

ARCHERHILL COURT RESIDENTIAL DEVELOPMENT

TRANSPORTATION IMPACT STUDY

VERSION 1 JULY 2021

REPORT PREPARED FOR



TREASURE HILL

1-1681 LANGSTAFF ROAD
VAUGHAN, ONTARIO
L4K 5T3

REPORT PREPARED BY



THE MUNICIPAL INFRASTRUCTURE GROUP LTD., A T.Y. LIN INTERNATIONAL COMPANY

8800 DUFFERIN STREET, SUITE
200, VAUGHAN, ON L4K 0C5
(905) 738-5700

TMIG PROJECT NUMBER 10187

**TOWN OF AURORA
PLANNING AND DEVELOPMENT SERVICES
Development Planning Division**

DATE: Aug. 12, 2021

RECEIVED

SUBMISSION No. 1

EXECUTIVE SUMMARY

The Municipal Infrastructure Group, a T.Y. Lin International Company (TMIG) was retained by Treasure Hill to complete a Transportation Impact Study, in support of the proposed Archerhill Court residential redevelopment to be located on the north/west corner of Vandorf Sideroad and Bayview Avenue (Regional Road 34) intersection in the Town of Aurora, York Region.

The proposed residential redevelopment will consist of 146 single-detached homes.

This report determines the site related traffic and the subsequent traffic-related impacts on the adjacent road network during the weekday AM and PM peak hours from the proposed development. These impacts are based on traffic volumes and road network conditions derived for 2021 baseline conditions and the 2030 (five-year post build-out) planning horizon, as agreed with the reviewing agencies.

Future background traffic volumes were derived by applying applicable growth rates to the existing traffic volumes, as well as traffic generated by the adjacent background development(s) planned by the 2030 horizon year.

The proposed development is expected to generate a total of 89 trips during the AM peak hour (24 inbound and 65 outbound) and a total of 129 trips during the PM peak hour (79 inbound and 50 outbound).

Overall, the capacity and queuing analysis indicates that for all scenarios under all horizons (baseline 2021, future background 2030, and future total 2030) for both a.m. and p.m. peak hours, the site access (Archerhill Court at Vandorf Sideroad) operates with reserve capacity and the queues do not exceed the available storage. In the baseline (2021) horizon, all movements at the intersection of Vandorf Sideroad and Bayview Avenue operate within capacity, with the southbound through movement approaching capacity in the a.m. peak hour.

In the future background (2030) horizon, due to background growth and the addition of background development traffic, the intersection of Vandorf Sideroad and Bayview Avenue continues to have capacity constraints in the a.m. peak hour with the southbound through movement approaching capacity, and the overall intersection operating with a v/c ratio of 0.86. The future total (2030) horizon operates with negligible difference from the future background (2030) horizon, due to the low amount of traffic volume added to the network from the proposed development.

A sensitivity analysis was completed for the future background (2030) and future total (2030) horizons to forecast the capacity and queuing operations with the future planned road widening of Bayview Avenue. Widening the southbound and northbound through lanes to two through lanes in each direction improves the operational constraints at the intersection. Before the road widening along Bayview Avenue is complete, the eastbound left and southbound right queues exceed the available queue lengths at Vandorf Sideroad in the future horizons, but this is resolved with the future planned road widening of Bayview Avenue (planned for beyond 2031).

TMIG recommends that optimized signal timing cycle length in the a.m. and p.m. peak hour and splits be implemented to accommodate 2030 future background conditions and the subsequent future total conditions at Vandorf Sideroad and Bayview Avenue. The traffic signal is recommended to have a cycle length of 90 seconds in both peak hours. An exclusive southbound left turn lane at the site access (Archerhill Court at Vandorf Sideroad) is also recommended.

Emergency, waste collection, heavy, and passenger vehicle manoeuvres within the site were modelled using AutoTURN software and the analysis illustrates the design vehicles can be accommodated. The design vehicles adhere to York Region guidelines. A pavement marking and signage plan was also completed.

Under future total conditions, the transit LOS meets the Region's standards. The cycling and pedestrian LOS at the intersection of Vandorf Sideroad and Archerhill Court is projected to be the similar to existing conditions.

TMIG recommends various TDM initiatives for the proposed development related to transit, active transportation, outreach programs and more.

This study concludes that the traffic generated by the proposed development can be accommodated by the boundary road network.

CONTENTS

EXECUTIVE SUMMARY	I
1 INTRODUCTION	1
1.1 Study Background and Purpose	1
1.2 Study Methodology	1
2 SITE CHARACTERISTICS	2
2.1 Study Environment	2
2.2 Study Area Intersections	2
2.3 Development Context	2
2.4 Site Access	3
2.5 Site Circulation	4
2.5.1 Emergency Vehicle	4
2.5.2 Waste Collection	4
2.5.3 Heavy Vehicle	4
2.5.4 Passenger Vehicle	4
2.6 Pavement Marking and Signing Plan	4
3 EXISTING CONDITIONS	5
3.1 Road Network	5
3.2 Transit Network	5
3.2.1 GO Regional Transit	5
3.2.2 York Region Transit (YRT)	6
3.3 Pedestrian Routes	8
3.4 Cycling Routes	8
3.5 Baseline Traffic	8
4 FUTURE BACKGROUND TRAFFIC	11
4.1 Study Horizon Year	11
4.2 Study Area Transportation Network Improvements	11
4.3 Background Corridor Growth	11
4.4 Background Developments	11
4.5 Future 2030 Background Traffic Volumes	11
5 SITE GENERATED TRAFFIC	13
5.1 Modal Split	13
5.2 Site Trip Generation	13
5.3 Site Trip Distribution and Assignment	14
6 TOTAL TRAFFIC VOLUMES	15
7 TRAFFIC CAPACITY ANALYSIS	16

7.1	Baseline Conditions 2021	16
7.2	Future Background 2030	17
7.2.1	Traffic Capacity Analysis	17
7.2.2	Sensitivity Analysis	19
7.3	Future Total 2030	20
7.3.1	Left-Turn Lane Requirements	20
7.3.2	Traffic Capacity Analysis	21
7.3.3	Sensitivity Analysis	23
8	TRAFFIC QUEUING OPERATIONS	24
9	PARKING ASSESSMENT	26
10	MULTI-MODAL LEVEL OF SERVICE REVIEW	27
10.1	Level of Service Review	27
10.1.1	Transit Level of Service	27
10.1.2	Pedestrian Level of Service	27
10.1.3	Cycling	28
11	TRANSPORTATION DEMAND MANAGEMENT	30
11.1	Objectives	30
11.2	Proposed TDM Measures	31
11.2.1	Active Transportation Plan	31
11.2.2	Transit Incentives	32
11.2.3	Rideshare Services	32
11.2.4	Microtransit	32
11.2.5	Information Brochure	33
11.2.6	Communication Strategy	33
11.3	TDM Monitoring and Measures of Success	33
11.4	TDM Checklist	34
12	CONCLUSIONS AND RECOMMENDATIONS	36

APPENDICES

APPENDIX A: PRE-CONSULTATION CORRESPONDENCE

APPENDIX B: SITE PLAN

APPENDIX C: SITE CIRCULATION ANALYSIS

APPENDIX D: PAVEMENT MARKING AND SIGNAGE PLAN

APPENDIX E: BASELINE TRAFFIC DATA

APPENDIX F: SYNCHRO CAPACITY ANALYSIS

APPENDIX G: LEFT TURN LANE WARRANT ANALYSIS

APPENDIX H: SIMTRAFFIC QUEUEING ANALYSIS

FIGURES

Figure 2-1 - Site Location	2
Figure 2-2 - Site Plan	3
Figure 3-1 - Aurora GO Station Bus Services.....	6
Figure 3-2 - York Region Transit Network Surrounding Site	7
Figure 3-3 - Baseline (2021) Traffic Volumes.....	10
Figure 4-1 - Future Background (2030) Traffic Volumes	12
Figure 6-1 - Future Total (2030) Traffic Volumes.....	15

TABLES

Table 3-1 - Site Trip Generation	9
Table 5-1 - Modal Split Summary.....	13
Table 5-2 - Site Trip Generation	14
Table 5-3 - Site Trip Distribution.....	14
Table 7-1 - Baseline 2021 Capacity Analysis.....	17
Table 7-2 - Future Background 2030 Capacity Analysis.....	18
Table 7-3 - Future Background 2030 Sensitivity Capacity Analysis.....	20
Table 7-4 - Future Total 2030 Capacity Analysis.....	22
Table 7-5 - Future Total 2030 Sensitivity Capacity Analysis	23
Table 8-1 - 95 th Percentile Queue Lengths.....	24
Table 9-1 - Parking Supply Analysis	26
Table 10-1 - Transit Level of Service Summary.....	27
Table 10-2 - Pedestrian Level of Service Summary	28
Table 10-3 - Cycling Level of Service Summary.....	29
Table 11-1 - TDM Checklist for Residential Developments	35

1 INTRODUCTION

1.1 Study Background and Purpose

The Municipal Infrastructure Group, a T.Y. Lin International Company (TMIG) was retained by Treasure Hill to complete a Transportation Impact Study, in support of the proposed Archerhill Court residential redevelopment to be located on the north/west corner of Vandorf Sideroad and Bayview Avenue (Regional Road 34) intersection in the Town of Aurora, York Region. The study investigates and presents the following:

Baseline traffic conditions for the study area, forecasts for future background traffic growth, and operation conditions for the study area road network for baseline (2021) and future conditions. A future 2030 (five-year post build-out) planning horizon is considered for this study.

Based on the residential development, the estimated traffic generation and distribution of the development to the adjacent road network to determine the future impacts in the context of all local transportation modes.

The future site-related impacts in the context of location transportation modes, including reviews of cycling and pedestrian facilities, circulation within the site, and connection from the proposed development to the external road network.

A review of the residential development plan in the context of operational/geometric issues and conformance with relevant design standards and provide recommendations on how to address any deficiencies (if any are revealed).

A Parking Assessment to check in-force parking supply by-law requirements, compared with the proposed parking supply.

A Transportation Demand Management (TDM) plan outlining the opportunities for residents to shift away from single occupant vehicle (non-SOV) travel modes, using the existing / future transit and active transportation facilities offered in the study area. An Active Transportation Plan and Multi-Modal Level of Service Review under baseline, future background, and future total conditions are included as part of the discussion surrounding the TDM plan.

The objective of this study is to determine the traffic volumes anticipated to be generated by the proposed redevelopment during the critical weekday a.m. and p.m. peak periods; to assess the impact of this traffic on the existing and future roadway network, recommend improvements to accommodate the projected traffic (if any are needed), and confirm that the internal road network is consistent with City standards and provides for the safe operation of vehicles within the proposed development.

A detailed scope was submitted by TMIG to the Town of Aurora and York Region staff for review and comment. Comments were received and have informed the general work program for the enclosed study and **Appendix A**.

1.2 Study Methodology

The study analysis focused on baseline conditions, modelled on a combination of turning movement counts obtained by TMIG, collected in April 2021, at the intersection of Vandorf Sideroad at Bayview Avenue and Vandorf Sideroad at Archerhill Court / Monkman Court; ITE trip generated traffic volumes; and, historical TMC data obtained from the Town and Region, which were grown to the baseline horizon year.

Traffic volumes for future conditions were forecasted for the 2030 study horizon. Estimated traffic volumes for future background conditions included corridor growth along Vandorf Sideroad and Bayview Avenue and traffic for relevant planned developments within the planning horizon.

The study assessment will be based on weekday a.m. and p.m. peak hour analysis, deemed the critical periods for study area assessment. The traffic operations assessment will consider the existing intersections of Vandorf Sideroad at Bayview Avenue and Vandorf Sideroad at Archerhill Court / Monkman Court. Study intersection analysis will be conducted using Synchro and SimTraffic software.

2 SITE CHARACTERISTICS

2.1 Study Environment

The proposed residential development is located within the Town of Aurora in York Region. The site is located on the north/west corner of the intersection of Vandorf Sideroad at Bayview Avenue, and is accessible by Archerhill Court, a local road terminating in a cul-de-sac. The proposed site and surrounding road network are illustrated in **Figure 2-1**.

Figure 2-1 - Site Location



2.2 Study Area Intersections

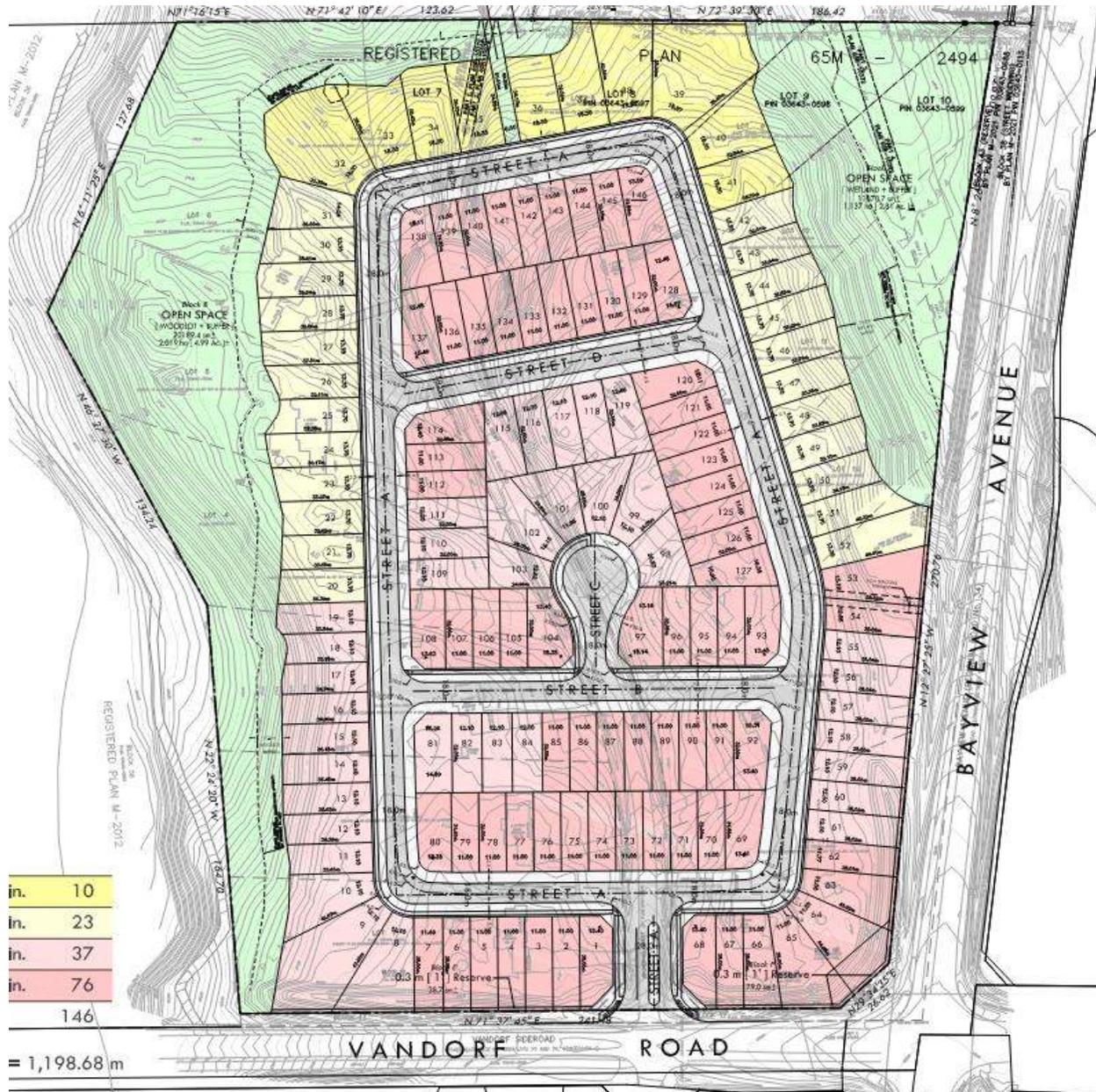
For the purposes of this study, the following study area intersections have been included:

- Vandorf Sideroad at Bayview Avenue
- Vandorf Side road at Archerhill Court / Monkman Court

2.3 Development Context

The existing site consists of 14 single-detached dwelling units. The proposed residential redevelopment will consist of 146 single-detached homes distributed across three central blocks. The proposed draft site plan showing the proposed residential blocks and site access is shown in **Figure 2-2**. The site plan can be found in **Appendix B**.

Figure 2-2 - Site Plan



2.4 Site Access

Site access to the internal road network will remain at the same location via Archerhill Court. Access is proposed via an 18.5 metre cross section consisting of two 4.75 m southbound outbound lanes, a 4.25 metre with a raised median dividing the 4.75 metre northbound inbound lane. The access will connect with the proposed internal network of four local streets: a ring road directly connected to the access, two additional streets oriented east-west crossing the central block, and a cul-de-sac north of the southerly cross street.

2.5 Site Circulation

2.5.1 Emergency Vehicle

Emergency vehicle manoeuvres within the site were modelled using AutoTURN software and the analysis illustrates the design vehicle can be accommodated, as seen in **Appendix C**. The design vehicle adheres to York Region guidelines.

2.5.2 Waste Collection

Waste collection vehicle turning movements were simulated using a Wayne Titan Garbage design truck. Truck turning movement simulations indicate that the design vehicle can be accommodated on site without conflict as shown in **Appendix C**.

2.5.3 Heavy Vehicle

Heavy vehicle turning movements were simulated using a Transportation Association of Canada (TAC) medium single unit (MSU) design truck. Truck turning movements indicate that a MSU truck can circulate the site without conflict as shown in **Appendix C**.

2.5.4 Passenger Vehicle

Passenger vehicle turning movements were simulated using the TAC passenger car (Class P) template. The vehicle tracking analysis confirms that the respective design vehicle can be accommodated on site without conflict, as shown in **Appendix C**.

2.6 Pavement Marking and Signing Plan

A pavement marking and signage plan was completed and is included in **Appendix D**.

3 EXISTING CONDITIONS

3.1 Road Network

The following describes the existing road infrastructure within the study area.

Bayview Avenue (York Regional Road 34) is a north-south arterial roadway that extends from Steeles Avenue (at the south border of York Region) to Davis Drive (at the northern border of the Town of Aurora). It is under the jurisdiction of York Region. It has a two-lane undivided cross-section, and a posted speed limit of 70 km/h in the vicinity of the study area. There are auxiliary left and right turn lanes for both the northbound and southbound approaches at its signalized intersection with Vandorf Sideroad.

Vandorf Sideroad is an east-west arterial road that extends from Industrial Parkway South in the west to Ontario Provincial Highway 48 in the east. It is under the jurisdiction of the Town of Aurora. It has a two-lane undivided urban cross section and a posted speed limit of 60 km/h in the vicinity of the study area. There are auxiliary left and right turn lanes for both the eastbound and westbound approaches at its signalized intersection with Bayview Avenue.

Archerhill Court is a north-south local road, under the jurisdiction of the Town of Aurora, extending north from Vandorf Sideroad west of Bayview Avenue. It forms the north leg of a four-leg two-way stop-controlled intersection, the south leg formed by Monkman Court. It has a two-lane rural cross section with an unposted speed limit of 40 km/h. It has a southbound outbound lane and northbound inbound lane at its intersection with Vandorf Sideroad.

Monkman Court is north-south local road, under the jurisdiction of the Town of Aurora, extending south from Vandorf Sideroad west of Bayview Avenue. At Vandorf Sideroad, Monkman has one northbound outbound lane and one southbound inbound lane. It has a two-lane rural cross section and an unposted speed limit of 40 km/h.

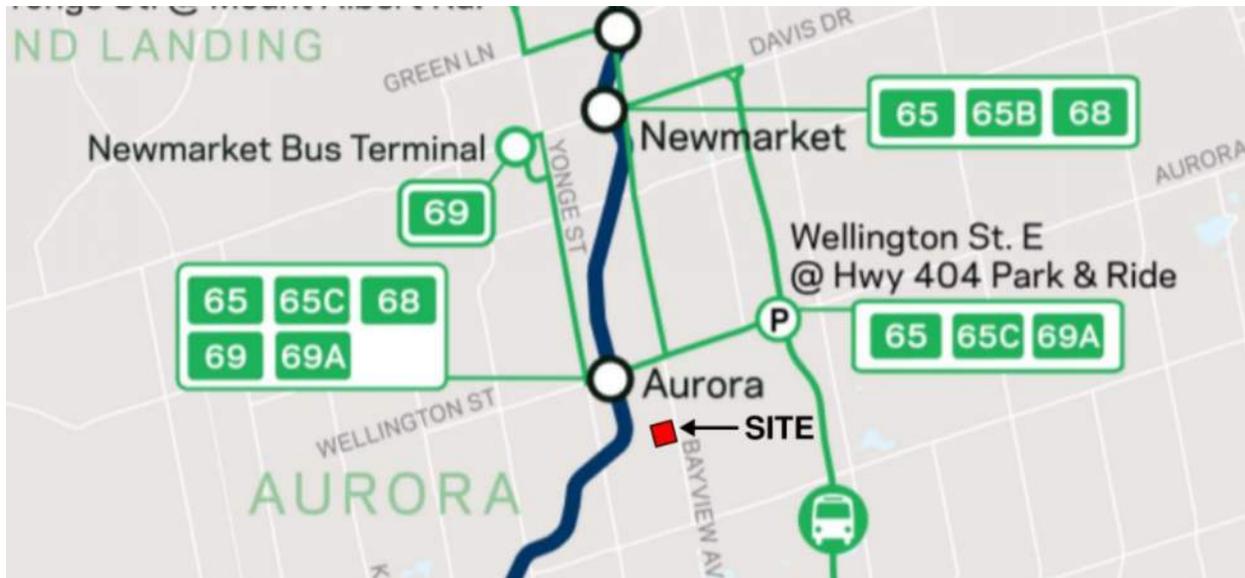
3.2 Transit Network

Transit services near the site include GO Regional Transit and York Regional Transit (YRT). There are presently no transit services or routes in the direct vicinity of the site, however, bus transit along Bayview Avenue is planned for implementation between 2027 and 2031 according to the 2016 York Region Transportation Master Plan.

3.2.1 GO Regional Transit

The nearest regional rail and bus station, **Aurora GO Station**, is approximately 3.2 km from the site, which is an approximate 5-minute drive by car. The station is serviced by the Barrie GO train line, in addition to GO Bus routes 65, 65C, 68, 69, and 69A (**Figure 3-1**). The site does not fall within the Mobility On-Request Aurora GO service area, which allows for direct travel from the YRT Aurora Go bus stop to a fixed address in the service area.

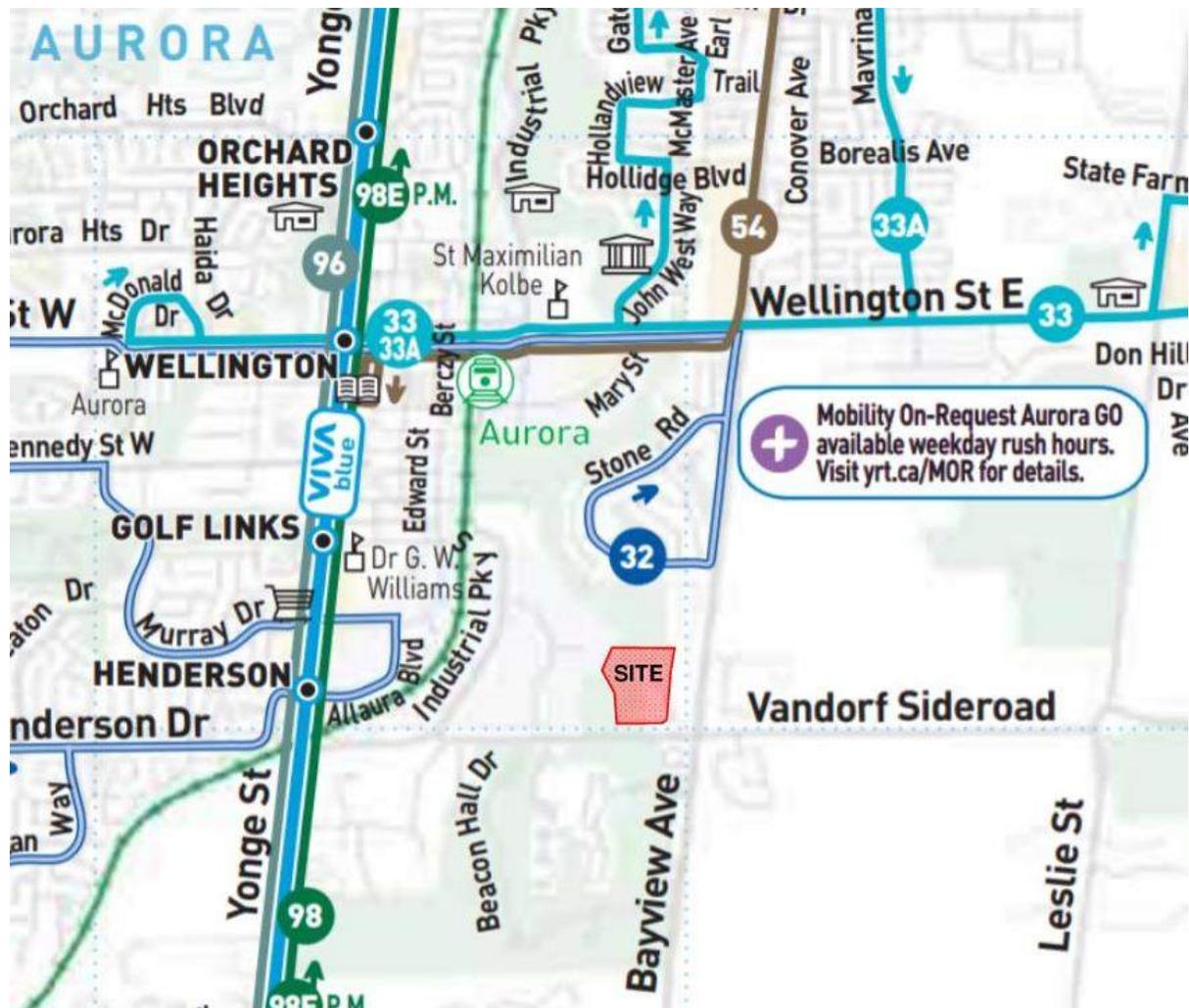
Figure 3-1 - Aurora GO Station Bus Services



3.2.2 York Region Transit (YRT)

York Region Transit services were disrupted by the COVID-19 pandemic at the time of reporting, thus the transit services described here do not reflect anticipated regular service. The YRT services near the subject site are shown below in **Figure 3-2**.

Figure 3-2 - York Region Transit Network Surrounding Site



The nearest VIVA bus rapid transit (BRT) service available is through **VIVA Blue**, which routes along Yonge Street; the nearest VIVA Blue stop, Henderson, is located approximately 2.2 km from the site. As of June 2021, the service runs seven days a week during all service hours, with 14-minute and 15-minute frequency in the weekday a.m. and p.m. peak hour, respectively.

The nearest local bus transit service available is through **YRT Route 32 Aurora South** which services Aurora south of Wellington Street from Bathurst Street in the west to Bayview Avenue in the East. The route runs north of the site along Stone Road and Bayview Avenue (stop 1.0 km away) as well as west of the site along Industrial Parkway (stop 1.2 km away). As of June, the service runs weekdays during rush hour only, with 75-minute frequency.

Other nearby transit routes include:

Route 98 Yonge, a regional bus route that operates along Yonge Street all week during all service hours from Bernard Terminal in Richmond Hill in the south to Newmarket Terminal in the north (nearest stop 1.9 km away).

Route 98E Yonge Limited Express, a regional bus route that operates rush hours only Monday to Friday and runs along Yonge Street from Bernard Terminal in Richmond Hill in the south to Newmarket Terminal in the north (nearest stop 1.9 km away).

Route 96 Keele-Yonge, a regional bus route that operates along Yonge Street, King Road, and Keele Street Monday through Saturday, from Pioneer Village Station in the south to Newmarket Terminal in the north (nearest stop 1.9 km away)

Route 33 Wellington, a local bus route that services Aurora along and North of Wellington Street Monday through Saturday, from McDonald Drive in the west to First Commerce Drive in the East (nearest stop 2.2 km away).

3.3 Pedestrian Routes

Archerhill Court has no shoulder or sidewalks along its length.

Monkman Court has a sidewalk on the east side of the road.

Vandorf Sideroad west of Archerhill Court/Monkman Court has a sidewalk on the north side and an asphalt multi-use path on the south side. Vandorf Sideroad from Archerhill Court/Monkman Court to Bayview Avenue has a gravel shoulder on both the north and south sides. Vandorf Sideroad east of Bayview Avenue has gravel shoulders on both sides and a sidewalk on the south side.

