Traffic Impact Study

New Dundee Road

1000215769 Ontario Inc.

14 July 2023

The Power of Commitment

Executive summary

GHD Limited was retained to prepare a Traffic Impact Study report for the proposed residential development located in the northwest corner of New Dundee Road and Robert Ferrie Drive in the City of Kitchener.

This report determines the site related traffic and subsequent traffic related impacts on the adjacent road network during the weekday a.m. and p.m. peak hours. These impacts are based on the projected future background traffic and road network conditions derived for a 2030 future planning horizon year.

A site plan was prepared by Turner Fleischer Architects Inc. and consists of 210 townhouse units provided within 11 3-storey stacked townhouse units.

Access to the subject site is proposed via two full-moves accesses. The first access is proposed to be located along New Dundee Road and will be offset to the west of the intersection with Reichert Drive. The second access is proposed to be located along Blair Creek Drive near the site's western limit.

The study intersections reflect the agreed terms of reference for the study and include:

- New Dundee Road and Robert Ferrie Drive
- Robert Ferrie Drive and Blair Creek Drive
- New Dundee Road and Reichert Drive/proposed site access
- Blair Creek Drive and the proposed site access

The proposed new development is expected to generate a total of 88 new two-way trips consisting of 21 inbound and 67 outbound trips during weekday a.m. peak hour and 111 new two-way trips consisting of 70 inbound and 41 outbound trips during the weekday p.m. peak hour.

Under existing conditions, all study intersections are operating within capacity with all movements operating within capacity and no critical movements.

Under 2030 future background traffic conditions, which includes the implementation of the roundabout at the intersection of New Dundee Road and Robert Ferrie Drive, the study intersections continue to operate with acceptable v/c ratios and levels of service with no reported critical movements.

Under 2030 future total traffic conditions, with the addition of site generated traffic, all study intersections continue to operate with acceptable v/c ratios and levels of service with no reported critical movements.

Based on the anticipated capacity analysis of the proposed roundabout, the intersection Reichert Road and the site access, it is GHD's opinion that the proposed access from the subject site to New Dundee Road will not negatively impact the future operation of the roundabout.

Application of the current City of Kitchener By-Law parking rates to the subject site results in a requirement of 315 vehicle parking space and 8 barrier free spaces.

The subject site provides a total of 245 parking spaces for cars, a shortfall of 70 parking spaces from the By-law requirement.

However, the City of Kitchener's Zoning By-law 2019-051 is the newest of the City's Zoning By-laws. The By-law is gradually replacing Zoning By-law 85-1 and currently governs approximately 80% of the City's properties. The newest By-law provides a reduced minimum parking requirement from the older By-Law in addition to providing a maximum parking requirement.

Under the newest City By-law, the subject site would be required to provide a minimum of 231 vehicle parking spaces, and up to a maximum of 294 vehicle parking spaces (inclusive of visitor parking spaces). The proposed parking supply for the subject site satisfies the proposed new Zoning By-law 2019-051.

Under the newt City By-law, the subject site would be required to provide a minimum of 105 Class A bicycle parking spaces and 6 Class B parking spaces. The proposed site plan provides for a total of 105 Class A bicycle parking spaces and 6 Class B bicycle parking spaces to satisfy the zoning requirements.

The subject site is also proposing 20% of the total parking supply be EV ready for a total of 50 parking spaces.

A series of Transportation Demand Management (TDM) measures are proposed for the site to reduce dependency on single-occupancy vehicle trips by encouraging residents to explore alternative modes of transportation. These measures include:

- Improved pedestrian and cycling connectivity to the municipal networks, to make it easy and safe for people to walk or bike to their destination.
- Communication strategy and information packages.

These measures will not only help reduce traffic congestion and air pollution, but also promote a healthier and more active lifestyle for the residents. The reduced parking rate will also encourage residents to use public transit.

A Vehicle Swept Path Analysis was undertaken to assess the site's ability to accommodate the required turning movements of an emergency vehicle and a Molok waste collection truck as per TAC design guidelines and confirmed that the site can sufficiently accommodate the aforementioned design vehicles.

We trust that this satisfies your requirements, but do not hesitate to contact the undersigned if you have any questions.

Sincerely,

GHD

William Maria, P. Eng.

Transportation Planning Lead

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1. Introduction

1.1 Retainer and Objective

GHD Limited was retained to prepare a Transportation Impact Study in support of a residential development located in generally to the northwest of the intersection of New Dundee Road and Robert Ferrie Drive in the City of Kitchener.

The site location is illustrated in **Figure 1**.

The purpose of this study is to:

- Establish baseline traffic conditions for the study area in 2023 and determine future background operating conditions for a future planning horizon in 2028.
- Utilizing Institute of Transportation Engineer's (ITE) Trip Generation data and first principles to estimate the site trips generated by the proposed development and distribute the traffic to the adjacent road network.
- Determine future operating traffic conditions during the weekday peek periods through intersection capacity analysis.
- Review the number of proposed parking spaces in accordance with the City of Kitchener's Zoning By-law.
- Provide a series of Travel Demand Management (TDM) measures to encourage residents to reduce dependencies on single occupancy vehicle trips.
- Review the swept path of the expected design vehicles for the subject site.

The scope of work and terms of reference for the traffic study were confirmed with the City of Kitchener and Region of Waterloo via email correspondence. A copy of the correspondence is provided in **Appendix A**.

1.2 Study Team

The GHD team involved in the preparation of the study are:

- William Maria, P. Eng., Transportation Planning Lead
- Rafael Andrenacci, B.Eng., Transportation Planner
- Safder Haider, B.Eng., Transportation EIT

Figure 1 Site Location

2. Site Characteristics

2.1 Study Area

The study intersections reflect the agreed terms of reference for the study and include:

- New Dundee Road and Robert Ferrie Drive
- Robert Ferrie Drive and Blair Creek Drive
- New Dundee Road and Reichert Drive/proposed site access
- Blair Creek Drive and the proposed site access

2.2 Proposed Development Content

A site plan was prepared by Turner Fleischer Architects Inc. and consists of a total of 210 stacked townhouse units

Access to the subject site is proposed via two full-moves accesses. The first access is located along New Dundee Road directly opposite of Reichert Drive. The second full-moves access is located along Blair Creek Drive near the site's western limit.

Figure 2 Site Plan

3. Existing Conditions

3.1 Existing Road Network

New Dundee Road is an east/west regional road under the jurisdiction of the Region of Waterloo. Within the study area it has a two-lane cross-section. Its intersection with Robert Ferrie Drive is signalized, with an auxiliary right-turn lane in the westbound direction and an auxiliary left-turn lane in the eastbound direction. Its intersection with Reichert Drive is unsignalized with an auxiliary left-turn lane in the westbound direction and the stop-control along the minor approach onto New Dundee Road. The posted speed limit along New Dundee Road is 80 km/h.

Robert Ferrie Drive is a north/south major community collector road under the jurisdiction of the City of Kitchener. Within the study area it has a two-lane cross-section. Its intersection with New Dundee Road is signalized with a left-turn lane and an auxiliary right-turn lane in the southbound direction. Its intersection with Blair Creek Drive is unsignalized with a stop-control along the minor approach onto Robert Ferrie Drive. The posted speed limit along Robert Ferrie Drive is 40 km/h.

Reichert Drive is a north/south local road under the jurisdiction of the City of Kitchener. Within the study area it has a two-lane cross-section. Its intersection with New Dundee Road is unsignalized with a stop-control along the minor approach onto New Dundee Road. The posted speed limit along Reichert Drive is 80 km/h.

Blair Creek Drive is an east/west major community collector road under the jurisdiction of the City of Kitchener. Within the study area it has a two-lane cross-section. Its intersection with Robert Ferrie Drive is unsignalized with a stop-control along the minor approach onto Robert Ferrie Drive. The assumed posted speed limit along Blair Creek Drive is 50 km/h.

The existing lane configurations at the study intersections is provided in the figure below.

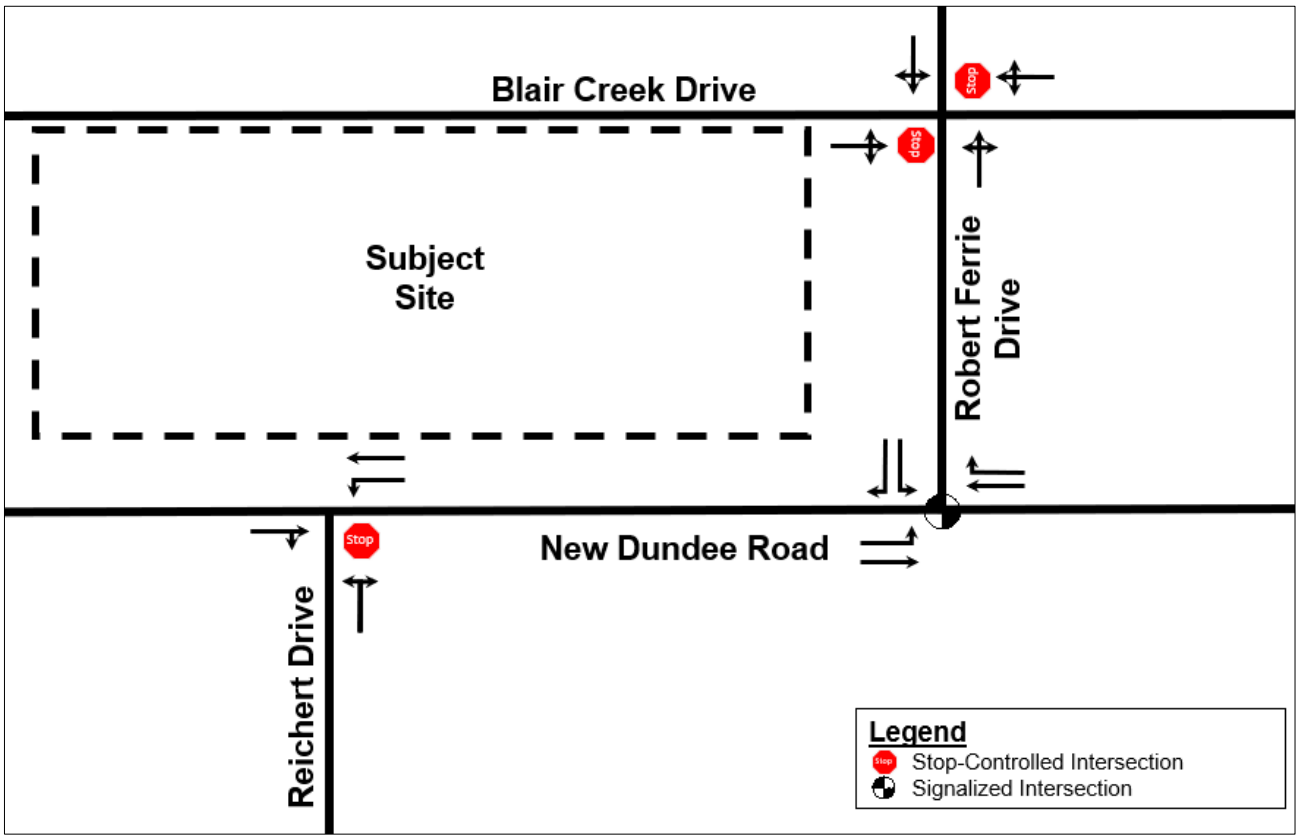


Figure 3 Existing Lane Configurations

3.2 Pedestrian and Bicycle Routes

Sidewalks are provided on both sides of the road along only Robert Ferrie Drive and Blair Creek Drive throughout the study area. There are no sidewalks along either New Dundee Road or Reichert Drive.

A bike lane is only provided along Blair Creek Drive to the east of Robert Ferrie Drive.

The existing pedestrian and cycling amenities are illustrated in the following figure.

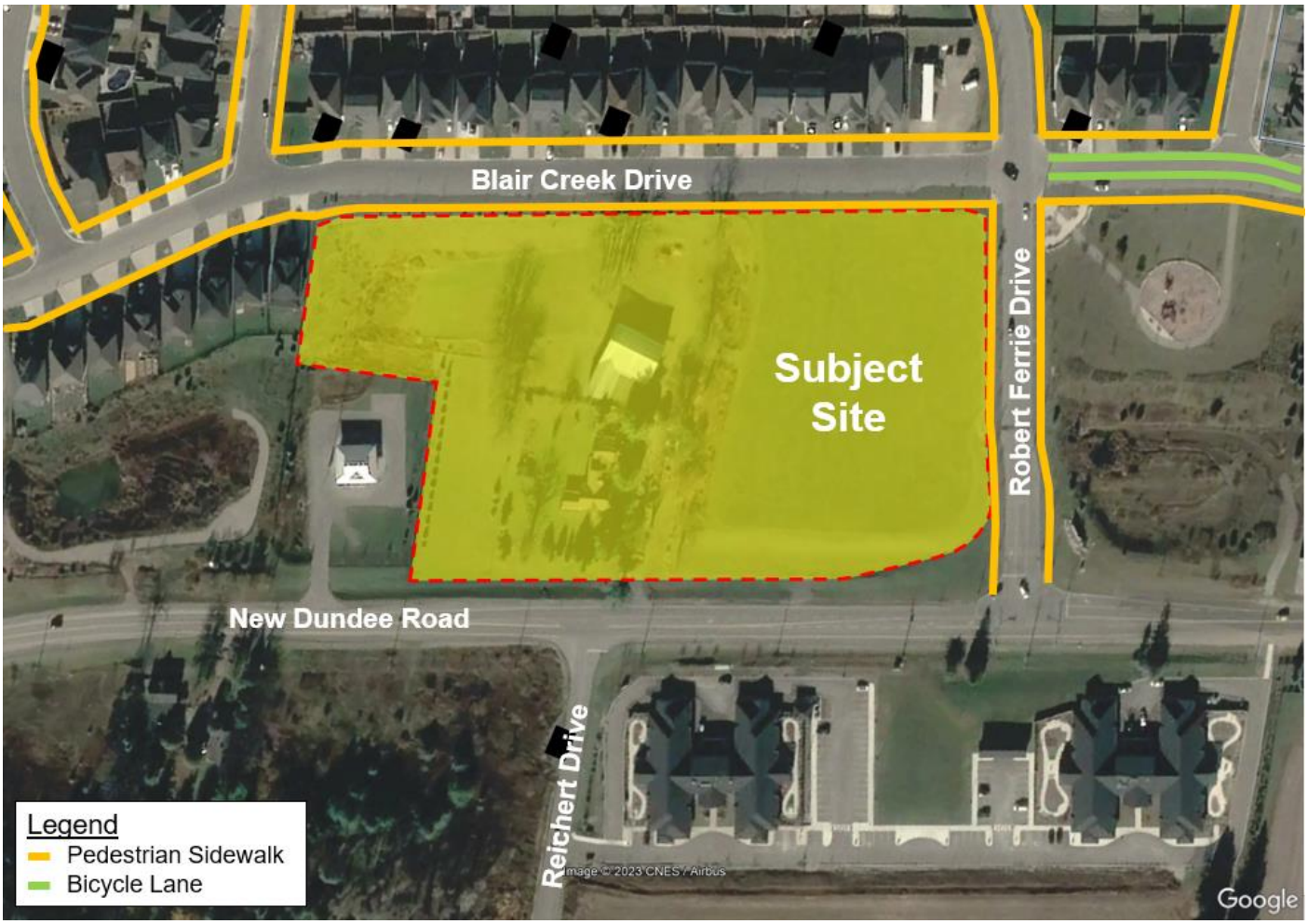


Figure 4 Existing Sidewalks and Bicycle Routes

3.3 Transit Services

Within the study area, Grand River Transit (GRT) only provides service along Route 36. The route operates between the Conestoga College Doon Campus in the east and the roundabout at Robert Ferrie Drive and Evens Pond Crescent/South Creek Drive to the west. Along the study area road network, the route operates in the east/west direction along New Dundee to/from the east, and in the north/south direction along Robert Ferrie Drive to/from the north. The route operates with a 30-minute headway throughout the day.

The nearest transit stop is located along Robert Ferrie Drive at Blair Creek Drive for both directions as shown in **Figure 5**.

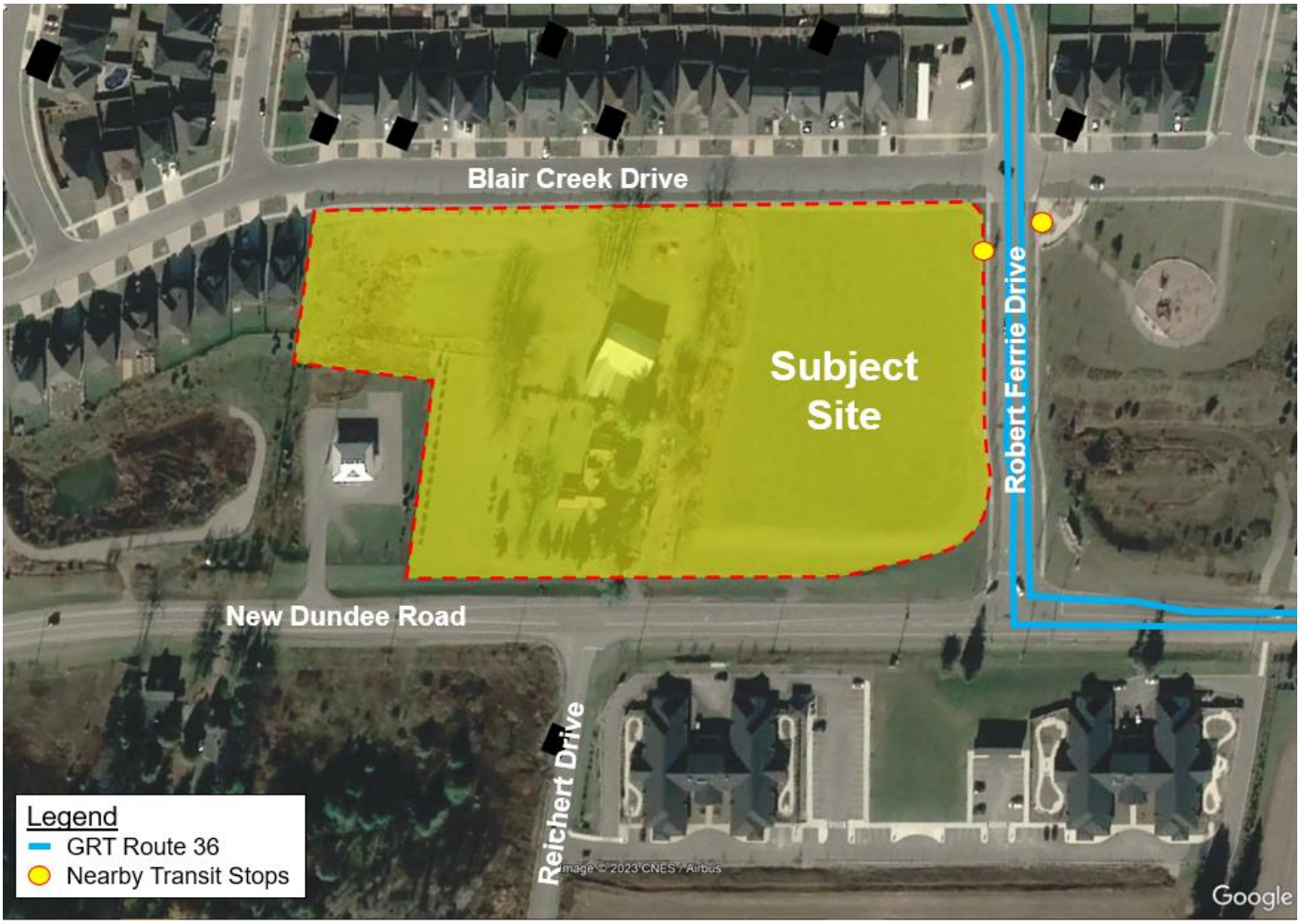


Figure 5 Existing Transit Routes and Transit Stops

3.4 Existing Traffic Data

GHD contracted Spectrum Traffic Solutions Inc. to collect updated turning movement counts at all existing study intersections.

The baseline 2023 traffic volumes for the a.m. and p.m. peak hours are summarized in **Figure 6** with the updated counts conducted by Spectrum Traffic Solutions Inc. provided in **Appendix B**.

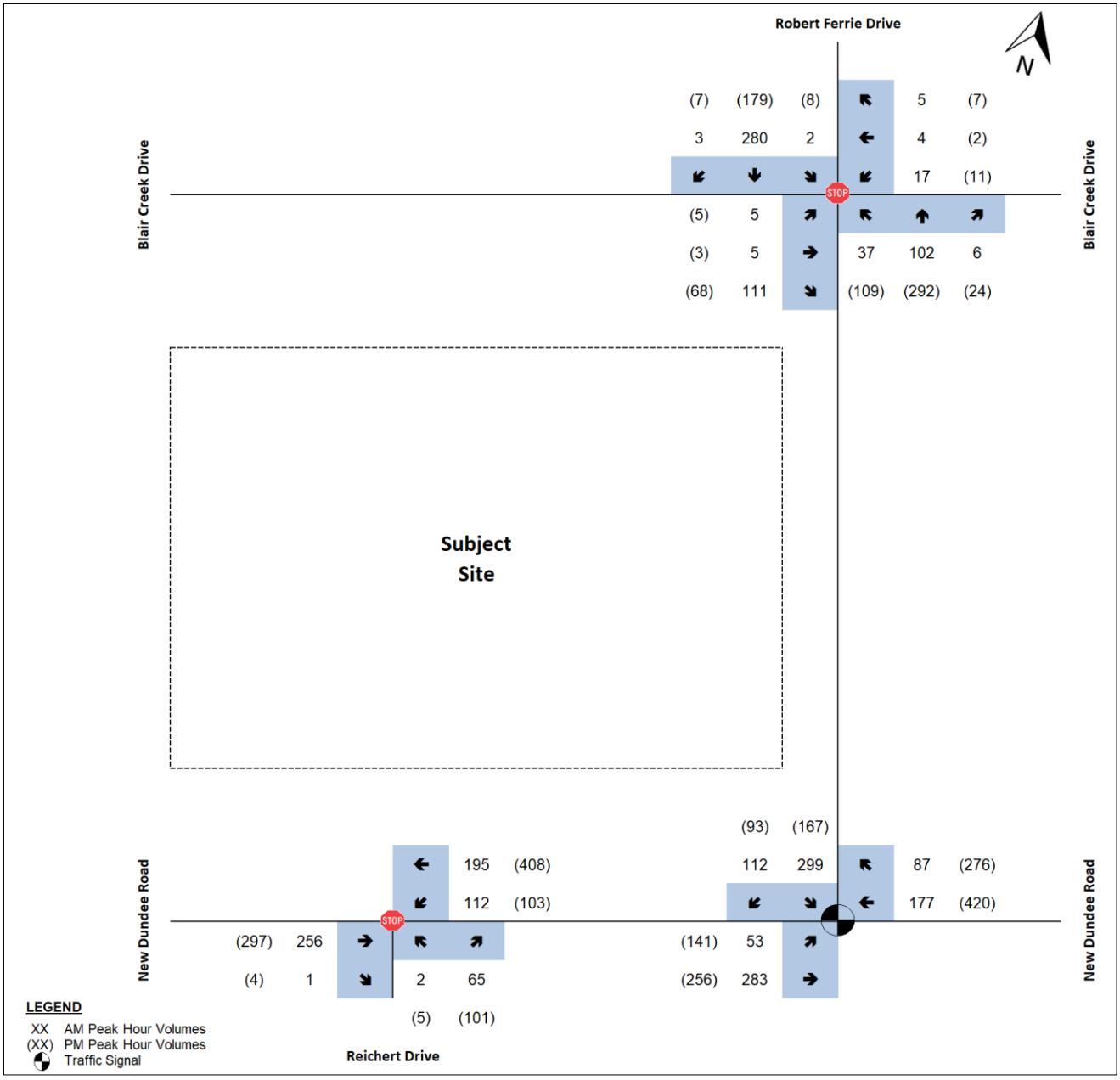


Figure 6 Baseline 2023 Traffic Volumes

4. Future Background Traffic

4.1 Study Horizon Year

A future horizon year of 2028 was selected for the analysis of future traffic conditions, generally corresponding with the Region's Transportation Impact Study Guidelines of five years from the date of the Traffic Impact Study. The horizon year was agreed and confirmed in the terms of reference with City and Region staff.

4.2 Corridor Growth

As directed by both City and Region staff, GHD applied a 2% growth to all turning movement counts to account for general corridor growth along with the study area roadways.

4.3 Background Development Traffic

City staff indicated to GHD that there are currently no proposed developments located near the study area that would contribute additional traffic volumes to the study intersections.

