | | 466 | | 385 | 574 | | 396 | 607 | |
| Starvation Cap Reductn | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 | |
| Reduced v/c Ratio | 0.05 | 0.44 | | | 0.33 | | 0.17 | 0.24 | | 0.10 | 0.29 | |

Intersection Summary

| | |
|-----------------------------------|---|
| Area Type: | CBD |
| Cycle Length: | 50 |
| Actuated Cycle Length: | 50 |
| Offset: | 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green |
| Natural Cycle: | 50 |
| Control Type: | Pretimed |
| Maximum v/c Ratio: | 0.44 |
| Intersection Signal Delay: | 11.7 |
| Intersection LOS: | B |
| Intersection Capacity Utilization | 61.3% |
| ICU Level of Service | B |
| Analysis Period (min) | 15 |

Splits and Phases: 2: Ilderton Road & Hyde Park Road



HCM Unsignalized Intersection Capacity Analysis
1: Access Road & Ilderton Road

2024 TOTAL AM TRAFFIC
09-12-2022



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|------|------|-------|----------------------|------|------|
| Lane Configurations | ↑ | ↗ | | ↖ | ↘ | |
| Traffic Volume (veh/h) | 250 | 9 | 21 | 142 | 8 | 19 |
| Future Volume (Veh/h) | 250 | 9 | 21 | 142 | 8 | 19 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 272 | 10 | 23 | 154 | 9 | 21 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | TWLTL | | | |
| Median storage (veh) | 2 | | | | | |
| Upstream signal (m) | 108 | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | | | 282 | | 472 | 272 |
| vC1, stage 1 conf vol | | | | | 272 | |
| vC2, stage 2 conf vol | | | | | 200 | |
| vCu, unblocked vol | | | 282 | | 472 | 272 |
| tC, single (s) | | | 4.1 | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | 5.4 | |
| tF (s) | | | 2.2 | | 3.5 | 3.3 |
| p0 queue free % | | | 98 | | 99 | 97 |
| cM capacity (veh/h) | | | 1280 | | 692 | 767 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | | |
| Volume Total | 272 | 10 | 177 | 30 | | |
| Volume Left | 0 | 0 | 23 | 9 | | |
| Volume Right | 0 | 10 | 0 | 21 | | |
| cSH | 1700 | 1700 | 1280 | 743 | | |
| Volume to Capacity | 0.16 | 0.01 | 0.02 | 0.04 | | |
| Queue Length 95th (m) | 0.0 | 0.0 | 0.4 | 1.0 | | |
| Control Delay (s) | 0.0 | 0.0 | 1.2 | 10.1 | | |
| Lane LOS | | | A | B | | |
| Approach Delay (s) | 0.0 | | 1.2 | 10.1 | | |
| Approach LOS | | | | B | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 1.0 | | | |
| Intersection Capacity Utilization | | | 35.1% | ICU Level of Service | A | |
| Analysis Period (min) | | | 15 | | | |