Bayview Avenue north of Vandorf Sideroad has paved shoulders on both the east and west sides of the road with no sidewalks. Bayview Avenue south of Vandorf Sideroad has paved shoulders on both the east and west sides of the road, with sidewalk on the east side of the road from Vandorf Sideroad to a point approximately 220 metres south of Vandorf Sideroad. A multi-use path exists on the west side of the road.

The two-way stop-controlled intersection of Vandorf Sideroad and Archerhill Court / Monkman Court has one crosswalk across the north leg (Archerhill Court). The signalized intersection of Vandorf Sideroad and Bayview Avenue has crosswalks and pedestrian signals across all four legs.

Approximately 180 metres west of Archerhill Court at Vandorf Sideroad is the southern terminus of the Klaus Wehrenberg Trail, a walking and cycling trail which travels north-south through Aurora. The Tim Jones Trail / Nokiidaa Trail is an unpaved trail which extends south of Vandorf Sideroad leading to Bayview Avenue. The Tim Jones Trail / Nokiidaa Trail also extends north of Vandorf Sideroad following the route of the Klaus Wehrenberg Trail, until Wellington and eventually East Gwillimbury.

3.4 Cycling Routes

Bicycle lanes are not explicitly provided on any streets within the study area. However, the multi-use path on the south side of Vandorf Sideroad west of the intersection with Archerhill Court may be used by bikes, as may the previously mentioned Nokiidaa Trail, located west of the site. In addition, the multi-use path on the west side of Bayview functions as a bike path, and the paved shoulders along Bayview Avenue may be considered de-facto bicycle lanes.

3.5 Baseline Traffic

The existing signal timing plan for Vandorf Sideroad and Bayview Avenue were obtained from York Region.

TMIG collected turning movement counts for the two study intersections on Thursday April 15, 2021, during the weekday a.m. and p.m. peak hours. Automatic traffic recorder (ATR) count data representing annual average daily traffic (AADT) for Vandorf Sideroad west of Archerhill Court were obtained from the Town of Aurora, dated April/May 2011. Due to the COVID-19 pandemic and the subsequent governmental emergency measures in place at the time of collection, traffic data collected in 2021 were found to be significantly lower than the ATR count data collected in 2011.

To conservatively estimate typical baseline volumes, a growth rate of 0.5% per annum was selected based on York Region's EMME traffic model and is consistent with the growth rate used in the Stronach South Wellington Lands Block

Plan Transportation Mobility Plan, 2018¹. The growth rate was applied to historical traffic volumes from York Region (2007) and the Town of Aurora.

Vandorf Sideroad and Bayview Avenue:

Baseline traffic for the intersection of Vandorf Sideroad and Bayview Avenue was taken from the historical traffic volumes from York Region (2007) and grown to 2021 using the growth rate of 0.5% per annum.

Vandorf Sideroad and Archerhill Court / Monkman Court:

Baseline traffic for the intersection of Vandorf Sideroad and Archerhill Court / Monkman Court was taken in part from historical TMC data, TMIG's collected turning movement counts, and ITE trip generation.

The south leg (ingress/egress for Monkman Court) was taken from ITE trip generation as it is more conservative than the turning movement count at the intersection. The development on the southern leg of the intersection of Vandorf Sideroad and Archerhill Court / Monkman Court consists of 32 single-family detached residence units. Site traffic generated by the development for the weekday a.m. and p.m. peak hours was estimated by applying the trip rates published by the Institute of Transportation Engineers (ITE) 10th Edition, for Land Use Code (LUC) 210 Single-Family Detached Housing. **Table 3-1** summarizes the estimated total trip generation of the development.

Table 3-1 - Site Trip Generation

Parameters	Peak Hour Trip Generation for LUC 210 Single-Family Detached Housing					
	Weekday AM			Weekday PM		
	In	Out	Total	In	Out	Total
Fitted Curve Equation	T = 0.71 X + 4.8			Ln(T) = 0.96 Ln(X) + 0.20		
Trip Distribution	25%	75%	100%	63%	37%	100%
Gross Trips	7	21	28	21	13	34
Non-Automobile Trip Reduction	1	4	5	3	1	4
Total Site Trips	6	17	23	18	12	30

These site trips were then distributed in and out of Monkman Court as per the same trip distribution methodology as our proposed site traffic, described further in **Section 5.3**.

The north leg (ingress/egress for Archerhill Court) was taken from TMIG's collected turning movement counts as is more conservative than the results produced by the ITE Trip Generation Manual rates.

The through volumes at the intersection of Vandorf Sideroad and Archerhill Court / Monkman Court were taken from the historical 2011 ATR count data and grown to 2021 using the growth rate of 0.5% per annum.

¹ The Stronach South Wellington Lands Block Plan Transportation Mobility Plan, BA Group Consulting, January 2018.

4 FUTURE BACKGROUND TRAFFIC

4.1 Study Horizon Year

The proposed development is anticipated to be fully built-out and occupied by 2025. As per York Region Transportation Mobility Plan Guidelines for Development Applications, future traffic conditions are to be examined for a five-year planning horizon beyond first occupancy. Therefore, a future horizon year of 2030 (five years beyond full build-out) was assumed for this analysis.

4.2 Study Area Transportation Network Improvements

No planned road improvements have been identified at either Bayview Avenue or Vandorf Sideroad in the vicinity of the study area between the baseline year (2021) and future horizon year of 2030. Widening of Bayview Avenue from 2 to 4 lanes is expected to be performed after 2031.

According to the 2016 York Region Transportation Master Plan, the only potential transit improvement in the vicinity of the study area will include the addition of Bayview Avenue as part of the YRT Frequent Transit Network, from 19th Avenue (in Richmond Hill), through Aurora, and up to Queensville Sideroad in East Gwillimbury, planned between 2027 to 2031. Near the study area, additional planned improvements include upgrading the existing VIVA Blue BRT line along Yonge Street to include rapidways for improved service (2022-2026), the inclusion of Wellington Street as part of the YRT Frequent Transit Network (2022-2026), and the start of two-way all-day GO Train service, with 15-minute service south of Aurora GO Station (2022-2026).

4.3 Background Corridor Growth

Traffic growth is expected in the study area due to the high potential for development in areas nearby. Thus, a 0.5% annual growth rate was applied to the 2030 planning horizon to account for corridor growth. The growth rate of 0.5% per annum was selected based on York Region's EMME traffic model and is consistent with the growth rate used in the Stronach South Wellington Lands Block Plan Transportation Mobility Plan, 2018.

The corridor growth was applied to the existing through movements along Vandorf Sideroad and Bayview Avenue.

4.4 Background Developments

Upon review of the Town's development applications, the following background development was identified and assumed to be constructed within the 2030 planning horizon, as confirmed with the Town:

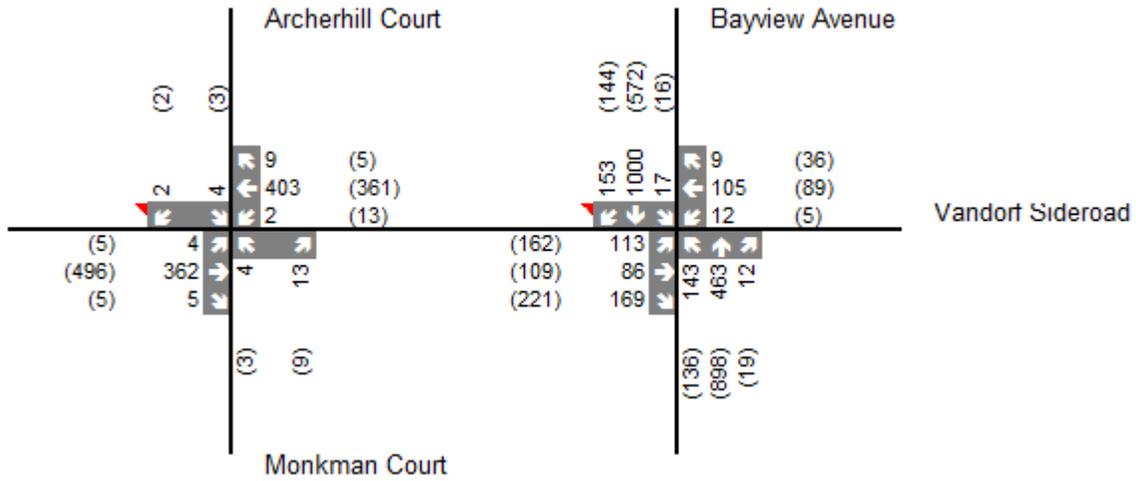
- As per the Stronach South Wellington Lands Block Plan Transportation Mobility Plan, 2018, Aurora Bayview Southeast Development Inc. proposes development of part of Lot 19, Lot 20, and Concession 20 as the Stronach South Wellington Lands, with approximately 2,705 dwelling units and 74,250 m² of non-residential gross floor area (GFA).

"Figure 21 (Net New Site Traffic)" of the aforementioned transportation study was used to forecast the future background development volumes at the study area intersections, as provided by the Town.

4.5 Future 2030 Background Traffic Volumes

The 2021 baseline traffic, plus nine years of corridor growth, plus specific future development traffic was combined to produce the 2030 future background weekday a.m. and p.m. peak hour traffic volumes, presented in **Figure 4-1**.

Figure 4-1 - Future Background (2030) Traffic Volumes



5 SITE GENERATED TRAFFIC

5.1 Modal Split

Based on a review 2016 Transportation Tomorrow Survey (TTS) weekday a.m. and p.m. peak period trip data in GTA Zone 2563 in which the site is located, as well as GTA Zones 2562, 2560, 2564, and 2569 surrounding the site, the mode splits during the weekday a.m. and p.m. peak periods are summarized in **Table 5-1**.

Table 5-1 - Modal Split Summary

Travel Mode	Distribution (%)			
	AM Peak Hour		PM Peak Hour	
	In	Out	In	Out
Transit (excluding GO Rail)	<1%	3%	2%	<0%
Cycle	1%	1%	1%	1%
Auto Driver	82%	66%	76%	82%
GO Rail only	-	4%	4%	-
Joint GO Rail and Local Transit	<1%	1%	2%	-
Motorcycle	-	<1%	<1%	<1%
Auto passenger	7%	14%	10%	10%
School Bus	2%	3%	1%	<1%
Walk	8%	7%	1%	5%
Other	-	-	-	1%
Total	100%	100%	100%	100%
Non-Auto Travel Mode¹	11%	20%	14%	8%

¹ – Assuming that Auto Driver, Auto Passenger, and Motorcycle both fall under Auto Travel Modes

5.2 Site Trip Generation

The development proposal consists of 146 single-family detached residence units across the site. Site traffic generated by the proposed development for the weekday a.m. and p.m. peak hours was estimated by applying the trip rates published by the Institute of Transportation Engineers (ITE) 10th Edition, for Land Use Code (LUC) 210 Single-Family Detached Housing. **Table 5-2** summarizes the estimated total trip generation of the development.

Table 5-2 - Site Trip Generation

Parameters	Peak Hour Trip Generation for LUC 210 Single-Family Detached Housing					
	Weekday AM			Weekday PM		
	In	Out	Total	In	Out	Total
Fitted Curve Equation	$T = 0.71 X + 4.8$			$\ln(T) = 0.96 \ln(X) + 0.20$		
Trip Distribution	25%	75%	100%	63%	37%	100%
Gross Trips	27	81	108	92	54	146
Non-Automobile Trip Reduction	3	16	19	13	4	17
Total Site Trips	24	65	89	79	50	129

The proposed development is expected to generate a total of 89 trips during the AM peak hour (24 inbound and 65 outbound) and a total of 129 trips during the PM peak hour (79 inbound and 50 outbound).

5.3 Site Trip Distribution and Assignment

The distribution of site traffic was derived from 2016 Transportation Tomorrow Survey (TTS) summary data for the Town of Aurora zones 2563, 2562, 2560, 2564, and 2569. And assigned to the road network based on existing traffic patterns.

Table 5-3 summarizes the proportion of site trips distributed to the study area under the 2030 road network by direction of approach and departure for the weekday a.m. and p.m. peak hours.

Table 5-3 - Site Trip Distribution

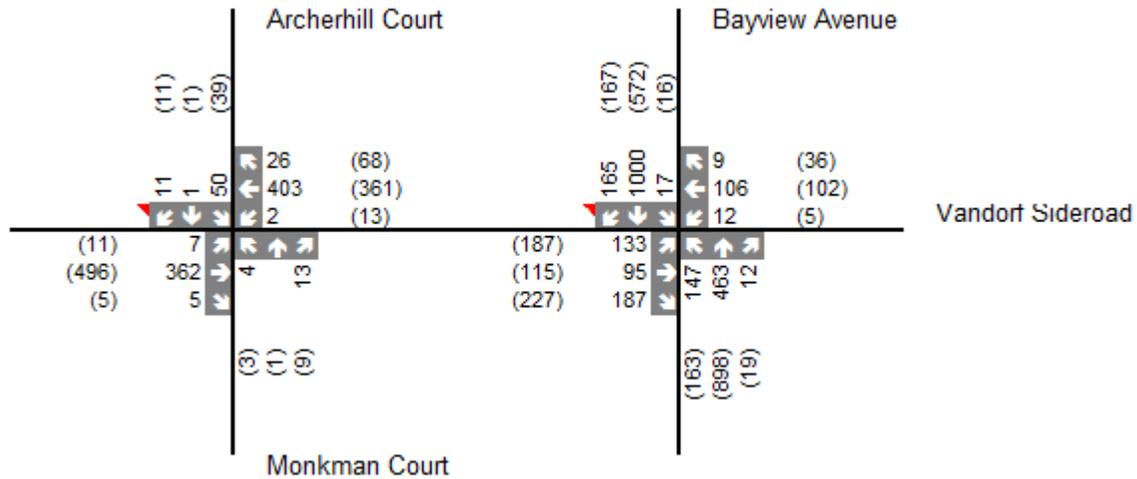
Trip Orientation	Inbound / Outbound Distribution			
	AM Peak Period		PM Peak Period	
	Inbound	Outbound	Inbound	Outbound
North	64%	38%	35%	61%
South	23%	44%	54%	16%
East	0%	3%	3%	6%
West	14%	15%	8%	16%
Total	100%	100%	100%	100%

6 TOTAL TRAFFIC VOLUMES

The future total traffic volumes in the weekday peak study hours for the 2030 planning horizon were derived by combining the projects future background traffic with the corresponding estimate of the site generated traffic.

Figure 6-1 summarizes the future total traffic volumes at the 2030 planning horizon during the weekday a.m. and p.m. peak hours.

Figure 6-1 - Future Total (2030) Traffic Volumes



7 TRAFFIC CAPACITY ANALYSIS

The capacity analysis identifies how well the intersections and access driveways are operation and how they are expected to operate in the future. The analysis contained in this report utilized the Highway Capacity Manual (HCM) 2000 techniques 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.

The analysis includes identification of all intersections and for all movements; v/c ratios, LOS indicators and 95th percentile queue lengths. 'Critical' intersections and movements as per York Region's Transportation Mobility Plan Guidelines, include:

- Overall intersection operations, through movements, or shared through/turning movements with a LOS 'E' or 'F', or have v/c ratios for exclusive movements that will exceed 0.85; and
- 95th percentile queue lengths for individual movements that exceed available lane storage.

The tables presented in the following sections summarize the Synchro/HCM capacity results for the study intersections during the weekday a.m. and p.m. peak hours under baseline (2021), future background and future total (2030) traffic conditions. Detailed Synchro reports are attached in **Appendix F**.

The following parameters were reflected in the existing Synchro analysis:

- Lane configurations, link speeds, storage lengths, and taper lengths, were applied to reflect existing conditions using aerial imagery.
- Saturation flow rates were set to 2,000 vehicles per hour per lane as per Region guidelines along Bayview Avenue.
- Signal timings for signalized intersections were taken directly from York Region signal timing plans,
- Vehicular volumes, heavy vehicle percentages, and pedestrian volumes were adjusted to reflect turning movement count data,
- Peak hour factors were calculated based on peak hour traffic counts.

7.1 Baseline Conditions 2021

The traffic capacity analysis results for the intersections in the study area are summarized in **Table 7-1** for both the weekday a.m. and p.m. peak hours under baseline 2021 traffic conditions.

Table 7-1 - Baseline 2021 Capacity Analysis

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Vandorf Sideroad & Archerhill Court / Monkman Court	EBLTR	0.01	<1	A	0.01	<1	A
	WBLTR	0.00	<1	A	0.01	<1	A
	NBLTR	0.06	15	B	0.03	14	B
	SBLTR	0.04	21	C	0.03	18	C
Vandorf Sideroad & Bayview Avenue	<i>Overall</i>	<i>0.82</i>	<i>28</i>	<i>C</i>	<i>0.69</i>	<i>18</i>	<i>B</i>
	EBL	0.53	32	C	0.64	36	D
	EBT	0.25	29	C	0.28	29	C
	EBR	0.11	28	C	0.15	28	C
	WBL	0.05	27	C	0.02	27	C
	WBT	0.32	29	C	0.23	28	C
	WBR	0.01	27	C	0.02	27	C
	NBL	0.61	21	C	0.27	8	A
	NBT	0.34	8	A	0.66	13	B
	NBR	0.01	6	A	0.01	6	A
	SBL	0.04	11	B	0.06	12	B
	SBT	0.96	41	D	0.49	16	B
	SBR	0.11	11	B	0.09	12	B

Under baseline conditions, the unsignalized intersection of Vandorf Sideroad and Archerhill Court / Monkman Court operates well with minimal delays and LOS 'C' or better during both the weekday a.m. and p.m. peak hours.

The signalized intersection of Vandorf Sideroad and Bayview Avenue operates with an overall LOS of 'C' and 'B' and overall v/c ratios of 0.82 and 0.69 during weekday a.m. and p.m. peak hours, respectively. All individual movements operate with relatively minimal delays and a v/c ratio less than 1.0, representing reserve capacity. Due to high existing southbound through traffic volumes along Bayview Avenue, this movement is approaching capacity with a v/c ratio of 0.96.

7.2 Future Background 2030

7.2.1 Traffic Capacity Analysis

The traffic capacity analysis results for the intersections in the study area are summarized in **Table 7-2** for both weekday a.m. and p.m. peak hours under 2030 future background traffic conditions.

The following parameters were reflected in the future background (2030) Synchro analysis:

- Peak Hour Factor at Vandorf Sideroad & Bayview Avenue was set to 0.95 in the a.m. peak hour, as it is in the p.m. peak hour. Peak Hour Factor at Vandorf Sideroad & Archerhill Court / Monkman Court was set to 0.92 and 0.95 in the a.m. and p.m. peak hours, respectively.
- Cycle length was lengthened to 90 seconds in the a.m. and p.m. peak hours and the signal timing splits were optimized,

These network improvements have been carried over into the future background (2030) sensitivity analysis and the future total (2030) analysis.

Table 7-2 - Future Background 2030 Capacity Analysis

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Vandorf Sideroad & Archerhill Court / Monkman Court	EBLTR	<0.01	<1	A	0.00	<1	A
	WBLTR	<0.01	<1	A	0.01	<1	A
	NBLTR	0.04	12	B	0.03	14	B
	SBLTR	0.02	16	C	0.02	18	C
Vandorf Sideroad & Bayview Avenue	<i>Overall</i>	0.86	91	C	0.79	20	B
	EBL	0.57	39	D	0.64	36	D
	EBT	0.29	34	C	0.30	29	C
	EBR	0.11	32	C	0.15	28	C
	WBL	0.06	32	C	0.02	27	C
	WBT	0.36	34	C	0.25	28	C
	WBR	0.01	32	C	0.02	27	C
	NBL	0.61	25	C	0.34	9	A
	NBT	0.38	8	A	0.77	16	B
	NBR	0.38	5	A	0.01	6	A
	SBL	0.04	10	A	0.10	13	B
	SBT	0.98	43	D	0.63	19	B
SBR	0.11	10	B	0.09	12	B	

Similar to baseline conditions, under future background 2030 conditions, the unsignalized intersection of Vandorf Sideroad and Archerhill Court / Monkman Court operates with minimal delays and LOS “C” or better during the weekday a.m. and p.m. peak hours.

The signalized intersection of Vandorf Sideroad and Bayview Avenue operates with an overall LOS of ‘C’ and ‘B’ and overall v/c ratios of 0.86 and 0.79, during weekday a.m. and p.m. peak hours, respectively. With the exception of the southbound through movement, all other movements operate with reserve capacity and low delays. As seen under baseline conditions, the southbound through movement on Bayview Avenue is approaching capacity, with a v/c ratio of 0.98; the increase in capacity of this movement is due to the addition of background traffic and growth. The future proposed widening of Bayview Avenue from 2 to 4 lanes, which is expected to be performed after 2031, is anticipated to improve the operations at the intersection of Vandorf Sideroad and Bayview Avenue. To forecast this, a sensitivity analysis has been completed in **Section 7.2.2**.

7.2.2 Sensitivity Analysis

The traffic capacity results for the intersection of Vandorf Sideroad & Bayview Avenue are summarized in **Table 7-3** for both weekday a.m. and p.m. peak hours under 2030 future background sensitivity analysis traffic conditions.

The following parameters were reflected in the future background (2030) sensitivity analysis:

- Bayview Avenue was widened to two-through lanes in each direction as planned post 2030 horizon.

This network improvement has been carried over into the future total (2030) sensitivity analysis.

Table 7-3 - Future Background 2030 Sensitivity Capacity Analysis

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Vandorf Sideroad & Bayview Avenue	Overall	0.52	16	B	0.49	15	B
	EBL	0.55	36	D	0.64	36	D
	EBT	0.28	32	C	0.30	29	C
	EBR	0.11	30	C	0.15	28	C
	WBL	0.06	30	C	0.02	27	C
	WBT	0.34	32	C	0.25	28	C
	WBR	0.01	30	C	0.02	27	C
	NBL	0.39	8	A	0.27	7	A
	NBT	0.20	6	A	0.41	9	A
	NBR	0.01	5	A	0.01	6	A
	SBL	0.04	10	B	0.06	12	B
	SBT	0.54	15	B	0.33	14	B
	SBR	0.10	11	B	0.09	12	B

Under future background 2030 sensitivity conditions, the intersection operates with an overall LOS of 'B' for both peak hours and overall v/c ratios of 0.52 and 0.49, during weekday a.m. and p.m. peak hours, respectively. Individual movements operate with sufficient reserve capacity and low delays. Specifically, the southbound through movement on Bayview Avenue has a v/c ratio of 0.54 in the a.m. peak hour, which is a significant improvement from the v/c ratio of 0.96 and 0.98 observed in the baseline and future background conditions.

7.3 Future Total 2030

The need for auxiliary turn lanes to facilitate access and egress to/from the subject site along Vandorf Sideroad was reviewed. It should be noted that the need for the turn lanes is not required to improve intersection capacity.

7.3.1 Left-Turn Lane Requirements

The intersection of Vandorf Sideroad and Archerhill Court / Monkman Court was analyzed to determine if the traffic volumes warrant the need for auxiliary left-turn lanes on the main line approach. The warrant for left-turn lanes follows the requirements in the MTO's Geometric Design Standards Manual.

A design speed of 80 km/h has been utilized along Vandorf Sideroad as design speeds are typically taken 20 kilometres per hour over the posted speed limit.

The percentages of left-turning vehicles in the approaching volume were rounded to the nearest 5 percent, as nomographs are provided for 5 percent increments. The left-turn lane warrant nomographs are attached in **Appendix G**.

Based on the warrant analysis, a left-turn lane with a 15-metre storage length is warranted in the future total (2030) traffic scenario. This apparent requirement is due to the nature of the warrant procedure, which assumes a minimum of 5% of left-turning vehicles in the advancing volume. In this case, the number of turning vehicles is far less than 5% of the advancing volume. In addition, if an eastbound left-turn lane were constructed on Vandorf Sideroad at Archerhill Court / Monkman Court, the change in LOS for the eastbound through traffic would be negligible as it currently operates at LOS 'A'.

Given no significant operational benefits are expected to occur with the implementation of a separate eastbound left-turn lane for the through volume given the amount of traffic turning left into the site, 7 vehicles in the a.m. peak hour and 11 vehicles in the p.m. peak hour, an eastbound left-turn lane is not recommended on Vandorf Sideroad at Archerhill Court / Monkman Court.

7.3.2 Traffic Capacity Analysis

The traffic capacity analysis results for the intersections in the study area are summarized in **Table 7-4** for both weekday a.m. and p.m. peak hours under 2030 future total traffic conditions. The proposed southbound left lane on Archerhill Court / Monkman Court has been included as reflected in the proposed site plan.

Table 7-4 - Future Total 2030 Capacity Analysis

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Vandorf Sideroad & Archerhill Court / Monkman Court	EBLTR	0.01	<1	A	0.01	<1	A
	WBLTR	<0.01	<1	A	0.01	<1	A
	NBLTR	0.04	13	B	0.04	15	C
	SBL	0.21	23	C	0.22	30	D
	SBTR	0.03	12	B	0.02	11	B
Vandorf Sideroad & Bayview Avenue	<i>Overall</i>	0.88	32	C	<i>0.81</i>	21	C
	EBL	0.65	42	D	0.71	39	D
	EBT	0.31	34	C	0.30	28	C
	EBR	0.12	32	C	0.15	27	C
	WBL	0.06	32	C	0.02	26	C
	WBT	0.35	34	C	0.27	28	C
	WBR	0.01	31	C	0.02	26	C
	NBL	0.63	27	C	0.42	10	B
	NBT	0.38	8	A	0.78	17	B
	NBR	0.01	5	A	0.01	7	A
	SBL	0.04	10	A	0.11	13	B
	SBT	0.99	45	D	0.63	20	B
	SBR	0.12	11	B	0.11	12	B

As in previous conditions, under future total 2030 conditions, the unsignalized intersection of Vandorf Sideroad and Archerhill Court / Monkman Court does not have any traffic operating concerns during the weekday a.m. or p.m. peak hours.

The signalized intersection of Vandorf Sideroad and Bayview Avenue is anticipated to operate with an overall LOS 'C' during both weekday a.m. and p.m. peak hours and overall v/c ratio of 0.88 and 0.81, respectively. All individual movements operate with relatively low delays and a v/c ratio less than 1.0, representing reserve capacity. It is noted that the site traffic does not impact the volume of traffic using the southbound through movement at the Vandorf Sideroad at Bayview Avenue intersection. Although this movement would operate close to capacity, it is expected that with the planned widening of Bayview Avenue to two lanes in both directions after 2031 this future capacity constraint will be resolved. To forecast this, a sensitivity analysis has been completed in **Section 7.3.3**.

7.3.3 Sensitivity Analysis

The traffic capacity analysis results for the intersection of Vandorf Sideroad & Bayview Avenue is summarized in **Table 7-5** for both weekday a.m. and p.m. peak hours under 2030 future total sensitivity analysis traffic conditions. The proposed southbound left lane on Archerhill Court / Monkman Court has been included as reflected in the proposed site plan.

Table 7-5 - Future Total 2030 Sensitivity Capacity Analysis

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Vandorf Sideroad & Bayview Avenue	Overall	0.55	17	B	0.52	16	B
	EBL	0.61	37	D	0.71	39	D
	EBT	0.28	30	C	0.30	28	C
	EBR	0.12	29	C	0.15	27	C
	WBL	0.05	29	C	0.02	26	C
	WBT	0.33	31	C	0.27	28	C
	WBR	0.01	28	C	0.02	26	C
	NBL	0.40	8	A	0.33	8	A
	NBT	0.21	7	A	0.41	9	A
	NBR	0.01	6	A	0.01	7	A
	SBL	0.06	11	B	0.06	12	B
	SBT	0.56	16	B	0.33	14	B
	SBR	0.10	11	B	0.11	12	B

Under future total 2030 sensitivity conditions, the signalized intersection of Vandorf Sideroad and Bayview Avenue operates significantly better with the addition of northbound and southbound lanes. The intersection operates with an overall LOS of 'B' for both peak hours and overall v/c ratios of 0.55 and 0.52, during weekday a.m. and p.m. peak hours, respectively. Individual movements operate with sufficient reserve capacity and low delays. Specifically, the southbound through movement on Bayview Avenue has a v/c ratio of 0.56 in the a.m. peak hour, which is a significant improvement from the v/c ratio of 0.99 observed in the future total conditions.

8 TRAFFIC QUEUING OPERATIONS

Table 8-1 provides a summary of the 95th percentile queues derived from microsimulation of baseline and future conditions in 2021 and 2030. The queuing report was prepared using SimTraffic V.10 micro-simulation software using the following methodology: 10 minutes seeding time, one-hour recording, and 5 runs. The 95th percentile queue lengths that are bolded are predicted to extend beyond available storage of a dedicated turn lane or extend beyond an upstream intersection and/or major access point.

Queuing analysis conditions are provided in **Appendix H**.