4.4 New Dundee Road and Robert Ferrie Drive Roundabout

A new roundabout is proposed at the intersection of New Dundee Road and Robert Ferrie Drive. At the time of the study, the project is at a detailed design stage with construction expected to being in Spring 2024 with an anticipated completion date in Fall 2024. The roundabout has been included in the analysis of the 2028 horizon year.

The current design includes two lanes in the eastbound/westbound direction and one lane in the northbound/southbound direction. The east and west approaches consist of a through lane and a through/right or through/left, depending on the approach. The north approach consists of a left-turn and a right-turn lane. The proposed design obtained from the Engage Waterloo website is provided in **Figure 7**.

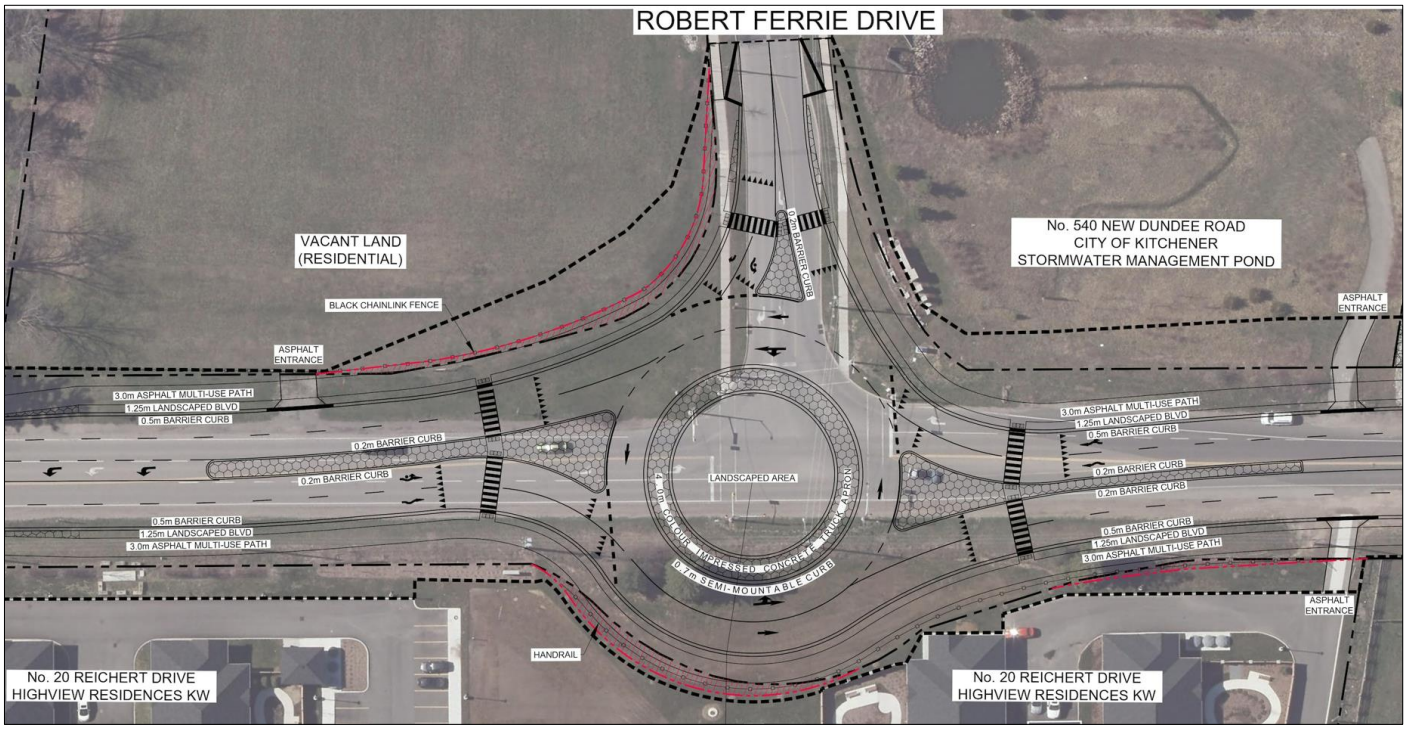


Figure 7 New Dundee Road and Robert Ferrie Road Proposed Roundabout Design

4.5 Future Background Traffic Volumes

The background traffic volumes for the 2028 horizon year were derived by applying the aforementioned growth rates to the study area road network. The resulting 2028 future background traffic volumes are summarized in **Figure 8**.

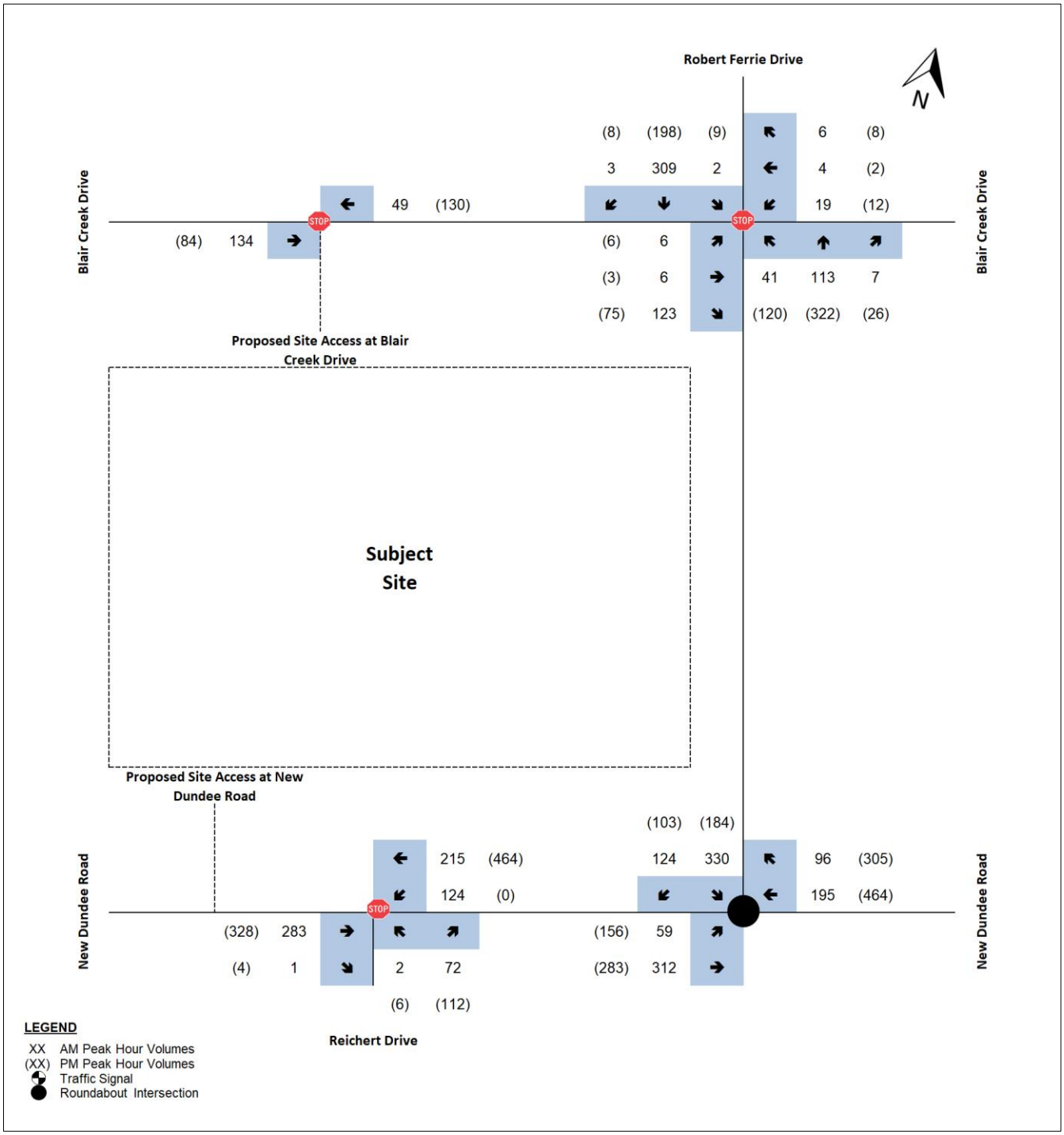


Figure 8 2028 Future Background Traffic Volumes

5. Site Generated Traffic

5.1 Site Traffic Generation

The proposed residential development consists of a total of 210 stacked townhouse units. Trip generation for the residential component was calculated using rates provided in the Institute of Transportation Engineer's (ITE) Trip Generation Manual, 11th Edition using Land Use Code (LUC) 220 (Multifamily Housing – Low-Rise) for all 210 residential dwelling units.

GHD compared the average rates to the fitted curve equation and adopted the rate that generated the highest volume of site trips for a more conservative analysis.

No transit modal split reduction were applied to the ITE trip rates in addition to the transit split taken into consideration by the ITE rates in consideration of the limited transit options currently available in the area.

Table 1 below summarizes the estimated trip generation for the proposed development.

Table 1 Estimated Site Trips

Land Uses	GFA (Dwelling Units)	Parameters	Peak Hour					
			Weekday AM			Weekday PM		
			In	Out	Total	In	Out	Total
Low-Rise Residential (LUC 220)	210 units	Trip Ratio	24%	76%	100%	63%	37%	100%
		Gross Trips	21	67	88	70	41	111
Total Primary Trips			***21***	***67***	***88***	***70***	***41***	***111***

The proposed development is expected to generate a total of 88 new two-way trips consisting of 21 inbound and 67 outbound trips during weekday a.m. peak hour and 111 new two-way trips consisting of 70 inbound and 41 outbound trips during the weekday p.m. peak hour.

5.2 Site Traffic Distribution and Assignment

Site generated traffic for the residential development was distributed mainly based on a review of the existing travel patterns and confirmed with the 2016 Transportation Tomorrow Survey (TTS) data for residential trips for the study area and the adjacent zone. Site trips were mainly assigned to the east and west along New Dundee Road with some traffic also being assigned towards the south along Reichart Drive and the north along Robert Ferrie Drive to take into account that some traffic may go towards those directions.

The directional split for the site traffic is provided in **Table 2** with the full 2016 TTS data calculation sheets provided in **Appendix C**.

The site generated traffic assignment to the study area road network for the weekday a.m. and p.m. peak hours provided in **Figure 9**.

Table 2 Directional Trip Distribution of Site Traffic (Residential)

Peak Period	Direction	North (Robert Ferrie)	South (Reichert)	East (New Dundee)	West (New Dundee)
AM	Inbound	5%	10%	45%	40%
	Outbound	5%	10%	60%	25%
PM	Inbound	5%	10%	60%	43%
	Outbound	5%	10%	25%	42%

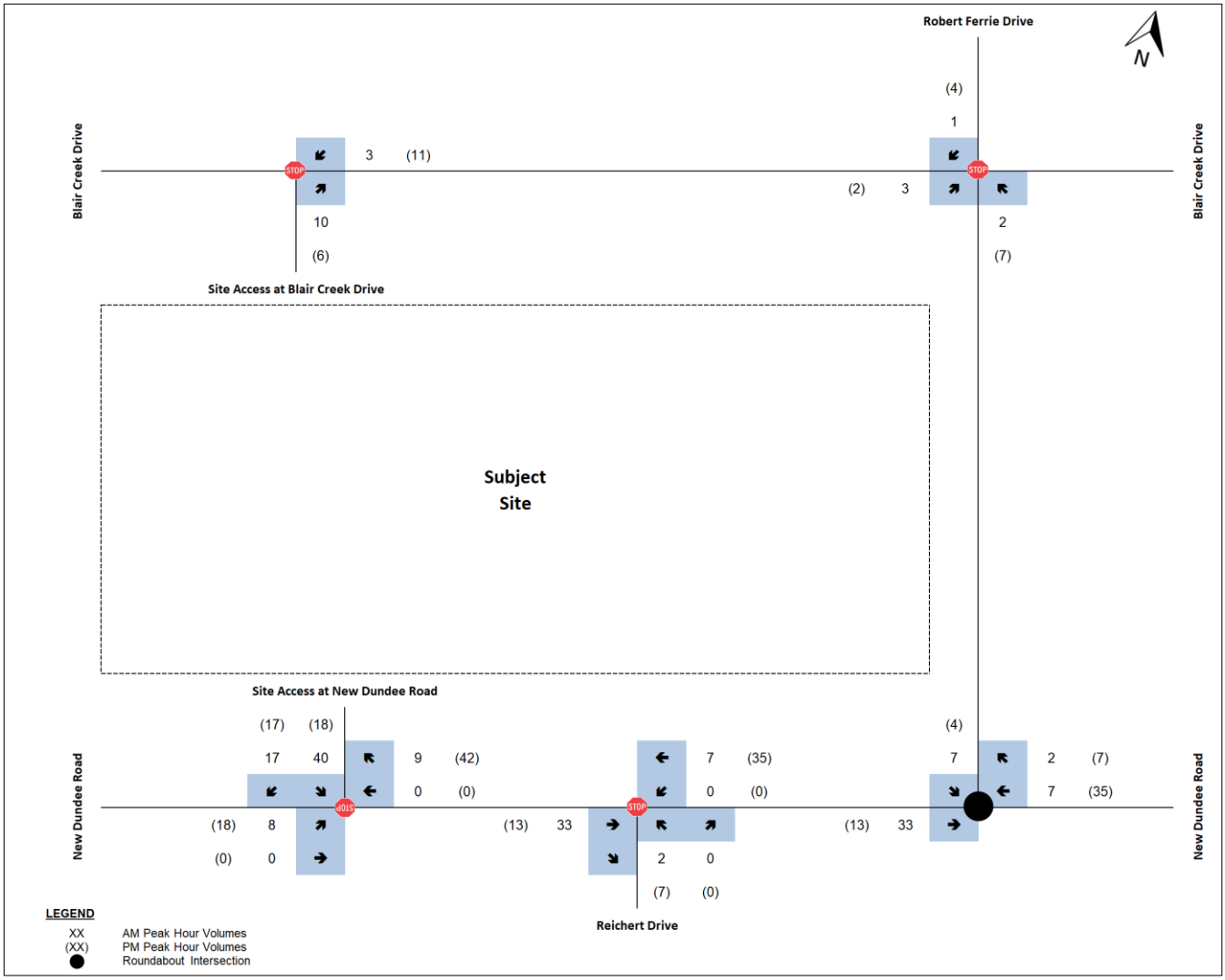


Figure 9 Total Site Trips

6. Future Total Traffic

The future total traffic conditions in the weekday a.m. and p.m. peak hours for the 2028 planning horizon was derived by combining the projected future background traffic with the corresponding estimated site generated traffic. The resulting traffic volumes are presented in **Figure 10**.

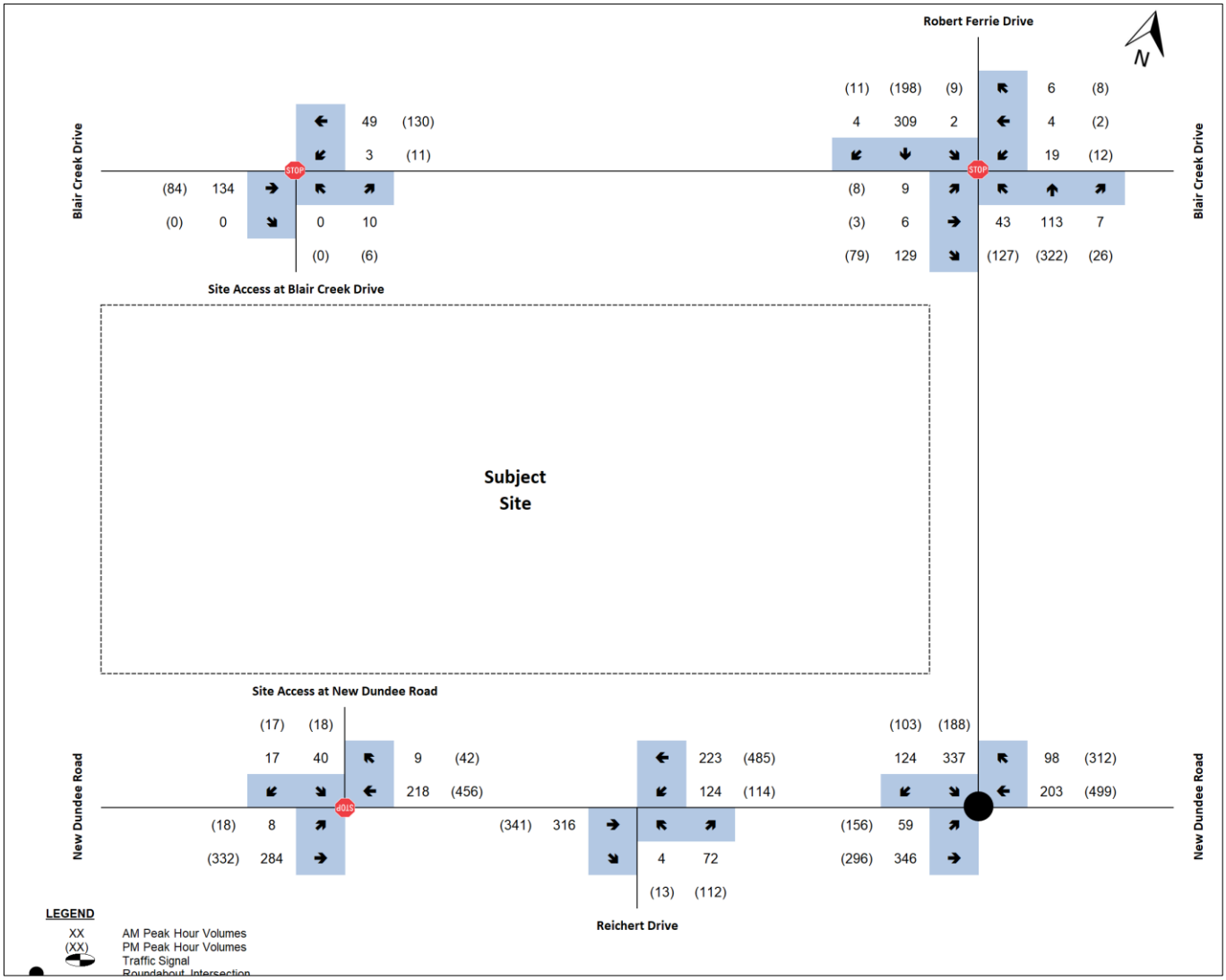


Figure 10 2028 Future Total Traffic Volumes

7. Capacity Analysis

The capacity analysis identifies how well the intersections and driveways are operating. The analysis contained within this report utilized the Highway Capacity Manual (HCM) 2000 procedure within the Synchro Version 10 Software package. The reported intersection volume-to-capacity ratios (v/c) are a measure of the saturation volume for each turning movement, while the levels-of-service (LOS) are a measure of the average delay for each turning movement. Queuing characteristics are reported as the predicted 95th percentile queue for each turning movement. Both pedestrian crossing volumes and heavy vehicle proportions are included in the analyses. The peak hour factors from the historic counts were used to analyze existing and future traffic conditions.

Roundabout capacity analysis was analysed in the ARCADY 8 roundabout capacity software with a capacity adjustment (a -15 percent adjustment to the y-intercept of the capacity equation), as typically requested by the Town to account for a driver's unfamiliarity with roundabout operations. As drivers accustomed to roundabouts, the no y-intercept adjustment will provide a more realistic calculation of the expected capacity of the roundabout.

The analysis includes identification and required modifications and improvements (if any) at intersections where the addition of background growth or background growth plus site-generated traffic volumes causes the following:

The criteria for identifying “critical” intersections are:

- overall Level of Service E or F (i.e. average control delay per vehicle greater than 55 seconds) for signalized intersections; and
- overall Level of Service E or F (i.e. average control delay per vehicle greater than 35 seconds) for unsignalized intersections.

The criteria for identifying “critical” movements are:

- the average control delay for individual movements is greater than 55 seconds;
- estimated 95th percentile queue length for an exclusive movement exceeds the available storage space;
- estimated 95th percentile queue length for an individual movement will block an existing access;
- exclusive turning lanes are inaccessible because of queue lengths in adjacent through lanes; and
- poor quality of service for non-auto modes (as per the assessment in 7.3 section in the Region’s TIS Guidelines).

The following tables summarize the HCM capacity results for the study intersections during the weekday a.m. and p.m. peak hours under existing (2023), future background (2028) and future total (2028) traffic conditions. The detailed calculation sheets are provided in **Appendix D**.

7.1 New Dundee Road and Robert Ferrie Drive

Capacity analysis at this intersection during the weekday a.m. and p.m. peak hours for the existing condition is provided in **Table 3** and for the proposed roundabout under the future background and future total traffic conditions in **Table 4**.

Table 3 Capacity analysis of New Dundee Road and Robert Ferrie Drive (Signalized)

Scenario	AM Peak Hour		PM Peak Hour	
	V/C (LOS) seconds	95th % Que.	V/C (LOS) seconds	95th % Que
Existing 2023	Overall: 0.41 (C) 20 EBL = 0.08 (A) 8 EBT = 0.27 (A) 10 WBT = 0.25 (B) 18 WBR = 0.06 (B) 16 SBL = 0.63 (C) 34 SBR = 0.07 (C) 24	 EBL = 10 m EBT = 40 m WBT = 35 m WBR = 10 m SBL = 75 m SBR = 15 m	Overall: 0.46 (B) 19 EBL = 0.31 (B) 12 EBT = 0.25 (A) 10 WBT = 0.56 (C) 23 WBR = 0.27 (B) 18 SBL = 0.36 (C) 28 SBR = 0.06 (C) 24	 EBL = 20 m EBT = 35 m WBT = 90 m WBR = 30 m SBL = 45 m SBR = 15 m

Table 4 Capacity analysis of New Dundee Road and Robert Ferrie Drive (Roundabout)

Traffic Condition	Location	AM Peak Hour			PM Peak Hour		
		V/C Ratio	LOS	Que	V/C Ratio	LOS	Que
Future background 2028 (85% y-intercept)	SB Robert Ferrie Drive	0.24	A	<25 m	0.17	A	<25 m
	EB New Dundee Road	0.20	A	<25 m	0.23	A	<25 m
	WB New Dundee Road/	0.14	A	<25 m	0.39	A	<25 m

Traffic Condition	Location	AM Peak Hour			PM Peak Hour		
		V/C Ratio	LOS	Que	V/C Ratio	LOS	Que
Future background 2028 (100% y-intercept)	SB Robert Ferrie Drive	0.20	A	<25 m	0.14	A	<25 m
	EB New Dundee Road	0.17	A	<25 m	0.19	A	<25 m
	WB New Dundee Road/	0.12	A	<25 m	0.33	A	<25 m
Future Total 2028 (85% y-intercept)	SB Robert Ferrie Drive	0.24	A	<25 m	0.17	A	<25 m
	EB New Dundee Road	0.22	A	<25 m	0.23	A	<25 m
	WB New Dundee Road/	0.15	A	<25 m	0.41	A	<25 m
Future Total 2028 (100% y-intercept)	SB Robert Ferrie Drive	0.20	A	<25 m	0.14	A	<25 m
	EB New Dundee Road	0.19	A	<25 m	0.20	A	<25 m
	WB New Dundee Road/	0.13	A	<25 m	0.35	A	<25 m

Under existing traffic conditions, the overall intersection has a reported v/c ratio of 0.41 LOS C during the a.m. peak hour and 0.46 LOS B during the p.m. peak hour. The intersection operates without any critical movements.

As a roundabout under the future background and future total traffic scenarios, the roundabout is reported to operate under both the 85% and 100% y-intercept with all approaches at LOS A and with minimal queueing of less than 25 metres.

No geometric improvements were identified at this intersection to accommodate the proposed development. Signal timing improvements to optimize the cycle lengths and minimize delays were implemented where required to improve capacity and reduce delays.

7.2 New Dundee Road and Reichert Drive

Capacity analysis for this intersection during the weekday a.m. and p.m. peak hours for the existing, future background, and future total traffic conditions are summarized in the following table.