Lanes, Volumes, Timings
2: Ilderton Road & Hyde Park Road

2024 TOTAL PM TRAFFIC
09-12-2022



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-------------------------|-------|-------|------|-------|-------|------|-------|-------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 38 | 158 | 142 | 34 | 176 | 52 | 139 | 211 | 31 | 30 | 188 | 23 |
| Future Volume (vph) | 38 | 158 | 142 | 34 | 176 | 52 | 139 | 211 | 31 | 30 | 188 | 23 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (m) | 15.0 | | 0.0 | 0.0 | | 0.0 | 40.0 | | 0.0 | 40.0 | | 81.0 |
| Storage Lanes | 1 | | 0 | 0 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (m) | 15.0 | | | 7.5 | | | 15.0 | | | 15.0 | | |
| 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 | | 0.929 | | | 0.973 | | | 0.981 | | | 0.984 | |
| Flt Protected | 0.950 | | | | 0.994 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1610 | 1494 | 0 | 0 | 1608 | 0 | 1579 | 1577 | 0 | 1579 | 1668 | 0 |
| Flt Permitted | 0.637 | | | | 0.911 | | 0.616 | | | 0.597 | | |
| Satd. Flow (perm) | 1080 | 1494 | 0 | 0 | 1473 | 0 | 1024 | 1577 | 0 | 993 | 1668 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 101 | | | 28 | | | 17 | | | 14 | |
| Link Speed (k/h) | | 50 | | | 50 | | | 50 | | | 50 | |
| Link Distance (m) | | 108.1 | | | 264.8 | | | 206.5 | | | 290.3 | |
| Travel Time (s) | | 7.8 | | | 19.1 | | | 14.9 | | | 20.9 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 2% | 8% | 7% | 2% | 5% | 2% | 4% | 5% | 25% | 4% | 2% | 2% |
| Adj. Flow (vph) | 41 | 172 | 154 | 37 | 191 | 57 | 151 | 229 | 34 | 33 | 204 | 25 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 41 | 326 | 0 | 0 | 285 | 0 | 151 | 263 | 0 | 33 | 229 | 0 |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | |
| Minimum Split (s) | 25.0 | 25.0 | | 25.0 | 25.0 | | 25.0 | 25.0 | | 25.0 | 25.0 | |
| Total Split (s) | 25.0 | 25.0 | | 25.0 | 25.0 | | 25.0 | 25.0 | | 25.0 | 25.0 | |
| Total Split (%) | 50.0% | 50.0% | | 50.0% | 50.0% | | 50.0% | 50.0% | | 50.0% | 50.0% | |
| Maximum Green (s) | 18.0 | 18.0 | | 18.0 | 18.0 | | 18.0 | 18.0 | | 18.0 | 18.0 | |
| Yellow Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Lost Time (s) | 7.0 | 7.0 | | | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | |
| Lead/Lag | | | | | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Walk Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | |
| Flash Dont Walk (s) | 11.0 | 11.0 | | 11.0 | 11.0 | | 11.0 | 11.0 | | 11.0 | 11.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 18.0 | 18.0 | | 18.0 | 18.0 | | 18.0 | 18.0 | | 18.0 | 18.0 | |
| Actuated g/C Ratio | 0.36 | 0.36 | | 0.36 | 0.36 | | 0.36 | 0.36 | | 0.36 | 0.36 | |
| v/c Ratio | 0.11 | 0.54 | | 0.52 | 0.52 | | 0.41 | 0.46 | | 0.09 | 0.38 | |
| Control Delay | 11.6 | 12.6 | | 15.4 | 15.4 | | 16.3 | 14.5 | | 11.5 | 13.3 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 11.6 | 12.6 | | 15.4 | 15.4 | | 16.3 | 14.5 | | 11.5 | 13.3 | |
| LOS | B | B | | B | B | | B | B | | B | B | |
| Approach Delay | | 12.5 | | 15.4 | 15.4 | | 15.2 | 15.2 | | 13.1 | 13.1 | |
| Approach LOS | | B | | B | B | | B | B | | B | B | |
| Queue Length 50th (m) | 2.5 | 15.3 | | 18.0 | 18.0 | | 10.3 | 16.8 | | 2.0 | 14.3 | |

Lanes, Volumes, Timings
 2: Ilderton Road & Hyde Park Road

2024 TOTAL PM TRAFFIC
 09-12-2022



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|-----|-----|-------|-----|------|-------|-----|------|-------|-----|
| Queue Length 95th (m) | 7.6 | 35.1 | | | 36.8 | | 23.5 | 33.6 | | 6.6 | 28.7 | |
| Internal Link Dist (m) | | 84.1 | | | 240.8 | | | 182.5 | | | 266.3 | |
| Turn Bay Length (m) | 15.0 | | | | | | 40.0 | | | 40.0 | | |
| Base Capacity (vph) | 388 | 602 | | | 548 | | 368 | 578 | | 357 | 609 | |
| Starvation Cap Reductn | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 | |
| Reduced v/c Ratio | 0.11 | 0.54 | | | 0.52 | | 0.41 | 0.46 | | 0.09 | 0.38 | |