Table 8-1 - 95th Percentile Queue Lengths

Intersection	Movement	Available [Proposed] Storage (m)	95 th Percentile Queue Length (m)									
			Baseline 2021		Background 2030		Background 2030 Sensitivity		Total 2030		Total 2030 Sensitivity	
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Vandorf Sideroad & Archerhill Court / Monkman Court	EBLTR	-	3	4	5	6	4	3	12	6	7	9
	WBLTR	-	3	8	-	10	5	10	5	13	6	12
	NBLTR	-	12	10	12	12	11	11	13	12	12	12
	SBLTR	-	9	9	11	8	11	8	-	-	-	-
	SBL	[42]	-	-	-	-	-	-	15	24	14	23
	SBTR	-	-	-	-	-	-	-	16	10	16	10
Vandorf Sideroad & Bayview Avenue	EBL	50	38	49	50	50	42	45	74	54	48	56
	EBT	-	35	33	34	40	31	36	60	38	31	39
	EBR	60	41	35	43	40	29	27	52	44	30	31
	WBL	60	10	6	10	7	11	5	9	6	10	6
	WBT	-	33	27	36	30	32	27	36	33	31	31
	WBR	60	6	18	9	16	8	13	8	18	9	14
	NBL	75	43	30	46	53	42	31	50	69	38	36
	NBT	-	45	96	43	133	33	50	47	145	34	53
	NBR	70	4	8	5	8	3	7	4	9	5	6
	SBL	75	9	10	56	10	8	9	54	11	8	9
	SBT	-	141	60	363	81	61	44	408	82	59	46
SBR	70	32	14	172	16	15	14	211	18	17	15	

Under baseline 2021 conditions, all 95th percentile queues at both intersections can be accommodated by the available storage distances.

Under future background 2030 conditions, all 95th percentile queues are shorter than the available storage at the intersection of Vandorf Sideroad and Archerhill Court / Monkman Court. With the exception of the southbound right movement, all other 95th percentile queues can be accommodated by the available storage at Vandorf Sideroad and Bayview Avenue. The a.m. peak hour southbound right movement at Vandorf Sideroad and Bayview Avenue shows a queue of 172 metres, which exceeds the available storage for the southbound right-turn lane. This is a result of the large queue for the southbound through movement blocking access to the southbound right lane increasing the length of the southbound right queue. With the proposed widening of Bayview Avenue under future background sensitivity conditions, the southbound through and right queues significantly decrease.

Similarly, under 2030 future total conditions, the 95th percentile queue lengths do not exceed available storage at Vandorf Sideroad and Archerhill Court / Monkman Court. As seen in the future background conditions, the southbound right movement during the a.m. peak hour exceeds the available storage at Vandorf Sideroad and Bayview Avenue intersection with a 95th percentile queue length of 211 metres. This is resolved with future widening of Bayview Avenue. Additionally, the a.m. and p.m. peak hour eastbound left movements at Vandorf Sideroad and Bayview Avenue are shown to extend beyond their available storage lengths under future total conditions as a result of the signal timing modifications required to provide additional time for the southbound direction. However, with the planned widening of Bayview Avenue, the storage lengths can accommodate the 95th percentile queue during the a.m. peak hour. In the p.m. peak hour, although the queues exceed the storage, the projected queue can be accommodated in the left turn taper.

Overall, the queueing analysis indicates that for all scenarios under all horizons (i.e. baseline 2021, future background 2030, and future total 2030) for both a.m. and p.m. peak hours, most intersection queues do not exceed the available storage, indicating acceptable traffic operations. At the intersection of Vandorf Sideroad and Bayview Avenue, queues exceeding the storage lengths can be accommodated by the taper length, or with future road improvements at the intersection.

9 PARKING ASSESSMENT

The parking requirements for developments in the Town of Aurora are governed by their Zoning By-Law #6000-17 Section 5.4. Based on this by-law, the minimum parking supply rate is 2.0 spaces per detached dwelling unit.

The proposed parking supply for the subject site is 4.0 spaces per unit (2.0 spaces per driveway, and 2.0 space per garage). For 146 detached dwellings units as proposed in the site plan, the required parking supply is 292 units, and the proposed supply is 584 spaces. Thus, the site exceeds the required minimum parking standard, with a surplus of 292 spaces. **Table 9-1** summarizes the parking supply required and provided.

Table 9-1 - Parking Supply Analysis

Quantity	Number of Spaces
Minimum Parking Rate	2.0 per detached dwelling unit
Number of Units	146
Minimum Required Parking Supply	292
Proposed Parking Rate	4.0 per detached dwelling unit
Proposed Parking Supply	584
<i>Number of Surplus/Deficit Parking Spaces</i>	<i>+292</i>

10 MULTI-MODAL LEVEL OF SERVICE REVIEW

The multi-modal level of service (MMLOS) was determined for future conditions based on criteria outlined in York Region’s Transportation Mobility Plan Guidelines (November 2016). The transit, pedestrian, and cycling modes were reviewed.

10.1 Level of Service Review

10.1.1 Transit Level of Service

Table 10-1 summarizes the proposed transit level of service within the proximity of the subject site based on criteria outlined in York Region’s Transportation Mobility Plans Guidelines (November 2016).

Table 10-1 - Transit Level of Service Summary

Intersection	Direction	Access to Transit Stops	Transit headways	Intersection Approach (transit or curb lanes)
		LOS	LOS	LOS
Vandorf Sideroad at Archerhill Court / Monkman Court	Eastbound	A	C	A
	Westbound	A	C	A
	Northbound	A	C	C
	Southbound	A	C	C
Vandorf Sideroad at Bayview Avenue	Eastbound	A	C	C
	Westbound	A	C	C
	Northbound	A	C	B
	Southbound	A	C	C

Given the proximity of the two study intersections to one another, the transit levels of service were found to be similar between intersections. Access to transit stops and transit headways were deemed LOS A and C, respectively, in anticipation of the frequent transit network using Bayview by the final horizon year. All intersections will meet the transit LOS targets as provided by York Region.

10.1.2 Pedestrian Level of Service

Table 10-2 summarizes the proposed pedestrian level of service within the proximity of the subject site based on criteria outlined in York Region’s Transportation Mobility Plan Guidelines (November 2016). The northbound and southbound segments at Vandorf Sideroad and Archerhill Court / Monkman Court reflect the pedestrian level of service throughout the entirety of Archerhill Court and Monkman Court, respectively.

Table 10-2 - Pedestrian Level of Service Summary

Intersection	Direction	Segment		Intersection
		Description	LOS	LOS
Vandorf Sideroad at Archerhill Court / Monkman Court	Eastbound	Vandorf Sideroad	B	E
	Westbound	Vandorf Sideroad	B	E
	Northbound	Archerhill Court	B	E
	Southbound	Monkman Court	B	E
Vandorf Sideroad at Bayview Avenue	Eastbound	Vandorf Sideroad	E	D
	Westbound	Vandorf Sideroad	E	D
	Northbound	Bayview Avenue	A	A
	Southbound	Bayview Avenue	A	A

Pedestrian facilities exist along all study area segments. The critical approaches for the intersection of Vandorf Sideroad at Bayview Avenue are the eastbound and westbound segments. It is noted that Vandorf Sideroad at Archerhill Court / Monkman Court is a two-way stop-controlled intersection, without pedestrian signals, and with curb cuts provided along the northbound and southbound legs only.

10.1.3 Cycling

Table 10-3 summarizes the proposed pedestrian level of service within the proximity of the subject site based on criteria outlined in York Region's Transportation Mobility Plans Guidelines (November 2016).

Table 10-3 - Cycling Level of Service Summary

Intersection	Direction	Segment		Intersection
		Description	LOS	LOS
Vandorf Sideroad at Archerhill Court / Monkman Court	Eastbound	Vandorf Sideroad	D	D
	Westbound	Vandorf Sideroad	E	F
	Northbound	Archerhill Court	F	F
	Southbound	Monkman Court	F	F
Vandorf Sideroad at Bayview Avenue	Eastbound	Vandorf Sideroad	D	D
	Westbound	Vandorf Sideroad	E	E
	Northbound	Bayview Avenue	A	A
	Southbound	Bayview Avenue	A	A

The multi-use path on the west side of Bayview Avenue may be considered a separated cycling facility. The multi-use path on the south side of Vandorf Sideroad may be used by bikes and the paved shoulders along Bayview Avenue may be also considered de-facto bicycle lanes.

The MMLOS review indicates that future conditions meet targets for transit levels of service, but do not meet targets for pedestrian and cycling levels of service. This presents an opportunity to improve the pedestrian and cycling facilities in the area to improve the safety of pedestrians and cyclists while reducing dependence on the automobile, which will be further discussed in **Section 11**.

11 TRANSPORTATION DEMAND MANAGEMENT

Transportation 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; and
- Reduced personal transportation costs and energy consumptions.

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

Typical TDM measures include:

- Carpool/vanpool ride sharing, with emergency ride home;
- High-occupancy vehicle (HOV) lanes in existing rights-of-way for bus, taxis, and cars with three or more occupants;
- Bicycle and pedestrian programs;
- Promotion of public transit, including employer transit fare incentives;
- Parking supply and management strategies;
- Use of “smart card” technology and other advances in the pricing and marketing of transportation services;
- Establishment of Transportation Management Associations (TMAs) in employment areas and car-sharing organizations in residential areas;
- Programs to promote flexible working hours and telecommuting; and,
- Application of incident management systems and Intelligent Transportation System (ITS) innovations.

Development of site-specific TDM measures for the proposed site is based on a 2030 planning horizon. There, in the context that the primary objective is to reduce single-occupancy vehicle use, the plan will review opportunities to rest realistic targets for increased use of carpooling, transit, cycling, and walking trips.

This section will focus on:

- Identification of site related TDM measures that address York Region objectives; and,
- TDM program implementation, as well as the approach to on-going evaluation and monitoring

11.1 Objectives

York Region Transportation Master Plan

York Region’s Transportation master Plan (2016) sets out to respond to the challenge to “create an advanced interconnected system of mobility in the GHTA in order to give York Region residents and businesses a competitive advantage making York Region the best place to live, work, and play in the GTHA.” This outlook aligns with the benefits of TDM strategies, and as a result the following three TMP Objectives are well positioned to benefit a comprehensive TDM plan for the subject site.

Objective 1: Create a World Class Transit System

York Region will have a world class system when there is a seamless interconnected system of subways, rapidways, a frequent transit network and other services that meet the needs of all York Region residents and businesses. This

system will help to direct growth to Centres and Corridors and ensure a compact, mixed-use built form that minimizes the need for travel and reduces dependence on single-occupant vehicles.

Objective 3: Integrate Active Transportation in Urban Areas

Focusing on improving the viability of active transportation in York Region's urban areas is vital to ensuring a sustainable transportation system for the future. The Region recognizes the benefits of providing a variety of active transportation options, including improved health of residents, better air quality, and reduced greenhouse gas emissions, a more connected and efficient transportation network, reduced traffic congestion, and less dependence on the automobile.

Object 5: Make the Last Mile Work

The "last mile" refers to the point or moment when consumer decisions are actually made. It refers to the tactics used to increase adoption of transit and active transportation while lowering the amount of single occupant vehicle use especially during peak periods.

The results of this focus in policy are seen in the discussions below on opportunities being applied to enhance TDM opportunities throughout the study area and region. In particular, the focus on the Last Mile is worth noting as it will greatly benefit TDM strategies. As part of this objective, the TMP recommends the provision of safe and convenient walking/cycling opportunities to mobility hubs; managing parking supply and demand with innovation in pricing and technology; and embracing emerging technologies and the sharing economy to improve convenience and mobility. These actions are fundamental to a robust TDM plan.

11.2 Proposed TDM Measures

The TDM approach proposes a mix of hard and soft measures to meet the objectives and targets to reduce vehicular travel demand and encourage passenger, transit, cycling, and walking. Details are proposed and reviewed with each for the following TDM opportunities.

11.2.1 Active Transportation Plan

Pedestrian Connectivity

The concept plan identifies that sidewalks will be provided on one side of the street in Archerhill Court, as per the Town of Aurora standard drawings for residential streets with an 18.0 metre right-of-way. This internal pedestrian network will connect with the existing facilities on Vandorf Sideroad to facilitate the flow of pedestrian movement to and from the surrounding neighbourhoods. At intersections, curb cuts with AODA compliant ramps will connect sidewalks to grade level of all subdivision roads to facilitate the flow of pedestrians throughout Archerhill Court.

A multi-use path currently runs along the west side of Bayview Avenue, providing a facility for both pedestrians and cyclists along this road. Sidewalk gaps currently exist along both the north and south sides of Vandorf Sideroad between Archerhill Court and Bayview Avenue; paved shoulders currently exist at these segment locations. Installation of sidewalks along these locations by the Town of Aurora and York Region respectively would improve the pedestrian realm along these roads within the study area and facilitate the flow of pedestrians to and from Archerhill Court.

As noted previously, west of Archerhill Court at Vandorf Sideroad is the southern terminus of the Nokiidaa Trail, an Active Transportation walking and cycling trail which travels north-south through Aurora and Newmarket, eventually terminating in East Gwillimbury. A paved trail extends south of Vandorf Sideroad from the Nokiidaa Trail leading to Bayview Avenue. This trail will provide a car-free route for pedestrians and cyclists travelling to/from the neighbourhood, and along with existing pedestrian facilities highlights the potential for strong pedestrian connectivity within the development site and its adjacent community.

Cycling Network Connectivity

As determined by conducting the bicycle level of service review, de-facto cycling facilities exist along some of the road segments in the study area, and cyclists will be well-connected in and out of the study area through a network of multi-

use paths (such as along the west side of Bayview Avenue), paved shoulders, and quiet streets within Archerhill Court. Additionally, connectivity to the intermunicipal trail network is made possible by the nearby Nokiidaa Trail. Designated and marked cycling facilities are not currently provided along most roads in the study area, thus presenting an opportunity to provide designated facilities for cyclists along Bayview and Vandorf.

The 2016 York Region Transportation Master Plan conceptualizes the extension of the existing trail terminating at Bayview Avenue further south to meet the existing cycling facility at Bloomington Road. Additionally, by 2041, dedicated cycling facilities will be implemented along Bayview Avenue north and south of Vandorf Road, providing further connectivity to the regional cycling network.

Transit Service Expansion and Incentives

York Region, in partnership with the Province of Ontario and the Government of Canada, are investing in GO Regional Express Rail, subway extensions, Viva rapidways, YRT frequent transit network and YRT local and specialty transit services. All of these elements will provide for a fully integrated transit system connecting York Region's communities to one another and connecting residents to neighboring communities throughout the Greater Toronto and Hamilton Area.

According to the 2016 York Region Transportation Master Plan, the only potential transit improvement in the vicinity of the study area will include the addition of Bayview Avenue as part of the YRT Frequent Transit Network, from 19th Avenue (in Richmond Hill), through Aurora, and up to Queensville Sideroad in East Gwillimbury, planned between 2027 to 2031. The additional transit coverage provided will contribute to increasing the transit mode share within the study area.

Additional planned improvements nearby include upgrading the existing VIVA Blue BRT line along Yonge Street to include rapidways for improved service (2022-2026), the inclusion of Wellington Street as part of the YRT Frequent Transit Network (2022-2026), and the start of two-way all-day GO Train regional rail service, with 15-minute service south of Aurora GO Station (2022-2026). With effective investments in accessible local and regional transit service expansions, there are numerous opportunities for future and existing residents to connect to local and regional frequent and reliable transit from the study area.

11.2.2 Transit Incentives

Given the location of the site, which will have improved access to transit options in the future, York Region and/or the Town of Aurora should provide each residential dwelling unit with a twenty-five dollar (\$25) pre-loaded PRESTO card as an incentive to promote transit usage. The Region/Town should consider funding this TDM initiative to cover the anticipated costs and support transit ridership.

The owner shall agree in the Purchase Agreement to advise all potential purchasers of the existing and future introduction of transit services in this development. This includes current and potential transit routes, bus stops and shelter locations. This shall be achieved through distribution of information/marketing material (YRT/Viva route maps, future plan maps and providing YRT/Viva website contact information) at the sales office and appropriate notification clauses in purchase agreements.

11.2.3 Rideshare Services

With ride hailing services like Uber, Lyft and other emerging competitors, it should be noted these platforms would provide residents with flexible alternatives to transit, cycling and driving for short, local trips. For future residents who may not own or have access to a car, rideshare services may be used to reach a local transit station, retail plaza, or needed services. This is also an option for those who may not be able to participate in active transportation options and require a door-to-door service, at potentially lower costs than a traditional taxi service.

11.2.4 Microtransit

An option which residents of the proposed development could benefit from is a growing middle-tier form of movement, between private cars and public transportation, which is *microtransit*. Flexible local transit services have been growing

in suburban and urban communities from San Francisco to New York, and this informal rideshare network could reach the GTA by the expected 2025 future build out of this study area. Future microtransit providers may become feeders to public transit core routes, addressing accessibility challenges for some residents, while reducing the burden on the Town for custom local routes and supporting the trending car-free lifestyle of younger generations. While a newer, niche service, microtransit may be a viable TDM measure for the future development, particularly in a community the size of Aurora and with the proximity of Archerhill Court to nearby transit options.

11.2.5 Information Brochure

The TDM opportunities outlined in this section would all benefit from an additional measure of preparing a customized commuter options brochure for prospective and new residents. This brochure would contain details on a variety of travel options such as: local/regional transit, location of HOV lanes, pedestrian trails, cycling, and transit facilities and carpool options. The package may include a community map, York Region Transit route maps, GO Transit route map and schedules, and information on the York Region Smart Commute organization and its programs. Future transit routes may also be added for residents' information about future transportation options.

People who cycle for recreational purposes are good groups to target as potential commuter cyclists. They have access to a bicycle and may already be familiar with the Town's network of cycling and trail facilities. Many residents, however, may have simply never tried cycling and could be unfamiliar with appropriate routes, techniques, and advice for commuting to work / school by bike. This could be reinforced through a Bicycle Network Way-finder Map for residents that could be included in the information package.

Short-distance commuters could be targeted with messages focusing on the convenience, cost and health benefits of walking or cycling to work. In addition, practical advice regarding route selection, bike parking, and remaining active in cold or wet weather would be useful and effective. This information could be provided to residents during regular communications throughout the year by the Town.

Elderly residents as well as people with physical limitations may be prevented from getting to their destination on their own. In these instances, carpooling, car-share, and shuttle services are important transportation options. The marketing of these opportunities and availability of the services should be provided in further detail to better inform these individuals.

11.2.6 Communication Strategy

The developer / condo board should develop a Communication Strategy to document the steps that will need to be undertaken by the applicant at the appropriate time to assist the Region and the Town of Aurora to effectively deliver the Information Packages and pre-loaded PRESTO Cards to residents.

This communication strategy shall also include a physical location for distribution of the Information Packages and pre-loaded PRESTO Cards. The applicant is responsible for the coordination and for providing a venue for the distribution of PRESTO cards. Each event, approximately 2 hours of staff time, can serve approximately 50 residential units. The applicant shall coordinate specific event details with York Region/York Region Transit Staff allowing a minimum of 2 months' notice (value to be determined).

11.3 TDM Monitoring and Measures of Success

Site Assessment

The Town of Aurora should schedule an onsite assessment with the developer to understand infrastructure accessibility of all commuting modes and surrounding land uses (trails and cycle lanes etc.). The review will help guide cost-effective transportation strategies that could reduce auto trips.

Baseline Commuter Survey

The Town of Aurora, in collaboration with local residents, should conduct a confidential transportation survey amongst all residents in the proposed development. The comprehensive survey will provide a measure of current commuter traffic patterns, modes of transportation, behaviours, and perceptions for the area.

Results will also assist in identifying the demand for sustainable transportation options and opportunities to provide better site access and reduce auto trips.

Follow-Up Commuter Survey

The Town of Aurora, in collaboration with local residents, should conduct a follow-up TDM survey two years after the baseline commuter survey. Results will identify areas of success and improvement for sustainable options for the development and surrounding area. A revised work plan could be developed with strategies to improve sustainable transportation that meet the needs of the residents.

11.4 TDM Checklist

York Region, in consultation with local municipalities, has developed a Transportation Demand Management checklist to assist in the development of a comprehensive Transportation Demand Management Plan. York Region and local municipalities will consider other recommendations beyond the requirements outlined in the checklist, as long as it meets the objectives of the Regional and local municipal Official Plans and policies.

This checklist has been completed and included as part of the Transportation Demand Management Plan section for further review by Regional and respective local municipal staff. The TDM checklist is summarized in **Table 11-1**.

Table 11-1 - TDM Checklist for Residential Developments

TDM Measures	For Residential Developments		
	Requirement	Responsibility	Cost
Transit incentives (i.e. PRESTO cards)	Yes	York Region to consider	TBD
Information packages (YRT/Viva maps, GO schedules, cycling maps)	Yes	York Region to consider and could be distributed at sales office	TBD
Communication strategy and physical location to deliver PRESTO cards and information packages	Yes	Applicant	Approximately \$100.00 (print costs)
Outreach programs	Yes	York Region to consider	TBD
Pedestrian connections	Yes	Applicant	–
Cycling connections	Yes	Applicant	–
Ped/cycling connections to transit facilities	Yes	Applicant	–
Internal pedestrian/cycling circulation	Internal sidewalks provided	Applicant	–
Active transportation network/fine-grid	Yes	Applicant	–
Illumination of pedestrian/cycling connections	Area luminaires to be installed illuminating the proposed on-site sidewalks and roads	Applicant / Municipality	–
Monitoring program/report	Yes	York Region to consider	TBD

12 CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis completed as part of this study and associated findings, TMIG has concluded that the proposed development can be accommodated by the boundary road network. All conclusions and recommendations made as part of this study have been detailed below.

Site Circulation Review

Emergency, waste collection, heavy, and passenger vehicle manoeuvres within the site were modelled using AutoTURN software and the analysis illustrates the design vehicles can be accommodated. The design vehicles adhere to York Region guidelines. A pavement marking and signage plan was also completed.

Traffic Operations Review

Overall, the capacity and queuing analysis indicates that for all scenarios under all horizons (baseline 2021, future background 2030, and future total 2030) for both a.m. and p.m. peak hours, the site access (Archerhill Court at Vandorf Sideroad) operates with reserve capacity and the queues do not exceed the available storage. In the baseline (2021) horizon, all movements at the intersection of Vandorf Sideroad and Bayview Avenue operate within capacity, with the southbound through movement approaching capacity in the a.m. peak hour.

In the future background (2030) horizon, due to background growth and the addition of background development traffic, the intersection of Vandorf Sideroad and Bayview Avenue continues to have capacity constraints in the a.m. peak hour with the southbound through movement approaching capacity, and the overall intersection operating with a v/c ratio of 0.86. The future total (2030) horizon operates with negligible difference from the future background (2030) horizon, due to the low amount of traffic volume added to the network from the proposed development.

A sensitivity analysis was completed for the future background (2030) and future total (2030) horizons to forecast the capacity and queuing operations with the future planned road widening of Bayview Avenue. Widening the southbound and northbound through lanes to two through lanes in each direction improves the operational constraints at the intersection. Before the road widening along Bayview Avenue is complete, the eastbound left and southbound right queues exceed the available queue lengths at Vandorf Sideroad in the future horizons, but this is resolved with the future planned road widening of Bayview Avenue, planned beyond 2031.

TMIG recommends that optimized signal timing cycle length in the a.m. and p.m. peak hour and splits be implemented to accommodate 2030 future background conditions and the subsequent future total conditions at Vandorf Sideroad and Bayview Avenue. The traffic signal is recommended to have a cycle length of 90 seconds in both peak hours. An exclusive southbound left turn lane at the site access (Archerhill Court at Vandorf Sideroad) is also recommended.

Multi-Modal Level of Service

Under future total conditions, the transit LOS meets the Region's standards. The cycling and pedestrian LOS at the intersection of Vandorf Sideroad and Archerhill Court is projected to be the same as existing conditions.

Transportation Demand Management (TDM)

TMIG recommends various TDM initiatives for the proposed development related to transit, active transportation, outreach programs and more. All TDM recommendations have been summarized in **Section 11.4**.

APPENDIX A

Pre-Consultation Correspondence

March 19, 2021

PROJECT NUMBER 10187

Region of York
Attn: David Schleihauf
17250 Yonge Street
Newmarket, ON
L3Y 6Z1

Dear Mr. Schleihauf,

**Re: Proposed Archerhill Court Residential Development
Transportation Impact Study – Terms of Reference**

Introduction

The Municipal Infrastructure Group Ltd., a T.Y. Lin International Company (TMIG) has been retained to complete a Transportation Impact Study (TIS) for the proposed residential redevelopment to be located on the north/west corner of Vandorf Side Road and Bayview Avenue (Regional Road 34) intersection in the Town of Aurora.

The existing site currently consists of 14 detached homes fronting onto a cul-de-sac (Archerhill Court) and the proposed development is to consist of a subdivision with approximately 147 single detached homes with the proposed access via Archerhill Court/Street A at Vandorf Sideroad.

To properly scope this project, we ask that the review agencies (Town of Aurora and Region of York) provide comments on the following terms of reference and the requested information noted below.

Terms of Reference

Traffic Impact Assessment

- Collect road inventory information about the study area road network, including lane configurations, traffic controls, speed limits, locations of transit stops, sidewalks, and cycling facilities. The proposed Study Area is proposed to include the following intersections:
 - Vandorf Sideroad at Archerhill Court (unsignalized); and
 - Vandorf Sideroad at Baview Avenue (signalized).
- We will arrange to obtain from the review agencies, any other traffic studies, as made available, of nearby and relevant developments in the immediate vicinity of the subject site. We will also obtain any available background information relating to future road improvements in the vicinity of the subject site.
- Obtain viable turning movement counts for the existing intersections noted above from the review agencies. Should the review agencies be unable to provide recent traffic data (no available data or outdated counts), a subconsultant specializing in traffic data collection will be retained by TMIG to collect weekday morning (7:00 AM to 9:00 AM) and afternoon (4:00 PM to 6:00 PM) peak period turning movement counts at the required study intersection (peak study periods to be confirmed with the review agencies).
- Obtain signal timings for the existing signalized study area intersection from the Region.

- Based on the traffic counts, prepare a baseline model (2021) of traffic operations of the study area intersections using Synchro/SimTraffic (an industry-accepted analysis software) for the critical weekday morning and afternoon peak hours.
- Future background traffic volumes will be estimated for the study area to correspond with a five-year horizon from the date of the study. Traffic for the horizon year (2026) will be obtained by applying a growth rate and traffic generated from planned developments in the vicinity of the site. We will report any operational deficiencies and recommend mitigating measures, if necessary, to improve future pre-development traffic operations.
- The weekday morning and afternoon peak hour traffic to be generated by the proposed development will be estimated using the data published in the Institute of Transportation Engineers, Trip Generation (10th Edition). The directional distribution of traffic approaching and departing the site will be based upon the distribution derived from the traffic counts, the Transportation Tomorrow Survey, and/or any relevant data made available by the review agencies.
- Create a future conditions (2026) traffic operations model to assess the traffic impacts of the proposed development after introducing the estimated site generated traffic into the future background traffic model. We will report any operational deficiencies and recommend mitigating measures, if necessary, to improve traffic operations, including recommending lane configuration changes, and/or traffic control alterations.
- Based on the results of the traffic analyses, improvements to the study area roadway system and traffic controls will be recommended, as necessary, to accommodate projected future traffic volumes (triggered by background and/or site related trips). We would also provide recommendations for the lane configurations of the proposed site access.

Parking Assessment

- Provide a Parking Assessment to check in-force parking supply by-law requirements, compare with the proposed parking supply, and identify any changes required. We propose to include a chapter in the report summarizing this information for Town review and acceptance. Based on the initial information provided by the applicant, a total of four parking spaces (two in the garage and two in the driveway) are anticipated. It is therefore our presumption that the proposed site plan will satisfy the Town's parking supply by-law requirements.

Internal Subdivision Review

- Review the internal circulatory system and its conformance with relevant design standards. This would include a review of the general layout, sightline analysis, traffic controls, geometric reviews of corner radii and intersection alignment and parking areas.
- Provide a swept pathway analysis using vehicle tracking software (AutoTURN) at critical areas to ensure passenger cars, emergency service, heavy vehicle and waste removal vehicles can navigate the internal roadways and access points.

Active Transportation Plan

- Prepare a comprehensive Active Transportation Plan illustrating the pedestrian system throughout the site, including connections to external active transportation linkages (sidewalks) and transit facilities. Provide opinion and recommendations on features and mitigation measures to protect vulnerable road users and enhance safety within the Site and along the new municipal roadway.

Multi-Modal Level of Service Review

- As per the York Region Transportation Mobility Guidelines, TMIG will complete a review of the transit and active transportation level of service (LOS) under existing, future background and future total conditions. The LOS is based on the facilities in place (and planned) to support non-auto modes of travel, as well as the frequency and roadway operations regarding transit.
- As part of the multi-modal LOS review, TMIG will derive the non-auto trip generation associated with the proposed development, to be detailed in the study.