Table 5 Capacity analysis of New Dundee Road and Reicher Drive

Scenario	AM Peak Hour		PM Peak Hour	
	V/C (LOS) seconds	95th % Que.	V/C (LOS) seconds	95th % Que
Existing 2023	EBTR = 0.16 (A) 0 WBL = 0.09 (A) 8 WBT = 0.12 (A) 0 NBLR = 0.09 (B) 10	EBTR = 0 m WBL = 5 m WBT = 0 m NBLR = 5 m	EBTR = 0.2 (A) 0 WBL = 0.09 (A) 8 WBT = 0.27 (A) 0 NBLR = 0.18 (B) 12	EBTR = 0 m WBL = 5 m WBT = 0 m NBLR = 5 m
Future Background 2028	EBTR = 0.17 (A) 0 WBL = 0.1 (A) 8 WBT = 0.13 (A) 0 NBLR = 0.11 (B) 11	EBTR = 0 m WBL = 5 m WBT = 0 m NBLR = 5 m	EBTR = 0.22 (A) 0 WBL = 0.1 (A) 8 WBT = 0.29 (A) 0 NBLR = 0.21 (B) 12	EBTR = 0 m WBL = 5 m WBT = 0 m NBLR = 10 m
Future Total 2028	EBTR = 0.2 (A) 0 WBL = 0.11 (A) 8	EBTR = 0 m WBL = 5 m	EBTR = 0.23 (A) 0 WBL = 0.11 (A) 8	EBTR = 0 m WBL = 5 m

Scenario	AM Peak Hour		PM Peak Hour	
	V/C (LOS) seconds	95th % Que.	V/C (LOS) seconds	95th % Que
	WBT = 0.14 (A) 0 NBLR = 0.12 (B) 11	WBT = 0 m NBLR = 5 m	WBT = 0.32 (A) 0 NBLR = 0.26 (B) 14	WBT = 0 m NBLR = 10 m

Under existing traffic conditions, the intersection operates at satisfactory levels with the longest delays reported on the northbound left/right movement which is operating with a maximum delay of 10 seconds during the a.m. peak hour and 12 seconds during the p.m. peak hour.

With the addition of corridor growth under the 2028 future background traffic scenario, the intersection continues to operate at a satisfactory level with the maximum delay along the northbound approach increasing by one second during the a.m. peak hour to 11 second delay and remaining unchanged at 12 seconds during the p.m. peak hour.

Under the 2028 future total traffic condition, with the addition of site traffic, the intersection is reported to operate at satisfactory levels with the delay in the northbound approach remaining unchanged at 11 seconds during the a.m. peak hour and increasing slightly by 2 seconds to 14 seconds during the p.m. peak hour.

No geometric improvements were identified to accommodate the proposed development as the v/c ratios, delays and queuing remain acceptable under the future total traffic conditions.

7.3 Robert Ferrie Drive and Blair Creek Drive

Capacity analysis at this intersection during the weekday a.m. and p.m. peak hours for the future total traffic conditions are summarized in the following table.

Table 6 Capacity analysis of Robert Ferrie Drive and Blair Creek Drive

Scenario	AM Peak Hour		PM Peak Hour	
	V/C (LOS) seconds	95th % Que.	V/C (LOS) seconds	95th % Que
Existing 2023	EBTLR = 0.2 (B) 12 WBTLR = 0.08 (C) 15 NBTLR = 0.03 (A) 2 SBTLR = 0 (A) 0	EBTLR = 5 m WBTLR = 5 m NBTLR = 5 m SBTLR = 0 m	EBTLR = 0.12 (B) 11 WBTLR = 0.07 (C) 18 NBTLR = 0.09 (A) 3 SBTLR = 0.01 (A) 0	EBTLR = 5 m WBTLR = 5 m NBTLR = 5 m SBTLR = 5 m
Future Background 2028	EBTLR = 0.22 (B) 12 WBTLR = 0.09 (C) 17 NBTLR = 0.04 (A) 2 SBTLR = 0 (A) 0	EBTLR = 10 m WBTLR = 5 m NBTLR = 5 m SBTLR = 0 m	EBTLR = 0.13 (B) 11 WBTLR = 0.09 (C) 20 NBTLR = 0.1 (A) 3 SBTLR = 0.01 (A) 0	EBTLR = 5 m WBTLR = 5 m NBTLR = 5 m SBTLR = 5 m
Future Total 2028	EBTLR = 0.24 (B) 12 WBTLR = 0.09 (C) 17 NBTLR = 0.04 (A) 2 SBTLR = 0 (A) 0	EBTLR = 10 m WBTLR = 5 m NBTLR = 5 m SBTLR = 0 m	EBTLR = 0.15 (B) 12 WBTLR = 0.09 (C) 20 NBTLR = 0.1 (A) 3 SBTLR = 0.01 (A) 0	EBTLR = 5 m WBTLR = 5 m NBTLR = 5 m SBTLR = 5 m

Under existing conditions, the intersection of Robert Ferrie Drive and Blair Creek Drive is operating at satisfactory levels with a maximum delay observed along the westbound approach of 15 seconds during the a.m. peak hour and 18 seconds during the p.m. peak hour.

With the addition of corridor growth under the 2028 future background conditions, the intersection is reported to operate at satisfactory levels with the delay in the westbound approach increasing by 2 seconds during each peak hour, with the westbound approach operating with a 17 second delay during the a.m. peak hour and 20 seconds during the p.m. peak hour, respectively.

With the addition of site traffic generated by the subject site, the capacity analysis reported during the a.m. and p.m. peak hour remains unchanged with no increases in v/c ratio, delays or queuing. The subject site has no impact on the operation of this intersection.

No geometric improvements were identified at the site access to accommodate the proposed development.

7.4 New Dundee Road and Site Access 1

Capacity analysis at this intersection during the weekday a.m. and p.m. peak hours for the future total traffic conditions are summarized in the following table.

Table 7 Capacity analysis of New Dundee Road and Site Access 1

Scenario	AM Peak Hour		PM Peak Hour	
	V/C (LOS) seconds	95th % Que.	V/C (LOS) seconds	95th % Que
Future Total 2028	EBTL = 0.01 (A) 0 WBTR = 0.14 (A) 0 SBLR = 0.11 (B) 12	EBTL = 5 m WBTR = 0 m SBLR = 5 m	EBTL = 0.02 (A) 1 WBTR = 0.32 (A) 0 SBLR = 0.09 (C) 15	EBTL = 5 m WBTR = 0 m SBLR = 5 m

Under future total traffic conditions, the site access onto New Dundee Road is reported to operate at a satisfactory level with a maximum delay of one second along New Dundee Road (p.m. peak hour) with the access reporting a delay of 12 seconds during the a.m. peak hour and 15 seconds during the p.m. peak hour.

No geometric improvements in addition to the proposed site access were identified along the municipal roadway to accommodate the proposed development.

7.5 Blair Creek Drive and Site Access 2

Capacity analysis at this intersection during the weekday a.m. and p.m. peak hours for the future total traffic conditions are summarized in the following table.

Table 8 Capacity analysis of Blair Creek Drive and Site Access 2

Scenario	AM Peak Hour		PM Peak Hour	
	V/C (LOS) seconds	95th % Que.	V/C (LOS) seconds	95th % Que
Future Total 2028	EBTR = 0.09 (A) 0 WBTL = 0 (A) 0 NBLR = 0.01 (A) 9	EBTR = 0 m WBTL = 0 m NBLR = 5 m	EBTR = 0.06 (A) 0 WBTL = 0.01 (A) 1 NBLR = 0.01 (A) 9	EBTR = 0 m WBTL = 5 m NBLR = 5 m

Under future total conditions, the site access onto Blair Creek Drive operates at a satisfactory level with no delays along Blair Creek Drive during the a.m. peak hour and a one second delay in the westbound approach during the p.m. peak hour. The outbound movement from the site access is also expected to operate with a maximum delay of 9 seconds delay during both peak hours with minimum queuing of one vehicle length.

8. Access Assessment

As discussed in **Section 4.4**, a new roundabout is proposed for the intersection of New Dundee Road and Robert Ferrie Drive. At the time of the study, the project is at a detailed design stage with construction expected to being in Spring 2024 with an anticipated completion date in Fall 2024

The Region of Waterloo requested GHD to review the operation of the proposed new access along New Dundee Road and confirm it will not have an impact on the operation of the roundabout.

The proposed site access along New Dundee Road is located approximately 21 metres west of the intersection of New Dundee Road and Reichert Drive (measured centreline to centreline) and results in no overlapping left turns on New Dundee Road. The reported 95th percentile queues at both Reichert Drive and the proposed site access under

the Future Total 2028 traffic scenario do not result in any operational concerns with blocking of either intersection that would be cause for concern from a safety standpoint.

The operation of the shared through/right turn into the site from New Dundee Road is also reported to operate with minimal delays which based on the projected volume of traffic through the roundabout should have a negligible impact on the ability for vehicles to merge from the two lane exit from the roundabout to the single lane on New Dundee Road west of the subject site driveway.

Lastly, based on the reported queue lengths at the eastbound approach to the roundabout, the reported queues are not expected to extend beyond the proposed splitter island. As a result, the operation of the roundabout is not impacted by its proximity to the intersection of New Dundee Road with Reichert Road or the proposed site access which is located further to the west.

Based on the anticipated capacity analysis of the proposed roundabout, the intersection Reichert Road and the site access, it is GHD's opinion that the proposed access from the subject site to New Dundee Road will not negatively impact the future operation of the roundabout.

9. Parking Review

9.1 Existing City of Kitchener Zoning By-law

9.1.1 Vehicular Parking

The subject site is governed by the City of Kitchener's Zoning By-law 85-1, with the minimum parking requirement found in Section 6.1.2, a. The minimum By-law requirement for the subject site is as follows:

- Multiple Dwellings Totaling 61 Dwelling Units of More: 1.5 spaces for each dwelling unit.

The minimum parking required for the proposed development is as follow:

- 1.5 parking space per unit x 210 units = 315 spaces

In total, 315 vehicle parking spaces are required under the City's Zoning By-law.

9.1.2 Accessible Parking

The minimum requirement for accessible parking spaces can also be found in the City of Kitchener's Zoning By-law, with the accessible parking standards found in Section 6.7.1. When 201-1,000 spaces are required, 2 spaces plus 2% of the total required parking spaces are required to be barrier-free accessible parking spaces.

- 2 spaces, plus 2% of 315 spaces = 8 spaces

In total, 8 accessible parking spaces are required under the City's By-law.

9.2 Proposed Site Parking

The following table summarizes the minimum By-law requirements and the proposed parking/loading supply for the subject site.

Table 9 Parking Requirements and Provisions

Type	Unit Count/GFA	By-Law Requirement	Required	Provided

Vehicle Parking – Residential (Residents)	210 dwelling units	Minimum 1.5 parking space per unit	Minimum of 315 spaces	245 spaces
Barrier Free Parking		Minimum of 2 spaces, plus 2% of total vehicle parking spaces required	Minimum of 8 spaces	8 barrier free spaces
Bicycle Parking	210 dwelling units	Class A	105	105 spaces
		Class B	6	6 spaces

The subject site proposes to provide a total of 245 vehicle parking spaces, a shortfall of 70 spaces from the By-law requirement of 323 spaces.

The subject site is also proposing 20% of the total parking supply be EV ready for a total of 50 parking spaces.

9.3 Parking Assessment

Providing off-street residential parking influences a commuter choice on whether to drive or choose alternate forms of transportation. Providing more parking in general leads to a higher percentage of auto ownership and auto usage as well. Changing travel behaviour is best done when a prospective buyer is looking to purchase a unit and providing the opportunity for a prospective buyer to easily purchase a parking space either through making it affordable, at no additional cost, or having an excess in number of spaces available to purchase can introduce travel behaviour into an area that once established is hard to change.

Sustainable transportation is a crucial component of achieving climate change adaption and environmental protection goals and reducing traffic related air pollutant and greenhouse gas emissions.

The development is proposing Travel Demand Management (TDM), as outlined in **Section 10** of the report including planning and design, walking and cycling, transit, parking, carshare/bikeshare, wayfinding and trip planning, education and promotion that can be adopted to make alternatives more competitive to driving, reducing the dependency on auto trips, and the need to provide an excessive supply of parking.

9.4 Ontario’s Five Year Climate Change Action Plan

The purpose of Ontario's Climate Change Action Plan, announced in 2016, is to address climate change through transportation and land-use measures. The plan aims to reduce emissions, create more livable, mixed-use communities, and prioritize addressing climate change at the municipal level.

In terms of development, the plan outlines key actions such as supporting cycling and walking, reducing single-passenger vehicle trips, and eliminating minimum parking requirements. These actions are aimed at promoting alternative modes of transportation and creating complete, compact, and mixed-use communities. The elimination of minimum parking requirements is also a change in perspective toward auto-ownership and travel, and is becoming a more common in urban areas as population increases, transit expands, and auto-ownership declines.

The concept of eliminating the minimum parking requirements for high density buildings in areas with access to public transportation is not a new concept in North America. Examples of such developments can be found in a variety of cities including Toronto, Brampton, Oakville, Ottawa, Calgary and Vancouver.

As the population of Kitchener continues to grow, transit infrastructure expands across the city, and personal vehicle ownership declines, more residential developments with reduced parking standards relative to existing Zoning By-law requirements is becoming more commonplace.

9.5 City of Kitchener's Zoning By-law 2019-051

The City of Kitchener's Zoning By-law 2019-051 is the newest of the City's Zoning By-laws. The By-law is gradually replacing Zoning By-law 85-1 and currently governs approximately 80% of the City's properties. The newest By-law provides a reduced minimum parking requirement from the older By-Law in addition to providing a maximum parking requirement.

The minimum By-law requirement for vehicle parking is found in Section 5.6, Table 5-5, with the minimum requirements for the subject site as follows:

- Multiple residential buildings (cluster townhouse dwelling, dwelling unit, multiple dwelling), 81+ dwelling units:
    - Minimum of 1.0 parking space per dwelling unit
    - Minimum of 0.1 visitor parking spaces per dwelling unit
    - Maximum of 1.4 parking spaces per dwelling unit, including visitors

The minimum parking required for the proposed development under the new By-law is as follow:

- Multiple residential buildings (cluster townhouse dwelling, dwelling unit, multiple dwelling), 81+ dwelling units:
    - 1.0 parking space per dwelling unit x 210 dwelling units = 210 spaces
    - 0.1 visitor parking spaces per dwelling unit x 210 dwelling units = 21 spaces
    - 1.4 spaces per dwelling unit x 210 units = 294 spaces

Under the newest City By-law, the subject site would be required to provide a minimum of 231 vehicle parking spaces, and up to a maximum of 294 vehicle parking spaces (inclusive of visitor parking spaces). The proposed parking supply for the subject site satisfies the proposed new Zoning By-law 2019-051.

9.5.1 Bicycle Parking Requirement

The City of Kitchener's Zoning By-law 2019-051 also provides minimum bicycle parking requirements for multiple dwelling units developments can also be found under Section 5.6, Table 5-5.

The minimum By-law requirement for bicycle parking for the subject are as follows:

- Multiple residential buildings (cluster townhouse dwelling, dwelling unit, multiple dwelling):
    - 0.5 Class A bicycle parking stalls per dwelling unit without a private garage
    - 2 spaces, or 6 Class B bicycle parking stalls where more than 20 dwelling units are on a lot.

The minimum bicycle parking required for the proposed development under the new by-law is as follows:

    - 210 dwelling units x 0.5 Class A bicycle parking spaces per unit = 105 Class A bicycle parking spaces
    - 6 Class B bicycle parking spaces

Under the newt City By-law, the subject site would be required to provide a minimum of 105 Class A bicycle parking spaces and 6 Class B parking spaces. The proposed site plan provides for a total of 105 Class A bicycle parking spaces and 6 Class B bicycle parking spaces to satisfy the zoning requirements.

10. Travel Demand Management

10.1 Travel Demand Management

Travel Demand Management (TDM) refers to a variety of strategies to reduce congestion, minimize the number of single-occupant vehicles, encourage non-auto modes of travel, and reduce vehicle dependency to create a sustainable transportation system. TDM strategies have multiple benefits including the following:

- Reduced auto-related emissions to improve air quality;
- Decreased traffic congestion to reduce travel time;
- Increased travel options for businesses and commuters;
- Reduced personal transportation costs and energy consumptions; and
- Support Provincial smart growth objectives.

The combined benefits listed above will assist in creating a more active and livable community through improvements to overall active transportation standards for the local businesses and surrounding community.

10.2 Existing TDM Opportunities

10.2.1 Walking and Cycling

Sidewalks are provided on both sides of the road along only Robert Ferrie Drive and Blair Creek Drive throughout the study area.

A bike lane is only provided along Blair Creek Drive to the east of Robert Ferrie Drive

10.2.2 Transit

Grand River Transit provides service along Route 36 within the study area. The route operates between the Conestoga College Doon Campus in the east and the roundabout at Robert Ferrie Drive and Evens Pond Crescent/South Creek Drive to the west. Along the study area road network, the route operates in the east/west direction along New Dundee to/from the east, and in the north/south direction along Robert Ferrie Drive to/from the north. The route operates with a 30-minute headway throughout the day.

The nearest transit stop is located along Robert Ferrie Drive at Blair Creek Drive for both directions.

10.3 Recommended TDM Measures

The table below summarizes the recommended TDM strategies for the subject site.

Table 10 Recommended TDM Strategies

TDM Measure	Responsibility	Cost	Note
Hard Measures			
Pedestrian connections	Applicant	Integrated into the overall development cost	Site plan includes a walkway system providing a connection to the municipal sidewalks.

			Enhanced pedestrian amenities will also be provided on-site, including but not limited to benches, landscaping and lighting.
Public Transit Access	Applicant	Integrated into the overall development cost	The subject site is located within walking distance of transit stops located along Robert Ferrie Drive.
Soft Measures			
Information packages (GRT Transit, cycling maps)	Applicant	To be determined.	Distributed at the sales office with Purchase and Sales Agreement

11. Vehicle Swept Path Analysis

GHD undertook a Vehicle Swept Path Analysis to assess the proposed site plan's ability to accommodate the required turning movements of an emergency vehicle and a Molok waste collection vehicle. The results of the analysis, which are provided in **Appendix E,** illustrate that the site can sufficiently accommodate the aforementioned design vehicles.

12. Conclusions

The proposed site plan consists of a total of 210 dwelling units located with 11 3-storey townhouse blocks.

Access to the subject site is proposed via two full-moves accesses.

One is proposed to be located along New Dundee Road and will be offset to the west of the intersection with Reichert Drive. The other access is proposed to be located along Blair Creek Drive near the site's western limit.

The subject site is expected to generate a total of 88 new two-way trips consisting of 21 inbound and 67 outbound trips during weekday a.m. peak hour and 111 new two-way trips consisting of 70 inbound and 41 outbound trips during the weekday p.m. peak hour.

Under existing conditions, all study intersections are operating within capacity with all movements operating within capacity and no critical movements.

Under 2030 future background traffic conditions, which includes the implementation of the roundabout at the intersection of New Dundee Road and Robert Ferrie Drive, the study intersections continue to operate with acceptable v/c ratios and levels of service with no reported critical movements.

Under 2030 future total traffic conditions, with the addition of site generated traffic, all study intersections continue to operate with acceptable v/c ratios and levels of service with no reported critical movements.

Based on the anticipated capacity analysis of the proposed roundabout, the intersection Reichert Road and the site access, it is GHD's opinion that the proposed access from the subject site to New Dundee Road will not negatively impact the future operation of the roundabout.

Application of the current City of Kitchener By-Law parking rates to the subject site results in a requirement of 315 vehicle parking space and 8 barrier free spaces.

The subject site provides a total of 245 parking spaces for cars, a shortfall of 70 parking spaces from the By-law requirement.

However, the City of Kitchener's Zoning By-law 2019-051 is the newest of the City's Zoning By-laws. The By-law is gradually replacing Zoning By-law 85-1 and currently governs approximately 80% of the City's properties. The newest By-law provides a reduced minimum parking requirement from the older By-Law in addition to providing a maximum parking requirement.

Under the newest City By-law, the subject site would be required to provide a minimum of 231 vehicle parking spaces, and up to a maximum of 294 vehicle parking spaces (inclusive of visitor parking spaces). The proposed parking supply for the subject site satisfies the proposed new Zoning By-law 2019-051.

Under the newt City By-law, the subject site would be required to provide a minimum of 105 Class A bicycle parking spaces and 6 Class B parking spaces. The proposed site plan provides for a total of 105 Class A bicycle parking spaces and 6 Class B bicycle parking spaces to satisfy the zoning requirements.

The subject site is also proposing 20% of the total parking supply be EV ready for a total of 50 parking spaces.

A series of Transportation Demand Management (TDM) measures are proposed for the site to reduce dependency on single-occupancy vehicle trips by encouraging residents to explore alternative modes of transportation. These measures include:

- Improved pedestrian and cycling connectivity to the municipal networks, to make it easy and safe for people to walk or bike to their destination.
- Communication strategy and information packages

These measures will not only help reduce traffic congestion and air pollution, but also promote a healthier and more active lifestyle for the residents. The reduced parking rate will also encourage residents to use public transit.

A Vehicle Swept Path Analysis was undertaken to assess the site's ability to accommodate the required turning movements of an emergency vehicle and waste collection truck as per TAC design guidelines and confirmed that the site can sufficiently accommodate the aforementioned design vehicles.

Appendices

Appendix A

Terms of Reference

Raf Andrenacci

From: Joginder Bhatia <JBhatia@regionofwaterloo.ca>
Sent: Thursday, February 23, 2023 10:17 AM
To: Raf Andrenacci
Cc: Will Maria; Dave.Seller@kitchener.ca; Saman Ajamzadeh; Paula Sawicki (InTouch)
Subject: RE: Terms of Reference - 628 New Dundee Road

Hi Raf,

The Regional perspective in this TIS is only ***to have an access analysis to confirm that the proposed access on New Dundee will not impact the future roundabout operation.*** *All other items are City related.*

For any specific questions, please contact Paula Sawicki copied herewith.

Thanks.

Joginder Bhatia
Transportation Planner
Corridor Planning
Region of Waterloo
Email: JBhatia@regionofwaterloo.ca
Cell: 226-753-0368

From: Raf Andrenacci <Raf.Andrenacci@ghd.com>
Sent: February 23, 2023 9:40 AM
To: Dave Seller <Dave.Seller@kitchener.ca>; Joginder Bhatia <JBhatia@regionofwaterloo.ca>
Cc: Will Maria <William.Maria@ghd.com>
Subject: Re: Terms of Reference - 628 New Dundee Road

Thanks for your comments Dave. Just following up to see if the Region can provide us with any comments they may have regarding the TOR.

Regards,
Raf

From: Dave Seller <Dave.Seller@kitchener.ca>
Sent: Tuesday, February 14, 2023 9:34 AM
To: Raf Andrenacci <Raf.Andrenacci@ghd.com>; JBhatia@regionofwaterloo.ca <JBhatia@regionofwaterloo.ca>
Cc: Will Maria <William.Maria@ghd.com>
Subject: RE: Terms of Reference - 628 New Dundee Road

Hi Raf,

See my comments below in purple.

Dave Seller, C.E.T.
Traffic Planning Analyst | Transportation Services | City of Kitchener
519-741-2200 ext. 7369 | TTY 1-866-969-9994 | dave.seller@kitchener.ca

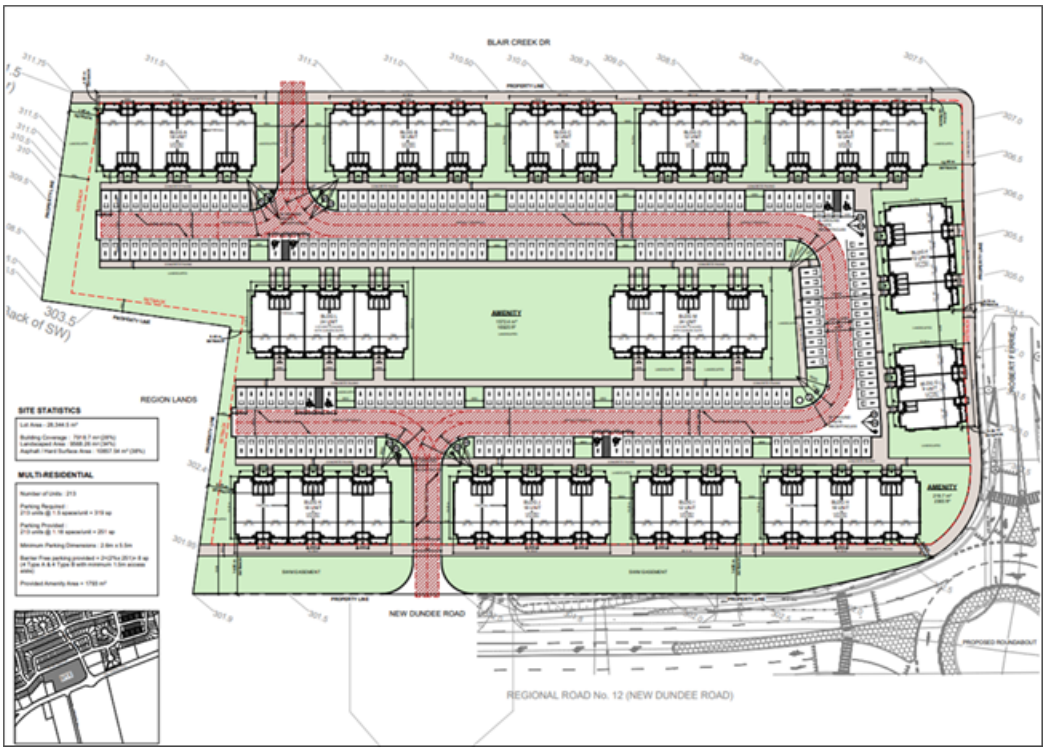
From: Raf Andrenacci <Raf.Andrenacci@ghd.com>
Sent: Tuesday, February 07, 2023 4:21 PM
To: JBhatia@regionofwaterloo.ca; Dave Seller <Dave.Seller@kitchener.ca>
Cc: Will Maria <William.Maria@ghd.com>
Subject: Terms of Reference - New Dundee Road

Hello,

GHD Inc. has been retained to prepare a Transportation Impact Study for a proposed stacked townhouse development located on New Dundee Road in the City of Kitchener.