Intersection Summary

| | |
|------------------------------------|---|
| Area Type: | CBD |
| Cycle Length: | 50 |
| Actuated Cycle Length: | 50 |
| Offset: | 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green |
| Natural Cycle: | 50 |
| Control Type: | Pretimed |
| Maximum v/c Ratio: | 0.54 |
| Intersection Signal Delay: | 14.1 |
| Intersection LOS: | B |
| Intersection Capacity Utilization: | 79.2% |
| ICU Level of Service: | D |
| Analysis Period (min): | 15 |

Splits and Phases: 2: Ilderton Road & Hyde Park Road



HCM Unsignalized Intersection Capacity Analysis
 1: Access Road & Ilderton Road

2024 TOTAL PM TRAFFIC
 09-12-2022



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|------|------|-------|----------------------|------|------|
| Lane Configurations | ↑ | ↑ | | ↑ | ↑ | |
| Traffic Volume (veh/h) | 318 | 8 | 20 | 318 | 8 | 19 |
| Future Volume (Veh/h) | 318 | 8 | 20 | 318 | 8 | 19 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 346 | 9 | 22 | 346 | 9 | 21 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | TWLTL | | | |
| Median storage (veh) | 2 | | | | | |
| Upstream signal (m) | 108 | | | | | |
| pX, platoon unblocked | | | | | 0.98 | |
| vC, conflicting volume | | | 355 | | 736 | 346 |
| vC1, stage 1 conf vol | | | | | 346 | |
| vC2, stage 2 conf vol | | | | | 390 | |
| vCu, unblocked vol | | | 355 | | 719 | 346 |
| tC, single (s) | | | 4.1 | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | 5.4 | |
| tF (s) | | | 2.2 | | 3.5 | 3.3 |
| p0 queue free % | | | 98 | | 98 | 97 |
| cM capacity (veh/h) | | | 1204 | | 575 | 697 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | | |
| Volume Total | 346 | 9 | 368 | 30 | | |
| Volume Left | 0 | 0 | 22 | 9 | | |
| Volume Right | 0 | 9 | 0 | 21 | | |
| cSH | 1700 | 1700 | 1204 | 655 | | |
| Volume to Capacity | 0.20 | 0.01 | 0.02 | 0.05 | | |
| Queue Length 95th (m) | 0.0 | 0.0 | 0.4 | 1.1 | | |
| Control Delay (s) | 0.0 | 0.0 | 0.7 | 10.8 | | |
| Lane LOS | | | A | B | | |
| Approach Delay (s) | 0.0 | | 0.7 | 10.8 | | |
| Approach LOS | | | | B | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 0.7 | | | |
| Intersection Capacity Utilization | | | 43.1% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | | | |

Lanes, Volumes, Timings
2: Ilderton Road & Hyde Park Road

2034 TOTAL AM TRAFFIC

09-12-2022



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-------------------------|-------|-------|------|-------|-------|------|-------|-------|------|-------|-------|-------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 22 | 175 | 119 | 47 | 96 | 21 | 70 | 129 | 25 | 44 | 170 | 24 |
| Future Volume (vph) | 22 | 175 | 119 | 47 | 96 | 21 | 70 | 129 | 25 | 44 | 170 | 24 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (m) | 15.0 | | 0.0 | 0.0 | | 0.0 | 40.0 | | 0.0 | 40.0 | | 81.0 |
| Storage Lanes | 1 | | 0 | 0 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (m) | 15.0 | | | 7.5 | | | 15.0 | | | 15.0 | | |
| 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 | | 0.939 | | | 0.983 | | | 0.976 | | | 0.982 | |
| Flt Protected | 0.950 | | | | 0.986 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1610 | 1592 | 0 | 0 | 1483 | 0 | 1579 | 1559 | 0 | 1564 | 1659 | 0 |
| Flt Permitted | 0.645 | | | | 0.815 | | 0.626 | | | 0.651 | | |
| Satd. Flow (perm) | 1093 | 1592 | 0 | 0 | 1226 | 0 | 1041 | 1559 | 0 | 1072 | 1659 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 76 | | | 17 | | | 22 | | | | 16 |
| Link Speed (k/h) | | 50 | | | 50 | | | 50 | | | | 50 |
| Link Distance (m) | | 108.1 | | | 264.8 | | | 206.5 | | | | 290.3 |
| Travel Time (s) | | 7.8 | | | 19.1 | | | 14.9 | | | | 20.9 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 18% | 13% | 2% | 4% | 5% | 25% | 5% | 2% | 5% |
| Adj. Flow (vph) | 24 | 190 | 129 | 51 | 104 | 23 | 76 | 140 | 27 | 48 | 185 | 26 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 24 | 319 | 0 | 0 | 178 | 0 | 76 | 167 | 0 | 48 | 211 | 0 |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | | 6 |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | |
| Minimum Split (s) | 25.0 | 25.0 | | 25.0 | 25.0 | | 25.0 | 25.0 | | 25.0 | | 25.0 |
| Total Split (s) | 25.0 | 25.0 | | 25.0 | 25.0 | | 25.0 | 25.0 | | 25.0 | | 25.0 |
| Total Split (%) | 50.0% | 50.0% | | 50.0% | 50.0% | | 50.0% | 50.0% | | 50.0% | | 50.0% |
| Maximum Green (s) | 18.0 | 18.0 | | 18.0 | 18.0 | | 18.0 | 18.0 | | 18.0 | | 18.0 |
| Yellow Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | | 4.0 |
| All-Red Time (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | | 3.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | 0.0 | | 0.0 | | 0.0 |
| Total Lost Time (s) | 7.0 | 7.0 | | | 7.0 | | 7.0 | 7.0 | | 7.0 | | 7.0 |
| Lead/Lag | | | | | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Walk Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | | 7.0 |
| Flash Dont Walk (s) | 11.0 | 11.0 | | 11.0 | 11.0 | | 11.0 | 11.0 | | 11.0 | | 11.0 |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | | 0 |
| Act Effct Green (s) | 18.0 | 18.0 | | | 18.0 | | 18.0 | 18.0 | | 18.0 | | 18.0 |
| Actuated g/C Ratio | 0.36 | 0.36 | | | 0.36 | | 0.36 | 0.36 | | 0.36 | | 0.36 |
| v/c Ratio | 0.06 | 0.51 | | | 0.39 | | 0.20 | 0.29 | | 0.12 | | 0.35 |
| Control Delay | 11.1 | 12.9 | | | 14.0 | | 12.9 | 11.6 | | 11.8 | | 12.8 |
| Queue Delay | 0.0 | 0.0 | | | 0.0 | | 0.0 | 0.0 | | 0.0 | | 0.0 |
| Total Delay | 11.1 | 12.9 | | | 14.0 | | 12.9 | 11.6 | | 11.8 | | 12.8 |
| LOS | B | B | | | B | | B | B | | B | | B |
| Approach Delay | | 12.8 | | | 14.0 | | | 12.0 | | | | 12.6 |
| Approach LOS | | B | | | B | | | B | | | | B |
| Queue Length 50th (m) | 1.4 | 16.6 | | | 10.7 | | 4.7 | 9.2 | | 2.9 | | 12.8 |