Transportation Demand Management (TDM) Plan

- TMIG will prepare a TDM plan detailing all initiatives recommended to support reductions to single-occupant private vehicle trips and promote a shift to transit and active transportation modes. A breakdown of all TDM initiatives will be provided, along with the cost and responsible party associated with each item.

Documentation

- We will prepare a Transportation Impact Study report documenting the above analyses conducted and our findings and conclusions for submission to the review agencies by the applicant.

Summary of Requested Information

Please provide the following information and note that we have submitted a separate request to the Town of Aurora:

- a) Comments on the above terms of reference;
- b) Recent turning movement counts for the study area intersection(s);
- c) Signal timings for the existing signalized study area intersection;
- d) Historical traffic volume data along Vandorf Sideroad and Bayview Avenue or provide an appropriate annual growth rate or traffic model outputs for the study area roadways;
- e) All relevant background developments (and associated traffic studies, if available) to be included as part of the future background conditions; and
- f) All planned roadways improvements to be implemented at/near the study area by the horizon year.

Thank you in advance for your attention to this matter. We look forward to your comments on the preceding scope of work and the requested information.

Should you have any questions, please do not hesitate to contact me.

Yours truly,

THE MUNICIPAL INFRASTRUCTURE GROUP LTD.
A T.Y. LIN INTERNATIONAL COMPANY



Chris Day, C.E.T., MITE.

Senior Project Manager | cday@tmig.ca

Alan Xaykongsa

From: Schleihauf, David <David.Schleihauf@york.ca>
Sent: Friday, March 26, 2021 9:31 AM
To: Chris Day
Cc: Bui, Vi; Wong, Ryan
Subject: RE: 10187: Archerhill Court Residential Development TIS - TOR

Hello Chris,

Just a follow-up, the Region has decided to accept new traffic counts. If possible, please compare to historical data.

Regards,

David Schleihauf, P.Eng. | Transportation Planner, Transportation Development Planning, Transportation & Infrastructure Planning Branch, Transportation Services

1-877-464-9675 ext. 77857

Our Mission: **Working together to serve our thriving communities – today and tomorrow**

From: Schleihauf, David
Sent: Thursday, March 25, 2021 9:36 AM
To: Chris Day <CDay@tmig.ca>
Cc: Bui, Vi <Vi.Bui@york.ca>; Wong, Ryan <Ryan.Wong@york.ca>
Subject: RE: 10187: Archerhill Court Residential Development TIS - TOR

Hello Chris,

Please see our comments below regarding the TOR.

1. Traffic counts, signal timings, and historical AADTs can be purchased from traffic.data@york.ca. Unfortunately, we do not have a recent count for Bayview/Vandorf, please check with the Town as they may have a count from a recently approved study. It is still not advised to conduct traffic counts now, however, updated counts may be required for future submissions.
2. The study should be consistent with our [Mobility Plan Guidelines](#) and [Access Guidelines](#).
3. The TOR notes a horizon year of 2026, please note that our Mobility Plan Guidelines state the horizon year should be five years after full build-out.
4. Please consult with the Town regarding relevant background studies in the area.
5. FYI, due to noise concerns, the Region discourages backlotting along arterial roads for low-density residential.

Please note, this is not an approval, the Region will provide additional detailed comments when the study is submitted for review.

Regards,

David Schleihauf, P.Eng. | Transportation Planner, Transportation Development Planning, Transportation & Infrastructure Planning Branch, Transportation Services

1-877-464-9675 ext. 77857

From: Chris Day <CDay@tmig.ca>
Sent: Friday, March 19, 2021 3:19 PM
To: Schleichauf, David <David.Schleichauf@york.ca>
Subject: 10187: Archerhill Court Residential Development TIS - TOR

CAUTION! This is an external email. Verify the sender's email address and carefully examine any links or attachments before clicking. If you believe this may be a phishing email, forward it to isitsafe@york.ca then delete it from your inbox. If you think you may have clicked on a phishing link, report it to the IT Service Desk, ext. 71111, and notify your supervisor immediately.

Good Afternoon David,

Attached is the Transportation Impact Study (TIS) Terms of Reference (ToR) for the subject development in the Town of Aurora.

Can you, or designate, please provide any comments the Region has on the ToR and provide the requested information noted in the ToR.

Please note that the ToR has also been sent to the Town for comment.

Should you have any questions, please do not hesitate to contact me.

Thanks,

Chris Day, C.E.T., MITE
Senior Project Manager, Traffic

TMIG | TYLI
The Municipal Infrastructure Group Ltd.
a T.Y. Lin International Company

8800 Dufferin Street, Suite 200 | Vaughan, Ontario L4K 0C5
c: +1.437.331.0857
tmig.ca | tylin.com

March 19, 2021

PROJECT NUMBER 10187

Town of Aurora
Michael Bat
100 John West Way
Aurora, ON
L4G 6J1

Dear Mr. Bat,

**Re: Proposed Archerhill Court Residential Development
Transportation Impact Study – Terms of Reference**

Introduction

The Municipal Infrastructure Group Ltd., a T.Y. Lin International Company (TMIG) has been retained to complete a Transportation Impact Study (TIS) for the proposed residential redevelopment to be located on the north/west corner of Vandorf Side Road and Bayview Avenue (Regional Road 34) intersection in the Town of Aurora.

The existing site currently consists of 14 detached homes fronting onto a cul-de-sac (Archerhill Court) and the proposed development is to consist of a subdivision with approximately 147 single detached homes with the proposed access via Archerhill Court/Street A at Vandorf Sideroad.

To properly scope this project, we ask that the review agencies (Town of Aurora and Region of York) provide comments on the following terms of reference and the requested information noted below.

Terms of Reference

Traffic Impact Assessment

- Collect road inventory information about the study area road network, including lane configurations, traffic controls, speed limits, locations of transit stops, sidewalks, and cycling facilities. The proposed Study Area is proposed to include the following intersections:
 - Vandorf Sideroad at Archerhill Court (unsignalized); and
 - Vandorf Sideroad at Baview Avenue (signalized).
- We will arrange to obtain from the review agencies, any other traffic studies, as made available, of nearby and relevant developments in the immediate vicinity of the subject site. We will also obtain any available background information relating to future road improvements in the vicinity of the subject site.
- Obtain viable turning movement counts for the existing intersections noted above from the review agencies. Should the review agencies be unable to provide recent traffic data (no available data or outdated counts), a subconsultant specializing in traffic data collection will be retained by TMIG to collect weekday morning (7:00 AM to 9:00 AM) and afternoon (4:00 PM to 6:00 PM) peak period turning movement counts at the required study intersection (peak study periods to be confirmed with the review agencies).
- Obtain signal timings for the existing signalized study area intersection from the Region.

- Based on the traffic counts, prepare a baseline model (2021) of traffic operations of the study area intersections using Synchro/SimTraffic (an industry-accepted analysis software) for the critical weekday morning and afternoon peak hours.
- Future background traffic volumes will be estimated for the study area to correspond with a five-year horizon from the date of the study. Traffic for the horizon year (2026) will be obtained by applying a growth rate and traffic generated from planned developments in the vicinity of the site. We will report any operational deficiencies and recommend mitigating measures, if necessary, to improve future pre-development traffic operations.
- The weekday morning and afternoon peak hour traffic to be generated by the proposed development will be estimated using the data published in the Institute of Transportation Engineers, Trip Generation (10th Edition). The directional distribution of traffic approaching and departing the site will be based upon the distribution derived from the traffic counts, the Transportation Tomorrow Survey, and/or any relevant data made available by the review agencies.
- Create a future conditions (2026) traffic operations model to assess the traffic impacts of the proposed development after introducing the estimated site generated traffic into the future background traffic model. We will report any operational deficiencies and recommend mitigating measures, if necessary, to improve traffic operations, including recommending lane configuration changes, and/or traffic control alterations.
- Based on the results of the traffic analyses, improvements to the study area roadway system and traffic controls will be recommended, as necessary, to accommodate projected future traffic volumes (triggered by background and/or site related trips). We would also provide recommendations for the lane configurations of the proposed site access.

Parking Assessment

- Provide a Parking Assessment to check in-force parking supply by-law requirements, compare with the proposed parking supply, and identify any changes required. We propose to include a chapter in the report summarizing this information for Town review and acceptance. Based on the initial information provided by the applicant, a total of four parking spaces (two in the garage and two in the driveway) are anticipated. It is therefore our presumption that the proposed site plan will satisfy the Town's parking supply by-law requirements.

Internal Subdivision Review

- Review the internal circulatory system and its conformance with relevant design standards. This would include a review of the general layout, sightline analysis, traffic controls, geometric reviews of corner radii and intersection alignment and parking areas.
- Provide a swept pathway analysis using vehicle tracking software (AutoTURN) at critical areas to ensure passenger cars, emergency service, heavy vehicle and waste removal vehicles can navigate the internal roadways and access points.

Active Transportation Plan

- Prepare a comprehensive Active Transportation Plan illustrating the pedestrian system throughout the site, including connections to external active transportation linkages (sidewalks) and transit facilities. Provide opinion and recommendations on features and mitigation measures to protect vulnerable road users and enhance safety within the Site and along the new municipal roadway.

Multi-Modal Level of Service Review

- As per the York Region Transportation Mobility Guidelines, TMIG will complete a review of the transit and active transportation level of service (LOS) under existing, future background and future total conditions. The LOS is based on the facilities in place (and planned) to support non-auto modes of travel, as well as the frequency and roadway operations regarding transit.
- As part of the multi-modal LOS review, TMIG will derive the non-auto trip generation associated with the proposed development, to be detailed in the study.

Transportation Demand Management (TDM) Plan

- TMIG will prepare a TDM plan detailing all initiatives recommended to support reductions to single-occupant private vehicle trips and promote a shift to transit and active transportation modes. A breakdown of all TDM initiatives will be provided, along with the cost and responsible party associated with each item.

Documentation

- We will prepare a Transportation Impact Study report documenting the above analyses conducted and our findings and conclusions for submission to the review agencies by the applicant.

Summary of Requested Information

Please provide the following information and note that we have submitted a separate request to the Region of York:

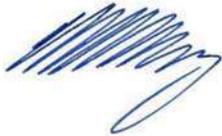
1. Comments on the above terms of reference;
2. Recent turning movement counts for the study area intersection(s);
3. Historical traffic volume data along Vandorf Sideroad and Bayview Avenue or provide an appropriate annual growth rate or traffic model outputs for the study area roadways;
4. All relevant background developments (and associated traffic studies, if available) to be included as part of the future background conditions; and
5. All planned roadway improvements to be implemented at/near the study area by the horizon year.

Thank you in advance for your attention to this matter. We look forward to your comments on the preceding scope of work and the requested information.

Should you have any questions, please do not hesitate to contact me.

Yours truly,

THE MUNICIPAL INFRASTRUCTURE GROUP LTD.
A T.Y. LIN INTERNATIONAL COMPANY

A handwritten signature in blue ink, appearing to read "Chris Day".

Chris Day, C.E.T., MITE.

Senior Project Manager | cday@tmig.ca

Alan Xaykongsas

From: Bat, Michael <MBat@aurora.ca>
Sent: Wednesday, March 31, 2021 3:49 PM
To: Chris Day
Subject: RE: 10187: Archerhill Court Residential Development TIS - TOR
Attachments: 10187_Archerhill Crt Res. Dev. TIS ToR (Town)_20210319.pdf; 3_Vandorf Sdrd W of Archerhill Crt.pdf

Good afternoon Chris,

Please see my comments below for the attached ToR.

- The proposed study area is sufficient. However, the Town don't have any TMC at Archerhill Court (the Region may have count at Bayview Ave). I've attached the most recent AADT at Vandord Sideroad just west of Archerhill Court. This may assist you to make any necessary adjustments. Free feel to give me a call and discuss further if needed;
- The consultant must review the Town's planning application status list (link provided below) for background developments, if you wish to review any of the submitted traffic studies, please contact the Planning Department;
<https://www.aurora.ca/en/your-government/resources/development-planning/Status-Map.pdf>
- Growth rates must be considered for Town roads unless acceptable justifications are provided; and,
- Provide a Pavement Marking and Signage Plan.

Thank you.

Michael

Michael Bat
Analyst, Traffic/Transportation
Engineering and Capital Delivery Division
Planning and Development Services

Town of Aurora
100 John West Way, Box 1000
Aurora, Ontario L4G 6J1

Phone: 905-727-3123 ext. 4374
Fax: 905-841-7119
mbat@aurora.ca
www.aurora.ca

From: Chris Day <CDay@tmig.ca>
Sent: Friday, March 19, 2021 3:21 PM
To: Bat, Michael <MBat@aurora.ca>
Subject: 10187: Archerhill Court Residential Development TIS - TOR

Good Afternoon Michael,

Attached is the Transportation Impact Study (TIS) Terms of Reference (ToR) for the subject development in the Town of Aurora.

Can you, or designate, please provide any comments the Town has on the ToR and provide the requested information noted in the ToR.

Please note that the ToR has also been sent to the Region for comment.

Should you have any questions, please do not hesitate to contact me.

Thanks,

Chris Day, C.E.T., MITE
Senior Project Manager, Traffic

TMIG | TYLI
The Municipal Infrastructure Group Ltd.
a T.Y. Lin International Company

8800 Dufferin Street, Suite 200 | Vaughan, Ontario L4K 0C5
c: +1.437.331.0857
tmig.ca | tylin.com



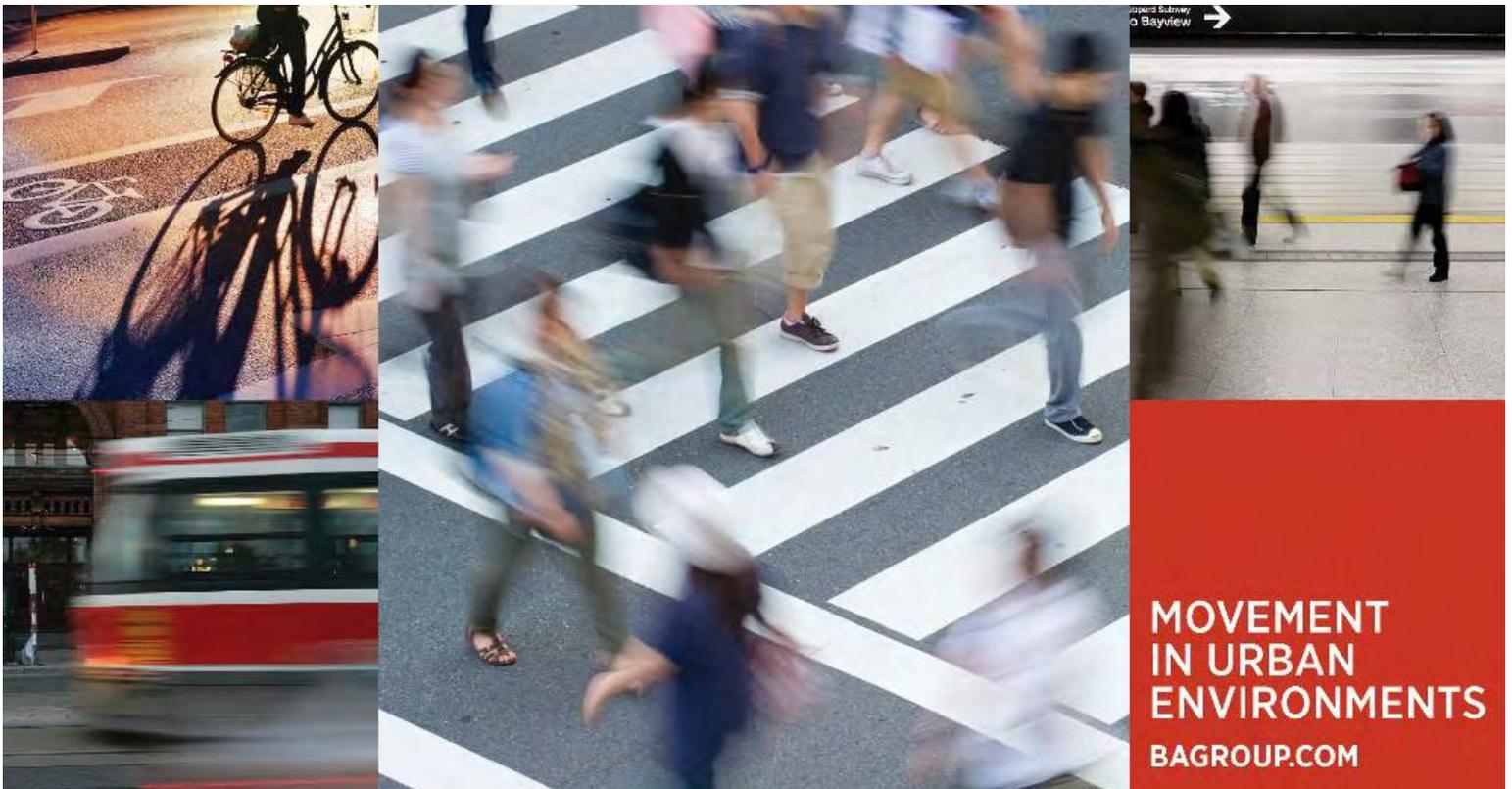
BA Group

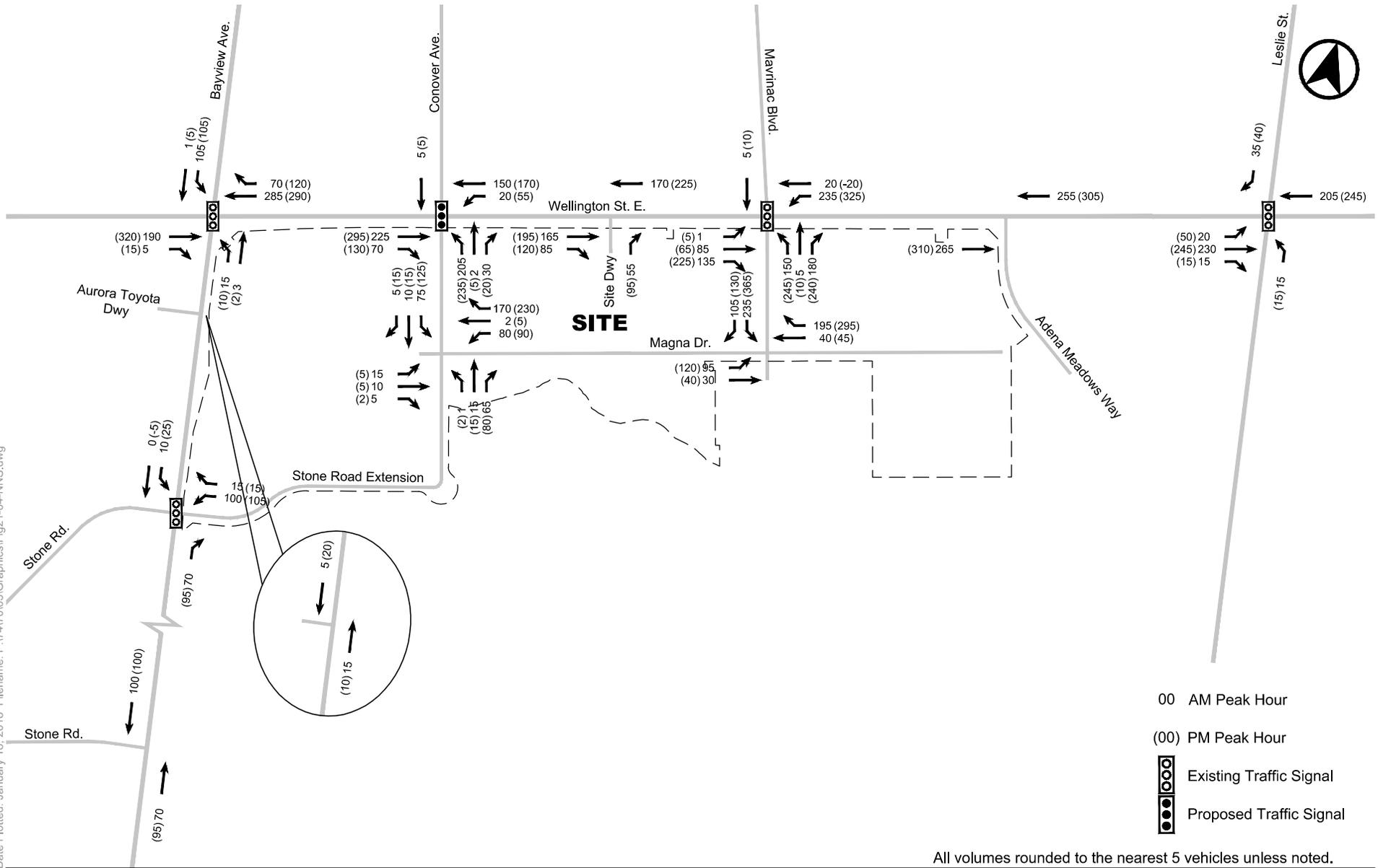
STRONACH SOUTH WELLINGTON LANDS BLOCK PLAN TRANSPORTATION MOBILITY PLAN

Part of Lots 17, 18, 19 and 20 Concession 2, Town of Whitchurch Block 4
Part of Lots 1, 2, 3, 5, 13 and 14 R-Plan 65M-3436, Town of Aurora

Prepared For: The Stronach Group

January 2018





NET NEW SITE TRAFFIC VOLUMES

Alan Xaykongsa

From: Alycia Gruchalla
Sent: Tuesday, August 3, 2021 10:06 AM
To: Alan Xaykongsa
Subject: FW: 10187: Archerhill Court Residential Development TIS - Data Request

From: Schleihauf, David <David.Schleihauf@york.ca>
Sent: May 26, 2021 9:29 AM
To: Alycia Gruchalla <AGruchalla@tmig.ca>
Cc: Bui, Vi <Vi.Bui@york.ca>; Chris Day <CDay@tmig.ca>; Ye, Kevin <Kevin.Ye@york.ca>; Subhani, Ahmad <Ahmad.Subhani@york.ca>; Gao, Wenli <Wenli.Gao@york.ca>
Subject: RE: 10187: Archerhill Court Residential Development TIS - Data Request

Good morning Alycia,

We typically do not confirm growth rates, we'll wait to see the full report as opposed to confirming individual parameters.

Regards,

David Schleihauf, P.Eng. | Transportation Planner, Transportation Development Planning, Transportation & Infrastructure Planning Branch, Transportation Services

1-877-464-9675 ext. 77857

Our Mission: **Working together to serve our thriving communities – today and tomorrow**

From: Alycia Gruchalla <AGruchalla@tmig.ca>
Sent: Friday, May 21, 2021 2:31 PM
To: Schleihauf, David <David.Schleihauf@york.ca>
Cc: Chris Day <CDay@tmig.ca>; Ye, Kevin <Kevin.Ye@york.ca>; Subhani, Ahmad <Ahmad.Subhani@york.ca>; Gao, Wenli <Wenli.Gao@york.ca>
Subject: RE: 10187: Archerhill Court Residential Development TIS - Data Request

CAUTION! This is an external email. Verify the sender's email address and carefully examine any links or attachments before clicking. If you believe this may be a phishing email, forward it to isitsafe@york.ca then delete it from your inbox. If you think you may have clicked on a phishing link, report it to the IT Service Desk, ext. 71111, and notify your supervisor immediately.

Hi David,

Upon review of the provided Region's Emme model as well as a recent, approved traffic study north of our subject site, we propose a 0.5% annual growth rate to be used at the intersection of Bayview Road and Vandorf Sideroad intersection. We feel the 0.5% growth rate is acceptable as:

- The average approach growth rate of the Emme model for the subject intersection is 0.3%
- The growth rate used in the attached traffic study was 0% northbound and 0.5% southbound along Bayview Road

Please confirm that the conservative 0.5% growth rate is acceptable for the purposes of our study.

Thank you and enjoy your long weekend,

Alycia Gruchalla, E.I.T.
Junior Project Manager, Traffic and Mobility Planning

TMIG | TYLI

The Municipal Infrastructure Group Ltd.
a T.Y. Lin International Company

8800 Dufferin Street, Suite 200 | Vaughan ON Canada L4K 0C5
p: +1.905.738.5700 x351 | m: +1 416-543-5253
tmig.ca | tylin.com

From: Gao, Wenli <Wenli.Gao@york.ca>
Sent: May 7, 2021 4:52 PM
To: Alycia Gruchalla <AGruchalla@tmig.ca>
Cc: Chris Day <CDay@tmig.ca>; Ye, Kevin <Kevin.Ye@york.ca>; Subhani, Ahmad <Ahmad.Subhani@york.ca>
Subject: RE: 10187: Archerhill Court Residential Development TIS - Data Request

Hi Alycia,

Please find attached the Region's Emme model outputs for your request. You may refer to the Region's 10-Year Capital Program - [Regional Roads | York Region](#) for the 2031 network assumptions.

The charge for the model outputs is \$300 and the official invoice will be sent to you later. Let me know if you have further questions.

Regards,

Wenli Gao | Transportation Technologist - Forecasting, Transportation and Infrastructure Planning, Transportation Services Department

1-877-464-9675 ext. 75197

Our Mission: **Working together to serve our thriving communities – today and tomorrow**

From: Alycia Gruchalla <AGruchalla@tmig.ca>
Sent: Thursday, May 6, 2021 3:59 PM
To: Gao, Wenli <Wenli.Gao@york.ca>
Cc: Chris Day <CDay@tmig.ca>; Traffic data <Traffic.data@york.ca>; Ye, Kevin <Kevin.Ye@york.ca>
Subject: RE: 10187: Archerhill Court Residential Development TIS - Data Request

CAUTION! This is an external email. Verify the sender's email address and carefully examine any links or attachments before clicking. If you believe this may be a phishing email, forward it to isitsafe@york.ca then delete it from your inbox. If you think you may have clicked on a phishing link, report it to the IT Service Desk, ext. 71111, and notify your supervisor immediately.

Hello,

Thank you for the information.
Can you please provide us with the 2016, 2021 and 2031 horizon years for the Emme model.

Best regards,

Alycia Gruchalla, E.I.T.
Junior Project Manager, Traffic and Mobility Planning

TMIG | TYLI

The Municipal Infrastructure Group Ltd.
a T.Y. Lin International Company

8800 Dufferin Street, Suite 200 | Vaughan ON Canada L4K 0C5
p: +1.905.738.5700 x351 | m: +1 416-543-5253
tmig.ca | tylin.com

From: Gao, Wenli <Wenli.Gao@york.ca>

Sent: May 6, 2021 11:38 AM

To: Alycia Gruchalla <AGruchalla@tmig.ca>

Cc: Chris Day <CDay@tmig.ca>; Traffic data <Traffic.data@york.ca>; Ye, Kevin <Kevin.Ye@york.ca>

Subject: RE: 10187: Archerhill Court Residential Development TIS - Data Request

Hi Alycia,

The Region's Emme model simulates traffic flows on the Regional roads for the morning peak hour for 2016, 2021, 2031 and 2041. The administrative fee associated with the model outputs is \$100 (tax included) per scenario/horizon. Please specify the horizon years for your study if you want to purchase the model outputs.

Regards,

Wenli Gao | Transportation Technologist - Forecasting, Transportation and Infrastructure Planning, Transportation Services Department

1-877-464-9675 ext. 75197

Our Mission: **Working together to serve our thriving communities – today and tomorrow**

From: Traffic data <Traffic.data@york.ca>

Sent: Tuesday, May 4, 2021 4:41 PM

To: Alycia Gruchalla <AGruchalla@tmig.ca>; Gao, Wenli <Wenli.Gao@york.ca>; Ye, Kevin <Kevin.Ye@york.ca>

Cc: Chris Day <CDay@tmig.ca>

Subject: RE: 10187: Archerhill Court Residential Development TIS - Data Request

Hi, Alycia,

We have the following data:

- 2007 TMC at Bayview Avenue /Vandorf Side Road intersection.
- 2019 TMC at Bayview Avenue / Benville Crescent intersection (am and pm peak periods).
- Due to technical problem of our software, the 2018 TMC data at Bayview Avenue / Benville Crescent intersection has some error and needs to be fixed first, which might need a couple of weeks.

The charge for TMC is \$100 per location. Let me know which items you'd purchase and provide to me your billing address.

Wenli/Kevin, please advise Alycia on Emme model as requested in below email.

Thanks,

Frank Feng, P.Eng. PhD | Senior Traffic Data Analyst, Corridor Control and Safety, Roads and Traffic Operations, Transportation Services

The Regional Municipality of York

Courier Address: 90 Bales Drive East | East Gwillimbury, ON L0G 1V0

Mailing Address: 17250 Yonge Street | Newmarket, ON L3Y 6Z1

O: 1-877-464-9675 ext. 73948 | frank.feng@york.ca | www.york.ca

Our Values: *Integrity, Commitment, Accountability, Respect, Excellence*



Please consider the environment before printing this email.