The subject site consists of 213 stacked townhouse units.

Access to the subject site is proposed via a full-moves road connection to the south on New Dundee Road located opposite Reichert Drive and a full moves road connection to the north located on Blair Creek Drive.



In order to properly scope this project, we ask that the City and Region review and provide comments on the following scope and confirm if there are any additional items required as part of the study.

Study intersections

- **YES** New Dundee Road and Robert Ferrie Drive
- **YES** Robert Ferrie Drive and Blair Creek Drive
- **YES** New Dundee Road and Reichert Drive/Proposed Site Access
- **YES** Blair Creek Drive and Proposed Site Access

Traffic Data

YES Updated traffic counts at the existing study intersections will be undertaken during the a.m. and p.m. peak hours.

Study Peak Hours

YES Weekday a.m. and p.m. peak hours

Study Horizon Year

YES 2023 (existing), and 2028 (5 years from the date of the study)

Background Growth Rate

YES GHD will consult with staff to determine if AADT data prior to 2020 is available to establish appropriate growth rates to be used for Dundee Road. **YES** City staff to confirm if a 2% per annum growth rate is acceptable on local roads.

Background Development Traffic

N/A City staff to advise if there are any proposed background development to include in the study.

Trip Generation

YES Will be completed using rates published by the ITE Trip Generation 11th Edition, LUC 220 Multifamily Housing (Low-Rise).

YES The directional distribution of traffic approaching and departing the site will be determined based on TTS 2016 data, existing local patterns and first principles.

YES – ensure that a left turn lane analysis is completed for the site access at Blair Creek Drive The analysis will Identify the transportation system requirements and other measures required to ensure the acceptable operation of the study intersections, including auxiliary turning lanes and other transportation infrastructure improvements.

City of Kitchener defer to the Region of Waterloo comments for New Dundee Road TAC and City guidelines will be reviewed in order to complete an access management for the proposed access on New Dundee Road. Review for the site access that reviews corner clearance, driveway spacing, auxiliary lanes, corner radii, and clear throat distance.

YES Complete AutoTurn assessment of the proposed site for emergency vehicles, waste collection, and passenger cars.

YES Existing TDM opportunities will be identified and future TDM opportunities will be recommended for the site.

YES The parking supply will be reviewed in accordance with the City's Zoning By-law

If the above scope is acceptable to the City and Region, it will form the basis of our scope of work.

Thank you,
Raf

Appendix B

Traffic Data

GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

Turning Movement Count (2 . NEW DUNDEE RD & REICHERT DR)

Start Time	E Approach NEW DUNDEE RD					S Approach REICHERT DR					W Approach NEW DUNDEE RD					Int. Total (15 min)	Int. Total (1 hr)
	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	UTurn W:W	Peds W:	Approach Total		
07:00:00	36	25	0	0	61	11	1	0	0	12	0	50	0	0	50	123	
07:15:00	45	19	0	0	64	17	0	0	0	17	1	64	0	0	65	146	
07:30:00	46	23	0	0	69	12	0	0	0	12	0	84	0	0	84	165	
07:45:00	38	24	0	0	62	19	1	0	0	20	3	71	0	0	74	156	590
08:00:00	46	28	0	0	74	17	0	0	0	17	0	54	0	0	54	145	612
08:15:00	55	26	0	0	81	17	1	0	0	18	0	61	0	0	61	160	626
08:30:00	51	26	0	0	77	8	1	0	0	9	1	74	0	0	75	161	622
08:45:00	43	32	0	0	75	23	0	0	0	23	0	67	0	0	67	165	631
BREAK																	
16:00:00	98	34	0	0	132	30	1	0	0	31	1	50	0	0	51	214	
16:15:00	96	36	0	0	132	20	0	0	0	20	1	68	0	0	69	221	
16:30:00	101	23	0	0	124	22	3	0	0	25	1	70	0	0	71	220	
16:45:00	94	20	0	0	114	31	0	0	0	31	0	67	0	0	67	212	867
17:00:00	117	30	0	0	147	29	0	0	0	29	0	80	0	0	80	256	909
17:15:00	96	30	0	0	126	19	2	0	0	21	3	80	0	0	83	230	918
17:30:00	98	20	0	0	118	19	1	0	0	20	1	56	0	0	57	195	893
17:45:00	77	22	0	0	99	7	1	0	0	8	2	56	0	0	58	165	846
Grand Total	1137	418	0	0	1555	301	12	0	0	313	14	1052	0	0	1066	**2934**	-
Approach%	73.1%	26.9%	0%		-	96.2%	3.8%	0%		-	1.3%	98.7%	0%		-	**-**	-
Totals %	38.8%	14.2%	0%		53%	10.3%	0.4%	0%		10.7%	0.5%	35.9%	0%		36.3%	**-**	-
Heavy	19	7	0		-	5	1	0		-	2	19	0		-	**-**	-
Heavy %	1.7%	1.7%	0%		-	1.7%	8.3%	0%		-	14.3%	1.8%	0%		-	**-**	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	**-**	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	**-**	-

GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

Peak Hour: 08:00 AM - 09:00 AM Weather: Fog (-2.51 °C)

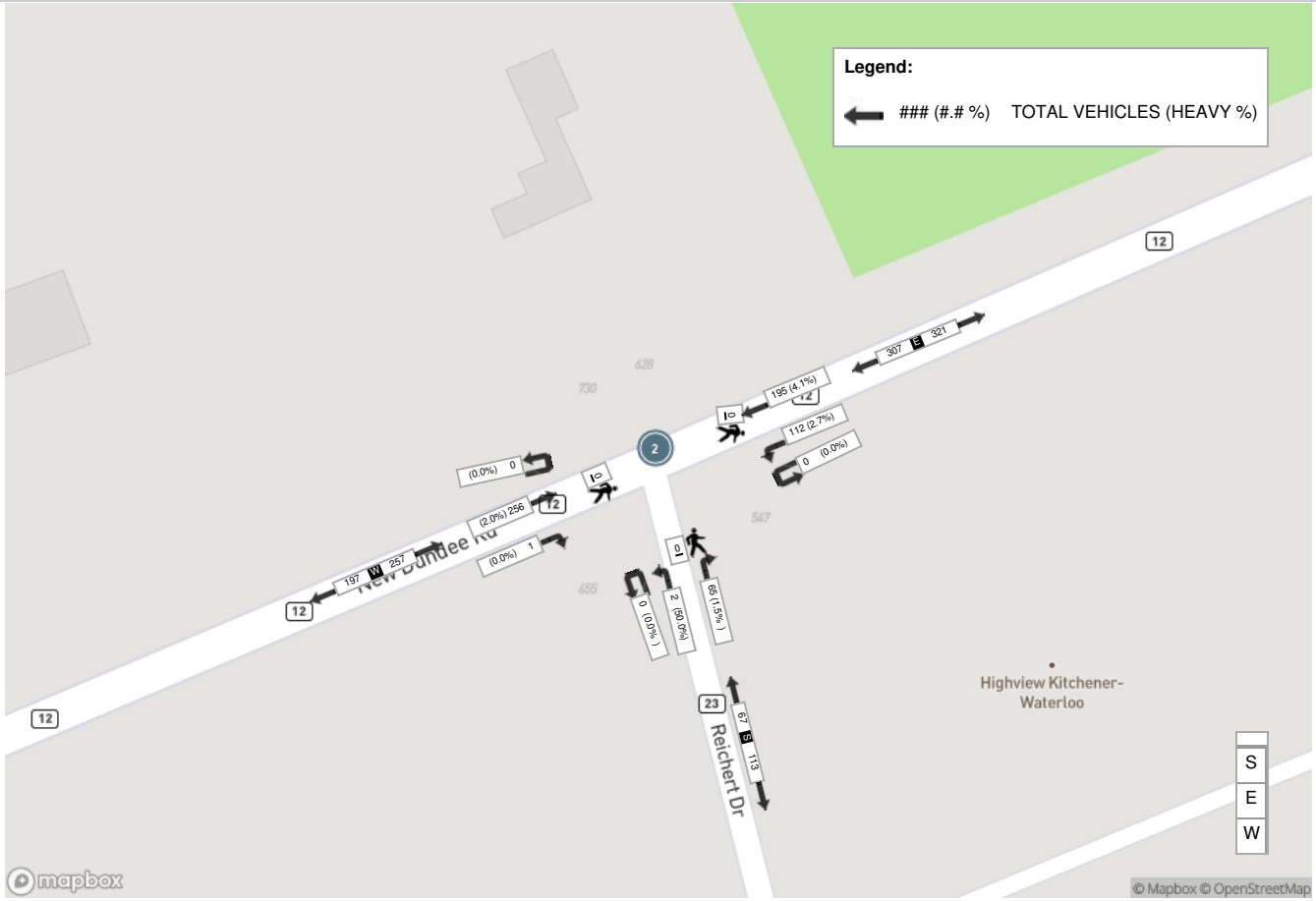
Start Time	E Approach NEW DUNDEE RD					S Approach REICHERT DR					W Approach NEW DUNDEE RD					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
08:00:00	46	28	0	0	74	17	0	0	0	17	0	54	0	0	54	145
08:15:00	55	26	0	0	81	17	1	0	0	18	0	61	0	0	61	160
08:30:00	51	26	0	0	77	8	1	0	0	9	1	74	0	0	75	161
08:45:00	43	32	0	0	75	23	0	0	0	23	0	67	0	0	67	165
Grand Total	195	112	0	0	307	65	2	0	0	67	1	256	0	0	257	**631**
Approach%	63.5%	36.5%	0%		-	97%	3%	0%		-	0.4%	99.6%	0%		-	**-**
Totals %	30.9%	17.7%	0%		48.7%	10.3%	0.3%	0%		10.6%	0.2%	40.6%	0%		40.7%	**-**
PHF	0.89	0.88	0		0.95	0.71	0.5	0		0.73	0.25	0.86	0		0.86	**-**
Heavy	8	3	0		11	1	1	0		2	0	5	0		5	**-**
Heavy %	4.1%	2.7%	0%		3.6%	1.5%	50%	0%		3%	0%	2%	0%		1.9%	**-**
Lights	187	109	0		296	64	1	0		65	1	251	0		252	**-**
Lights %	95.9%	97.3%	0%		96.4%	98.5%	50%	0%		97%	100%	98%	0%		98.1%	**-**
Single-Unit Trucks	7	3	0		10	0	0	0		0	0	4	0		4	**-**
Single-Unit Trucks %	3.6%	2.7%	0%		3.3%	0%	0%	0%		0%	0%	1.6%	0%		1.6%	**-**
Buses	0	0	0		0	1	1	0		2	0	0	0		0	**-**
Buses %	0%	0%	0%		0%	1.5%	50%	0%		3%	0%	0%	0%		0%	**-**
Articulated Trucks	1	0	0		1	0	0	0		0	0	1	0		1	**-**
Articulated Trucks %	0.5%	0%	0%		0.3%	0%	0%	0%		0%	0%	0.4%	0%		0.4%	**-**

GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

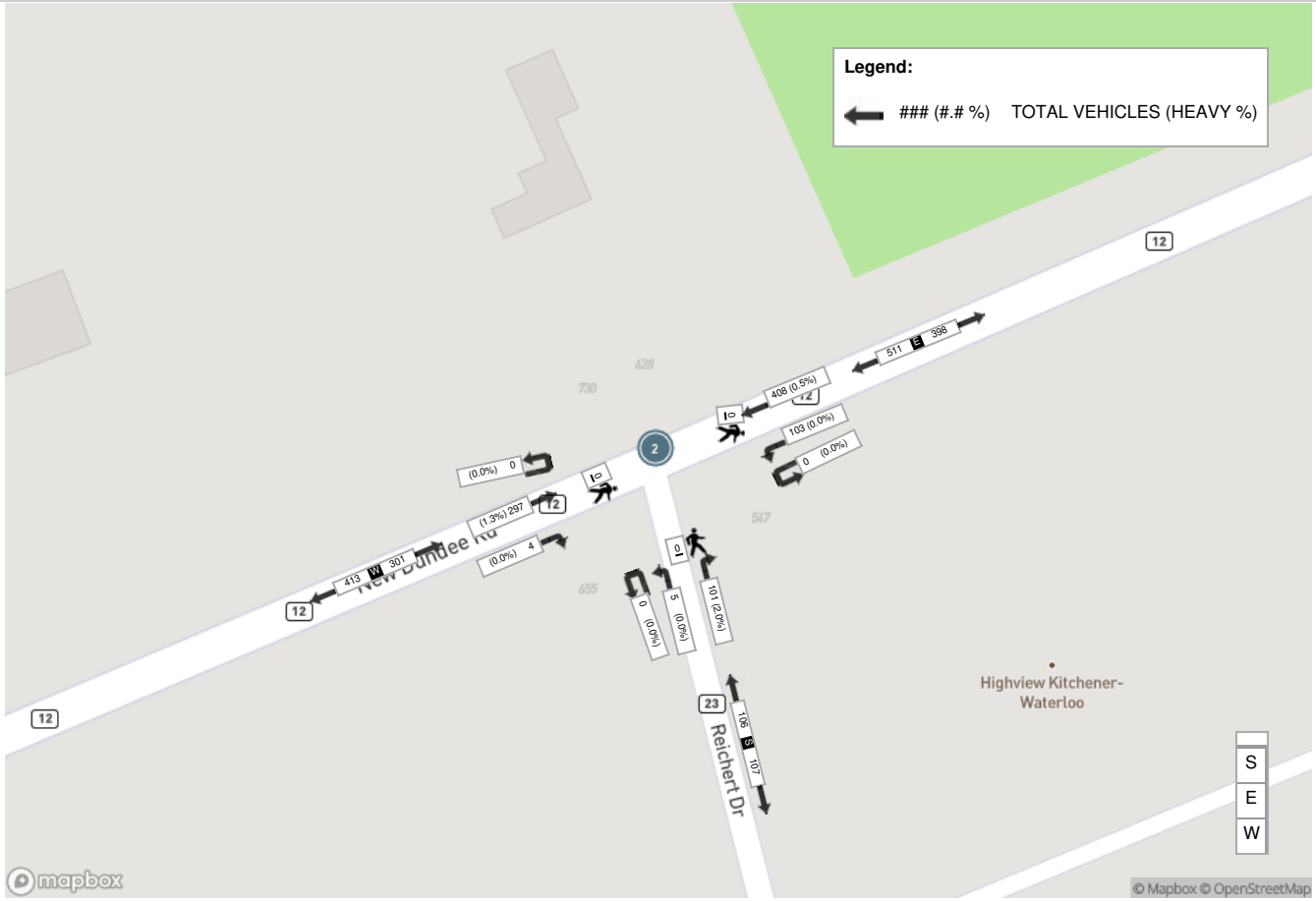
Peak Hour: 04:30 PM - 05:30 PM Weather: Broken Clouds (2.61 °C)

Start Time	E Approach NEW DUNDEE RD					S Approach REICHERT DR					W Approach NEW DUNDEE RD					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
16:30:00	101	23	0	0	124	22	3	0	0	25	1	70	0	0	71	220
16:45:00	94	20	0	0	114	31	0	0	0	31	0	67	0	0	67	212
17:00:00	117	30	0	0	147	29	0	0	0	29	0	80	0	0	80	256
17:15:00	96	30	0	0	126	19	2	0	0	21	3	80	0	0	83	230
Grand Total	408	103	0	0	511	101	5	0	0	106	4	297	0	0	301	**918**
Approach%	79.8%	20.2%	0%		-	95.3%	4.7%	0%		-	1.3%	98.7%	0%		-	**-**
Totals %	44.4%	11.2%	0%		55.7%	11%	0.5%	0%		11.5%	0.4%	32.4%	0%		32.8%	**-**
PHF	0.87	0.86	0		0.87	0.81	0.42	0		0.85	0.33	0.93	0		0.91	**-**
Heavy	2	0	0		2	2	0	0		2	0	4	0		4	**-**
Heavy %	0.5%	0%	0%		0.4%	2%	0%	0%		1.9%	0%	1.3%	0%		1.3%	**-**
Lights	406	103	0		509	99	5	0		104	4	293	0		297	**-**
Lights %	99.5%	100%	0%		99.6%	98%	100%	0%		98.1%	100%	98.7%	0%		98.7%	**-**
Single-Unit Trucks	2	0	0		2	1	0	0		1	0	3	0		3	**-**
Single-Unit Trucks %	0.5%	0%	0%		0.4%	1%	0%	0%		0.9%	0%	1%	0%		1%	**-**
Buses	0	0	0		0	1	0	0		1	0	1	0		1	**-**
Buses %	0%	0%	0%		0%	1%	0%	0%		0.9%	0%	0.3%	0%		0.3%	**-**
Articulated Trucks	0	0	0		0	0	0	0		0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	**-**

Peak Hour: 08:00 AM - 09:00 AM Weather: Fog (-2.51 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Broken Clouds (2.61 °C)



GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

Turning Movement Count (1 . NEW DUNDEE RD & ROBERT FERRIE DR)

Start Time	N Approach ROBERT FERRIE DR					E Approach NEW DUNDEE RD					W Approach NEW DUNDEE RD					Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	UTurn E:E	Peds E:	Approach Total	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	15	39	0	0	54	16	45	0	0	61	56	4	0	1	60	175	
07:15:00	22	60	0	0	82	21	45	0	0	66	69	12	0	0	81	229	
07:30:00	30	86	0	0	116	15	39	0	0	54	85	13	0	0	98	268	
07:45:00	21	87	0	0	108	18	40	0	0	58	71	18	0	0	89	255	927
08:00:00	38	56	0	0	94	23	37	0	0	60	63	7	0	0	70	224	976
08:15:00	23	70	0	0	93	31	61	0	0	92	64	15	0	0	79	264	1011
08:30:00	25	57	0	0	82	29	47	0	0	76	72	10	0	0	82	240	983
08:45:00	24	46	0	0	70	26	53	0	0	79	70	21	0	0	91	240	968
BREAK																	
16:00:00	20	39	0	0	59	60	112	0	0	172	59	26	0	0	85	316	
16:15:00	22	30	0	0	52	54	109	0	0	163	68	21	0	0	89	304	
16:30:00	21	37	0	0	58	67	105	0	0	172	61	31	0	0	92	322	
16:45:00	23	54	0	0	77	62	96	0	0	158	58	40	0	0	98	333	1275
17:00:00	26	39	0	0	65	77	114	0	0	191	76	30	0	0	106	362	1321
17:15:00	23	37	0	0	60	70	105	0	0	175	61	40	0	0	101	336	1353
17:30:00	21	31	0	1	52	77	97	0	0	174	46	31	0	0	77	303	1334
17:45:00	19	41	0	0	60	83	78	0	0	161	38	24	0	1	62	283	1284
Grand Total	373	809	0	1	1182	729	1183	0	0	1912	1017	343	0	2	1360	**4454**	-
Approach%	31.6%	68.4%	0%		-	38.1%	61.9%	0%		-	74.8%	25.2%	0%		-	**-**	-
Totals %	8.4%	18.2%	0%		26.5%	16.4%	26.6%	0%		42.9%	22.8%	7.7%	0%		30.5%	**-**	-
Heavy	3	11	0		-	14	24	0		-	21	3	0		-	**-**	-
Heavy %	0.8%	1.4%	0%		-	1.9%	2%	0%		-	2.1%	0.9%	0%		-	**-**	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	**-**	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	**-**	-

GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

Peak Hour: 07:30 AM - 08:30 AM Weather: Fog (-2.51 °C)

Start Time	N Approach ROBERT FERRIE DR					E Approach NEW DUNDEE RD					W Approach NEW DUNDEE RD					Int. Total (15 min)
	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	
07:30:00	30	86	0	0	116	15	39	0	0	54	85	13	0	0	98	268
07:45:00	21	87	0	0	108	18	40	0	0	58	71	18	0	0	89	255
08:00:00	38	56	0	0	94	23	37	0	0	60	63	7	0	0	70	224
08:15:00	23	70	0	0	93	31	61	0	0	92	64	15	0	0	79	264
Grand Total	112	299	0	0	411	87	177	0	0	264	283	53	0	0	336	**1011**
Approach%	27.3%	72.7%	0%		-	33%	67%	0%		-	84.2%	15.8%	0%		-	**-**
Totals %	11.1%	29.6%	0%		40.7%	8.6%	17.5%	0%		26.1%	28%	5.2%	0%		33.2%	**-**
PHF	0.74	0.86	0		0.89	0.7	0.73	0		0.72	0.83	0.74	0		0.86	**-**
Heavy	1	2	0		3	5	10	0		15	5	1	0		6	**-**
Heavy %	0.9%	0.7%	0%		0.7%	5.7%	5.6%	0%		5.7%	1.8%	1.9%	0%		1.8%	**-**
Lights	111	297	0		408	82	167	0		249	278	52	0		330	**-**
Lights %	99.1%	99.3%	0%		99.3%	94.3%	94.4%	0%		94.3%	98.2%	98.1%	0%		98.2%	**-**
Single-Unit Trucks	0	0	0		0	1	9	0		10	2	0	0		2	**-**
Single-Unit Trucks %	0%	0%	0%		0%	1.1%	5.1%	0%		3.8%	0.7%	0%	0%		0.6%	**-**
Buses	1	2	0		3	4	0	0		4	1	1	0		2	**-**
Buses %	0.9%	0.7%	0%		0.7%	4.6%	0%	0%		1.5%	0.4%	1.9%	0%		0.6%	**-**
Articulated Trucks	0	0	0		0	0	1	0		1	2	0	0		2	**-**
Articulated Trucks %	0%	0%	0%		0%	0%	0.6%	0%		0.4%	0.7%	0%	0%		0.6%	**-**
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**

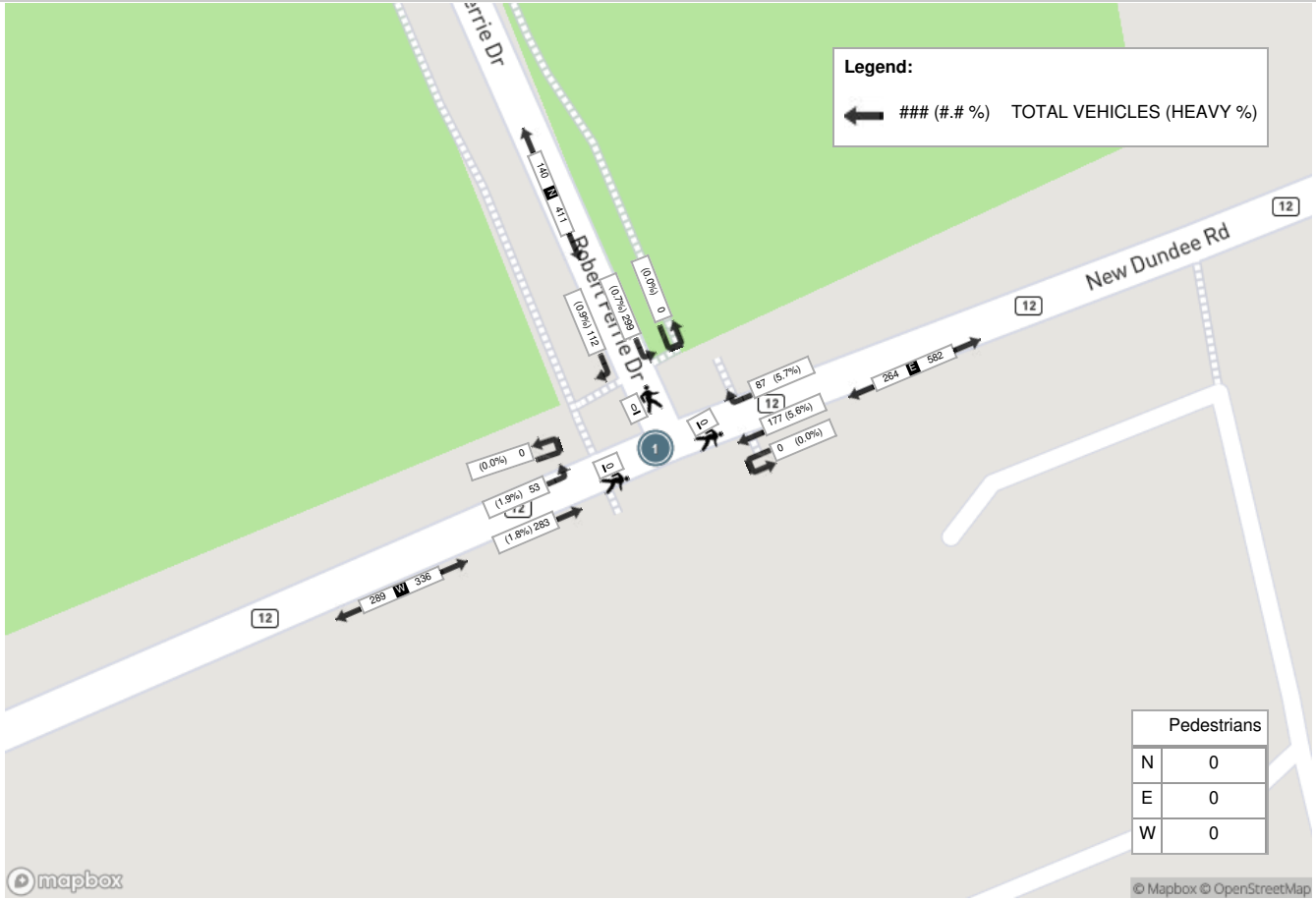
GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