Lanes, Volumes, Timings
2: Ilderton Road & Hyde Park Road

2034 TOTAL AM TRAFFIC
09-12-2022

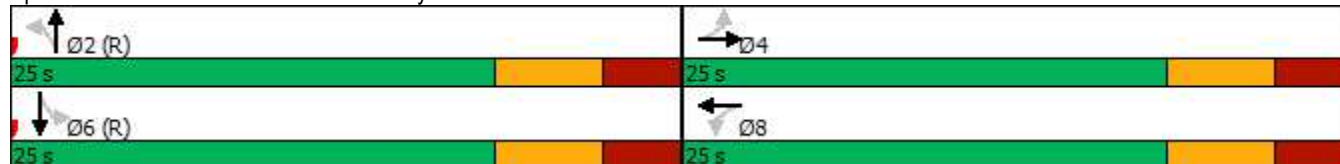


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|-----|-----|-------|-----|------|-------|-----|------|-------|-----|
| Queue Length 95th (m) | 5.2 | 35.5 | | | 24.3 | | 12.4 | 20.6 | | 8.6 | 26.3 | |
| Internal Link Dist (m) | | 84.1 | | | 240.8 | | | 182.5 | | | 266.3 | |
| Turn Bay Length (m) | 15.0 | | | | | | 40.0 | | | 40.0 | | |
| Base Capacity (vph) | 393 | 621 | | | 452 | | 374 | 575 | | 385 | 607 | |
| Starvation Cap Reductn | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 | |
| Reduced v/c Ratio | 0.06 | 0.51 | | | 0.39 | | 0.20 | 0.29 | | 0.12 | 0.35 | |

Intersection Summary

| | |
|------------------------------------|---|
| Area Type: | CBD |
| Cycle Length: | 50 |
| Actuated Cycle Length: | 50 |
| Offset: | 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green |
| Natural Cycle: | 50 |
| Control Type: | Pretimed |
| Maximum v/c Ratio: | 0.51 |
| Intersection Signal Delay: | 12.8 |
| Intersection LOS: | B |
| Intersection Capacity Utilization: | 67.4% |
| ICU Level of Service: | C |
| Analysis Period (min): | 15 |

Splits and Phases: 2: Ilderton Road & Hyde Park Road



HCM Unsignalized Intersection Capacity Analysis
1: Access Road & Ilderton Road




















2034 TOTAL AM TRAFFIC
09-12-2022



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|------|------|-------|----------------------|------|------|
| Lane Configurations | ↑ | ↗ | | ↖ | ↘ | |
| Traffic Volume (veh/h) | 297 | 9 | 32 | 169 | 8 | 19 |
| Future Volume (Veh/h) | 297 | 9 | 32 | 169 | 8 | 19 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 323 | 10 | 35 | 184 | 9 | 21 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | TWLTL | | | |
| Median storage (veh) | 2 | | | | | |
| Upstream signal (m) | 108 | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | | | 333 | | 577 | 323 |
| vC1, stage 1 conf vol | | | | | 323 | |
| vC2, stage 2 conf vol | | | | | 254 | |
| vCu, unblocked vol | | | 333 | | 577 | 323 |
| tC, single (s) | | | 4.1 | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | 5.4 | |
| tF (s) | | | 2.2 | | 3.5 | 3.3 |
| p0 queue free % | | | 97 | | 99 | 97 |
| cM capacity (veh/h) | | | 1226 | | 638 | 718 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | | |
| Volume Total | 323 | 10 | 219 | 30 | | |
| Volume Left | 0 | 0 | 35 | 9 | | |
| Volume Right | 0 | 10 | 0 | 21 | | |
| cSH | 1700 | 1700 | 1226 | 692 | | |
| Volume to Capacity | 0.19 | 0.01 | 0.03 | 0.04 | | |
| Queue Length 95th (m) | 0.0 | 0.0 | 0.7 | 1.1 | | |
| Control Delay (s) | 0.0 | 0.0 | 1.5 | 10.4 | | |
| Lane LOS | | | A | B | | |
| Approach Delay (s) | 0.0 | | 1.5 | 10.4 | | |
| Approach LOS | | | | B | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 1.1 | | | |
| Intersection Capacity Utilization | | | 39.6% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | | | |

Lanes, Volumes, Timings
2: Ilderton Road & Hyde Park Road

2034 TOTAL PM TRAFFIC
09-12-2022

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | | |  | |  |  | |  |  | |
| Traffic Volume (vph) | 44 | 186 | 167 | 40 | 207 | 62 | 163 | 251 | 37 | 35 | 223 | 27 |
| Future Volume (vph) | 44 | 186 | 167 | 40 | 207 | 62 | 163 | 251 | 37 | 35 | 223 | 27 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (m) | 15.0 | | 0.0 | 0.0 | | 0.0 | 40.0 | | 0.0 | 40.0 | | 81.0 |
| Storage Lanes | 1 | | 0 | 0 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (m) | 15.0 | | | 7.5 | | | 15.0 | | | 15.0 | | |
| 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 | | 0.929 | | | 0.973 | | | 0.981 | | | 0.984 | |
| Flt Protected | 0.950 | | | | 0.994 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1610 | 1494 | 0 | 0 | 1608 | 0 | 1579 | 1577 | 0 | 1579 | 1668 | 0 |
| Flt Permitted | 0.582 | | | | 0.899 | | 0.593 | | | 0.570 | | |
| Satd. Flow (perm) | 987 | 1494 | 0 | 0 | 1454 | 0 | 986 | 1577 | 0 | 948 | 1668 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 101 | | | 28 | | | 16 | | | 13 | |
| Link Speed (k/h) | | 50 | | | 50 | | | 50 | | | 50 | |
| Link Distance (m) | | 108.1 | | | 264.8 | | | 206.5 | | | 290.3 | |
| Travel Time (s) | | 7.8 | | | 19.1 | | | 14.9 | | | 20.9 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 2% | 8% | 7% | 2% | 5% | 2% | 4% | 5% | 25% | 4% | 2% | 2% |
| Adj. Flow (vph) | 48 | 202 | 182 | 43 | 225 | 67 | 177 | 273 | 40 | 38 | 242 | 29 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 48 | 384 | 0 | 0 | 335 | 0 | 177 | 313 | 0 | 38 | 271 | 0 |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | |
| Minimum Split (s) | 25.0 | 25.0 | | 25.0 | 25.0 | | 25.0 | 25.0 | | 25.0 | 25.0 | |
| Total Split (s) | 25.0 | 25.0 | | 25.0 | 25.0 | | 25.0 | 25.0 | | 25.0 | 25.0 | |
| Total Split (%) | 50.0% | 50.0% | | 50.0% | 50.0% | | 50.0% | 50.0% | | 50.0% | 50.0% | |
| Maximum Green (s) | 18.0 | 18.0 | | 18.0 | 18.0 | | 18.0 | 18.0 | | 18.0 | 18.0 | |
| Yellow Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Lost Time (s) | 7.0 | 7.0 | | | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | |
| Lead/Lag | | | | | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Walk Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | |
| Flash Dont Walk (s) | 11.0 | 11.0 | | 11.0 | 11.0 | | 11.0 | 11.0 | | 11.0 | 11.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 18.0 | 18.0 | | 18.0 | 18.0 | | 18.0 | 18.0 | | 18.0 | 18.0 | |
| Actuated g/C Ratio | 0.36 | 0.36 | | | 0.36 | | 0.36 | 0.36 | | 0.36 | 0.36 | |
| v/c Ratio | 0.14 | 0.64 | | | 0.62 | | 0.50 | 0.54 | | 0.11 | 0.45 | |
| Control Delay | 12.0 | 15.4 | | | 18.0 | | 18.5 | 16.3 | | 11.8 | 14.5 | |
| Queue Delay | 0.0 | 0.0 | | | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 12.0 | 15.4 | | | 18.0 | | 18.5 | 16.3 | | 11.8 | 14.5 | |
| LOS | B | B | | | B | | B | B | | B | B | |
| Approach Delay | | 15.0 | | | 18.0 | | | 17.1 | | | 14.1 | |
| Approach LOS | | B | | | B | | | B | | | B | |
| Queue Length 50th (m) | 2.9 | 20.3 | | | 22.6 | | 12.5 | 21.2 | | 2.3 | 17.7 | |