From: Alycia Gruchalla <AGruchalla@tmig.ca>
Sent: Monday, May 3, 2021 5:06 PM
To: Traffic data <Traffic.data@york.ca>
Cc: Chris Day <CDay@tmig.ca>
Subject: FW: 10187: Archerhill Court Residential Development TIS - Data Request

CAUTION! This is an external email. Verify the sender's email address and carefully examine any links or attachments before clicking. If you believe this may be a phishing email, forward it to isitsafe@york.ca then delete it from your inbox. If you think you may have clicked on a phishing link, report it to the IT Service Desk, ext. 71111, and notify your supervisor immediately.

Hello,

TMIG has been retained to complete a Transportation Impact Study for a proposed residential redevelopment to be located on the north/west corner of Vandorf Side Road and Bayview Avenue (Regional Road 34) intersection in the Town of Aurora.

As part of our study, we request the following data:

- 2007 TMC at Bayview Avenue /Vandorf Side Road intersection.
- 2019 and 2018 TMC at Bayview Avenue / Benville Crescent intersection (am and pm peak periods).
- The Region's Emme model print outs for us to base our growth from 2018 to 2021 along Bayview Avenue. Also, can you please confirm the Emme model horizon year.

Please let me know if you have any questions, your prompt response is greatly appreciated.

Thank you,

Alycia Gruchalla, E.I.T.
Junior Project Manager, Traffic and Mobility Planning

TMIG | TYLI
The Municipal Infrastructure Group Ltd.
a T.Y. Lin International Company

8800 Dufferin Street, Suite 200 | Vaughan ON Canada L4K 0C5
p: +1.905.738.5700 x351 | m: +1 416-543-5253
tmig.ca | tylin.com

From: Schleihauf, David <David.Schleihauf@york.ca>
Sent: April 26, 2021 11:51 AM
To: Alycia Gruchalla <AGruchalla@tmig.ca>
Cc: 'mbat@aurora.ca' <mbat@aurora.ca>; Chris Day <CDay@tmig.ca>; Bui, Vi <Vi.Bui@york.ca>; Wong, Ryan

<Ryan.Wong@york.ca>

Subject: RE: 10187: Archerhill Court Residential Development TIS - TOR

Hello Alycia,

We generally don't confirm growth rates as they vary significantly across the region, we rely on the consultant to review the relevant data to calculate it. The most recent count we have for Bayview/Vandorf is 2007. Have you contacted traffic.data@york.ca for AADT values? If they don't have count data, they can put in a request for EMME printouts. Also, I had a look at available counts in the area, there are counts for Bayview/Benville Cres (just south of Vandorf) from 2019 and 2018, that may be an option as well (these can be obtained from traffic.data@york.ca).

Regards,

David Schleihauf, P.Eng. | Transportation Planner, Transportation Development Planning, Transportation & Infrastructure Planning Branch, Transportation Services

1-877-464-9675 ext. 77857

Our Mission: **Working together to serve our thriving communities – today and tomorrow**

From: Alycia Gruchalla <AGruchalla@tmig.ca>

Sent: Monday, April 26, 2021 11:33 AM

To: Schleihauf, David <David.Schleihauf@york.ca>; Bat, Michael <MBat@aurora.ca>

Cc: Chris Day <CDay@tmig.ca>

Subject: RE: 10187: Archerhill Court Residential Development TIS - TOR

CAUTION! This is an external email. Verify the sender's email address and carefully examine any links or attachments before clicking. If you believe this may be a phishing email, forward it to isitsafe@york.ca then delete it from your inbox. If you think you may have clicked on a phishing link, report it to the IT Service Desk, ext. 71111, and notify your supervisor immediately.

Hello,

TMIG has been working away on the Traffic Impact Study as per the discussed TOR correspondence with the Town and Region. We have collected the turning movement count data, as discussed, but unfortunately the recent traffic count data at the study area intersections shows a substantial reduction in volumes (approximately 40% in AM peak hour and 50% in PM Peak hour) when compared to the historical 2011 traffic count data on Vandorf Sideroad that we received from the Town. This would be due to the pandemic and associated government restrictions. We are therefore unable to use this traffic count data for carrying out the Transportation Study.

Michael, are there any recently completed transportation studies in the area that may have more recent data than 2011 counts used for their analysis?

David, do you have any traffic data at Vandorf/Bayview that we could use and apply a growth rate to for our analysis? Could you please confirm what growth rate would be acceptable?

Your assistance with this is much appreciated.

Best regards,

Alycia Gruchalla, E.I.T.
Junior Project Manager, Traffic and Mobility Planning

TMIG | TYLI
The Municipal Infrastructure Group Ltd.

a T.Y. Lin International Company

8800 Dufferin Street, Suite 200 | Vaughan ON Canada L4K 0C5
p: +1.905.738.5700 x351 | m: +1 416-543-5253
tmig.ca | tylin.com

From: Schleihauf, David <David.Schleihauf@york.ca>
Sent: March 26, 2021 9:31 AM
To: Chris Day <CDay@tmig.ca>
Cc: Bui, Vi <Vi.Bui@york.ca>; Wong, Ryan <Ryan.Wong@york.ca>
Subject: RE: 10187: Archerhill Court Residential Development TIS - TOR

Hello Chris,

Just a follow-up, the Region has decided to accept new traffic counts. If possible, please compare to historical data.

Regards,

David Schleihauf, P.Eng. | Transportation Planner, Transportation Development Planning, Transportation & Infrastructure Planning Branch, Transportation Services

1-877-464-9675 ext. 77857

Our Mission: **Working together to serve our thriving communities – today and tomorrow**

From: Schleihauf, David
Sent: Thursday, March 25, 2021 9:36 AM
To: Chris Day <CDay@tmig.ca>
Cc: Bui, Vi <Vi.Bui@york.ca>; Wong, Ryan <Ryan.Wong@york.ca>
Subject: RE: 10187: Archerhill Court Residential Development TIS - TOR

Hello Chris,

Please see our comments below regarding the TOR.

1. Traffic counts, signal timings, and historical AADTs can be purchased from traffic.data@york.ca. Unfortunately, we do not have a recent count for Bayview/Vandorf, please check with the Town as they may have a count from a recently approved study. It is still not advised to conduct traffic counts now, however, updated counts may be required for future submissions.
2. The study should be consistent with our [Mobility Plan Guidelines](#) and [Access Guidelines](#).
3. The TOR notes a horizon year of 2026, please note that our Mobility Plan Guidelines state the horizon year should be five years after full build-out.
4. Please consult with the Town regarding relevant background studies in the area.
5. FYI, due to noise concerns, the Region discourages backlotting along arterial roads for low-density residential.

Please note, this is not an approval, the Region will provide additional detailed comments when the study is submitted for review.

Regards,

David Schleihauf, P.Eng. | Transportation Planner, Transportation Development Planning, Transportation & Infrastructure Planning Branch, Transportation Services

1-877-464-9675 ext. 77857

From: Chris Day <CDay@tmig.ca>
Sent: Friday, March 19, 2021 3:19 PM
To: Schleihauf, David <David.Schleihauf@york.ca>
Subject: 10187: Archerhill Court Residential Development TIS - TOR

CAUTION! This is an external email. Verify the sender's email address and carefully examine any links or attachments before clicking. If you believe this may be a phishing email, forward it to isitsafe@york.ca then delete it from your inbox. If you think you may have clicked on a phishing link, report it to the IT Service Desk, ext. 71111, and notify your supervisor immediately.

Good Afternoon David,

Attached is the Transportation Impact Study (TIS) Terms of Reference (ToR) for the subject development in the Town of Aurora.

Can you, or designate, please provide any comments the Region has on the ToR and provide the requested information noted in the ToR.

Please note that the ToR has also been sent to the Town for comment.

Should you have any questions, please do not hesitate to contact me.

Thanks,

Chris Day, C.E.T., MITE
Senior Project Manager, Traffic

TMIG | TYLI
The Municipal Infrastructure Group Ltd.
a T.Y. Lin International Company

8800 Dufferin Street, Suite 200 | Vaughan, Ontario L4K 0C5
c: +1.437.331.0857
tmig.ca | tylin.com

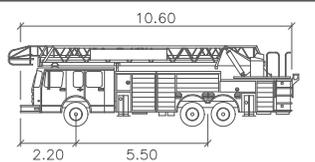
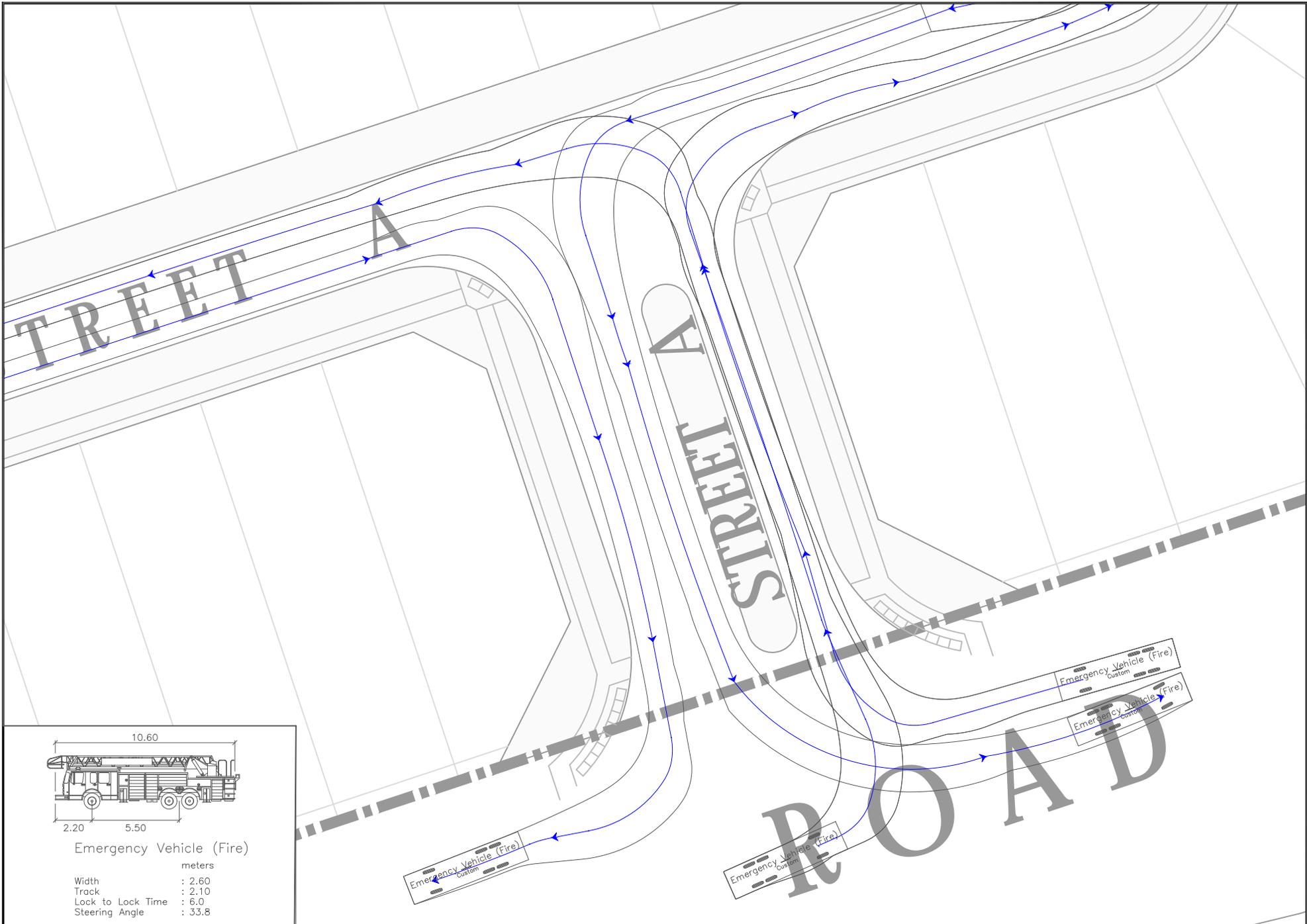
APPENDIX B

Site Plan

APPENDIX C

Site Circulation Analysis

G:\Projects\2021\10187 - Archerhill Crt. Res. Dev. TIS\03 Analysis\03 Site Review & Circulation\VMD\VMD 20210611\Design



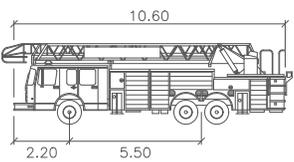
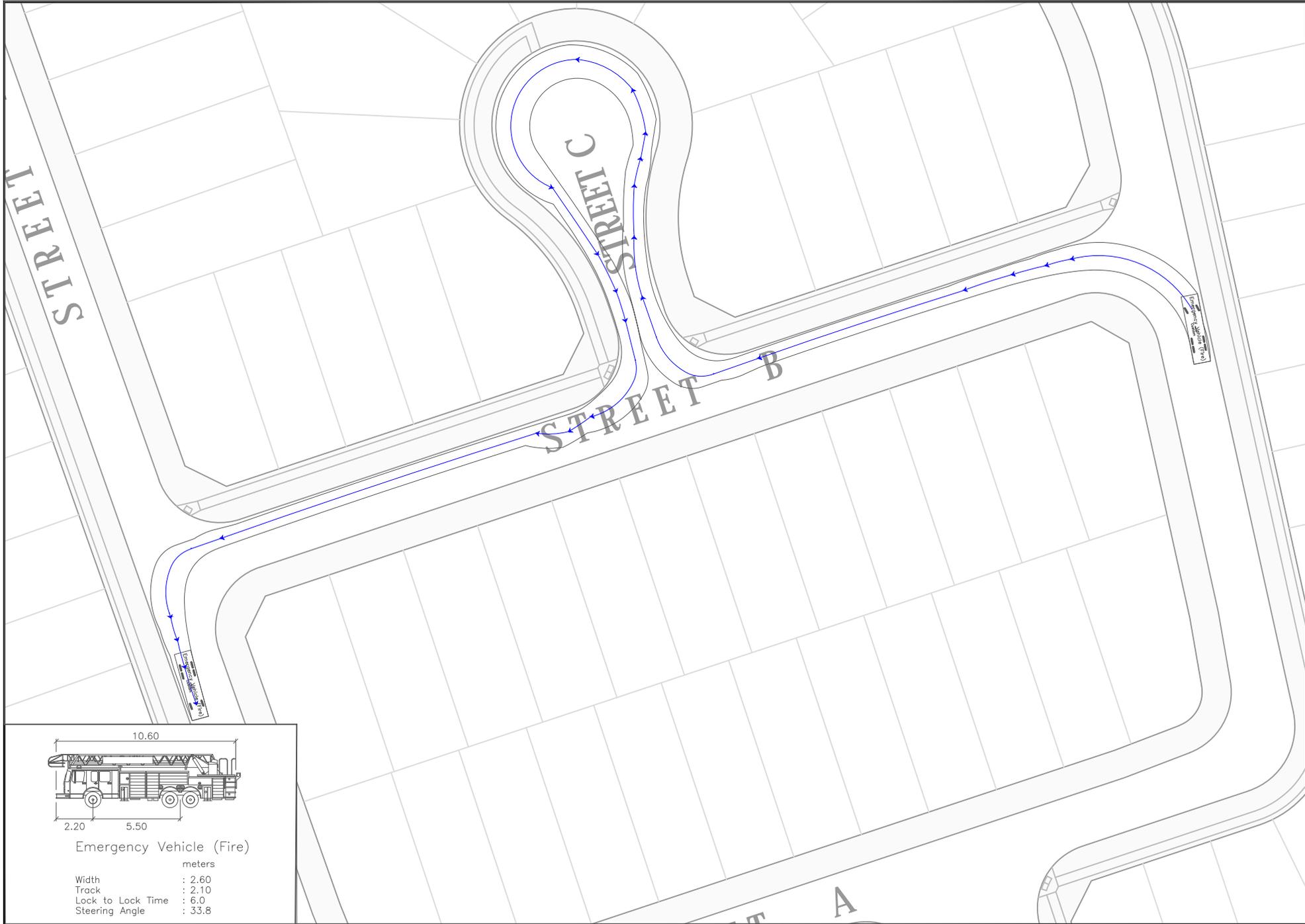
Emergency Vehicle (Fire)
 meters
 Width : 2.60
 Track : 2.10
 Lock to Lock Time : 6.0
 Steering Angle : 33.8

TMIG
 A TYLON INTERNATIONAL COMPANY
 8800 Dufferin Street,
 Suite 200
 Vaughan, ON
 L4K 0C5
 p: 905.738.5700
 f: 905.738.0065

EMERGENCY VEHICLE MANEUVERS - ACCESS CIRCULATION
 10187 - ARCHERHILL COURT RESIDENTIAL DEVELOPMENT TIS

SCALE:	N.T.S.	PROJECT No.	10187
DATE:	JUNE 2021	FIGURE No.	VMD-1
DESIGNED BY:	A.X.	DRAWN BY:	A.X.
CHECKED BY:		CHECKED BY:	

G:\Projects\2021\10187 - Archerhill Crt Res. Dev. TIS\03 Analysis\03 Site Review & Circulation\VMD\20210611\Design



Emergency Vehicle (Fire)

	meters
Width	: 2.60
Track	: 2.10
Lock to Lock Time	: 6.0
Steering Angle	: 33.8

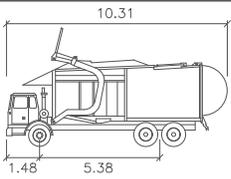
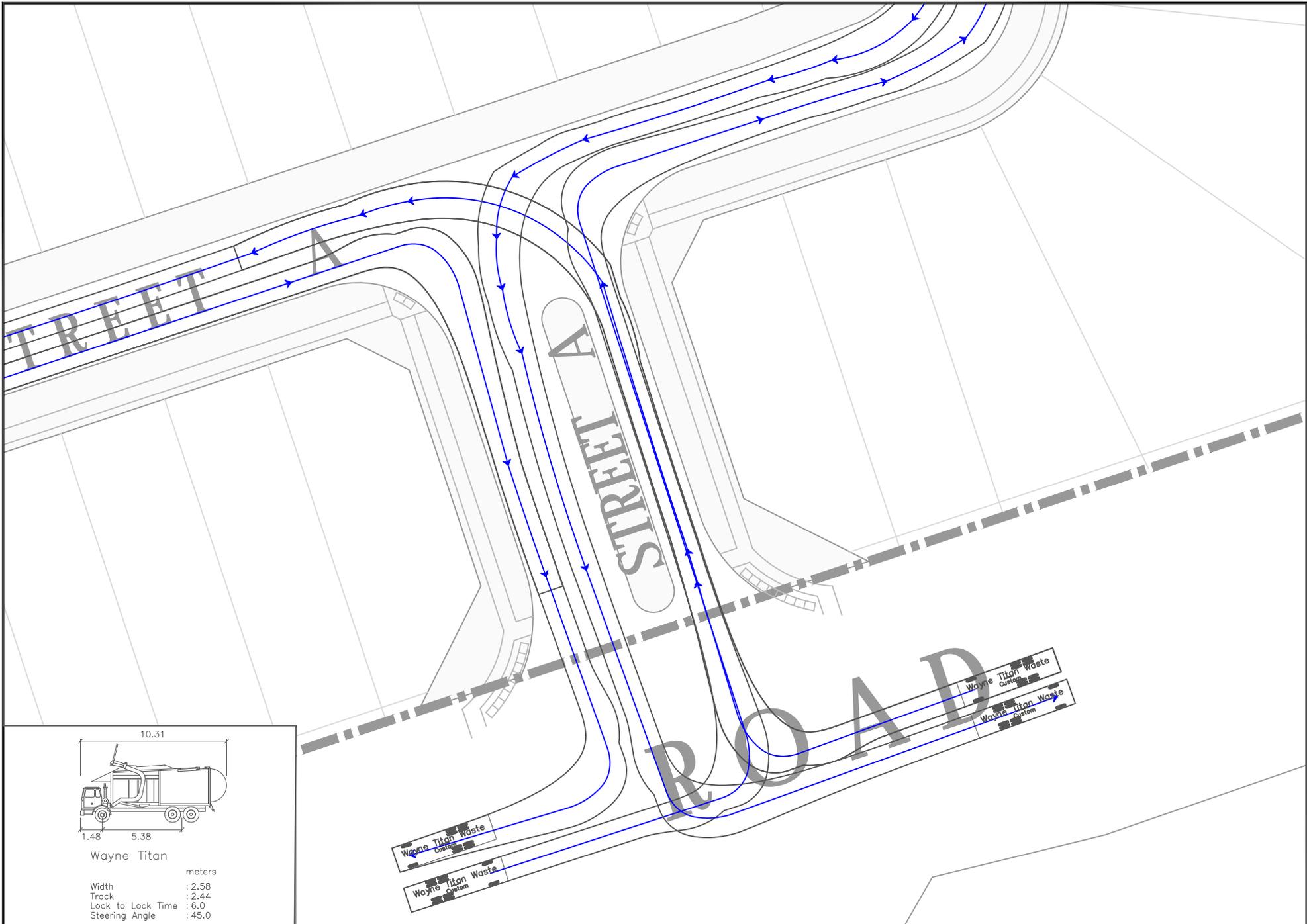
TMIG
TYLON INTERNATIONAL COMPANY

8800 Dufferin Street,
 Suite 200
 Vaughan, ON
 L4K 0C5
 p: 905.738.5700
 f: 905.738.0065

EMERGENCY VEHICLE MANEUVERS - STREET B AND STREET C CIRCULATION
 10187 - ARCHERHILL COURT RESIDENTIAL DEVELOPMENT TIS

SCALE:	N.T.S.	PROJECT No.	10187
DATE:	JUNE 2021	FIGURE No.	VMD-2
DESIGNED BY:	A.X.	DRAWN BY:	A.X.
CHECKED BY:		CHECKED BY:	

G:\Projects\2021\10187 - Archerhill Ct. Res. Dev. TIS\03 Analysis\03 Site Review & Circulation\VMD\VMD 20210611\Design



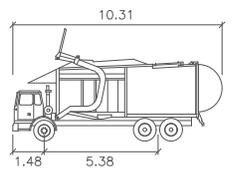
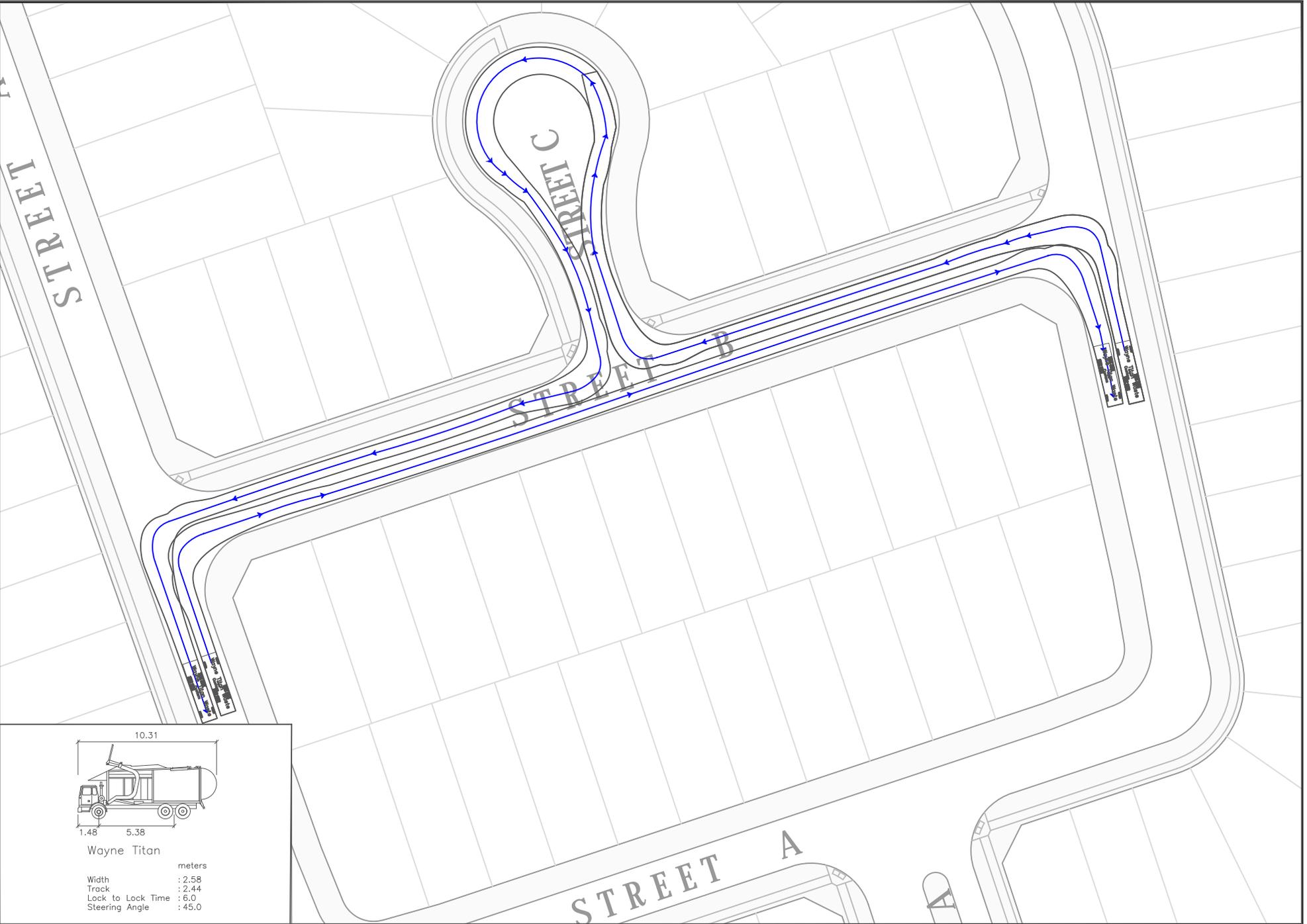
Wayne Titan
 meters
 Width : 2.58
 Track : 2.44
 Lock to Lock Time : 6.0
 Steering Angle : 45.0

TMIG
 A TYLON INTERNATIONAL COMPANY
 8800 Dufferin Street, Suite 200
 Vaughan, ON L4K 0C5
 p: 905.738.5700
 f: 905.738.0065

WASTE COLLECTION MANEUVERS - ACCESS CIRCULATION
 10187 - ARCHERHILL COURT RESIDENTIAL DEVELOPMENT TIS

SCALE:	N.T.S.	PROJECT No.	10187
DATE:	JUNE 2021	FIGURE No.	VMD-3
DESIGNED BY:	A.X.	DRAWN BY:	A.X.
CHECKED BY:		CHECKED BY:	

G:\Projects\2021\10187 - Archerhill Ct Res. Dev. TIS\03 Analysis\03 Site Review & Circulation\VMD\20210611\Design