Peak Hour: 04:30 PM - 05:30 PM Weather: Broken Clouds (2.61 °C)

Start Time	N Approach ROBERT FERRIE DR					E Approach NEW DUNDEE RD					W Approach NEW DUNDEE RD					Int. Total (15 min)
	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	
16:30:00	21	37	0	0	58	67	105	0	0	172	61	31	0	0	92	322
16:45:00	23	54	0	0	77	62	96	0	0	158	58	40	0	0	98	333
17:00:00	26	39	0	0	65	77	114	0	0	191	76	30	0	0	106	362
17:15:00	23	37	0	0	60	70	105	0	0	175	61	40	0	0	101	336
Grand Total	93	167	0	0	260	276	420	0	0	696	256	141	0	0	397	**1353**
Approach%	35.8%	64.2%	0%		-	39.7%	60.3%	0%		-	64.5%	35.5%	0%		-	**-**
Totals %	6.9%	12.3%	0%		19.2%	20.4%	31%	0%		51.4%	18.9%	10.4%	0%		29.3%	**-**
PHF	0.89	0.77	0		0.84	0.9	0.92	0		0.91	0.84	0.88	0		0.94	**-**
Heavy	0	2	0		2	3	2	0		5	4	1	0		5	**-**
Heavy %	0%	1.2%	0%		0.8%	1.1%	0.5%	0%		0.7%	1.6%	0.7%	0%		1.3%	**-**
Lights	93	165	0		258	273	418	0		691	252	140	0		392	**-**
Lights %	100%	98.8%	0%		99.2%	98.9%	99.5%	0%		99.3%	98.4%	99.3%	0%		98.7%	**-**
Single-Unit Trucks	0	0	0		0	1	2	0		3	3	0	0		3	**-**
Single-Unit Trucks %	0%	0%	0%		0%	0.4%	0.5%	0%		0.4%	1.2%	0%	0%		0.8%	**-**
Buses	0	2	0		2	2	0	0		2	1	1	0		2	**-**
Buses %	0%	1.2%	0%		0.8%	0.7%	0%	0%		0.3%	0.4%	0.7%	0%		0.5%	**-**
Articulated Trucks	0	0	0		0	0	0	0		0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**

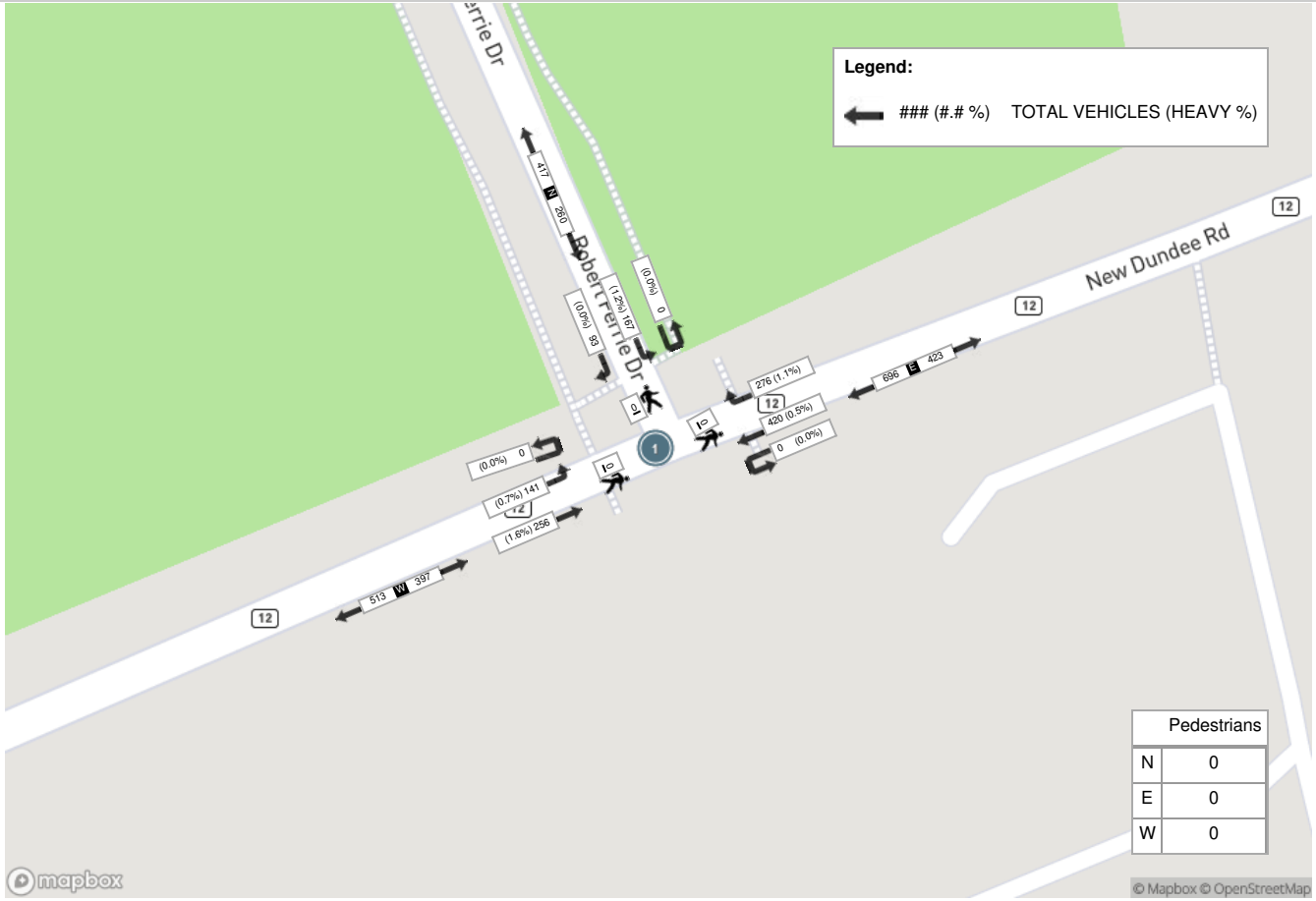
GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

Peak Hour: 07:30 AM - 08:30 AM Weather: Fog (-2.51 °C)



GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

Peak Hour: 04:30 PM - 05:30 PM Weather: Broken Clouds (2.61 °C)



Spectrum

Turning Movement Count
Location Name: ROBERT FERRIE DR & BLAIR CREEK DR
Date: Thu, Mar 02, 2023 Deployment Lead: Walter Fugaj

GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

Turning Movement Count (3 . ROBERT FERRIE DR & BLAIR CREEK DR)

Start Time	N Approach ROBERT FERRIE DR						E Approach BLAIR CREEK DR						S Approach ROBERT FERRIE DR						W Approach BLAIR CREEK DR						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	0	35	0	0	0	35	0	0	3	0	0	3	0	15	5	0	0	20	18	0	1	0	0	19	77	
07:15:00	2	57	0	0	1	59	0	2	6	0	4	8	1	21	6	0	8	28	19	4	2	0	2	25	120	
07:30:00	2	88	2	0	0	92	2	1	5	0	4	8	1	24	7	0	1	32	27	0	1	0	2	28	160	
07:45:00	0	68	0	0	0	68	0	0	2	0	0	2	1	28	7	0	0	36	30	1	2	0	0	33	139	496
08:00:00	1	62	0	0	2	63	0	1	5	0	1	6	2	20	8	0	0	30	29	3	1	0	0	33	132	551
08:15:00	0	62	0	0	0	62	3	2	5	0	0	10	2	30	15	0	0	47	25	1	1	0	0	27	146	577
08:30:00	1	51	3	0	0	55	2	1	4	0	0	7	1	32	5	0	0	38	30	1	0	0	0	31	131	548
08:45:00	4	45	1	0	0	50	5	2	2	0	0	9	3	22	20	0	2	45	18	0	0	0	0	18	122	531
BREAK																										
16:00:00	3	36	1	0	1	40	1	2	4	0	1	7	7	58	21	0	0	86	20	1	0	0	0	21	154	
16:15:00	3	45	0	0	0	48	0	1	0	0	0	1	4	51	20	0	0	75	7	1	1	0	0	9	133	
16:30:00	1	42	0	0	0	43	0	1	0	0	1	1	4	65	27	0	0	96	16	2	0	0	0	18	158	
16:45:00	3	55	2	0	1	60	1	1	4	0	0	6	11	74	20	0	0	105	21	0	4	0	0	25	196	641
17:00:00	1	44	2	0	1	47	1	1	3	0	4	5	5	73	28	0	1	106	18	1	0	0	0	19	177	664
17:15:00	3	43	3	0	3	49	2	0	4	0	2	6	4	62	41	0	0	107	14	0	0	0	2	14	176	707
17:30:00	0	37	1	0	3	38	3	0	0	0	1	3	4	83	20	0	4	107	15	2	1	0	0	18	166	715
17:45:00	2	37	1	0	0	40	2	0	4	0	0	6	6	70	32	0	1	108	14	0	5	0	0	19	173	692
Grand Total	26	807	16	0	12	849	22	15	51	0	18	88	56	728	282	0	17	1066	321	17	19	0	6	357	**2360**	-
Approach%	3.1%	95.1%	1.9%	0%		-	25%	17%	58%	0%		-	5.3%	68.3%	26.5%	0%		-	89.9%	4.8%	5.3%	0%		-	-	-
Totals %	1.1%	34.2%	0.7%	0%		36%	0.9%	0.6%	2.2%	0%		3.7%	2.4%	30.8%	11.9%	0%		45.2%	13.6%	0.7%	0.8%	0%		15.1%	-	-
Heavy	1	17	0	0		-	2	2	0	0		-	0	23	3	0		-	9	0	0	0		-	-	-
Heavy %	3.8%	2.1%	0%	0%		-	9.1%	13.3%	0%	0%		-	0%	3.2%	1.1%	0%		-	2.8%	0%	0%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

Peak Hour: 07:30 AM - 08:30 AM Weather: Fog (-2.51 °C)

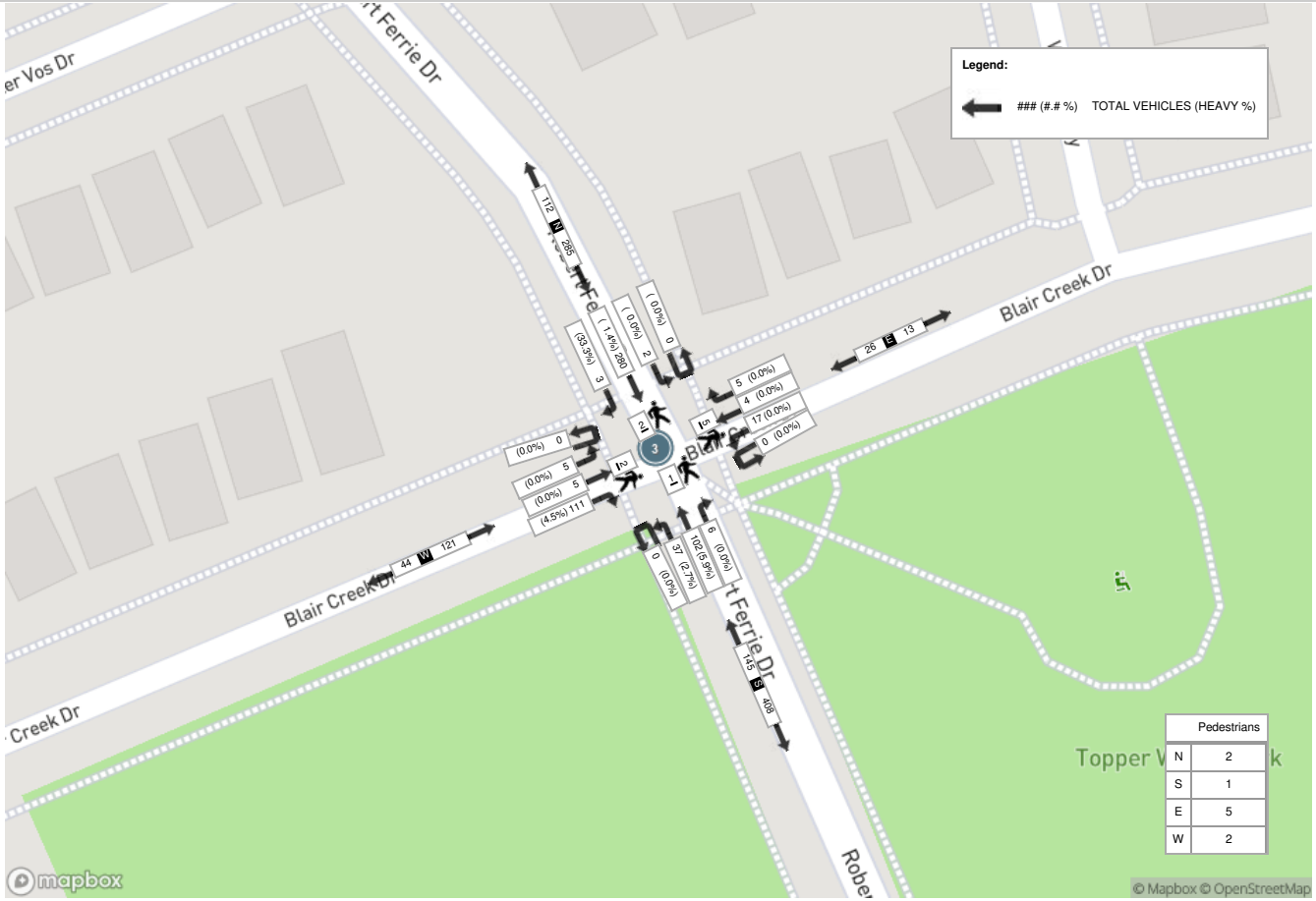
Start Time	N Approach ROBERT FERRIE DR						E Approach BLAIR CREEK DR						S Approach ROBERT FERRIE DR						W Approach BLAIR CREEK DR						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
07:30:00	2	88	2	0	0	92	2	1	5	0	4	8	1	24	7	0	1	32	27	0	1	0	2	28	160
07:45:00	0	68	0	0	0	68	0	0	2	0	0	2	1	28	7	0	0	36	30	1	2	0	0	33	139
08:00:00	1	62	0	0	2	63	0	1	5	0	1	6	2	20	8	0	0	30	29	3	1	0	0	33	132
08:15:00	0	62	0	0	0	62	3	2	5	0	0	10	2	30	15	0	0	47	25	1	1	0	0	27	146
Grand Total	3	280	2	0	2	285	5	4	17	0	5	26	6	102	37	0	1	145	111	5	5	0	2	121	**577**
Approach%	1.1%	98.2%	0.7%	0%		-	19.2%	15.4%	65.4%	0%		-	4.1%	70.3%	25.5%	0%		-	91.7%	4.1%	4.1%	0%		-	**-**
Totals %	0.5%	48.5%	0.3%	0%		49.4%	0.9%	0.7%	2.9%	0%		4.5%	1%	17.7%	6.4%	0%		25.1%	19.2%	0.9%	0.9%	0%		21%	**-**
PHF	0.38	0.8	0.25	0		0.77	0.42	0.5	0.85	0		0.65	0.75	0.85	0.62	0		0.77	0.93	0.42	0.63	0		0.92	**-**
Heavy	1	4	0	0		5	0	0	0	0		0	0	6	1	0		7	5	0	0	0		5	**-**
Heavy %	33.3%	1.4%	0%	0%		1.8%	0%	0%	0%	0%		0%	0%	5.9%	2.7%	0%		4.8%	4.5%	0%	0%	0%		4.1%	**-**
Lights	2	276	2	0		280	5	4	17	0		26	6	96	36	0		138	106	5	5	0		116	**-**
Lights %	66.7%	98.6%	100%	0%		98.2%	100%	100%	100%	0%		100%	100%	94.1%	97.3%	0%		95.2%	95.5%	100%	100%	0%		95.9%	**-**
Single-Unit Trucks	0	1	0	0		1	0	0	0	0		0	0	1	1	0		2	5	0	0	0		5	**-**
Single-Unit Trucks %	0%	0.4%	0%	0%		0.4%	0%	0%	0%	0%		0%	0%	1%	2.7%	0%		1.4%	4.5%	0%	0%	0%		4.1%	**-**
Buses	1	3	0	0		4	0	0	0	0		0	0	5	0	0		5	0	0	0	0		0	**-**
Buses %	33.3%	1.1%	0%	0%		1.4%	0%	0%	0%	0%		0%	0%	4.9%	0%	0%		3.4%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	2	-	-	-	-	-	5	-	-	-	-	-	1	-	-	-	-	-	2	-	**-**
Pedestrians%	-	-	-	-	20%		-	-	-	-	50%		-	-	-	-	10%		-	-	-	-	20%		**-**

GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

Peak Hour: 04:45 PM - 05:45 PM **Weather: Broken Clouds (2.61 °C)**

Start Time	N Approach ROBERT FERRIE DR						E Approach BLAIR CREEK DR						S Approach ROBERT FERRIE DR						W Approach BLAIR CREEK DR						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:45:00	3	55	2	0	1	60	1	1	4	0	0	6	11	74	20	0	0	105	21	0	4	0	0	25	196
17:00:00	1	44	2	0	1	47	1	1	3	0	4	5	5	73	28	0	1	106	18	1	0	0	0	19	177
17:15:00	3	43	3	0	3	49	2	0	4	0	2	6	4	62	41	0	0	107	14	0	0	0	2	14	176
17:30:00	0	37	1	0	3	38	3	0	0	0	1	3	4	83	20	0	4	107	15	2	1	0	0	18	166
Grand Total	7	179	8	0	8	194	7	2	11	0	7	20	24	292	109	0	5	425	68	3	5	0	2	76	**715**
Approach%	3.6%	92.3%	4.1%	0%		-	35%	10%	55%	0%		-	5.6%	68.7%	25.6%	0%		-	89.5%	3.9%	6.6%	0%		-	**-**
Totals %	1%	25%	1.1%	0%		27.1%	1%	0.3%	1.5%	0%		2.8%	3.4%	40.8%	15.2%	0%		59.4%	9.5%	0.4%	0.7%	0%		10.6%	**-**
PHF	0.58	0.81	0.67	0		0.81	0.58	0.5	0.69	0		0.83	0.55	0.88	0.66	0		0.99	0.81	0.38	0.31	0		0.76	**-**
Heavy	0	3	0	0		3	0	0	0	0		0	0	8	0	0		8	0	0	0	0		0	**-**
Heavy %	0%	1.7%	0%	0%		1.5%	0%	0%	0%	0%		0%	0%	2.7%	0%	0%		1.9%	0%	0%	0%	0%		0%	**-**
Lights	7	176	8	0		191	7	2	11	0		20	24	284	109	0		417	68	3	5	0		76	**-**
Lights %	100%	98.3%	100%	0%		98.5%	100%	100%	100%	0%		100%	100%	97.3%	100%	0%		98.1%	100%	100%	100%	0%		100%	**-**
Single-Unit Trucks	0	1	0	0		1	0	0	0	0		0	0	5	0	0		5	0	0	0	0		0	**-**
Single-Unit Trucks %	0%	0.6%	0%	0%		0.5%	0%	0%	0%	0%		0%	0%	1.7%	0%	0%		1.2%	0%	0%	0%	0%		0%	**-**
Buses	0	2	0	0		2	0	0	0	0		0	0	3	0	0		3	0	0	0	0		0	**-**
Buses %	0%	1.1%	0%	0%		1%	0%	0%	0%	0%		0%	0%	1%	0%	0%		0.7%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	8	-	-	-	-	-	7	-	-	-	-	-	5	-	-	-	-	-	2	-	**-**
Pedestrians%	-	-	-	-	36.4%		-	-	-	-	31.8%		-	-	-	-	22.7%		-	-	-	-	9.1%		**-**

Peak Hour: 07:30 AM - 08:30 AM **Weather: Fog (-2.51 °C)**



Peak Hour: 04:45 PM - 05:45 PM **Weather: Broken Clouds (2.61 °C)**

Appendix C

Transportation Tomorrow Survey 2016

AM Inbound
Tue Mar 14 2023 16:08:37 GMT-0400 (Eastern Daylight Time) - Run Time: 5352ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of origin - pd_orig
Column: 2006 GTA zone of destination - gta06_dest

RowG:
ColG:(7465,7466)
TblG:

Filters:
Start time of trip - start_time In 600-900
and
Trip purpose of destination - purp_dest In H,

Trip 2016
Table:

,1		D
Mississauga	44	E
Kitchener	67	E
Cambridge	32	E
SUM	**143**	

PM Outbound
Tue Mar 14 2023 16:11:43 GMT-0400 (Eastern Daylight Time) - Run Time: 2694ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of destination - pd_dest
Column: 2006 GTA zone of origin - gta06_orig

RowG:
ColG:(7465,7466)
TblG:

Filters:
Start time of trip - start_time In 600-900
and
Trip purpose of destination - purp_dest In W,R,S,M,D

Trip 2016
Table:

,1		
PD 13 of Toronto	13	E
Newmarket	33	E
Mississauga	62	E
Milton	35	E
Hamilton	22	E & S
Waterloo	317	W
Kitchener	2223	E
Cambridge	501	E
Woolwich	59	E
City of Guelph	230	E
Puslinch	10	E
Rest of Wellington	28	E
Perth	9	E
Oxford	118	W
Brantford	32	S
External	49	E
SUM	**3741**	

PM Inbound
Tue Mar 14 2023 16:04:26 GMT-0400 (Eastern Daylight Time) - Run Time: 2456ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of origin - pd_orig
Column: 2006 GTA zone of destination - gta06_dest

RowG:
ColG:(7466,7466)
TblG:

Filters:
Start time of trip - start_time In 1500-1800
and
Trip purpose of destination - purp_dest In H,

Trip 2016
Table:

,1		
PD 1 of Toronto	47	E
PD 2 of Toronto	21	E
PD 13 of Toronto	13	E
Mississauga	84	E
Halton Hills	11	E
Milton	35	E
Hamilton	22	E
Waterloo	338	W
Kitchener	2285	E
Cambridge	407	E
North Dumfries	54	S
Wilmot	5	E
Woolwich	78	E
City of Guelph	180	E
Puslinch	10	E
Rest of Wellington	28	E
Perth	9	E
Oxford	145	W
Brantford	33	S
External	43	E
SUM	**3848**	

PM Outbound
Tue Mar 14 2023 16:12:41 GMT-0400 (Eastern Daylight Time) - Run Time: 2584ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of destination - pd_dest
Column: 2006 GTA zone of origin - gta06_orig

RowG:
ColG:(7465,7466)
TblG:

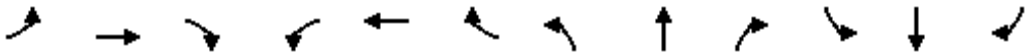
Filters:
Start time of trip - start_time In 1500-1800
and
Trip purpose of destination - purp_dest In W,R,S,M,D

Trip 2016
Table:

,1		
Mississaug	30	E
Waterloo	66	W
Kitchener	451	E
Cambridge	86	S
SUM	**633**	

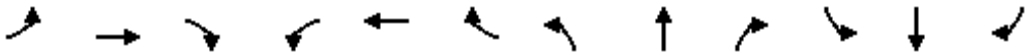
Appendix D

Synchro Outputs



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	5	111	17	4	5	37	102	6	2	280	3
Future Volume (vph)	5	5	111	17	4	5	37	102	6	2	280	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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		0.877			0.972			0.994			0.999	
Flt Protected		0.998			0.968			0.987				
Satd. Flow (prot)	0	1648	0	0	1772	0	0	1798	0	0	1878	0
Flt Permitted		0.998			0.968			0.987				
Satd. Flow (perm)	0	1648	0	0	1772	0	0	1798	0	0	1878	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			164.7			156.1			103.3	
Travel Time (s)		14.3			11.9			11.2			7.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	6%	3%	33%	2%	0%
Adj. Flow (vph)	6	6	123	19	4	6	41	113	7	2	311	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	135	0	0	29	0	0	161	0	0	316	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 40.9%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	111	17	4	5	37	102	6	2	280	3
Future Volume (Veh/h)	5	5	111	17	4	5	37	102	6	2	280	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	6	123	19	4	6	41	113	7	2	311	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								156				
pX, platoon unblocked												
vC, conflicting volume	523	518	312	641	516	116	314			120		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	523	518	312	641	516	116	314			120		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.4		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.5		
p0 queue free %	99	99	83	94	99	99	97			100		
cM capacity (veh/h)	446	446	728	310	447	936	1246			1296		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	135	29	161	316
Volume Left	6	19	41	2
Volume Right	123	6	7	3
cSH	689	379	1246	1296
Volume to Capacity	0.20	0.08	0.03	0.00
Queue Length 95th (m)	5.5	1.9	0.8	0.0
Control Delay (s)	11.5	15.3	2.2	0.1
Lane LOS	B	C	A	A
Approach Delay (s)	11.5	15.3	2.2	0.1
Approach LOS	B	C		

Intersection Summary				
Average Delay	3.7			
Intersection Capacity Utilization	40.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	256	1	112	195	2	65
Future Volume (vph)	256	1	112	195	2	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	47.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			7.6		7.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.999				0.869	
Flt Protected			0.950		0.999	
Satd. Flow (prot)	1882	0	1772	1847	1613	0
Flt Permitted			0.950		0.999	
Satd. Flow (perm)	1882	0	1772	1847	1613	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	31.4			160.0	199.2	
Travel Time (s)	2.3			11.5	14.3	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	2%	0%	3%	4%	50%	2%
Adj. Flow (vph)	267	1	117	203	2	68
Shared Lane Traffic (%)						
Lane Group Flow (vph)	268	0	117	203	70	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 33.9%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	256	1	112	195	2	65
Future Volume (Veh/h)	256	1	112	195	2	65
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	267	1	117	203	2	68
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				160		
pX, platoon unblocked						
vC, conflicting volume			268		704	268
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			268		704	268
tC, single (s)			4.1		6.9	6.2
tC, 2 stage (s)						
tF (s)			2.2		4.0	3.3
p0 queue free %			91		99	91
cM capacity (veh/h)			1290		308	771

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	268	117	203	70
Volume Left	0	117	0	2
Volume Right	1	0	0	68
cSH	1700	1290	1700	739
Volume to Capacity	0.16	0.09	0.12	0.09
Queue Length 95th (m)	0.0	2.3	0.0	2.4
Control Delay (s)	0.0	8.1	0.0	10.4
Lane LOS		A		B
Approach Delay (s)	0.0	3.0		10.4
Approach LOS				B

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	33.9%	ICU Level of Service	A
Analysis Period (min)	15		

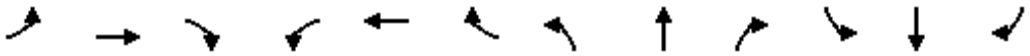
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	121	0	0	44	0	0
Future Volume (vph)	121	0	0	44	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1883	0	0	1883	1921	0
Flt Permitted						
Satd. Flow (perm)	1883	0	0	1883	1921	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	74.2			198.6	32.6	
Travel Time (s)	5.3			14.3	2.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	0%	0%
Adj. Flow (vph)	132	0	0	48	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	132	0	0	48	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 9.7%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	121	0	0	44	0	0
Future Volume (Veh/h)	121	0	0	44	0	0
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)	132	0	0	48	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			132		180	132
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			132		180	132
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1453		814	923

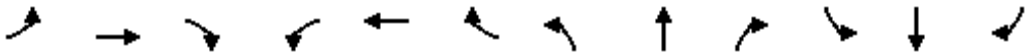
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	132	48	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1453	1700
Volume to Capacity	0.08	0.00	0.01
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		9.7%	ICU Level of Service
Analysis Period (min)		15	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	3	68	11	2	7	109	292	24	8	179	7
Future Volume (vph)	5	3	68	11	2	7	109	292	24	8	179	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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		0.878			0.951			0.992			0.995	
Flt Protected		0.997			0.973			0.987			0.998	
Satd. Flow (prot)	0	1649	0	0	1743	0	0	1832	0	0	1870	0
Flt Permitted		0.997			0.973			0.987			0.998	
Satd. Flow (perm)	0	1649	0	0	1743	0	0	1832	0	0	1870	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			164.7			156.1			103.3	
Travel Time (s)		14.3			11.9			11.2			7.4	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%
Adj. Flow (vph)	5	3	75	12	2	8	120	321	26	9	197	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	83	0	0	22	0	0	467	0	0	214	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 48.2%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	3	68	11	2	7	109	292	24	8	179	7
Future Volume (Veh/h)	5	3	68	11	2	7	109	292	24	8	179	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	5	3	75	12	2	8	120	321	26	9	197	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								156				
pX, platoon unblocked												
vC, conflicting volume	802	806	201	870	797	334	205			347		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	802	806	201	870	797	334	205			347		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	99	91	95	99	99	91			99		
cM capacity (veh/h)	276	286	840	228	289	708	1366			1212		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	83	22	467	214
Volume Left	5	12	120	9
Volume Right	75	8	26	8
cSH	704	311	1366	1212
Volume to Capacity	0.12	0.07	0.09	0.01
Queue Length 95th (m)	3.0	1.7	2.2	0.2
Control Delay (s)	10.8	17.5	2.7	0.4
Lane LOS	B	C	A	A
Approach Delay (s)	10.8	17.5	2.7	0.4
Approach LOS	B	C		

Intersection Summary				
Average Delay	3.3			
Intersection Capacity Utilization	48.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	297	4	103	408	5	101
Future Volume (vph)	297	4	103	408	5	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	47.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			7.6		7.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998				0.872	
Flt Protected			0.950		0.997	
Satd. Flow (prot)	1880	0	1825	1902	1639	0
Flt Permitted			0.950		0.997	
Satd. Flow (perm)	1880	0	1825	1902	1639	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	31.4			160.0	199.2	
Travel Time (s)	2.3			11.5	14.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	0%	0%	1%	0%	2%
Adj. Flow (vph)	330	4	114	453	6	112
Shared Lane Traffic (%)						
Lane Group Flow (vph)	334	0	114	453	118	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 38.1%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	297	4	103	408	5	101
Future Volume (Veh/h)	297	4	103	408	5	101
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	330	4	114	453	6	112
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				160		
pX, platoon unblocked					0.84	
vC, conflicting volume			334		1013	332
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			334		921	332
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			91		97	84
cM capacity (veh/h)			1237		231	710

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	334	114	453	118
Volume Left	0	114	0	6
Volume Right	4	0	0	112
cSH	1700	1237	1700	642
Volume to Capacity	0.20	0.09	0.27	0.18
Queue Length 95th (m)	0.0	2.3	0.0	5.1
Control Delay (s)	0.0	8.2	0.0	11.9
Lane LOS		A		B
Approach Delay (s)	0.0	1.6		11.9
Approach LOS				B

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	38.1%	ICU Level of Service	A
Analysis Period (min)	15		

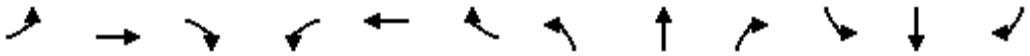
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	76	0	0	118	0	0
Future Volume (vph)	76	0	0	118	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1883	0	0	1883	1883	0
Flt Permitted						
Satd. Flow (perm)	1883	0	0	1883	1883	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	74.2			198.6	32.6	
Travel Time (s)	5.3			14.3	2.3	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Adj. Flow (vph)	100	0	0	155	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	100	0	0	155	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 9.5%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	76	0	0	118	0	0
Future Volume (Veh/h)	76	0	0	118	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	100	0	0	155	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			100		255	100
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			100		255	100
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1493		734	956

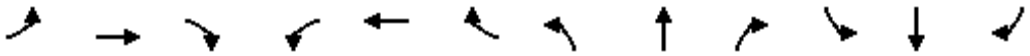
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	100	155	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1493	1700
Volume to Capacity	0.06	0.00	0.01
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	9.5%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	3	75	12	2	7	120	322	26	8	197	7
Future Volume (vph)	5	3	75	12	2	7	120	322	26	8	197	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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		0.877			0.953			0.992			0.995	
Flt Protected		0.997			0.973			0.987			0.998	
Satd. Flow (prot)	0	1647	0	0	1746	0	0	1844	0	0	1870	0
Flt Permitted		0.997			0.973			0.987			0.998	
Satd. Flow (perm)	0	1647	0	0	1746	0	0	1844	0	0	1870	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			164.7			156.1			103.3	
Travel Time (s)		14.3			11.9			11.2			7.4	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	5	3	82	13	2	8	132	354	29	9	216	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	90	0	0	23	0	0	515	0	0	233	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 52.1%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	3	75	12	2	7	120	322	26	8	197	7
Future Volume (Veh/h)	5	3	75	12	2	7	120	322	26	8	197	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	5	3	82	13	2	8	132	354	29	9	216	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								156				
pX, platoon unblocked												
vC, conflicting volume	880	885	220	954	874	368	224			383		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	880	885	220	954	874	368	224			383		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	99	90	93	99	99	90			99		
cM capacity (veh/h)	242	254	820	196	258	677	1345			1175		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	90	23	515	233
Volume Left	5	13	132	9
Volume Right	82	8	29	8
cSH	679	267	1345	1175
Volume to Capacity	0.13	0.09	0.10	0.01
Queue Length 95th (m)	3.5	2.1	2.5	0.2
Control Delay (s)	11.1	19.7	2.8	0.4
Lane LOS	B	C	A	A
Approach Delay (s)	11.1	19.7	2.8	0.4
Approach LOS	B	C		

Intersection Summary				
Average Delay	3.5			
Intersection Capacity Utilization	52.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	327	4	113	450	5	111
Future Volume (vph)	327	4	113	450	5	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	47.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			7.6		7.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.999				0.871	
Flt Protected			0.950		0.998	
Satd. Flow (prot)	1882	0	1825	1902	1639	0
Flt Permitted			0.950		0.998	
Satd. Flow (perm)	1882	0	1825	1902	1639	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	31.4			160.0	199.2	
Travel Time (s)	2.3			11.5	14.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	0%	0%	1%	0%	2%
Adj. Flow (vph)	363	4	126	500	6	123
Shared Lane Traffic (%)						
Lane Group Flow (vph)	367	0	126	500	129	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	327	4	113	450	5	111
Future Volume (Veh/h)	327	4	113	450	5	111
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	363	4	126	500	6	123
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				160		
pX, platoon unblocked					0.81	
vC, conflicting volume			367		1117	365
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			367		1030	365
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			90		97	82
cM capacity (veh/h)			1203		190	680

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	367	126	500	129
Volume Left	0	126	0	6
Volume Right	4	0	0	123
cSH	1700	1203	1700	607
Volume to Capacity	0.22	0.10	0.29	0.21
Queue Length 95th (m)	0.0	2.7	0.0	6.1
Control Delay (s)	0.0	8.3	0.0	12.5
Lane LOS		A		B
Approach Delay (s)	0.0	1.7		12.5
Approach LOS				B

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

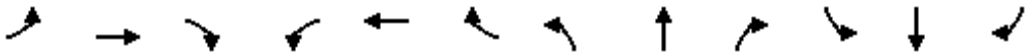
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	83	0	0	130	0	0
Future Volume (vph)	83	0	0	130	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1883	0	0	1883	1883	0
Flt Permitted						
Satd. Flow (perm)	1883	0	0	1883	1883	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	74.2			198.6	32.6	
Travel Time (s)	5.3			14.3	2.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	90	0	0	141	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	90	0	0	141	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 10.2%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	83	0	0	130	0	0
Future Volume (Veh/h)	83	0	0	130	0	0
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)	90	0	0	141	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			90		231	90
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			90		231	90
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1505		757	968

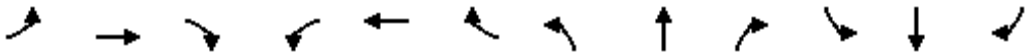
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	90	141	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1505	1700
Volume to Capacity	0.05	0.00	0.01
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	10.2%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	5	122	18	4	5	40	112	6	2	309	3
Future Volume (vph)	5	5	122	18	4	5	40	112	6	2	309	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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		0.876			0.973			0.995			0.999	
Flt Protected		0.998			0.968			0.988				
Satd. Flow (prot)	0	1647	0	0	1774	0	0	1852	0	0	1882	0
Flt Permitted		0.998			0.968			0.988				
Satd. Flow (perm)	0	1647	0	0	1774	0	0	1852	0	0	1882	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			164.7			156.1			103.3	
Travel Time (s)		14.3			11.9			11.2			7.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	6	136	20	4	6	44	124	7	2	343	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	148	0	0	30	0	0	175	0	0	348	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 45.2%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	122	18	4	5	40	112	6	2	309	3
Future Volume (Veh/h)	5	5	122	18	4	5	40	112	6	2	309	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	6	136	20	4	6	44	124	7	2	343	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								156				
pX, platoon unblocked												
vC, conflicting volume	572	568	344	703	566	128	346			131		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	572	568	344	703	566	128	346			131		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	81	93	99	99	96			100		
cM capacity (veh/h)	413	416	698	272	418	923	1213			1454		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	148	30	175	348
Volume Left	6	20	44	2
Volume Right	136	6	7	3
cSH	662	335	1213	1454
Volume to Capacity	0.22	0.09	0.04	0.00
Queue Length 95th (m)	6.5	2.2	0.9	0.0
Control Delay (s)	12.0	16.8	2.3	0.1
Lane LOS	B	C	A	A
Approach Delay (s)	12.0	16.8	2.3	0.1
Approach LOS	B	C		

Intersection Summary				
Average Delay	3.8			
Intersection Capacity Utilization	45.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	282	1	123	215	2	71
Future Volume (vph)	282	1	123	215	2	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	47.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			7.6		7.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.869	
Flt Protected			0.950		0.999	
Satd. Flow (prot)	1884	0	1772	1847	1615	0
Flt Permitted			0.950		0.999	
Satd. Flow (perm)	1884	0	1772	1847	1615	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	31.4			160.0	199.2	
Travel Time (s)	2.3			11.5	14.3	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	2%	0%	3%	4%	50%	2%
Adj. Flow (vph)	294	1	128	224	2	74
Shared Lane Traffic (%)						
Lane Group Flow (vph)	295	0	128	224	76	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	36.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	282	1	123	215	2	71
Future Volume (Veh/h)	282	1	123	215	2	71
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	294	1	128	224	2	74
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				160		
pX, platoon unblocked						
vC, conflicting volume			295		774	294
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			295		774	294
tC, single (s)			4.1		6.9	6.2
tC, 2 stage (s)						
tF (s)			2.2		4.0	3.3
p0 queue free %			90		99	90
cM capacity (veh/h)			1261		275	745

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	295	128	224	76
Volume Left	0	128	0	2
Volume Right	1	0	0	74
cSH	1700	1261	1700	713
Volume to Capacity	0.17	0.10	0.13	0.11
Queue Length 95th (m)	0.0	2.6	0.0	2.7
Control Delay (s)	0.0	8.2	0.0	10.7
Lane LOS		A		B
Approach Delay (s)	0.0	3.0		10.7
Approach LOS				B

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	36.2%	ICU Level of Service	A
Analysis Period (min)	15		

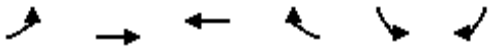
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	133	0	0	48	0	0
Future Volume (vph)	133	0	0	48	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1883	0	0	1883	1883	0
Flt Permitted						
Satd. Flow (perm)	1883	0	0	1883	1883	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	74.2			198.6	32.6	
Travel Time (s)	5.3			14.3	2.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	145	0	0	52	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	145	0	0	52	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 10.3%		ICU Level of Service A	
Analysis Period (min) 15			

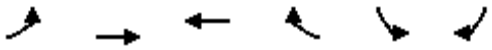
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	133	0	0	48	0	0
Future Volume (Veh/h)	133	0	0	48	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	145	0	0	52	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			145		197	145
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			145		197	145
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1437		792	902

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	145	52	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1437	1700
Volume to Capacity	0.09	0.00	0.01
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		10.3%	ICU Level of Service
Analysis Period (min)		15	



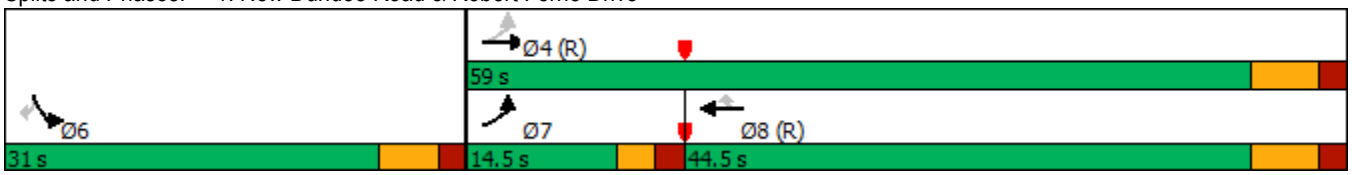
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	58	345	202	98	336	123
Future Volume (vph)	58	345	202	98	336	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	36.0			25.0	38.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	7.6				7.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1789	1883	1812	1541	1807	1617
Flt Permitted	0.549				0.950	
Satd. Flow (perm)	1034	1883	1812	1541	1807	1617
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				104		131
Link Speed (k/h)		50	50		50	
Link Distance (m)		160.0	358.0		156.1	
Travel Time (s)		11.5	25.8		11.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	2%	2%	6%	6%	1%	1%
Adj. Flow (vph)	62	367	215	104	357	131
Shared Lane Traffic (%)						
Lane Group Flow (vph)	62	367	215	104	357	131
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.9	4.9		4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases	4			8		6
Minimum Split (s)	14.5	59.0	44.5	44.5	31.0	31.0
Total Split (s)	14.5	59.0	44.5	44.5	31.0	31.0
Total Split (%)	16.1%	65.6%	49.4%	49.4%	34.4%	34.4%
Maximum Green (s)	10.0	52.5	38.0	38.0	25.0	25.0
Yellow Time (s)	2.5	4.5	4.5	4.5	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	6.5	6.5	6.5	6.0	6.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Walk Time (s)		5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	54.5	52.5	38.0	38.0	25.0	25.0
Actuated g/C Ratio	0.61	0.58	0.42	0.42	0.28	0.28

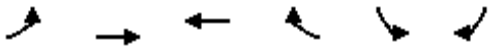


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
v/c Ratio	0.09	0.33	0.28	0.15	0.71	0.24
Control Delay	7.6	10.8	18.3	4.0	38.5	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.6	10.8	18.3	4.0	38.5	6.0
LOS	A	B	B	A	D	A
Approach Delay		10.3	13.6		29.7	
Approach LOS		B	B		C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 31.5 (35%), Referenced to phase 4:EBTL and 8:WBT, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 18.8		Intersection LOS: B	
Intersection Capacity Utilization 75.0%		ICU Level of Service D	
Analysis Period (min) 15			

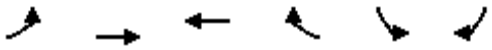
Splits and Phases: 1: New Dundee Road & Robert Ferrie Drive





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	62	367	215	104	357	131
v/c Ratio	0.09	0.33	0.28	0.15	0.71	0.24
Control Delay	7.6	10.8	18.3	4.0	38.5	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.6	10.8	18.3	4.0	38.5	6.0
Queue Length 50th (m)	4.0	30.3	23.7	0.0	55.5	0.0
Queue Length 95th (m)	8.7	46.4	39.4	8.7	85.8	12.4
Internal Link Dist (m)		136.0	334.0		132.1	
Turn Bay Length (m)	36.0			25.0	38.0	
Base Capacity (vph)	710	1098	765	710	501	543
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.33	0.28	0.15	0.71	0.24

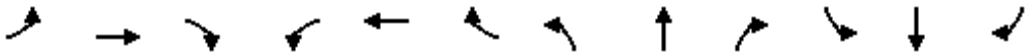
Intersection Summary



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	58	345	202	98	336	123
Future Volume (vph)	58	345	202	98	336	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.5	6.5	6.5	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1789	1883	1812	1541	1807	1617
Flt Permitted	0.55	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1035	1883	1812	1541	1807	1617
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	62	367	215	104	357	131
RTOR Reduction (vph)	0	0	0	60	0	95
Lane Group Flow (vph)	62	367	215	44	357	36
Heavy Vehicles (%)	2%	2%	6%	6%	1%	1%
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	52.5	52.5	38.0	38.0	25.0	25.0
Effective Green, g (s)	52.5	52.5	38.0	38.0	25.0	25.0
Actuated g/C Ratio	0.58	0.58	0.42	0.42	0.28	0.28
Clearance Time (s)	4.5	6.5	6.5	6.5	6.0	6.0
Lane Grp Cap (vph)	687	1098	765	650	501	449
v/s Ratio Prot	0.01	c0.19	0.12		c0.20	
v/s Ratio Perm	0.04			0.03		0.02
v/c Ratio	0.09	0.33	0.28	0.07	0.71	0.08
Uniform Delay, d1	8.2	9.7	17.0	15.5	29.3	24.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.8	0.9	0.2	8.4	0.4
Delay (s)	8.5	10.5	18.0	15.7	37.6	24.4
Level of Service	A	B	B	B	D	C
Approach Delay (s)		10.2	17.2		34.1	
Approach LOS		B	B		C	

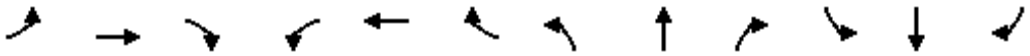
Intersection Summary			
HCM 2000 Control Delay	21.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	5	129	18	4	5	42	112	6	2	309	4
Future Volume (vph)	8	5	129	18	4	5	42	112	6	2	309	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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		0.878			0.973			0.995			0.998	
Flt Protected		0.997			0.968			0.987				
Satd. Flow (prot)	0	1649	0	0	1774	0	0	1800	0	0	1877	0
Flt Permitted		0.997			0.968			0.987				
Satd. Flow (perm)	0	1649	0	0	1774	0	0	1800	0	0	1877	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			164.7			156.1			103.3	
Travel Time (s)		14.3			11.9			11.2			7.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	6%	3%	33%	2%	0%
Adj. Flow (vph)	9	6	143	20	4	6	47	124	7	2	343	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	158	0	0	30	0	0	178	0	0	349	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			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			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	5	129	18	4	5	42	112	6	2	309	4
Future Volume (Veh/h)	8	5	129	18	4	5	42	112	6	2	309	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	9	6	143	20	4	6	47	124	7	2	343	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								156				
pX, platoon unblocked												
vC, conflicting volume	578	574	345	716	572	128	347			131		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	578	574	345	716	572	128	347			131		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.4		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.5		
p0 queue free %	98	99	80	92	99	99	96			100		
cM capacity (veh/h)	408	412	698	263	413	923	1212			1284		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	158	30	178	349
Volume Left	9	20	47	2
Volume Right	143	6	7	4
cSH	654	325	1212	1284
Volume to Capacity	0.24	0.09	0.04	0.00
Queue Length 95th (m)	7.2	2.3	0.9	0.0
Control Delay (s)	12.2	17.2	2.4	0.1
Lane LOS	B	C	A	A
Approach Delay (s)	12.2	17.2	2.4	0.1
Approach LOS	B	C		