Lanes, Volumes, Timings
 2: Ilderton Road & Hyde Park Road

2024 TOTAL PM TRAFFIC
 09-12-2022



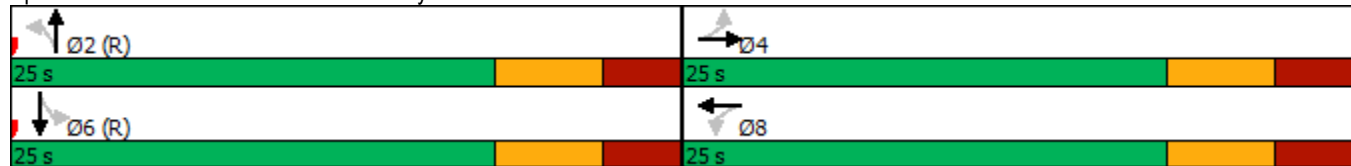
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|-----|-----|-------|-----|------|-------|-----|------|-------|-----|
| Queue Length 95th (m) | 8.7 | 44.8 | | | 45.3 | | 28.3 | 41.1 | | 7.3 | 34.5 | |
| Internal Link Dist (m) | | 84.1 | | | 240.8 | | | 182.5 | | | 266.3 | |
| Turn Bay Length (m) | 15.0 | | | | | | 40.0 | | | 40.0 | | |
| Base Capacity (vph) | 355 | 602 | | | 541 | | 354 | 577 | | 341 | 608 | |
| Starvation Cap Reductn | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | | 0 | | 0 | 0 | | 0 | 0 | |
| Reduced v/c Ratio | 0.14 | 0.64 | | | 0.62 | | 0.50 | 0.54 | | 0.11 | 0.45 | |

Intersection Summary

Area Type: CBD
 Cycle Length: 50
 Actuated Cycle Length: 50
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 50
 Control Type: Pretimed
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 16.1
 Intersection Capacity Utilization 89.2%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service E

Splits and Phases: 2: Ilderton Road & Hyde Park Road



HCM Unsignalized Intersection Capacity Analysis
1: Access Road & Ilderton Road

2034 TOTAL PM TRAFFIC
09-12-2022



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|------|------|-------|----------------------|------|------|
| Lane Configurations | ↑ | ↑ | | ↑ | ↑ | |
| Traffic Volume (veh/h) | 378 | 8 | 20 | 378 | 8 | 19 |
| Future Volume (Veh/h) | 378 | 8 | 20 | 378 | 8 | 19 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 411 | 9 | 22 | 411 | 9 | 21 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | TWLTL | | | |
| Median storage (veh) | 2 | | | | | |
| Upstream signal (m) | 108 | | | | | |
| pX, platoon unblocked | | | | | 0.93 | |
| vC, conflicting volume | | | 420 | | 866 | 411 |
| vC1, stage 1 conf vol | | | | | 411 | |
| vC2, stage 2 conf vol | | | | | 455 | |
| vCu, unblocked vol | | | 420 | | 818 | 411 |
| tC, single (s) | | | 4.1 | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | 5.4 | |
| tF (s) | | | 2.2 | | 3.5 | 3.3 |
| p0 queue free % | | | 98 | | 98 | 97 |
| cM capacity (veh/h) | | | 1139 | | 525 | 641 |
| Direction, Lane # | EB 1 | EB 2 | WB 1 | NB 1 | | |
| Volume Total | 411 | 9 | 433 | 30 | | |
| Volume Left | 0 | 0 | 22 | 9 | | |
| Volume Right | 0 | 9 | 0 | 21 | | |
| cSH | 1700 | 1700 | 1139 | 601 | | |
| Volume to Capacity | 0.24 | 0.01 | 0.02 | 0.05 | | |
| Queue Length 95th (m) | 0.0 | 0.0 | 0.5 | 1.3 | | |
| Control Delay (s) | 0.0 | 0.0 | 0.6 | 11.3 | | |
| Lane LOS | | | A | B | | |
| Approach Delay (s) | 0.0 | | 0.6 | 11.3 | | |
| Approach LOS | | | | B | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 0.7 | | | |
| Intersection Capacity Utilization | | | 46.2% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | | | |

Appendix D

PHOTOS