Wayne Titan

meters

Width : 2.58
 Track : 2.44
 Lock to Lock Time : 6.0
 Steering Angle : 45.0

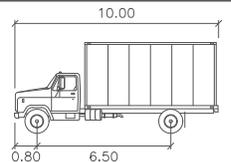
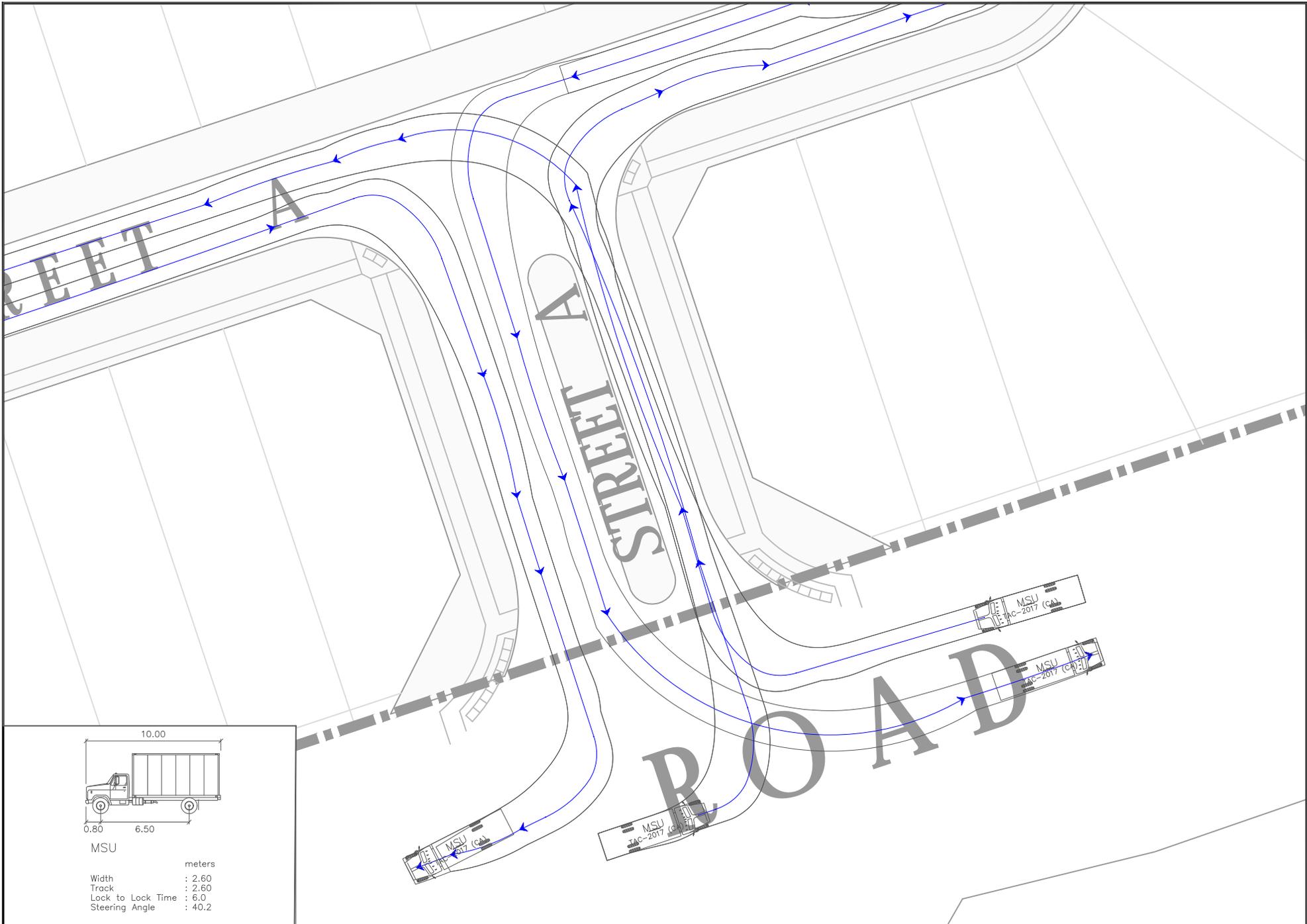
8800 Dufferin Street,
 Suite 200
 Vaughan, ON
 L4K 0C5
 p: 905.738.5700
 f: 905.738.0065

TYLON INTERNATIONAL COMPANY

WASTE COLLECTION VEHICLE MANEUVERS - STREET B AND STREET C CIRCULATION
 10187 - ARCHERHILL COURT RESIDENTIAL DEVELOPMENT TIS

SCALE: N.T.S.		PROJECT No.
DATE: JUNE 2021		10187
DESIGNED BY: A.X.	DRAWN BY: A.X.	FIGURE No.
CHECKED BY:	CHECKED BY:	VMD-4

G:\Projects\2021\10187 - Archerhill Ct. Res. Dev. TIS\03 Analysis\03 Site Review & Circulation\VMD\VMD 20210611\Design



MSU

meters

Width : 2.60
 Track : 2.60
 Lock to Lock Time : 6.0
 Steering Angle : 40.2

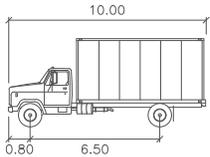
MEDIUM SINGLE UNIT (MSU) TRUCK MANEUVERS - ACCESS CIRCULATION
 10187 - ARCHERHILL COURT RESIDENTIAL DEVELOPMENT TIS

TMIG
 A TYLON INTERNATIONAL COMPANY

8800 Dufferin Street,
 Suite 200
 Vaughan, ON
 L4K 0C5

p: 905.738.5700
 f: 905.738.0065

SCALE: N.T.S.		PROJECT No.
DATE: JUNE 2021		10187
DESIGNED BY: A.X.	DRAWN BY: A.X.	FIGURE No.
CHECKED BY:	CHECKED BY:	VMD-5



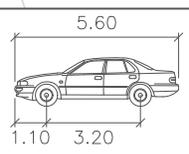
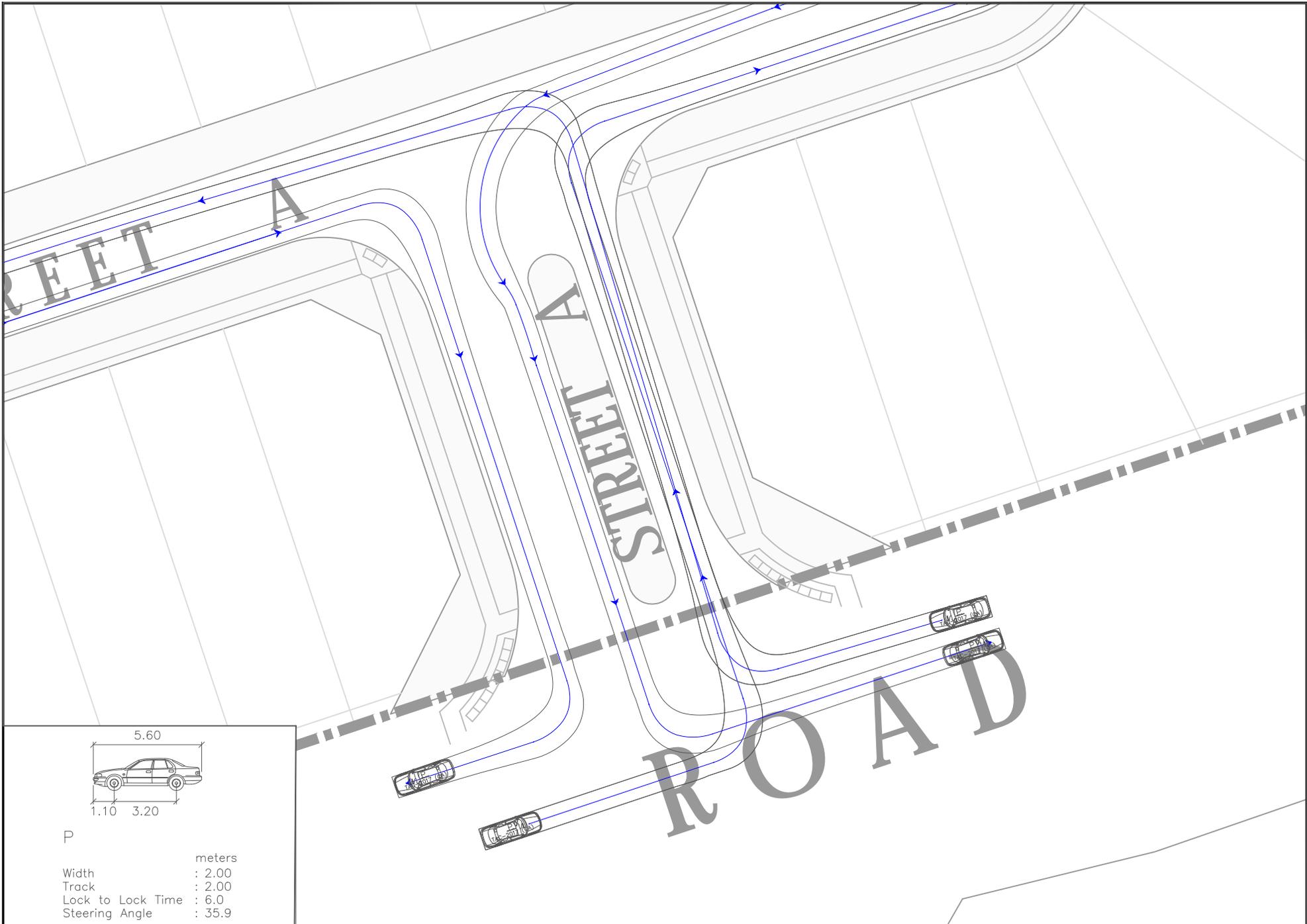
MSU
meters
Width : 2.60
Track : 2.60
Lock to Lock Time : 6.0
Steering Angle : 40.2

TMIG
TYLON INTERNATIONAL COMPANY
8800 Dufferin Street,
Suite 200
Vaughan, ON
L4K 0C5
p: 905.738.5700
f: 905.738.0065

MEDIUM SINGLE UNIT (MSU) TRUCK MANEUVERS - STREET B AND STREET C CIRCULATION
10187 - ARCHERHILL COURT RESIDENTIAL DEVELOPMENT TIS

SCALE:	N.T.S.	PROJECT No.	10187
DATE:	JUNE 2021	FIGURE No.	VMD-6
DESIGNED BY:	A.X.	DRAWN BY:	A.X.
CHECKED BY:		CHECKED BY:	

G:\Projects\2021\10187 - Archerhill Ct. Res. Dev. TIS\03 Analysis\03 Site Review & Circulation\VMD\VMD 20210611\Design



P

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

TMIG
 A TYLON INTERNATIONAL COMPANY

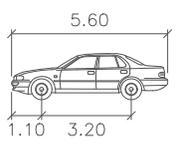
8800 Dufferin Street,
 Suite 200
 Vaughan, ON
 L4K 0C5

p: 905.738.5700
 f: 905.738.0065

PASSENGER CAR MANEUVERS - ACCESS CIRCULATION
 10187 - ARCHERHILL COURT RESIDENTIAL DEVELOPMENT TIS

SCALE: N.T.S.	PROJECT No.
DATE: JUNE 2021	10187
DESIGNED BY: A.X.	DRAWN BY: A.X.
CHECKED BY:	CHECKED BY:
	FIGURE No.
	VMD-7

G:\Projects\2021\10187 - Archerhill Ct Res. Dev. TIS\03 Analysis\03 Site Review & Circulation\VMD\20210611\Design



P

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

TMIG
 8800 Dufferin Street,
 Suite 200
 Vaughan, ON
 L4K 0C5
 p: 905.738.5700
 f: 905.738.0065

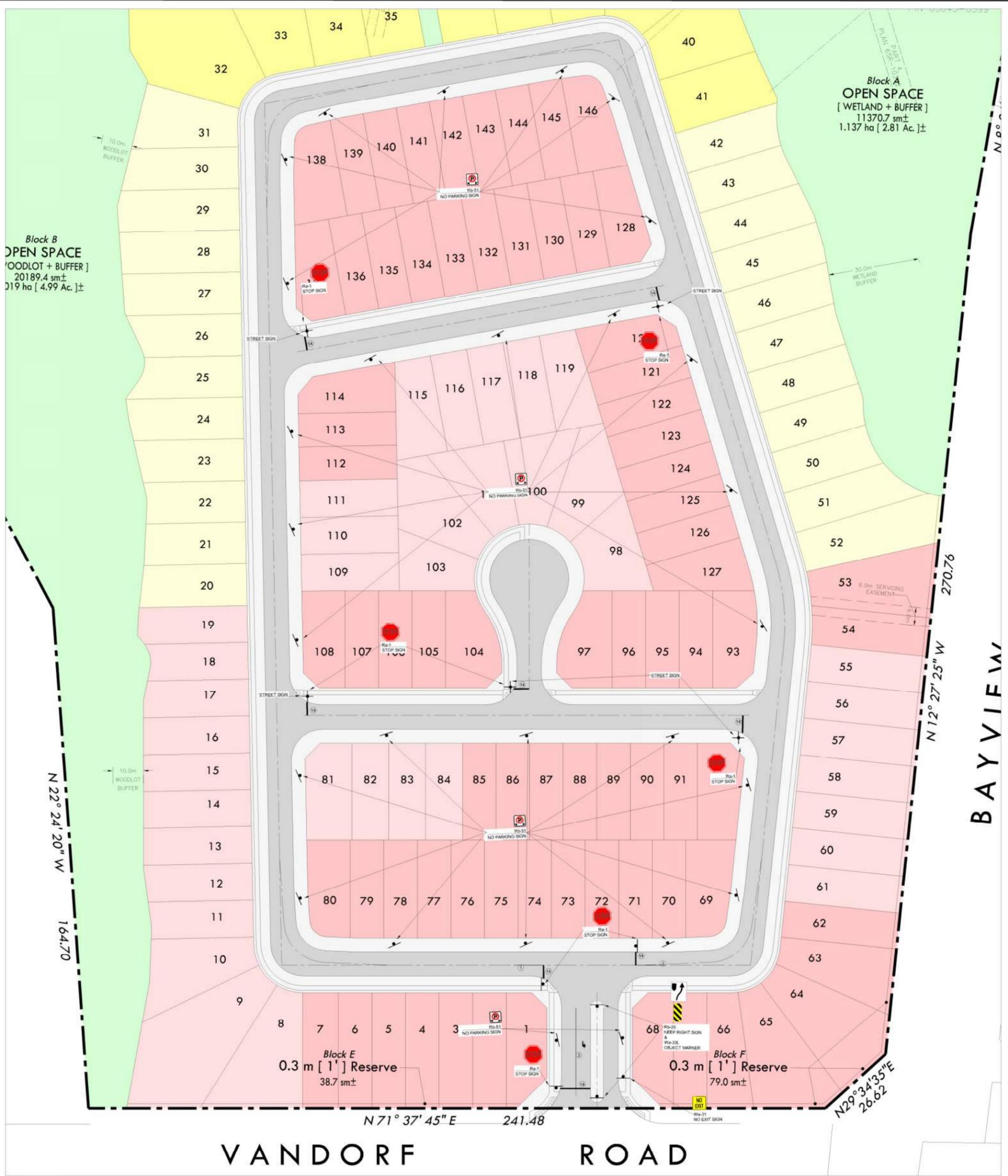
TYLUN INTERNATIONAL COMPANY

PASSENGER CAR MANEUVERS - STREET B AND STREET C CIRCULATION
 10187 - ARCHERHILL COURT RESIDENTIAL DEVELOPMENT TIS

SCALE: N.T.S.	PROJECT No. 10187
DATE: JUNE 2021	FIGURE No. VMD-8
DESIGNED BY: A.X.	DRAWN BY: A.X.
CHECKED BY:	CHECKED BY:

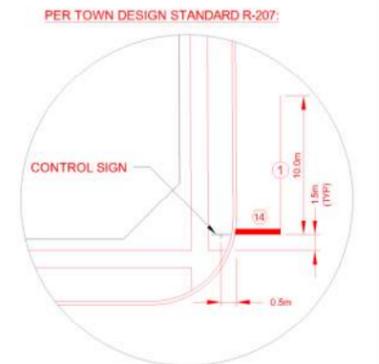
APPENDIX D

Pavement Marking and Signage Plan



- NOTES:**
1. MEASUREMENTS IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN.
 2. ALL MARKINGS AND SIGNS SHALL CONFORM WITH THE ONTARIO TRAFFIC MANUAL (OTM), AS WELL AS THE TOWN DESIGN STANDARD DRAWING R-207.
 3. FINAL LOCATION OF ALL SIGNS SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
 4. FINAL PAVEMENT MARKINGS SHALL BE APPROVED BY THE DEVELOPER.
 5. PERMANENT PAVEMENT MARKINGS APPLIED TO SURFACE COURSE ASPHALT SHALL BE TWO COMPONENT COLD CURING PLASTIC TYPE OR APPROVED EQUIVALENT.
 6. STREET SIGNAGE TO CONFORM WITH TOWN STANDARD DRAWING R-207.

PAVEMENT MARKING LEGEND			
IDENTIFICATION	TYPE	COLOUR	WIDTH (cm)
1	SOLID	YELLOW	10
2	SOLID	WHITE	10
14	SOLID	WHITE	50 <small>Per Town Standard R-207</small>



TRAFFIC SIGN SCHEDULE			
SIGN DESCRIPTION	MESSAGE	QUANTITY	COMMENTS
Ra-1	STOP	8	
Rb-51	NO PARKING	28	
Rb-25	KEEP RIGHT	2	
Wa-33L	OBJECT MARKER	2	
Wa-31	NO EXIT	1	
STREET NAME SIGNAGE		5	AS PER TOWN STANDARD DRAWING R-207

TYPICAL CONTROL SIGN AND STOP BAR LOCATION

PAVEMENT MARKING DENOTATION:

PERMANENT

DURABLE

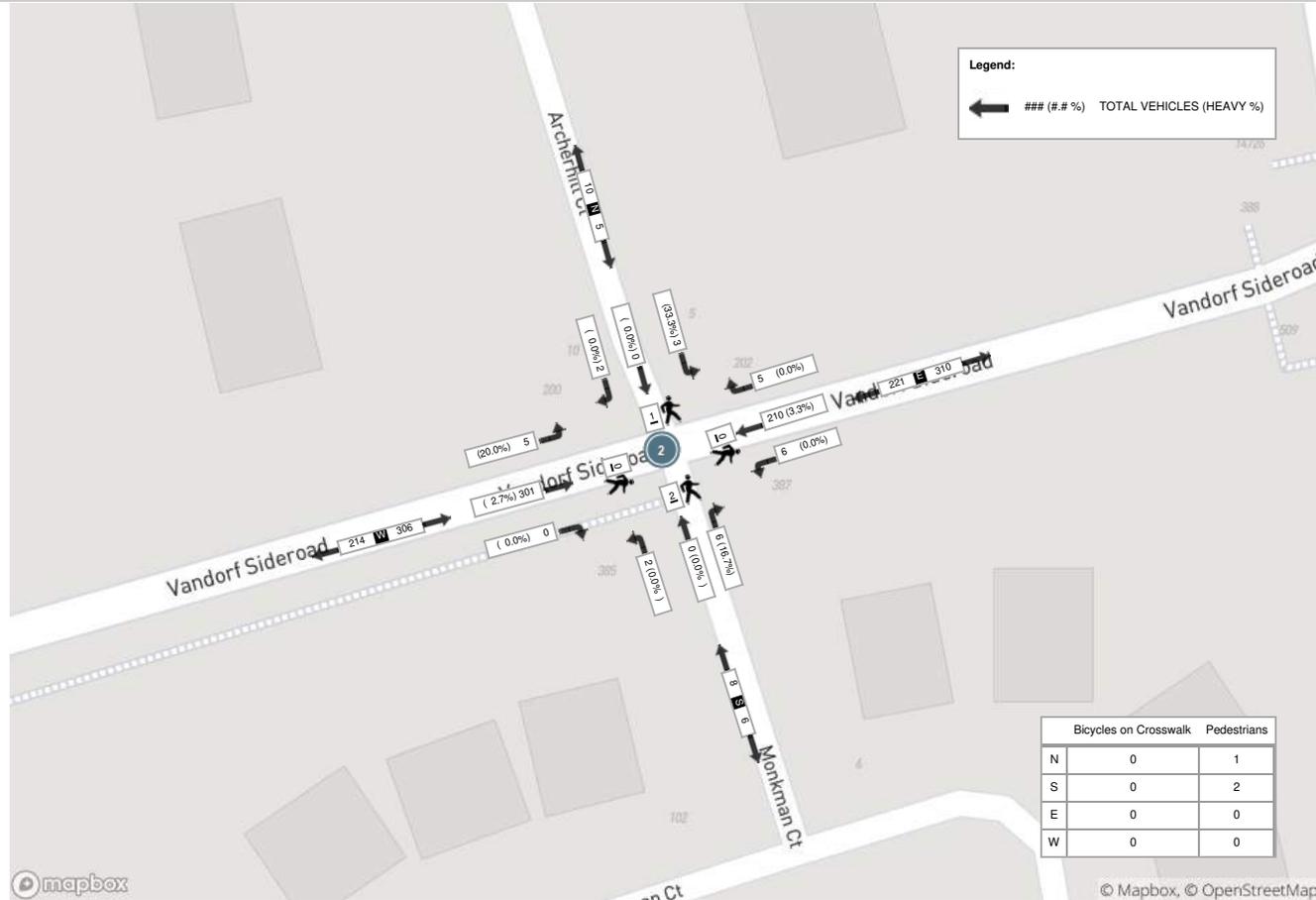
APPENDIX E

Baseline Traffic Data

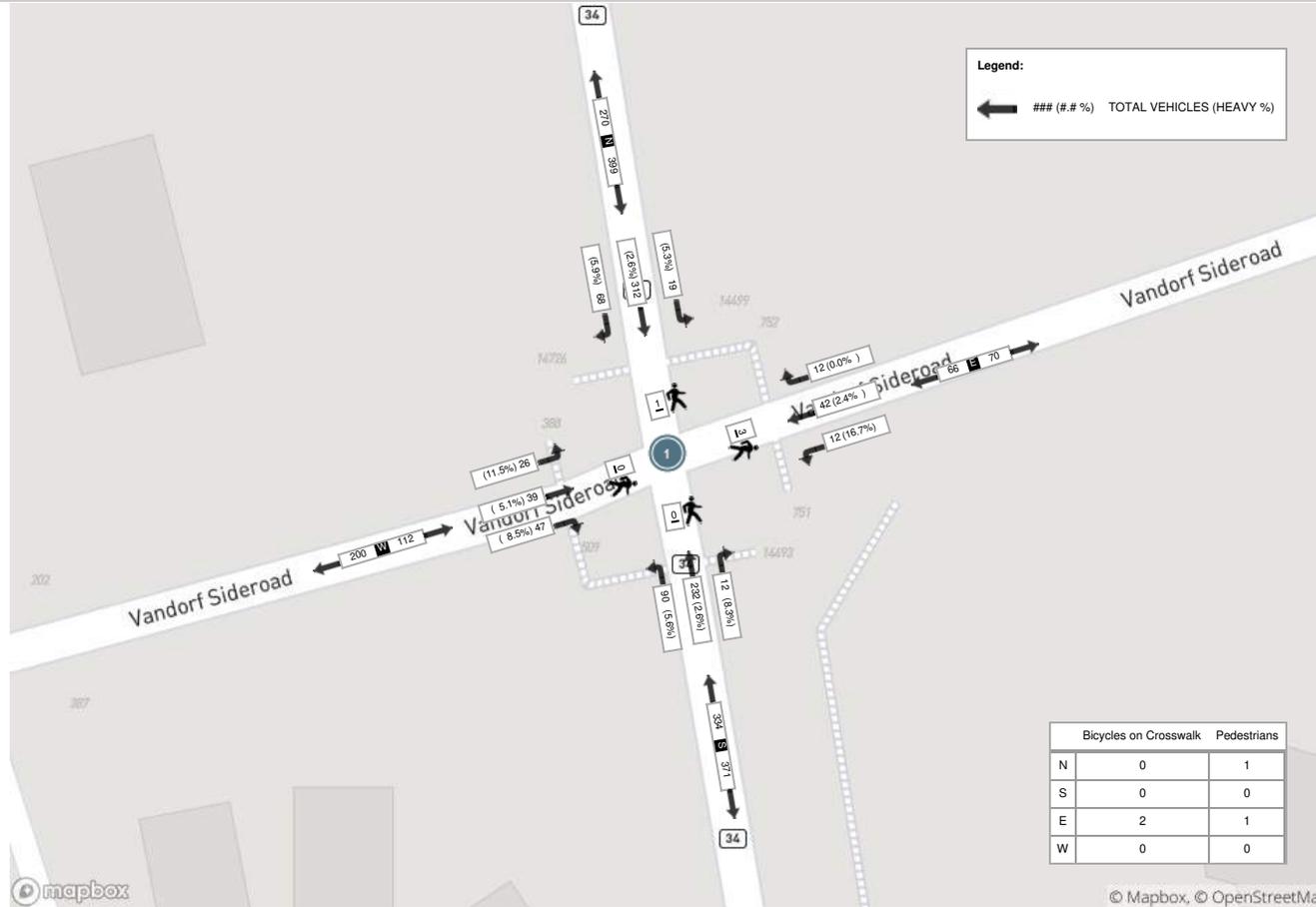
Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (2.78 °C)



Peak Hour: 04:00 PM - 05:00 PM Weather: Overcast Clouds (6.54 °C)



Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (2.78 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (6.54 °C)





Turning Movements Diagram Peak Hour Report: AM Period

Location..... Bayview Avenue & Vandorf Sideroad

GeoID..... ADC0BB2C

Municipality. Aurora

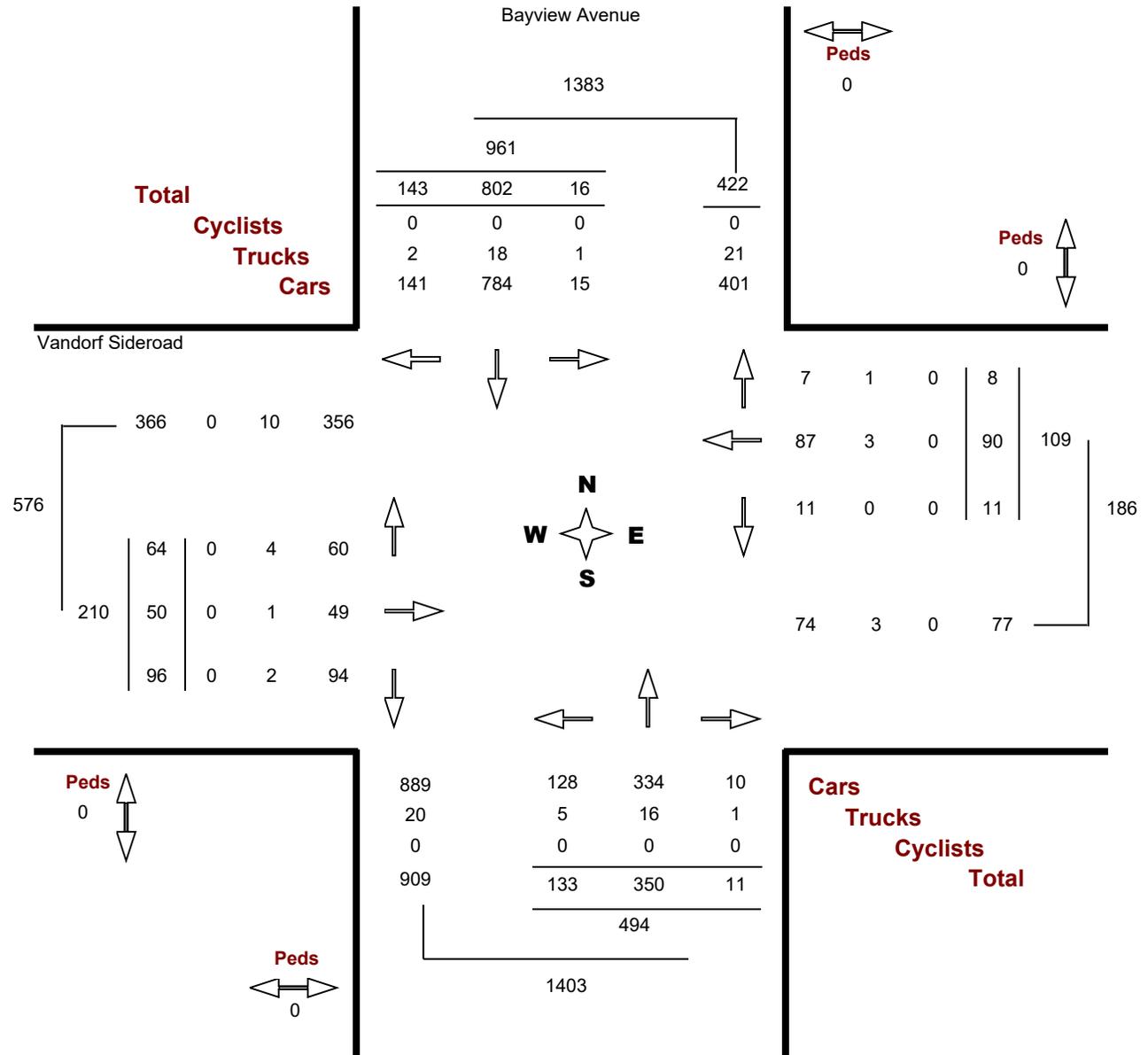
Count Date. Thursday, 05 April, 2007

Traffic Cont. Traffic signal

Count Period. 07:00 AM — 09:00 AM

Major Dir..... None

Peak Hour.... 07:30 AM — 08:30 AM



Notes:



Turning Movements Diagram Peak Hour Report: PM Period

Location..... Bayview Avenue & Vandorf Sideroad

GeoID..... ADC0BB2C

Municipality. Aurora

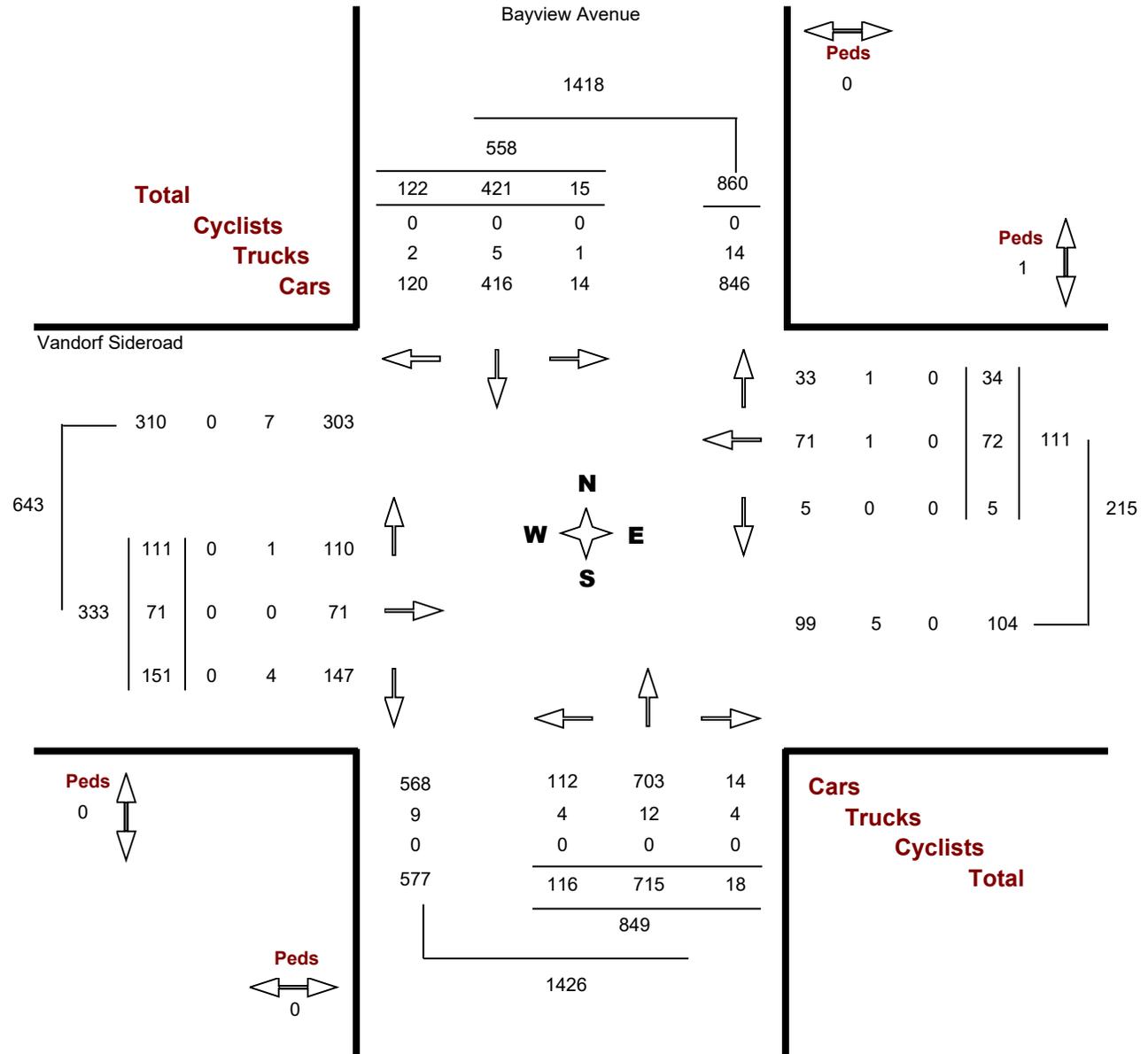
Count Date. Thursday, 05 April, 2007

Traffic Cont. Traffic signal

Count Period. 03:00 PM – 06:00 PM

Major Dir..... None

Peak Hour.... 04:30 PM – 05:30 PM



Notes:

Percent of Vehicles > 60 KPH : 91.2%
Mean Speed(Average) : 71 KPH

Ontario Traffic, Inc.