Intersection Summary				
Average Delay	4.1			
Intersection Capacity Utilization	43.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	316	7	123	222	4	71
Future Volume (vph)	316	7	123	222	4	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	47.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			7.6		7.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.997				0.872	
Flt Protected			0.950		0.997	
Satd. Flow (prot)	1879	0	1772	1847	1599	0
Flt Permitted			0.950		0.997	
Satd. Flow (perm)	1879	0	1772	1847	1599	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	31.4			160.0	199.2	
Travel Time (s)	2.3			11.5	14.3	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	2%	0%	3%	4%	50%	2%
Adj. Flow (vph)	329	7	128	231	4	74
Shared Lane Traffic (%)						
Lane Group Flow (vph)	336	0	128	231	78	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	38.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	316	7	123	222	4	71
Future Volume (Veh/h)	316	7	123	222	4	71
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	329	7	128	231	4	74
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				160		
pX, platoon unblocked						
vC, conflicting volume			336		820	332
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			336		820	332
tC, single (s)			4.1		6.9	6.2
tC, 2 stage (s)						
tF (s)			2.2		4.0	3.3
p0 queue free %			89		98	90
cM capacity (veh/h)			1218		257	709

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	336	128	231	78
Volume Left	0	128	0	4
Volume Right	7	0	0	74
cSH	1700	1218	1700	651
Volume to Capacity	0.20	0.11	0.14	0.12
Queue Length 95th (m)	0.0	2.7	0.0	3.1
Control Delay (s)	0.0	8.3	0.0	11.3
Lane LOS		A		B
Approach Delay (s)	0.0	3.0		11.3
Approach LOS				B

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	38.5%	ICU Level of Service	A
Analysis Period (min)	15		

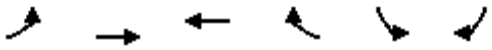
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	133	0	3	48	0	10
Future Volume (vph)	133	0	3	48	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.997		
Satd. Flow (prot)	1883	0	0	1878	1662	0
Flt Permitted				0.997		
Satd. Flow (perm)	1883	0	0	1878	1662	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	74.2			198.6	32.6	
Travel Time (s)	5.3			14.3	2.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	0%	0%
Adj. Flow (vph)	145	0	3	52	0	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	145	0	0	55	11	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 17.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	133	0	3	48	0	10
Future Volume (Veh/h)	133	0	3	48	0	10
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)	145	0	3	52	0	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			145		203	145
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			145		203	145
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1437		788	908

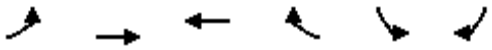
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	145	55	11
Volume Left	0	3	0
Volume Right	0	0	11
cSH	1700	1437	908
Volume to Capacity	0.09	0.00	0.01
Queue Length 95th (m)	0.0	0.0	0.3
Control Delay (s)	0.0	0.4	9.0
Lane LOS		A	A
Approach Delay (s)	0.0	0.4	9.0
Approach LOS			A

Intersection Summary			
Average Delay		0.6	
Intersection Capacity Utilization		17.0%	ICU Level of Service A
Analysis Period (min)		15	



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	8	283	217	9	40	16
Future Volume (vph)	8	283	217	9	40	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.995		0.962	
Flt Protected		0.999			0.965	
Satd. Flow (prot)	0	1882	1874	0	1748	0
Flt Permitted		0.999			0.965	
Satd. Flow (perm)	0	1882	1874	0	1748	0
Link Speed (k/h)		48	48		48	
Link Distance (m)		243.9	31.4		35.4	
Travel Time (s)		18.3	2.4		2.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	308	236	10	43	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	317	246	0	60	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	97			97	97	97
Sign Control		Free	Free		Stop	

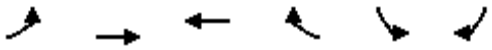
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.3%		ICU Level of Service A	
Analysis Period (min) 15			



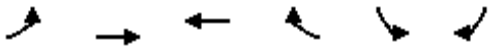
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	283	217	9	40	16
Future Volume (Veh/h)	8	283	217	9	40	16
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	308	236	10	43	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			191			
pX, platoon unblocked						
vC, conflicting volume	246				567	241
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	246				567	241
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				91	98
cM capacity (veh/h)	1320				482	798

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	317	246	60
Volume Left	9	0	43
Volume Right	0	10	17
cSH	1320	1700	543
Volume to Capacity	0.01	0.14	0.11
Queue Length 95th (m)	0.2	0.0	2.8
Control Delay (s)	0.3	0.0	12.5
Lane LOS	A		B
Approach Delay (s)	0.3	0.0	12.5
Approach LOS			B

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	31.3%	ICU Level of Service	A
Analysis Period (min)	15		



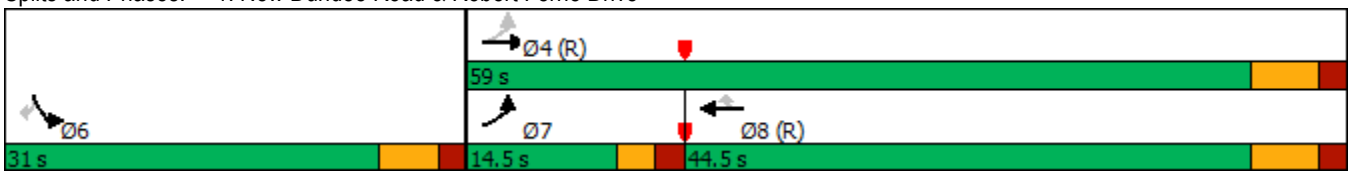
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	155	296	498	311	188	102
Future Volume (vph)	155	296	498	311	188	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	36.0			25.0	38.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	7.6				7.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1807	1883	1902	1617	1807	1617
Flt Permitted	0.246				0.950	
Satd. Flow (perm)	468	1883	1902	1617	1807	1617
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				185		110
Link Speed (k/h)		50	50		50	
Link Distance (m)		160.0	358.0		156.1	
Travel Time (s)		11.5	25.8		11.2	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	2%	1%	1%	1%	1%
Adj. Flow (vph)	167	318	535	334	202	110
Shared Lane Traffic (%)						
Lane Group Flow (vph)	167	318	535	334	202	110
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.9	4.9		4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases	4			8		6
Minimum Split (s)	14.5	59.0	44.5	44.5	31.0	31.0
Total Split (s)	14.5	59.0	44.5	44.5	31.0	31.0
Total Split (%)	16.1%	65.6%	49.4%	49.4%	34.4%	34.4%
Maximum Green (s)	10.0	52.5	38.0	38.0	25.0	25.0
Yellow Time (s)	2.5	4.5	4.5	4.5	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	6.5	6.5	6.5	6.0	6.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Walk Time (s)		5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	54.5	52.5	38.0	38.0	25.0	25.0
Actuated g/C Ratio	0.61	0.58	0.42	0.42	0.28	0.28

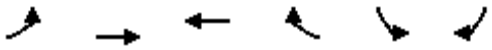


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
v/c Ratio	0.39	0.29	0.67	0.42	0.40	0.21
Control Delay	10.5	10.3	25.9	9.6	29.4	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.5	10.3	25.9	9.6	29.4	6.3
LOS	B	B	C	A	C	A
Approach Delay		10.3	19.6		21.2	
Approach LOS		B	B		C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 31.5 (35%), Referenced to phase 4:EBTL and 8:WBT, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 17.2		Intersection LOS: B	
Intersection Capacity Utilization 75.3%		ICU Level of Service D	
Analysis Period (min) 15			

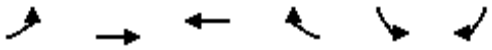
Splits and Phases: 1: New Dundee Road & Robert Ferrie Drive





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	167	318	535	334	202	110
v/c Ratio	0.39	0.29	0.67	0.42	0.40	0.21
Control Delay	10.5	10.3	25.9	9.6	29.4	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.5	10.3	25.9	9.6	29.4	6.3
Queue Length 50th (m)	11.5	25.5	72.3	15.9	28.3	0.0
Queue Length 95th (m)	19.9	39.8	107.2	36.1	47.6	11.5
Internal Link Dist (m)		136.0	334.0		132.1	
Turn Bay Length (m)	36.0			25.0	38.0	
Base Capacity (vph)	432	1098	803	789	501	528
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.29	0.67	0.42	0.40	0.21

Intersection Summary



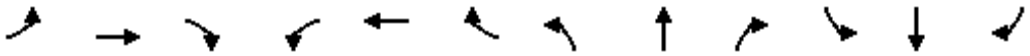
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	155	296	498	311	188	102
Future Volume (vph)	155	296	498	311	188	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.5	6.5	6.5	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1807	1883	1902	1617	1807	1617
Flt Permitted	0.25	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	468	1883	1902	1617	1807	1617
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	167	318	535	334	202	110
RTOR Reduction (vph)	0	0	0	107	0	79
Lane Group Flow (vph)	167	318	535	227	202	31
Heavy Vehicles (%)	1%	2%	1%	1%	1%	1%
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	52.5	52.5	38.0	38.0	25.0	25.0
Effective Green, g (s)	52.5	52.5	38.0	38.0	25.0	25.0
Actuated g/C Ratio	0.58	0.58	0.42	0.42	0.28	0.28
Clearance Time (s)	4.5	6.5	6.5	6.5	6.0	6.0
Lane Grp Cap (vph)	421	1098	803	682	501	449
v/s Ratio Prot	c0.04	0.17	c0.28		c0.11	
v/s Ratio Perm	0.19			0.14		0.02
v/c Ratio	0.40	0.29	0.67	0.33	0.40	0.07
Uniform Delay, d1	11.3	9.4	20.9	17.5	26.4	23.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.8	0.7	4.3	1.3	2.4	0.3
Delay (s)	14.1	10.1	25.3	18.8	28.8	24.2
Level of Service	B	B	C	B	C	C
Approach Delay (s)		11.5	22.8		27.2	
Approach LOS		B	C		C	

Intersection Summary			
HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	75.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	3	79	12	2	7	127	322	26	8	197	7
Future Volume (vph)	7	3	79	12	2	7	127	322	26	8	197	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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		0.880			0.953			0.993			0.995	
Flt Protected		0.996			0.973			0.987			0.998	
Satd. Flow (prot)	0	1651	0	0	1746	0	0	1834	0	0	1870	0
Flt Permitted		0.996			0.973			0.987			0.998	
Satd. Flow (perm)	0	1651	0	0	1746	0	0	1834	0	0	1870	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			164.7			156.1			103.3	
Travel Time (s)		14.3			11.9			11.2			7.4	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%
Adj. Flow (vph)	8	3	87	13	2	8	140	354	29	9	216	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	98	0	0	23	0	0	523	0	0	233	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 52.2%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	3	79	12	2	7	127	322	26	8	197	7
Future Volume (Veh/h)	7	3	79	12	2	7	127	322	26	8	197	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	8	3	87	13	2	8	140	354	29	9	216	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								156				
pX, platoon unblocked												
vC, conflicting volume	896	901	220	975	890	368	224			383		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	896	901	220	975	890	368	224			383		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	99	89	93	99	99	90			99		
cM capacity (veh/h)	235	247	820	187	251	677	1345			1175		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	98	23	523	233
Volume Left	8	13	140	9
Volume Right	87	8	29	8
cSH	643	258	1345	1175
Volume to Capacity	0.15	0.09	0.10	0.01
Queue Length 95th (m)	4.1	2.2	2.6	0.2
Control Delay (s)	11.6	20.3	2.9	0.4
Lane LOS	B	C	A	A
Approach Delay (s)	11.6	20.3	2.9	0.4
Approach LOS	B	C		

Intersection Summary				
Average Delay	3.7			
Intersection Capacity Utilization	52.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	341	8	113	485	12	111
Future Volume (vph)	341	8	113	485	12	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	47.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			7.6		7.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.997				0.878	
Flt Protected			0.950		0.995	
Satd. Flow (prot)	1879	0	1825	1902	1648	0
Flt Permitted			0.950		0.995	
Satd. Flow (perm)	1879	0	1825	1902	1648	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	31.4			160.0	199.2	
Travel Time (s)	2.3			11.5	14.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	0%	0%	1%	0%	2%
Adj. Flow (vph)	379	9	126	539	13	123
Shared Lane Traffic (%)						
Lane Group Flow (vph)	388	0	126	539	136	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	341	8	113	485	12	111
Future Volume (Veh/h)	341	8	113	485	12	111
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	379	9	126	539	13	123
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				160		
pX, platoon unblocked					0.79	
vC, conflicting volume			388		1174	384
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			388		1088	384
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			89		92	81
cM capacity (veh/h)			1182		170	664

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	388	126	539	136
Volume Left	0	126	0	13
Volume Right	9	0	0	123
cSH	1700	1182	1700	520
Volume to Capacity	0.23	0.11	0.32	0.26
Queue Length 95th (m)	0.0	2.7	0.0	7.9
Control Delay (s)	0.0	8.4	0.0	14.4
Lane LOS		A		B
Approach Delay (s)	0.0	1.6		14.4
Approach LOS				B

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		

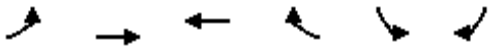
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	83	0	10	130	0	6
Future Volume (vph)	83	0	10	130	0	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.996		
Satd. Flow (prot)	1883	0	0	1876	1629	0
Flt Permitted				0.996		
Satd. Flow (perm)	1883	0	0	1876	1629	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	74.2			198.6	32.6	
Travel Time (s)	5.3			14.3	2.3	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Adj. Flow (vph)	109	0	13	171	0	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	109	0	0	184	8	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 24.1%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	83	0	10	130	0	6
Future Volume (Veh/h)	83	0	10	130	0	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	109	0	13	171	0	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			109		306	109
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			109		306	109
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	99
cM capacity (veh/h)			1481		680	945

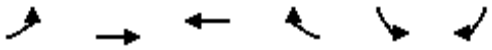
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	109	184	8
Volume Left	0	13	0
Volume Right	0	0	8
cSH	1700	1481	945
Volume to Capacity	0.06	0.01	0.01
Queue Length 95th (m)	0.0	0.2	0.2
Control Delay (s)	0.0	0.6	8.8
Lane LOS		A	A
Approach Delay (s)	0.0	0.6	8.8
Approach LOS			A

Intersection Summary			
Average Delay		0.6	
Intersection Capacity Utilization		24.1%	ICU Level of Service
Analysis Period (min)		15	



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	17	332	455	42	17	17
Future Volume (vph)	17	332	455	42	17	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.989		0.932	
Flt Protected		0.998			0.976	
Satd. Flow (prot)	0	1880	1863	0	1713	0
Flt Permitted		0.998			0.976	
Satd. Flow (perm)	0	1880	1863	0	1713	0
Link Speed (k/h)		50	48		48	
Link Distance (m)		243.9	31.4		35.4	
Travel Time (s)		17.6	2.4		2.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	18	361	495	46	18	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	379	541	0	36	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 41.3%		ICU Level of Service A	
Analysis Period (min) 15			



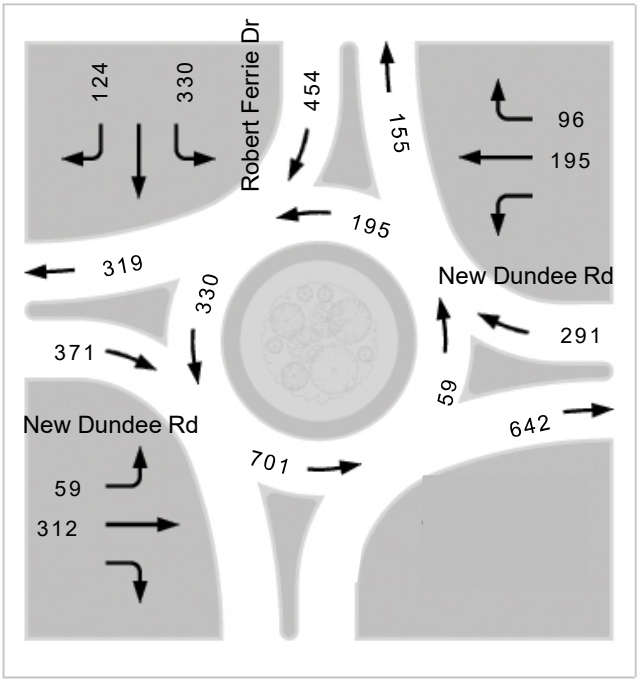
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	17	332	455	42	17	17
Future Volume (Veh/h)	17	332	455	42	17	17
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	361	495	46	18	18
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			191			
pX, platoon unblocked	0.80				0.80	0.80
vC, conflicting volume	541				915	518
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	296				766	268
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				94	97
cM capacity (veh/h)	1008				290	614

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	379	541	36
Volume Left	18	0	18
Volume Right	0	46	18
cSH	1008	1700	394
Volume to Capacity	0.02	0.32	0.09
Queue Length 95th (m)	0.4	0.0	2.3
Control Delay (s)	0.6	0.0	15.0
Lane LOS	A		C
Approach Delay (s)	0.6	0.0	15.0
Approach LOS			C

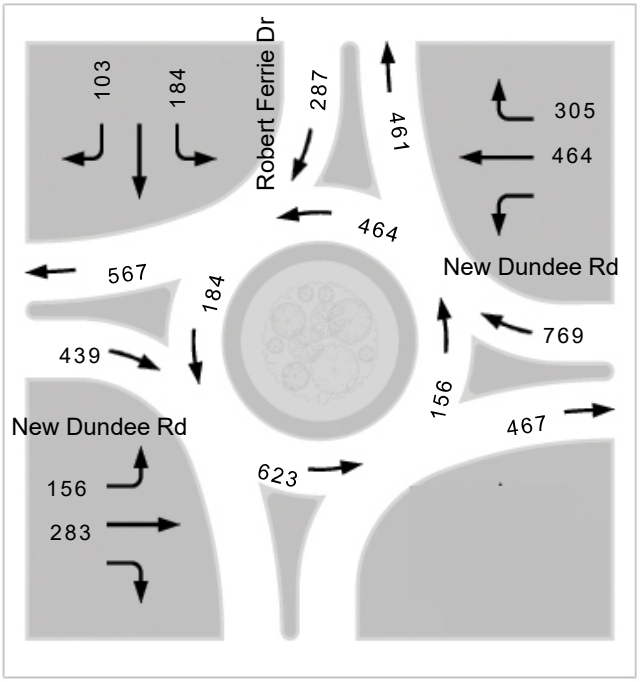
Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

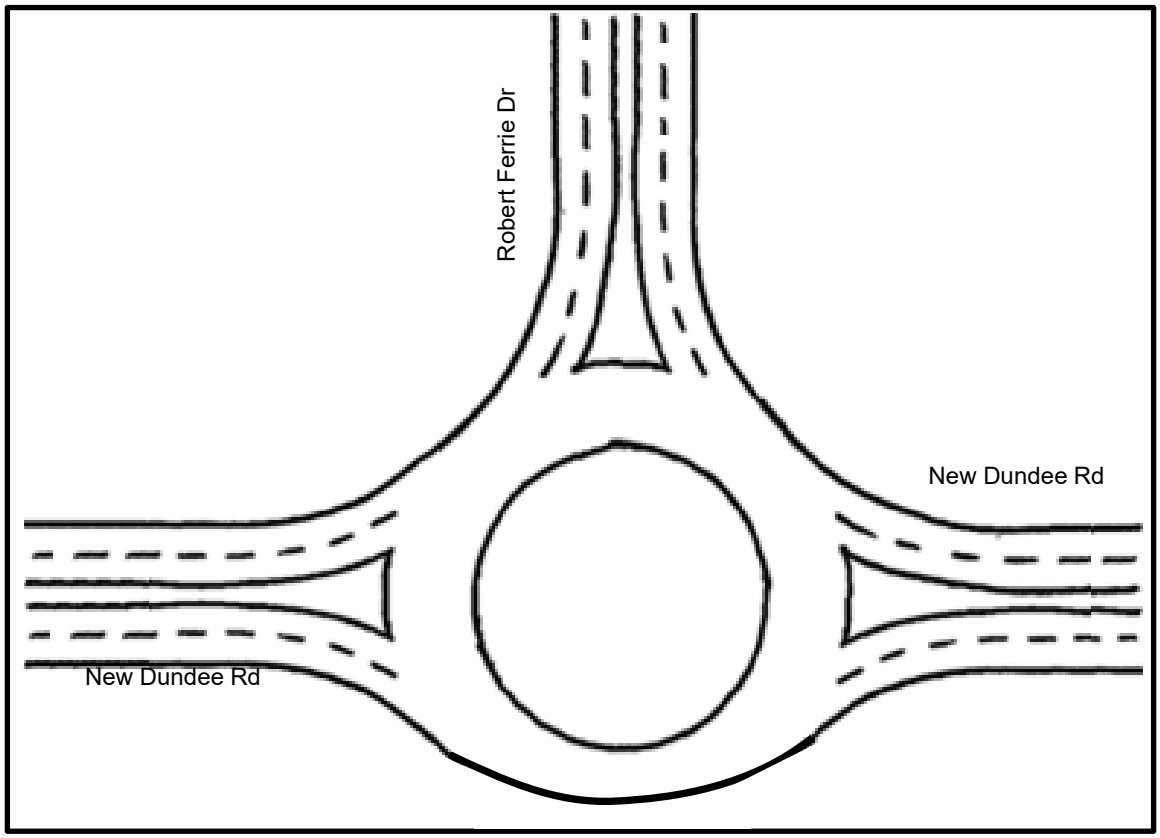
Turning Movement Forecasts

2028FB AM Peak Hour



2028FB PM Peak Hour





ARCADY Roundabout Capacity Analysis
New Dundee Road at Robert Ferrie Drive

Geometric Design Parameters

Conceptual Design Geometry

	Road Half Width, V (m)	Entry Width, E (m)	Eff. Flare Length, l' (m)	Entry Radius, R (m)	Inscribed Circle Dia, D (m)	Entry Angle, Ø (deg.)	Exit Only (T/F)	Right-Turn Bypass (T/F)
SB Robert Ferrie Dr	7.00	8.00	30	20	55	25	FALSE	FALSE
EB New Dundee Rd	7.00	8.00	30	20	55	25	FALSE	FALSE
NB	7.00	8.00	30	20	55	25	FALSE	FALSE
WB New Dundee Rd	7.00	8.00	30	20	55	25	FALSE	FALSE

Other Inputs

	Flare Storage (m)	Pedestrian Crossings	% Trucks	Flow Profile	Scaling Factor
SB Robert Ferrie Dr	30	0	2.0	ONE HOUR	0.89
EB New Dundee Rd	30	0	2.0	ONE HOUR	0.89
NB	30	0	2.0	ONE HOUR	0.89
WB New Dundee Rd	30	0	2.0	ONE HOUR	0.89

Capacity Analysis Results

2028FB AM Peak Hour

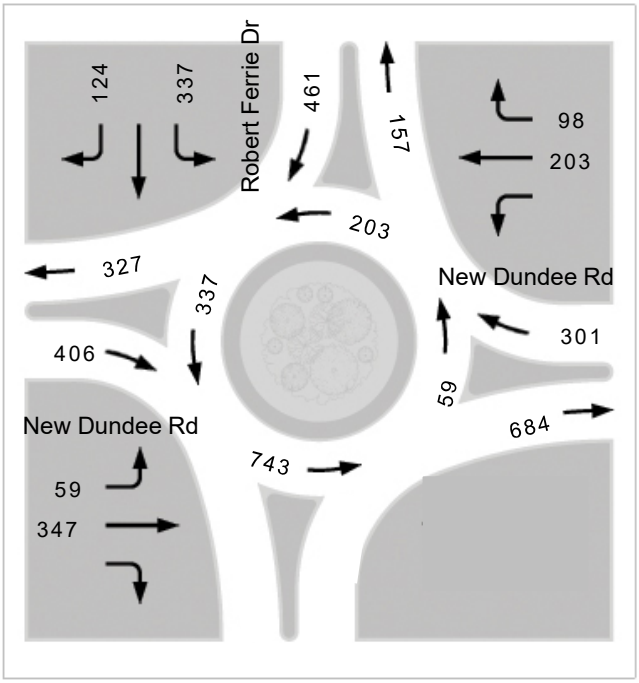
	95% Queue (m)	Delay (s/vehicle)	V/C Ratio	LOS	Int. Delay (s/vehicle)	Int. LOS	Intersection Residual Capacity
85% y-int. Adjustment							
SB Robert Ferrie Dr	<25	2.49	0.24	A	<5	A	226% [EB New Dundee Road]
EB New Dundee Rd	<25	2.51	0.20	A			
WB New Dundee Rd	<25	2.11	0.14	A			
NB	-	-	-	-			
100% y-int. Adjustment							
SB Robert Ferrie Dr	<25	1.99	0.20	A	<5	A	287% [EB New Dundee Road]
EB New Dundee Rd	<25	2.01	0.17	A			
WB New Dundee Rd	<25	1.74	0.12	A			
NB	-	-	-	-			

2028FB PM Peak Hour

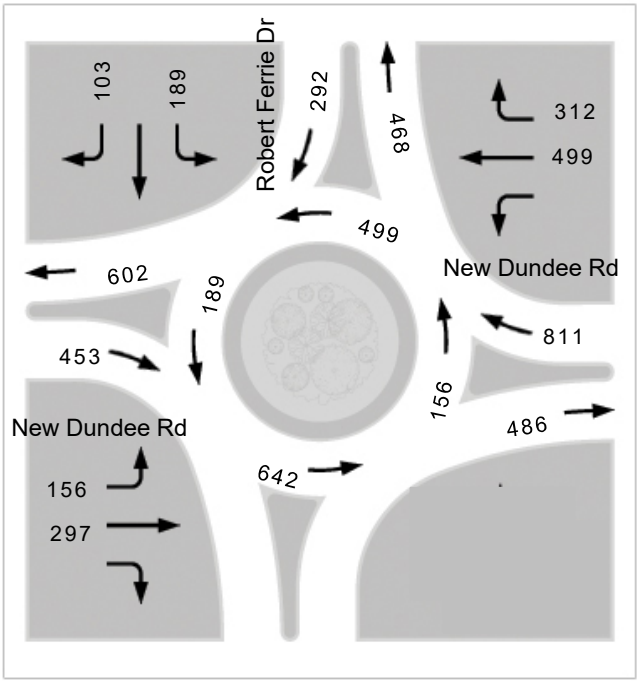
	95% Queue (m)	Delay (s/vehicle)	V/C Ratio	LOS	Int. Delay (s/vehicle)	Int. LOS	Intersection Residual Capacity
85% y-int. Adjustment							
SB Robert Ferrie Dr	<25	2.53	0.17	A	<5	A	126% [WB New Dundee Road]
EB New Dundee Rd	<25	2.45	0.23	A			
WB New Dundee Rd	<25	3.09	0.39	A			
NB	-	-	-	-			
100% y-int. Adjustment							
SB Robert Ferrie Dr	<25	2.02	0.14	A	<5	A	168% [WB New Dundee Road]
EB New Dundee Rd	<25	1.97	0.19	A			
WB New Dundee Rd	<25	2.36	0.33	A			
NB	-	-	-	-			

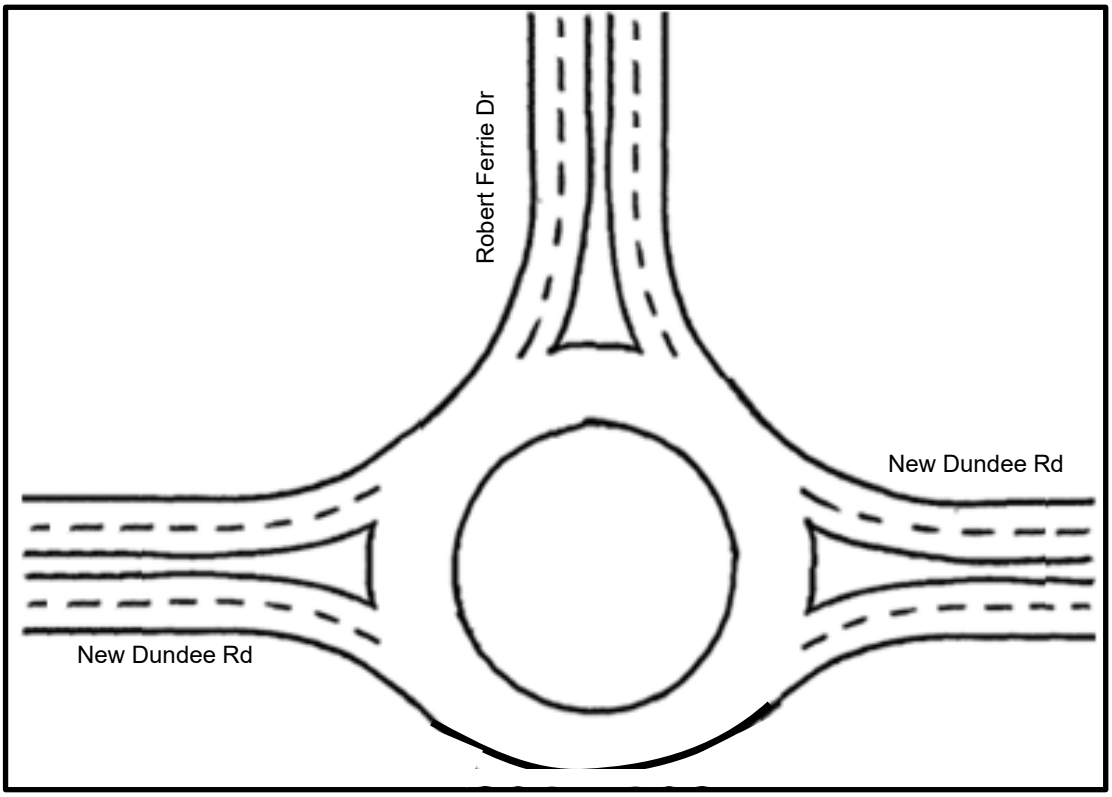
Turning Movement Forecasts

2028FT AM Peak Hour



2028FT PM Peak Hour





ARCADY Roundabout Capacity Analysis
New Dundee Road at Robert Ferrie Drive

Geometric Design Parameters

Conceptual Design Geometry

	Road Half Width, V (m)	Entry Width, E (m)	Eff. Flare Length, l' (m)	Entry Radius, R (m)	Inscribed Circle Dia, D (m)	Entry Angle, Ø (deg.)	Exit Only (T/F)	Right-Turn Bypass (T/F)
SB Robert Ferrie Dr	7.00	8.00	30	20	55	25	FALSE	FALSE
EB New Dundee Rd	7.00	8.00	30	20	55	25	FALSE	FALSE
NB	7.00	8.00	30	20	55	25	FALSE	FALSE
WB New Dundee Rd	7.00	8.00	30	20	55	25	FALSE	FALSE

Other Inputs

	Flare Storage (m)	Pedestrian Crossings	% Trucks	Flow Profile	Scaling Factor
SB Robert Ferrie Dr	30	0	2.0	ONE HOUR	0.89
EB New Dundee Rd	30	0	2.0	ONE HOUR	0.89
NB	30	0	2.0	ONE HOUR	0.89
WB New Dundee Rd	30	0	2.0	ONE HOUR	0.89

Capacity Analysis Results

2028FT AM Peak Hour

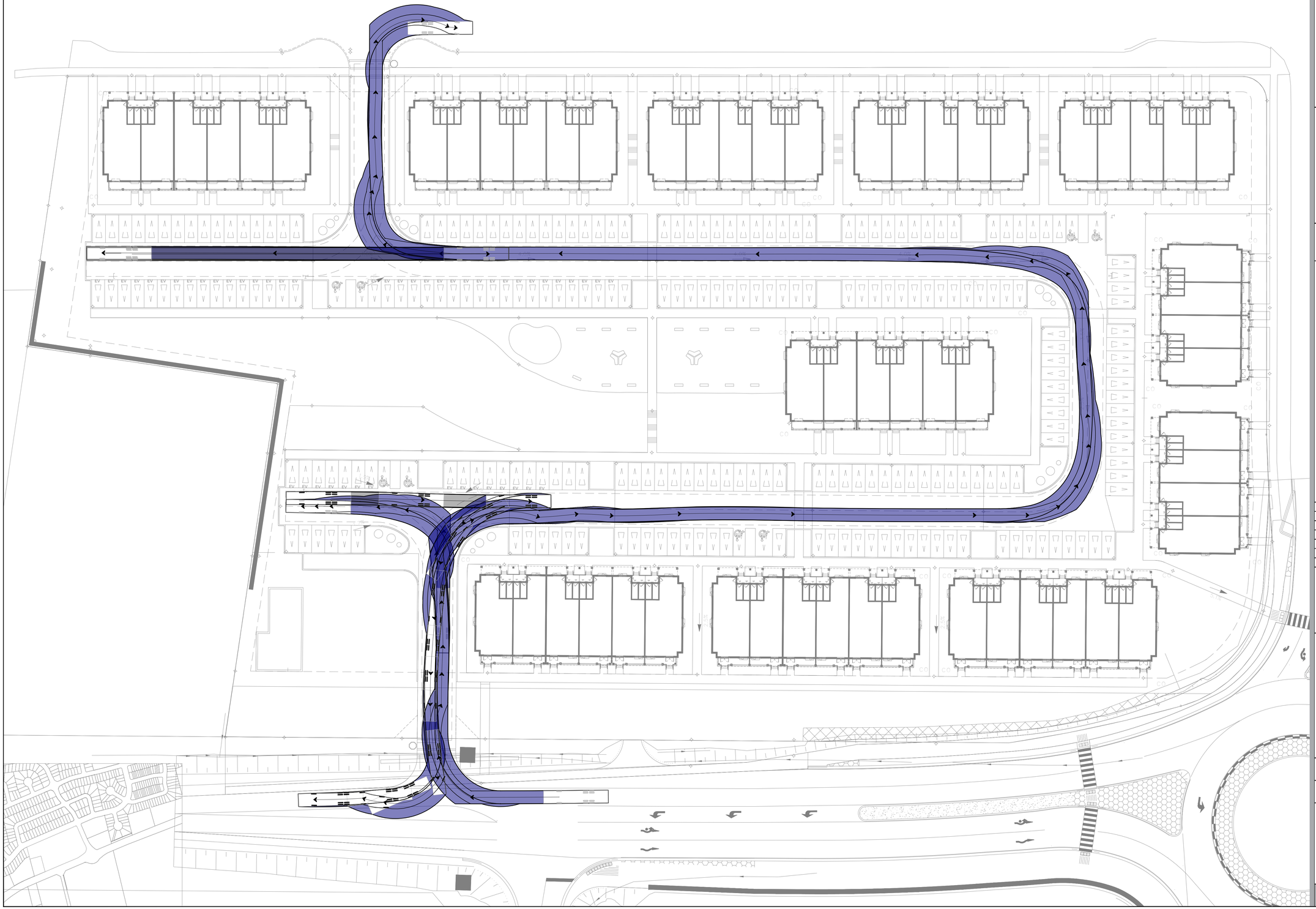
	95% Queue (m)	Delay (s/vehicle)	V/C Ratio	LOS	Int. Delay (s/vehicle)	Int. LOS	Intersection Residual Capacity
85% y-int. Adjustment							
SB Robert Ferrie Dr	<25	2.51	0.24	A	<5	A	206% [EB New Dundee Road]
EB New Dundee Rd	<25	2.58	0.22	A			
WB New Dundee Rd	<25	2.12	0.15	A			
NB	-	-	-	-			
100% y-int. Adjustment							
SB Robert Ferrie Dr	<25	2.01	0.20	A	<5	A	263% [EB New Dundee Road]
EB New Dundee Rd	<25	2.05	0.19	A			
WB New Dundee Rd	<25	1.75	0.13	A			
NB	-	-	-	-			

2028FT PM Peak Hour

	95% Queue (m)	Delay (s/vehicle)	V/C Ratio	LOS	Int. Delay (s/vehicle)	Int. LOS	Intersection Residual Capacity
85% y-int. Adjustment							
SB Robert Ferrie Dr	<25	2.59	0.17	A	<5	A	116% [WB New Dundee Road]
EB New Dundee Rd	<25	2.48	0.23	A			
WB New Dundee Rd	<25	3.20	0.41	A			
NB	-	-	-	-			
100% y-int. Adjustment							
SB Robert Ferrie Dr	<25	2.06	0.14	A	<5	A	156% [WB New Dundee Road]
EB New Dundee Rd	<25	1.99	0.20	A			
WB New Dundee Rd	<25	2.43	0.35	A			
NB	-	-	-	-			

Appendix E

AutoTURN Circulation Review



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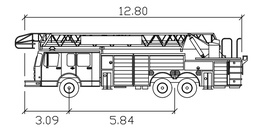
Jul. 13, 2023
W.C. MARIA
PROVINCE OF ONTARIO

Bar is 25mm on original size sheet
0 25mm



Aerial Fire

	meters
Width	: 2.54
Track	: 2.54
Lock to Lock Time	: 6.0
Steering Angle	: 37.0

No.	Issue	Author	Checked	Approved	Date
1	First Submission	R.A	W.M	W.M	7/13/23

Designer R.A
Drafting Check W.M
Design Check W.M
Project Manager W.M
Project Director W.M

Client
1000215769 ONTARIO INC.

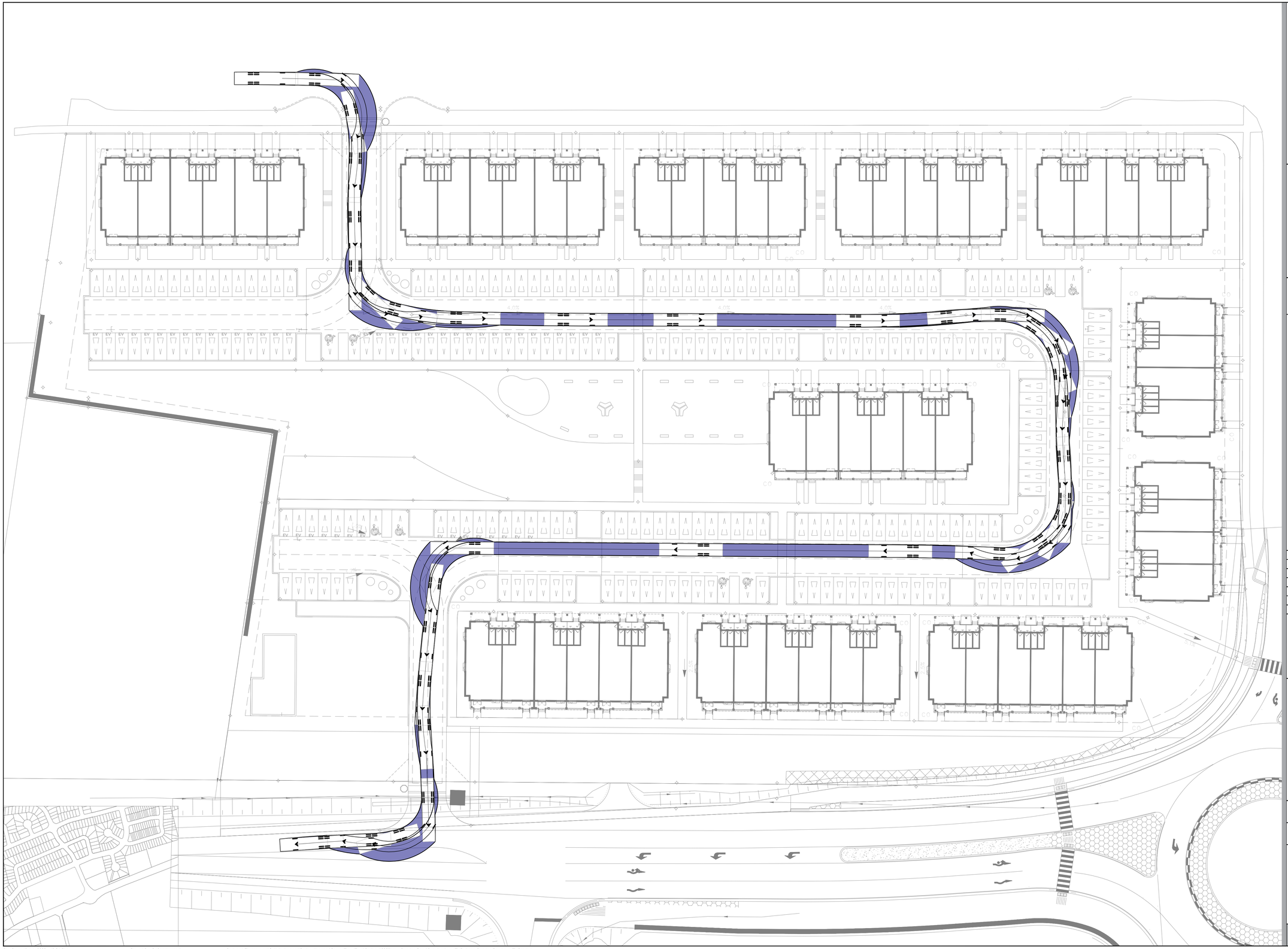
Project
NEW DUNDEE ROAD

Date July 13, 2023
Scale NTS
Project No. 12610417

Title
VEHICLE MANEUVERING DIAGRAM - FIRE TRUCK (INBOUND - SOUTH)

Size ANSI D

Sheet No. AT-101



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Jul. 13, 2023
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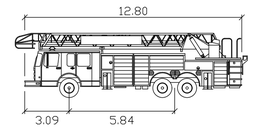
PROVINCE OF ONTARIO

Bar is 25mm on original size sheet
0 25mm



Aerial Fire

	meters
Width	: 2.54
Track	: 2.54
Lock to Lock Time	: 6.0
Steering Angle	: 37.0

No.	Issue	Checked	Approved	Date
1	First Submission	W.M	W.M	7/13/23

Author	R.A	Designer	R.A
Drafting Check	W.M	Design Check	W.M
Project Manager	W.M	Project Director	W.M

Client
1000215769 ONTARIO INC.

Project
NEW DUNDEE ROAD

Date July 13, 2023
Scale NTS

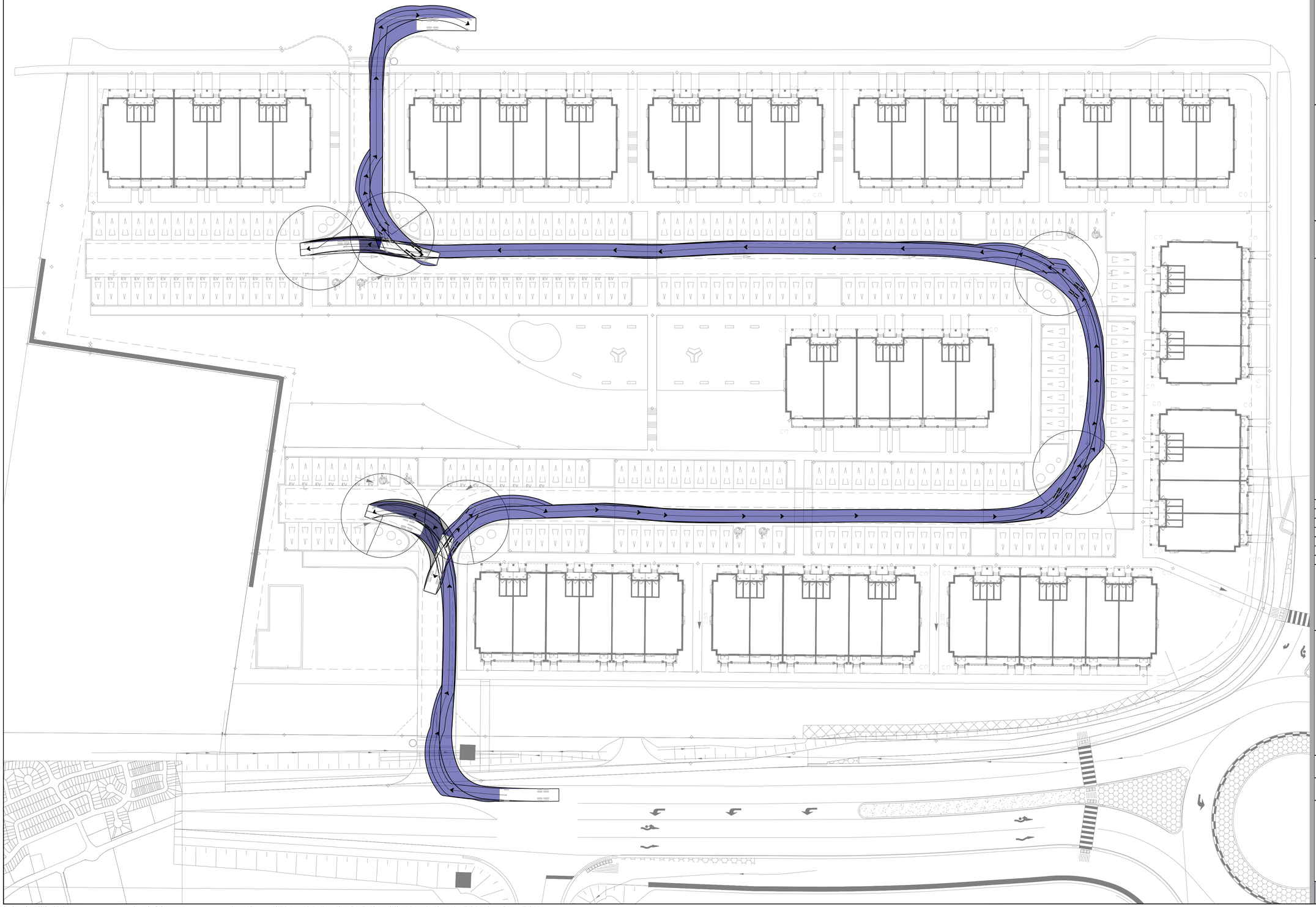
Project No. 12610417

Title
VEHICLE MANEUVERING DIAGRAM - FIRE TRUCK (INBOUND - NORTH)

Size ANSI D

Sheet No. AT-102

Plot Date: 13 July 2023 - 10:24 PM Plotted By: Raf Andrenacci Path and Filename: N:\CA\Mississauga\Projects\Legacy\SernasTransTech\Projects\2023\New Dundee Road\Drawings\AutoTURN\New Dundee Road AutoTURN.dwg



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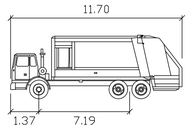
Jul. 13, 2023
W.C. MARIA
PROVINCE OF ONTARIO

Bar is 25mm on original size sheet
0 25mm



Molok

meters

Width : 2.47
Track : 2.47
Lock to Lock Time 6.0
Steering Angle : 53.0

No.	Issue	Checked	Approved	Date
1	First Submission	W.M	W.M	7/13/23

Author	R.A	Designer	R.A
Drafting Check	W.M	Design Check	W.M
Project Manager	W.M	Project Director	W.M

Client

1000215769 ONTARIO INC.

Project

NEW DUNDEE ROAD

Date July 13, 2023

Scale NTS

Project No. 12610417

Title

VEHICLE MANEUVERING DIAGRAM - MOLOK WASTE COLLECTION

Size ANSI D

Sheet No. AT-103

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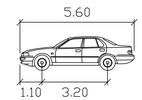
0 25mm



P

	meters
Width	: 2.00
Track	: 2.00
Lock to Lock Time	6.0
Steering Angle	: 35.9

No.	Issue	Checked	Approved	Date
1	First Submission	W.M	W.M	7/13/23

Author	R.A	Designer	R.A
Drafting Check	W.M	Design Check	W.M
Project Manager	W.M	Project Director	W.M

Client
1000215769 ONTARIO INC.

Project
NEW DUNDEE ROAD

Date July 13, 2023
Scale NTS

Project No. 12610417

Title
VEHICLE MANEUVERING DIAGRAM - PASSENGER VEHICLE

Size ANSI D

Sheet No. AT-104

Plot Date: 13 July 2023 - 10:24 PM
Plotted By: Raf Andrenacci
Path and Filename: N:\CA\Mississauga\Projects\Legacy\SernasTransTech\Projects\2023\New Dundee Road\Drawings\AutoTURN\New Dundee Road AutoTURN.dwg

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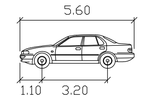
PROVINCE OF ONTARIO

Bar is 25mm on original size sheet
0 25mm



P

	meters
Width	: 2.00
Track	: 2.00
Lock to Lock Time	6.0
Steering Angle	: 35.9

No.	Issue	Author	Checked	Approved	Date
1	First Submission	R.A	W.M	W.M	7/13/23

Author	R.A	Designer	R.A
Drafting Check	W.M	Design Check	W.M
Project Manager	W.M	Project Director	W.M

Client
1000215769 ONTARIO INC.

Project
NEW DUNDEE ROAD

Date: July 13, 2023
Scale: NTS

Project No.: 12610417

Title
VEHICLE MANEUVERING DIAGRAM - PASSENGER VEHICLE (PARKING INBOUND)

Size: ANSI D

Sheet No.: AT-105

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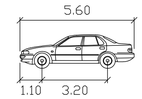
PROVINCE OF ONTARIO

Bar is 25mm on original size sheet
0 25mm



P

	meters
Width	: 2.00
Track	: 2.00
Lock to Lock Time	6.0
Steering Angle	: 35.9

No.	Issue	Author	Checked	Approved	Date
1	First Submission	R.A	W.M	W.M	7/13/23

Author	R.A	Designer	R.A
Drafting Check	W.M	Design Check	W.M
Project Manager	W.M	Project Director	W.M

Client
1000215769 ONTARIO INC.

Project
NEW DUNDEE ROAD

Date: July 13, 2023
Scale: NTS

Project No.: 12610417

Title
VEHICLE MANEUVERING DIAGRAM - PASSENGER VEHICLE (PARKING OUTBOUND)

Size: ANSI D

Sheet No.: AT-106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