17705 Leslie St., Unit 6
 Newmarket, ON, CANADA L3Y 3E3
 Tel: (905) 898-7711 (905) 898-3577 Fax: (905) 898-3664

Site Code: 3
 Station ID: T12
 Vandorf Sdrd W of Archerhill Crt

Date Start: 28-Apr-11
 Date End: 04-May-11
 Date Start: 28-Apr-11

WB

Start Time	1	30	35	40	45	50	55	60	65	70	75	80	85	90	95	9999	Total	Average (Mean)	85th Percent
04/28/11	0	0	0	0	0	0	1	3	2	3	1	1	1	0	0	0	12	70	79
01:00	0	0	0	0	0	1	1	0	3	1	0	0	0	0	0	0	6	63	67
02:00	0	0	0	0	0	1	1	0	2	1	1	0	0	0	0	0	6	65	74
03:00	0	0	0	0	0	0	0	1	1	0	0	0	1	0	1	0	4	77	85
04:00	0	0	0	0	0	1	0	1	1	1	0	2	0	0	0	0	6	69	80
05:00	0	0	0	0	0	1	0	6	15	11	6	0	0	1	1	0	41	70	75
06:00	0	0	0	0	0	1	5	64	62	48	25	12	2	2	1	0	222	69	76
07:00	0	0	0	0	1	2	10	89	118	67	29	14	5	2	1	0	338	68	74
08:00	0	0	0	0	0	0	27	107	114	89	34	8	4	1	1	0	385	68	74
09:00	0	0	0	0	0	3	12	54	55	53	23	8	1	0	0	0	209	68	75
10:00	0	0	0	0	0	4	10	43	43	27	11	5	0	3	0	0	146	67	74
11:00	0	0	0	0	0	0	7	49	48	39	13	6	2	1	0	0	165	68	74
12 PM	0	0	0	0	0	0	8	42	60	38	30	8	2	1	0	0	189	69	77
13:00	0	0	0	0	0	1	9	49	73	36	16	4	0	1	1	0	190	68	73
14:00	0	0	0	0	1	4	14	94	78	45	20	8	3	0	1	0	268	67	74
15:00	0	0	0	0	0	4	30	98	69	59	29	5	2	0	0	0	296	66	74
16:00	0	0	0	0	0	2	9	78	85	66	31	13	1	2	0	0	287	68	75
17:00	0	0	0	0	1	1	11	68	96	82	40	17	5	1	1	0	323	69	76
18:00	0	0	0	0	0	1	11	60	69	74	35	15	3	0	1	0	269	69	76
19:00	0	0	0	0	0	0	9	52	42	32	17	11	3	1	0	0	167	68	76
20:00	0	0	0	0	0	3	4	27	28	30	14	3	2	2	0	0	113	69	76
21:00	0	0	0	0	0	0	1	16	29	18	15	5	0	1	1	0	86	70	77
22:00	0	0	0	0	0	0	4	20	25	18	11	7	3	0	1	0	89	70	78
23:00	0	0	0	0	0	4	1	18	24	8	9	8	1	1	1	0	75	69	79
Total	0	0	0	0	3	34	185	1039	1142	846	410	160	41	20	12	0	3892		
Percent	0.0%	0.0%	0.0%	0.0%	0.1%	0.9%	4.8%	26.7%	29.3%	21.7%	10.5%	4.1%	1.1%	0.5%	0.3%	0.0%			
AM Peak Vol.					07:00	10:00	08:00	08:00	07:00	08:00	08:00	07:00	07:00	10:00	03:00	08:00			
PM Peak Vol.					14:00	14:00	15:00	15:00	17:00	17:00	17:00	17:00	17:00	16:00	13:00	17:00			
Statistic s					85th Percentile :		75 KPH												

Ontario Traffic, Inc.

17705 Leslie St., Unit 6
 Newmarket, ON, CANADA L3Y 3E3
 Tel: (905) 898-7711 (905) 898-3577 Fax: (905) 898-3664

Site Code: 3
 Station ID: T12
 Vandorf Sdrd W of Archerhill Crt

Date Start: 28-Apr-11
 Date End: 04-May-11
 Date Start: 28-Apr-11

WB

Start Time	1	30	35	40	45	50	55	60	65	70	75	80	85	90	95	9999	Total	Average (Mean)	85th Percent	
05/03/11	0	0	0	0	0	0	0	1	7	0	2	1	0	0	0	0	11	69	75	
01:00	0	0	0	0	0	0	1	1	3	2	2	1	0	0	0	0	10	70	75	
02:00	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2	64	65	
03:00	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2	68	75	
04:00	0	0	0	0	0	1	0	2	0	1	0	1	0	1	0	0	6	68	80	
05:00	0	0	0	0	0	0	5	6	16	10	5	2	3	0	0	0	47	69	77	
06:00	0	0	0	0	0	0	8	53	82	45	24	14	4	1	1	1	232	69	76	
07:00	0	0	0	0	0	1	13	79	104	67	35	10	2	0	0	0	311	68	74	
08:00	0	0	0	0	0	0	17	100	98	95	33	12	4	1	0	0	360	68	74	
09:00	0	0	0	0	1	3	10	47	69	45	25	8	4	0	0	0	212	68	75	
10:00	0	0	0	0	1	4	10	33	40	26	10	6	0	0	3	3	133	67	74	
11:00	0	0	0	0	2	2	16	35	29	35	17	7	1	0	0	0	144	67	75	
12 PM	0	0	0	1	0	4	8	63	48	36	18	7	1	1	0	0	187	67	74	
13:00	0	0	0	0	0	2	11	39	52	36	16	7	4	2	1	1	170	69	75	
14:00	0	0	0	0	0	1	17	85	81	43	20	6	3	0	1	1	257	67	73	
15:00	0	0	0	0	0	1	16	86	79	52	29	11	2	1	1	1	278	68	75	
16:00	0	0	0	0	0	5	19	84	99	72	29	13	3	1	1	1	326	68	74	
17:00	0	0	0	0	0	0	12	90	102	70	34	12	0	1	1	1	322	68	74	
18:00	0	0	1	0	0	0	6	52	73	55	23	11	5	2	2	2	230	69	76	
19:00	0	0	0	0	0	0	6	43	52	32	25	9	2	0	1	1	170	69	77	
20:00	0	0	0	0	0	1	10	48	50	24	14	8	1	1	1	1	158	68	75	
21:00	0	0	0	0	0	1	8	26	25	14	5	5	2	0	1	1	87	67	74	
22:00	0	0	0	0	0	1	4	22	22	15	5	2	1	1	0	0	73	67	74	
23:00	0	0	0	0	0	3	3	22	25	11	7	3	1	1	1	1	77	68	75	
Total	0	0	1	1	4	30	200	1019	1157	786	379	156	43	14	15	15	3805			
Percent	0.0%	0.0%	0.0%	0.0%	0.1%	0.8%	5.3%	26.8%	30.4%	20.7%	10.0%	4.1%	1.1%	0.4%	0.4%	0.4%				
AM Peak						11:00	10:00	08:00	08:00	07:00	08:00	07:00	06:00	06:00	04:00	10:00	08:00			
Vol.						2	4	17	100	104	95	35	14	4	1	3	360			
PM Peak			18:00	12:00		16:00	16:00	17:00	17:00	16:00	17:00	16:00	18:00	13:00	18:00	16:00				
Vol.			1	1		5	19	90	102	72	34	13	5	2	2	326				
Statistic s			85th Percentile :			75 KPH														

Percent of Vehicles > 60 KPH : 89.4%
Mean Speed(Average) : 69 KPH

Ontario Traffic, Inc.

17705 Leslie St., Unit 6
 Newmarket, ON, CANADA L3Y 3E3
 Tel: (905) 898-7711 (905) 898-3577 Fax: (905) 898-3664

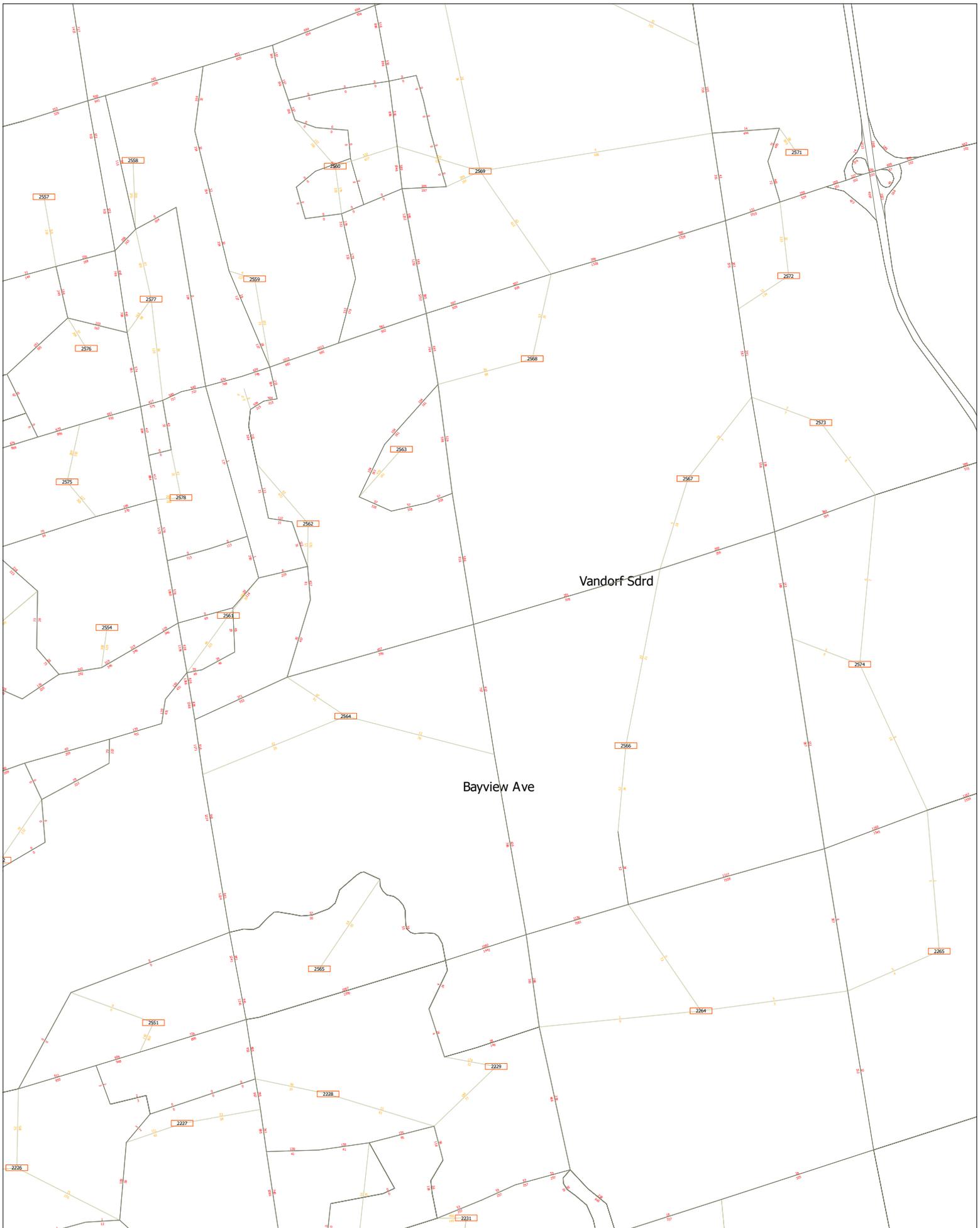
Site Code: 3
 Station ID: T12
 Vandorf Sdrd W of Archerhill Crt

Date Start: 28-Apr-11
 Date End: 04-May-11
 Date Start: 28-Apr-11

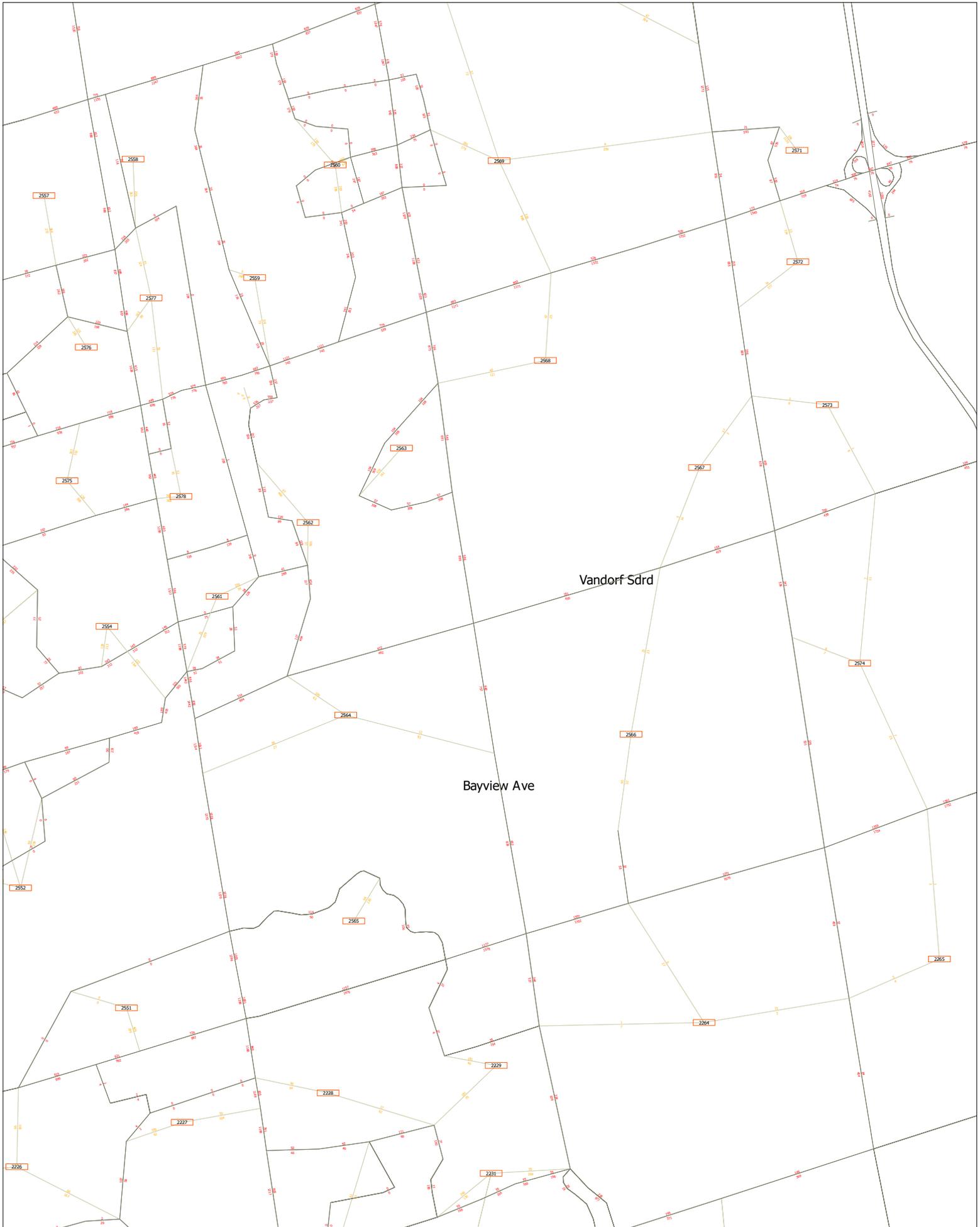
EB, WB																	
Start Time	1	30	35	40	45	50	55	60	65	70	75	80	85	90	95	Average (Mean)	85th Percent
	29	34	39	44	49	54	59	64	69	74	79	84	89	94	9999	Total	
04/28/11	0	0	0	0	1	5	5	15	17	19	8	1	2	1	0	74	67
01:00	0	0	0	0	0	1	4	4	6	1	0	0	0	0	0	16	63
02:00	0	0	0	0	1	2	1	5	7	1	2	0	1	1	0	21	66
03:00	0	0	0	0	0	0	1	1	3	0	0	1	1	0	1	8	73
04:00	0	0	0	0	0	2	0	1	3	3	0	3	0	0	0	12	69
05:00	0	0	0	0	0	1	0	11	20	17	9	4	0	1	1	64	70
06:00	0	0	0	0	0	5	6	94	101	84	46	28	4	3	4	375	70
07:00	0	0	0	1	1	7	20	140	196	130	72	32	12	3	2	616	69
08:00	0	0	0	0	4	0	35	171	190	171	82	35	14	3	1	706	69
09:00	0	0	0	0	0	5	17	95	104	106	54	28	6	4	1	420	69
10:00	0	0	0	0	1	6	18	83	95	80	39	22	2	5	4	355	69
11:00	0	0	0	0	0	2	16	82	95	91	52	20	9	1	2	370	70
12 PM	0	0	0	0	0	0	13	79	121	106	65	28	6	2	1	421	70
13:00	0	0	0	0	0	4	19	84	132	94	59	18	3	4	2	419	69
14:00	0	0	0	0	1	6	23	129	138	98	57	23	8	3	4	490	69
15:00	0	0	0	0	1	8	48	192	187	149	88	29	3	1	1	707	68
16:00	0	0	0	0	0	5	24	163	197	183	90	49	7	5	1	724	69
17:00	0	0	0	0	1	2	20	119	213	200	129	61	19	5	5	774	71
18:00	0	0	0	0	3	3	19	108	145	134	95	39	16	1	8	571	70
19:00	0	0	0	0	0	0	12	82	87	81	46	35	6	2	2	353	70
20:00	0	0	0	0	0	4	10	59	61	62	37	13	7	5	2	260	70
21:00	0	0	0	0	0	3	1	31	56	42	27	8	2	2	2	174	70
22:00	0	0	0	0	0	2	4	33	39	31	18	12	5	0	2	146	70
23:00	0	0	0	1	2	7	9	39	49	32	17	11	3	2	3	175	68
Total	0	0	0	2	16	80	325	1820	2262	1915	1092	500	136	54	49	8251	
Percent	0.0%	0.0%	0.0%	0.0%	0.2%	1.0%	3.9%	22.1%	27.4%	23.2%	13.2%	6.1%	1.6%	0.7%	0.6%		
AM Peak Vol.				07:00	08:00	07:00	08:00	08:00	07:00	08:00	08:00	08:00	08:00	08:00	10:00	06:00	08:00
				1	4	7	35	171	196	171	82	35	14	5	4	706	
PM Peak Vol.				23:00	18:00	15:00	15:00	15:00	17:00	17:00	17:00	17:00	17:00	16:00	18:00	17:00	
				1	3	8	48	192	213	200	129	61	19	5	8	774	
Statistics	85th Percentile : 77 KPH																

Percent of Vehicles > 60 KPH : 90.4%
Mean Speed(Average) : 70 KPH

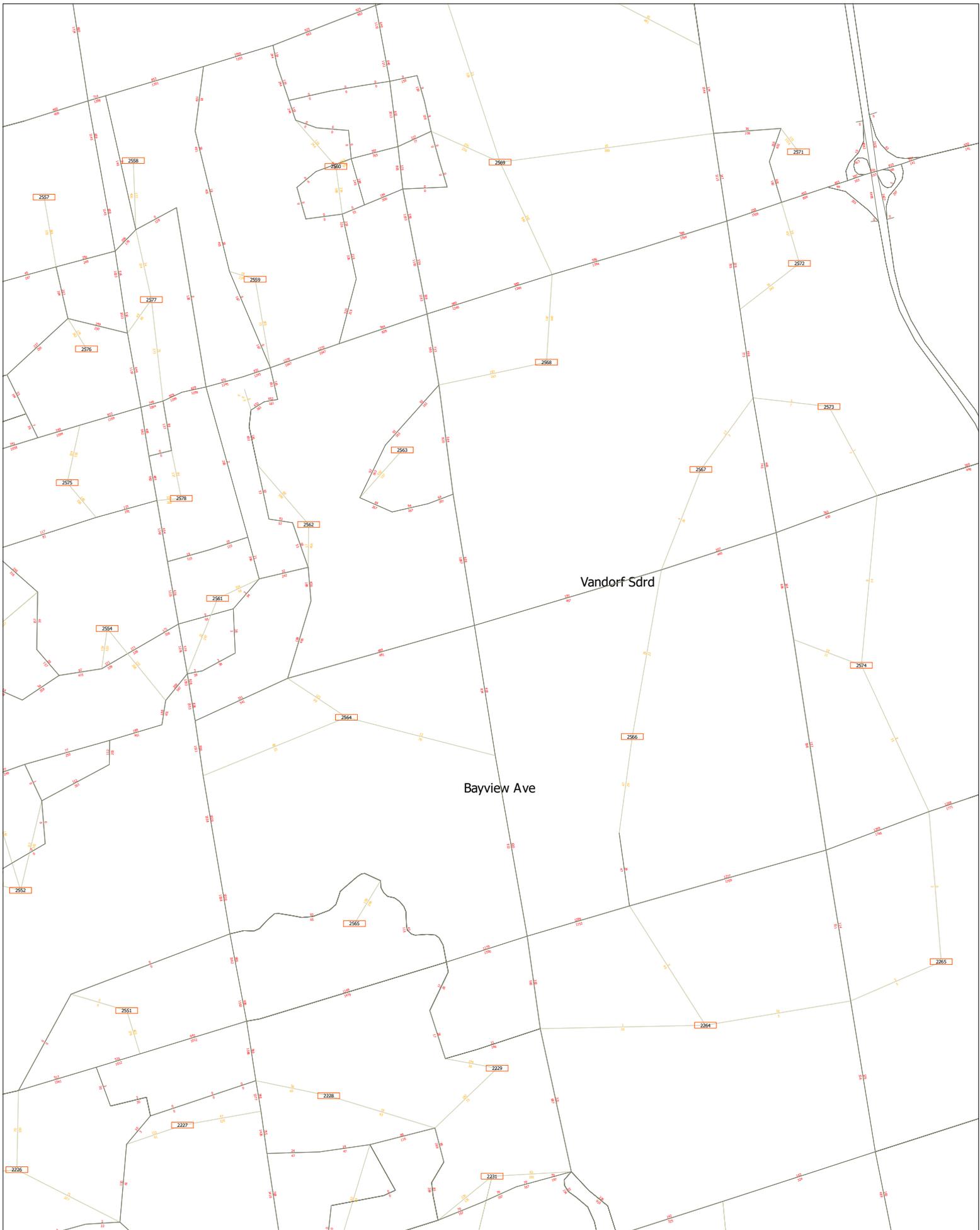
2016 AM Pkhr Auto Link Volumes



2021 AM Pkhr Auto Link Volumes



2031 AM Pkhr Auto Link Volumes



APPENDIX F

Synchro Capacity Analysis

HCM Unsignalized Intersection Capacity Analysis
1: Monkman Court/Archerhill Court & Vandorf Sideroad

Baseline 2021 AM Peak Hour
06/15/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Volume (veh/h)	4	346	5	2	385	9	4	0	13	4	0	2
Future Volume (Veh/h)	4	346	5	2	385	9	4	0	13	4	0	2
Sign Control	Free				Free				Stop			
Grade	0%				0%				0%			
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Hourly flow rate (vph)	6	481	7	3	535	13	6	0	18	6	0	3
Pedestrians					2				2			
Lane Width (m)					3.7				3.7			
Walking Speed (m/s)					1.1				1.1			
Percent Blockage					0				0			
Right turn flare (veh)												
Median type	None				None							
Median storage (veh)												
Upstream signal (m)					116							
pX, platoon unblocked	0.94					0.94	0.94			0.94	0.94	0.94
vC, conflicting volume	550	490				1049	1054	486	1064	1052	544	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	491	490				1021	1027	486	1037	1023	484	
tC, single (s)	4.1	4.6				7.1	6.5	6.2	7.1	6.5	6.7	
tC, 2 stage (s)												
tF (s)	2.2	2.7				3.5	4.0	3.3	3.5	4.0	3.8	
p0 queue free %	99	100				97	100	97	97	100	99	
cM capacity (veh/h)	1017	863				200	218	584	190	219	467	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	494	551	24	9								
Volume Left	6	3	6	6								
Volume Right	7	13	18	3								
cSH	1017	863	395	237								
Volume to Capacity	0.01	0.00	0.06	0.04								
Queue Length 95th (m)	0.1	0.1	1.5	0.9								
Control Delay (s)	0.2	0.1	14.7	20.8								
Lane LOS	A	A	B	C								
Approach Delay (s)	0.2	0.1	14.7	20.8								
Approach LOS	B				C							
Intersection Summary												
Average Delay	0.6											
Intersection Capacity Utilization	32.0%				ICU Level of Service				A			
Analysis Period (min)	15											

Timings
2: Bayview Avenue & Vandorf Sideroad

Baseline 2021 AM Peak Hour
06/15/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Volume (vph)	112	81	168	12	100	9	143	375	12	17	860	153
Future Volume (vph)	112	81	168	12	100	9	143	375	12	17	860	153
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	4		4		8		8		1		6	
Permitted Phases	4	4	4	8	8	8	6	6	2	2	2	
Detector Phase	4	4	4	8	8	8	1	6	6	2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	40.0	40.0	40.0	40.0	
Minimum Split (s)	17.5	17.5	17.5	17.5	17.5	17.5	11.0	47.5	47.5	47.5	47.5	
Total Split (s)	26.5	26.5	26.5	26.5	26.5	26.5	11.0	58.5	58.5	47.5	47.5	
Total Split (%)	31.2%	31.2%	31.2%	31.2%	31.2%	31.2%	12.9%	68.8%	68.8%	55.9%	55.9%	
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	3.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	1.0	2.5	2.5	2.5	2.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	
Lead/Lag							Lead		Lag		Lag	
Lead-Lag Optimize?							Yes		Yes		Yes	
Recall Mode	None	Max	Max	Max	Max							
Act Effect Green (s)	15.0	15.0	15.0	15.0	15.0	15.0	54.8	51.3	51.3	40.3	40.3	
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.18	0.18	0.67	0.63	0.63	0.50	0.50	
v/c Ratio	0.54	0.25	0.41	0.05	0.32	0.03	0.59	0.34	0.01	0.04	0.96	
Control Delay	38.3	29.3	7.2	26.0	30.5	0.1	20.6	9.1	0.0	13.5	44.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	38.3	29.3	7.2	26.0	30.5	0.1	20.6	9.1	0.0	13.5	44.1	
LOS	D	C	A	C	C	A	C	A	A	B	D	
Approach Delay	21.8		27.7		12.0		37.7					
Approach LOS	C		C		B		D					
Intersection Summary												
Cycle Length: 85												
Actuated Cycle Length: 81.4												
Natural Cycle: 80												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.96												
Intersection Signal Delay: 27.6							Intersection LOS: C					
Intersection Capacity Utilization 98.3%							ICU Level of Service F					
Analysis Period (min) 15												
Splits and Phases: 2: Bayview Avenue & Vandorf Sideroad												

HCM Signalized Intersection Capacity Analysis
2: Bayview Avenue & Vandorf Sideroad

Baseline 2021 AM Peak Hour
06/15/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↑	↗	↖	↑	↗	↖	↑	↗
Traffic Volume (vph)	112	81	168	12	100	9	143	375	12	17	860	153
Future Volume (vph)	112	81	168	12	100	9	143	375	12	17	860	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	2000	2000	2000	2000	2000	2000
Total Lost time (s)	7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
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
Frb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1720	1883	1601	1825	1847	1427	1847	1926	1538	1808	1963	1685
Fit Permitted	0.69	1.00	1.00	0.70	1.00	1.00	0.09	1.00	1.00	0.52	1.00	1.00
Satd. Flow (perm)	1243	1883	1601	1345	1847	1427	176	1926	1538	994	1963	1685
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	122	88	183	13	109	10	155	408	13	18	935	166
RTOR Reduction (vph)	0	0	149	0	0	8	0	0	5	0	0	73
Lane Group Flow (vph)	122	88	34	13	109	2	155	408	8	18	935	93
Confl. Peds. (#/hr)	1					1			3		3	
Heavy Vehicles (%)	6%	2%	2%	0%	4%	12%	4%	5%	9%	6%	3%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		1	6			2	
Permitted Phases	4		4	8		8	6		6	2		2
Actuated Green, G (s)	15.0	15.0	15.0	15.0	15.0	15.0	51.3	51.3	51.3	40.3	40.3	40.3
Effective Green, g (s)	15.0	15.0	15.0	15.0	15.0	15.0	51.3	51.3	51.3	40.3	40.3	40.3
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.18	0.18	0.63	0.63	0.63	0.50	0.50	0.50
Clearance Time (s)	7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	229	347	295	248	340	263	254	1215	970	492	973	835
v/s Ratio Prot		0.05			0.06		c0.05	0.21			c0.48	
v/s Ratio Perm	c0.10		0.02	0.01		0.00	0.33		0.01	0.02		0.06
v/c Ratio	0.53	0.25	0.11	0.05	0.32	0.01	0.61	0.34	0.01	0.04	0.96	0.11
Uniform Delay, d1	30.0	28.4	27.6	27.3	28.7	27.1	16.9	7.0	5.6	10.5	19.7	10.9
Progression 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
Incremental Delay, d2	2.4	0.4	0.2	0.1	0.5	0.0	4.3	0.7	0.0	0.1	20.8	0.3
Delay (s)	32.4	28.7	27.8	27.4	29.3	27.1	21.2	7.8	5.6	10.7	40.6	11.2
Level of Service	C	C	C	C	C	C	C	A	A	B	D	B
Approach Delay (s)		29.4			28.9			11.3			35.7	
Approach LOS		C			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	27.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	81.3	Sum of lost time (s)	19.0
Intersection Capacity Utilization	98.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
1: Monkman Court/Archerhill Court & Vandorf Sideroad

Baseline 2021 PM Peak Hour
06/15/2021

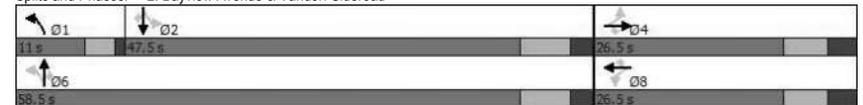
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (veh/h)	5	474	5	13	345	5	3	0	9	3	0	2
Future Volume (Veh/h)	5	474	5	13	345	5	3	0	9	3	0	2
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	527	6	14	383	6	3	0	10	3	0	2
Pedestrians							2			1		
Lane Width (m)							3.7			3.7		
Walking Speed (m/s)							1.1			1.1		
Percent Blockage							0			0		
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)				116								
pX, platoon unblocked	0.96					0.96	0.96		0.96	0.96	0.96	
vC, conflicting volume	390			535		960	962		532	967	962	387
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	341			535		936	938		532	944	938	338
tC, single (s)	4.3			4.1		7.1	6.5		6.3	7.4	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.2		3.5	4.0		3.4	3.8	4.0	3.3
p0 queue free %	99			99		99	100		98	98	100	100
cM capacity (veh/h)	1076			1041		232	248		527	196	248	678
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	539	403	13	5								
Volume Left	6	14	3	3								
Volume Right	6	6	10	2								
cSH	1076	1041	407	274								
Volume to Capacity	0.01	0.01	0.03	0.02								
Queue Length 95th (m)	0.1	0.3	0.7	0.4								
Control Delay (s)	0.2	0.4	14.1	18.4								
Lane LOS	A	A	B	C								
Approach Delay (s)	0.2	0.4	14.1	18.4								
Approach LOS			B	C								
Intersection Summary												
Average Delay			0.6									
Intersection Capacity Utilization			37.2%	ICU Level of Service	A							
Analysis Period (min)			15									

Timings
2: Bayview Avenue & Vandorf Sideroad

Baseline 2021 PM Peak Hour
06/15/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	162	103	220	5	84	36	135	767	19	16	451	143
Future Volume (vph)	162	103	220	5	84	36	135	767	19	16	451	143
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	4		4	8	8	8	1	6	6	2	2	2
Permitted Phases	4	4	4	8	8	8	1	6	6	2	2	2
Detector Phase	4	4	4	8	8	8	1	6	6	2	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	17.5	17.5	17.5	17.5	17.5	17.5	11.0	47.5	47.5	47.5	47.5	47.5
Total Split (s)	26.5	26.5	26.5	26.5	26.5	26.5	11.0	58.5	58.5	47.5	47.5	47.5
Total Split (%)	31.2%	31.2%	31.2%	31.2%	31.2%	31.2%	12.9%	68.8%	68.8%	55.9%	55.9%	55.9%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	3.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	1.0	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	Max	Max	Max	Max	Max						
Act Effect Green (s)	16.6	16.6	16.6	16.6	16.6	16.6	54.8	51.3	51.3	40.2	40.2	40.2
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.66	0.62	0.62	0.48	0.48	0.48
v/c Ratio	0.64	0.28	0.47	0.02	0.23	0.09	0.25	0.66	0.02	0.06	0.49	0.17
Control Delay	41.5	29.1	7.1	24.8	28.4	0.5	7.6	14.9	0.1	14.9	18.0	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.5	29.1	7.1	24.8	28.4	0.5	7.6	14.9	0.1	14.9	18.0	3.3
LOS	D	C	A	C	C	A	A	B	A	B	B	A
Approach Delay	23.2				20.1		13.5				14.4	
Approach LOS	C				C		B				B	
Intersection Summary												
Cycle Length: 85												
Actuated Cycle Length: 83												
Natural Cycle: 80												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.66												
Intersection Signal Delay: 16.4							Intersection LOS: B					
Intersection Capacity Utilization 106.1%							ICU Level of Service G					
Analysis Period (min) 15												

Splits and Phases: 2: Bayview Avenue & Vandorf Sideroad



HCM Signalized Intersection Capacity Analysis
2: Bayview Avenue & Vandorf Sideroad

Baseline 2021 PM Peak Hour
06/15/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Traffic Volume (vph)	162	103	220	5	84	36	135	767	19	16	451	143
Future Volume (vph)	162	103	220	5	84	36	135	767	19	16	451	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	2000	2000	2000	2000	2000	2000
Total Lost time (s)	7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
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
Frb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	1921	1551	1825	1883	1585	1846	1983	1380	1795	1983	1646
Fit Permitted	0.70	1.00	1.00	0.69	1.00	1.00	0.36	1.00	1.00	0.30	1.00	1.00
Satd. Flow (perm)	1331	1921	1551	1320	1883	1585	701	1983	1380	561	1983	1646
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	171	108	232	5	88	38	142	807	20	17	475	151
RTOR Reduction (vph)	0	0	186	0	0	30	0	0	8	0	0	78
Lane Group Flow (vph)	171	108	46	5	88	8	142	807	12	17	475	73
Confl. Peds. (#/hr)							2					2
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	1%	0%	3%	0%	2%	3%	4%	2%	22%	7%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		1	6			2	
Permitted Phases	4		4	8		8	6		6	2		2
Actuated Green, G (s)	16.6	16.6	16.6	16.6	16.6	16.6	51.3	51.3	51.3	40.3	40.3	40.3
Effective Green, g (s)	16.6	16.6	16.6	16.6	16.6	16.6	51.3	51.3	51.3	40.3	40.3	40.3
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.62	0.62	0.62	0.49	0.49	0.49
Clearance Time (s)	7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	266	384	310	264	377	317	530	1227	853	272	963	800
v/s Ratio Prot		0.06			0.05		0.02	c0.41			0.24	
v/s Ratio Perm	c0.13		0.03	0.00		0.00	0.14		0.01	0.03		0.04
v/c Ratio	0.64	0.28	0.15	0.02	0.23	0.02	0.27	0.66	0.01	0.06	0.49	0.09
Uniform Delay, d1	30.4	28.1	27.3	26.6	27.8	26.6	7.5	10.2	6.1	11.3	14.4	11.5
Progression 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
Incremental Delay, d2	5.2	0.4	0.2	0.0	0.3	0.0	0.3	2.8	0.0	0.4	1.8	0.2
Delay (s)	35.7	28.5	27.6	26.6	28.1	26.7	7.8	12.9	6.1	11.7	16.2	11.7
Level of Service	D	C	C	C	C	C	A	B	A	B	B	B
Approach Delay (s)		30.5			27.7			12.0			15.0	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			18.0							B		
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			82.9					19.0				
Intersection Capacity Utilization			106.1%							G		
Analysis Period (min)			15									
c Critical Lane Group												

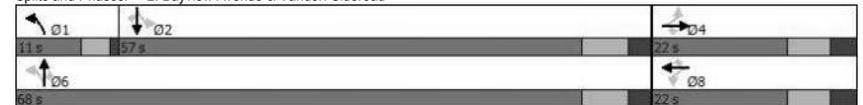
HCM Unsignalized Intersection Capacity Analysis Future Background 2030 AM Peak Hour
 1: Monkman Court/Archerhill Court & Vandorf Sideroad 06/15/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Volume (veh/h)	4	362	5	2	403	9	4	0	13	4	0	2
Future Volume (Veh/h)	4	362	5	2	403	9	4	0	13	4	0	2
Sign Control	Free		Free		Stop		Stop		Stop		Stop	
Grade	0%		0%		0%		0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	393	5	2	438	10	4	0	14	4	0	2
Pedestrians					2		2					
Lane Width (m)					3.7		3.7					
Walking Speed (m/s)					1.1		1.1					
Percent Blockage					0		0					
Right turn flare (veh)												
Median type	None		None									
Median storage (veh)												
Upstream signal (m)					116							
pX, platoon unblocked	0.94					0.94	0.94		0.94	0.94	0.94	
vC, conflicting volume	450			400		854	860	398	866	857	445	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	384			400		814	819	398	827	817	379	
tC, single (s)	4.1			4.6		7.1	6.5	6.2	7.1	6.5	6.7	
tC, 2 stage (s)												
tF (s)	2.2			2.7		3.5	4.0	3.3	3.5	4.0	3.8	
p0 queue free %	100			100		99	100	98	99	100	100	
cM capacity (veh/h)	1113			939		278	289	655	267	290	539	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	402	450	18	6								
Volume Left	4	2	4	4								
Volume Right	5	10	14	2								
cSH	1113	939	503	321								
Volume to Capacity	0.00	0.00	0.04	0.02								
Queue Length 95th (m)	0.1	0.0	0.8	0.4								
Control Delay (s)	0.1	0.1	12.4	16.4								
Lane LOS	A	A	B	C								
Approach Delay (s)	0.1	0.1	12.4	16.4								
Approach LOS			B	C								
Intersection Summary												
Average Delay			0.5									
Intersection Capacity Utilization			33.0%		ICU Level of Service		A					
Analysis Period (min)			15									

Timings Future Background 2030 AM Peak Hour
 2: Bayview Avenue & Vandorf Sideroad 06/15/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	113	86	169	12	105	9	143	463	12	17	1000	153
Future Volume (vph)	113	86	169	12	105	9	143	463	12	17	1000	153
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	4		4		8		8		1		6	
Permitted Phases	4		4	8	8	8	6		6	2		2
Detector Phase	4	4	4	8	8	8	1	6	6	2	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	17.5	17.5	17.5	17.5	17.5	17.5	11.0	47.5	47.5	47.5	47.5	47.5
Total Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	11.0	68.0	68.0	57.0	57.0	57.0
Total Split (%)	24.4%	24.4%	24.4%	24.4%	24.4%	24.4%	12.2%	75.6%	75.6%	63.3%	63.3%	63.3%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	3.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	1.0	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	7.5	7.5	3.0	7.5	7.5	7.5	7.5	7.5
Lead/Lag							Lead		Lag		Lag	
Lead-Lag Optimize?							Yes		Yes		Yes	
Recall Mode	None	Max	Max	Max	Max	Max						
Act Effect Green (s)	15.2	15.2	15.2	15.2	15.2	15.2	65.3	60.8	60.8	49.7	49.7	49.7
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17	0.17	0.72	0.67	0.67	0.55	0.55	0.55
v/c Ratio	0.58	0.29	0.43	0.06	0.36	0.03	0.60	0.38	0.01	0.04	0.98	0.16
Control Delay	45.8	34.8	8.3	30.8	36.2	0.1	23.3	8.7	0.0	12.1	46.1	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.8	34.8	8.3	30.8	36.2	0.1	23.3	8.7	0.0	12.1	46.1	3.6
LOS	D	C	A	C	D	A	C	A	A	B	D	A
Approach Delay	26.0				33.2		12.0				40.1	
Approach LOS	C				C		B				D	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 91												
Natural Cycle: 90												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.98												
Intersection Signal Delay: 29.8							Intersection LOS: C					
Intersection Capacity Utilization 98.3%							ICU Level of Service F					
Analysis Period (min) 15												

Splits and Phases: 2: Bayview Avenue & Vandorf Sideroad



HCM Signalized Intersection Capacity Analysis
2: Bayview Avenue & Vandorf Sideroad

Future Background 2030 AM Peak Hour
06/15/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↘	↔	↑	↘	↔	↑	↘	↔	↑	↘
Traffic Volume (vph)	113	86	169	12	105	9	143	463	12	17	1000	153
Future Volume (vph)	113	86	169	12	105	9	143	463	12	17	1000	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	2000	2000	2000	2000	2000	2000
Total Lost time (s)	7.5	7.5	7.5	7.5	7.5	7.5	3.0	7.5	7.5	7.5	7.5	7.5
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
Frb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1883	1601	1825	1847	1427	1847	1926	1538	1808	1963	1685
Fit Permitted	0.69	1.00	1.00	0.70	1.00	1.00	0.07	1.00	1.00	0.49	1.00	1.00
Satd. Flow (perm)	1241	1883	1601	1341	1847	1427	145	1926	1538	925	1963	1685
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	119	91	178	13	111	9	151	487	13	18	1053	161
RTOR Reduction (vph)	0	0	148	0	0	7	0	0	4	0	0	63
Lane Group Flow (vph)	119	91	30	13	111	2	151	487	9	18	1053	98
Confl. Peds. (#/hr)	1					1			3	3		
Heavy Vehicles (%)	6%	2%	2%	0%	4%	12%	4%	5%	9%	6%	3%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		1	6			2	
Permitted Phases	4		4	8		8	6		6	2		2
Actuated Green, G (s)	15.2	15.2	15.2	15.2	15.2	15.2	60.8	60.8	60.8	49.8	49.8	49.8
Effective Green, g (s)	15.2	15.2	15.2	15.2	15.2	15.2	61.8	60.8	60.8	49.8	49.8	49.8
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17	0.17	0.68	0.67	0.67	0.55	0.55	0.55
Clearance Time (s)	7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	207	314	267	223	308	238	248	1286	1027	506	1074	922
v/s Ratio Prot		0.05			0.06		c0.05	0.25			c0.54	
v/s Ratio Perm	c0.10		0.02	0.01		0.00	0.36		0.01	0.02		0.06
v/c Ratio	0.57	0.29	0.11	0.06	0.36	0.01	0.61	0.38	0.01	0.04	0.98	0.11
Uniform Delay, d1	34.9	33.2	32.2	31.9	33.6	31.6	20.7	6.7	5.0	9.5	20.1	9.9
Progression 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
Incremental Delay, d2	3.8	0.5	0.2	0.1	0.7	0.0	4.2	0.9	0.0	0.1	23.1	0.2
Delay (s)	38.8	33.7	32.4	32.0	34.3	31.6	24.9	7.6	5.1	9.6	43.3	10.1
Level of Service	D	C	C	C	C	C	C	A	A	A	D	B
Approach Delay (s)		34.6			33.9			11.5			38.4	
Approach LOS		C			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	30.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	98.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

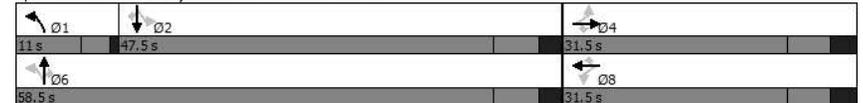
HCM Unsignalized Intersection Capacity Analysis Future Background 2030 PM Peak Hour
 1: Monkman Court/Archerhill Court & Vandorf Sideroad 07/15/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Volume (veh/h)	5	496	5	13	361	5	3	0	9	3	0	2
Future Volume (Veh/h)	5	496	5	13	361	5	3	0	9	3	0	2
Sign Control	Free				Free				Stop			
Grade	0%				0%				0%			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	522	5	14	380	5	3	0	9	3	0	2
Pedestrians							2		1			
Lane Width (m)							3.7		3.7			
Walking Speed (m/s)							1.1		1.1			
Percent Blockage							0		0			
Right turn flare (veh)							0		0			
Median type	None				None							
Median storage (veh)												
Upstream signal (m)					116							
pX, platoon unblocked	0.95						0.95		0.95		0.95	
vC, conflicting volume	386		529				949		950		526	
vC1, stage 1 conf vol											950	
vC2, stage 2 conf vol											384	
vCu, unblocked vol	332		529				922		924		526	
tC, single (s)	4.3		4.1				7.1		6.5		6.3	
tC, 2 stage (s)											6.2	
tF (s)	2.4		2.2				3.5		4.0		3.4	
p0 queue free %	100		99				99		100		99	
cM capacity (veh/h)	1080		1046				236		252		531	
Direction_Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	532	399	12	5								
Volume Left	5	14	3	3								
Volume Right	5	5	9	2								
cSH	1080	1046	405	280								
Volume to Capacity	0.00	0.01	0.03	0.02								
Queue Length 95th (m)	0.1	0.3	0.7	0.4								
Control Delay (s)	0.1	0.4	14.2	18.1								
Lane LOS	A	A	B	C								
Approach Delay (s)	0.1	0.4	14.2	18.1								
Approach LOS			B				C					
Intersection Summary												
Average Delay			0.5									
Intersection Capacity Utilization			38.4%		ICU Level of Service		A					
Analysis Period (min)	15											

Timings Future Background 2030 PM Peak Hour
 2: Bayview Avenue & Vandorf Sideroad 07/15/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Volume (vph)	162	109	221	5	89	36	136	898	19	16	572	144
Future Volume (vph)	162	109	221	5	89	36	136	898	19	16	572	144
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	4		4		8		8		1		6	
Permitted Phases	4		4		8		8		6		2	
Detector Phase	4		4		8		8		1		6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	17.5	17.5	17.5	17.5	17.5	17.5	11.0	47.5	47.5	47.5	47.5	47.5
Total Split (s)	31.5	31.5	31.5	31.5	31.5	31.5	11.0	58.5	58.5	47.5	47.5	47.5
Total Split (%)	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	12.2%	65.0%	65.0%	52.8%	52.8%	52.8%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	3.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	1.0	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lead/Lag							Lead		Lag		Lag	
Lead-Lag Optimize?							Yes		Yes		Yes	
Recall Mode	None		None		None		None		Max		Max	
Act Effect Green (s)	16.7	16.7	16.7	16.7	16.7	16.7	54.8	51.3	51.3	40.2	40.2	40.2
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.66	0.62	0.62	0.48	0.48	0.48
v/c Ratio	0.64	0.30	0.47	0.02	0.25	0.10	0.32	0.77	0.02	0.10	0.63	0.17
Control Delay	41.6	29.4	7.0	24.8	28.6	0.5	8.4	18.9	0.1	16.3	20.8	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.6	29.4	7.0	24.8	28.6	0.5	8.4	18.9	0.1	16.3	20.8	3.3
LOS	D	C	A	C	C	A	A	B	A	B	C	A
Approach Delay	23.4				20.7		17.2				17.3	
Approach LOS	C				C		B				B	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 83												
Natural Cycle: 80												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.77												
Intersection Signal Delay: 18.7							Intersection LOS: B					
Intersection Capacity Utilization 112.6%							ICU Level of Service H					
Analysis Period (min) 15												

Splits and Phases: 2: Bayview Avenue & Vandorf Sideroad



HCM Signalized Intersection Capacity Analysis
2: Bayview Avenue & Vandorf Sideroad

Future Background 2030 PM Peak Hour
07/15/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Traffic Volume (vph)	162	109	221	5	89	36	136	898	19	16	572	144
Future Volume (vph)	162	109	221	5	89	36	136	898	19	16	572	144
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	2000	2000	2000	2000	2000	2000
Total Lost time (s)	7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
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
Frb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	1921	1551	1825	1883	1585	1847	1983	1380	1795	1983	1646
Fit Permitted	0.70	1.00	1.00	0.68	1.00	1.00	0.26	1.00	1.00	0.19	1.00	1.00
Satd. Flow (perm)	1324	1921	1551	1312	1883	1585	505	1983	1380	353	1983	1646
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	171	115	233	5	94	38	143	945	20	17	602	152
RTOR Reduction (vph)	0	0	186	0	0	30	0	0	8	0	0	78
Lane Group Flow (vph)	171	115	47	5	94	8	143	945	12	17	602	74
Confl. Peds. (#/hr)							2					2
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	1%	0%	3%	0%	2%	3%	4%	2%	22%	7%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		1	6			2	
Permitted Phases	4		4	8		8	6		6	2		2
Actuated Green, G (s)	16.7	16.7	16.7	16.7	16.7	16.7	51.3	51.3	51.3	40.3	40.3	40.3
Effective Green, g (s)	16.7	16.7	16.7	16.7	16.7	16.7	51.3	51.3	51.3	40.3	40.3	40.3
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.62	0.62	0.62	0.49	0.49	0.49
Clearance Time (s)	7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	266	386	312	263	378	318	425	1225	852	171	962	799
v/s Ratio Prot		0.06			0.05		0.03	c0.48			0.30	
v/s Ratio Perm	c0.13		0.03	0.00		0.00	0.18		0.01	0.05		0.04
v/c Ratio	0.64	0.30	0.15	0.02	0.25	0.02	0.34	0.77	0.01	0.10	0.63	0.09
Uniform Delay, d1	30.4	28.2	27.3	26.6	27.9	26.6	8.9	11.6	6.1	11.5	15.8	11.5
Progression 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
Incremental Delay, d2	5.2	0.4	0.2	0.0	0.3	0.0	0.5	4.7	0.0	1.2	3.1	0.2
Delay (s)	35.7	28.6	27.5	26.6	28.2	26.6	9.4	16.3	6.1	12.7	18.9	11.7
Level of Service	D	C	C	C	C	C	A	B	A	B	B	B
Approach Delay (s)		30.4			27.7			15.2			17.3	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			19.7							B		
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			83.0					Sum of lost time (s)	19.0			
Intersection Capacity Utilization			112.6%					ICU Level of Service	H			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 1: Monkman Court/Archerhill Court & Vandorf Sideroad
 FB 2030 AM Peak Hour - Sensitivity
 07/15/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (veh/h)	4	362	5	2	403	9	4	0	13	4	0	2
Future Volume (Veh/h)	4	362	5	2	403	9	4	0	13	4	0	2
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	393	5	2	438	10	4	0	14	4	0	2
Pedestrians							2			2		
Lane Width (m)							3.7			3.7		
Walking Speed (m/s)							1.1			1.1		
Percent Blockage							0			0		
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)				116								
pX, platoon unblocked	0.94					0.94	0.94		0.94	0.94	0.94	
vC, conflicting volume	450		400			854	860	398	866	857	445	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	385		400			814	820	398	827	817	380	
tC, single (s)	4.1		4.6			7.1	6.5	6.2	7.1	6.5	6.7	
tC, 2 stage (s)												
tF (s)	2.2		2.7			3.5	4.0	3.3	3.5	4.0	3.8	
p0 queue free %	100		100			99	100	98	99	100	100	
cM capacity (veh/h)	1113		939			278	289	655	267	290	539	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	402	450	18	6								
Volume Left	4	2	4	4								
Volume Right	5	10	14	2								
cSH	1113	939	503	321								
Volume to Capacity	0.00	0.00	0.04	0.02								
Queue Length 95th (m)	0.1	0.0	0.8	0.4								
Control Delay (s)	0.1	0.1	12.4	16.4								
Lane LOS	A	A	B	C								
Approach Delay (s)	0.1	0.1	12.4	16.4								
Approach LOS			B	C								
Intersection Summary												
Average Delay			0.5									
Intersection Capacity Utilization			33.0%	ICU Level of Service	A							
Analysis Period (min)			15									

Timings
 2: Bayview Avenue & Vandorf Sideroad
 FB 2030 AM Peak Hour - Sensitivity
 07/15/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	113	86	169	12	105	9	143	463	12	17	1000	153
Future Volume (vph)	113	86	169	12	105	9	143	463	12	17	1000	153
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	4		4	8		8	1		6	2		2
Permitted Phases	4	4	4	8	8	8	6	6	6	2	2	2
Detector Phase	4	4	4	8	8	8	1	6	6	2	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	17.5	17.5	17.5	17.5	17.5	17.5	11.0	47.5	47.5	47.5	47.5	47.5
Total Split (s)	26.0	26.0	26.0	26.0	26.0	26.0	11.0	64.0	64.0	53.0	53.0	53.0
Total Split (%)	28.9%	28.9%	28.9%	28.9%	28.9%	28.9%	12.2%	71.1%	71.1%	58.9%	58.9%	58.9%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	3.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	1.0	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	7.5	7.5	3.0	7.5	7.5	7.5	7.5	7.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	Max	Max	Max	Max	Max						
Act Effect Green (s)	15.2	15.2	15.2	15.2	15.2	15.2	61.3	56.8	56.8	45.7	45.7	45.7
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17	0.17	0.70	0.65	0.65	0.52	0.52	0.52
v/c Ratio	0.55	0.28	0.42	0.06	0.34	0.03	0.37	0.20	0.01	0.04	0.54	0.17
Control Delay	42.0	32.3	7.8	28.6	33.7	0.1	8.0	7.2	0.0	12.8	15.9	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.0	32.3	7.8	28.6	33.7	0.1	8.0	7.2	0.0	12.8	15.9	2.9
LOS	D	C	A	C	C	A	A	A	A	B	B	A
Approach Delay	24.1				30.9		7.2				14.2	
Approach LOS	C				C		A				B	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 87.1												
Natural Cycle: 80												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.55												
Intersection Signal Delay: 14.8							Intersection LOS: B					
Intersection Capacity Utilization 98.3%							ICU Level of Service F					
Analysis Period (min) 15												

Splits and Phases: 2: Bayview Avenue & Vandorf Sideroad

↔ 01	↔ 02	↔ 04
11 s	53 s	26 s
↔ 05	↔ 08	
64 s	26 s	

HCM Signalized Intersection Capacity Analysis
2: Bayview Avenue & Vandorf Sideroad

FB 2030 AM Peak Hour - Sensitivity
07/15/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Traffic Volume (vph)	113	86	169	12	105	9	143	463	12	17	1000	153
Future Volume (vph)	113	86	169	12	105	9	143	463	12	17	1000	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	2000	2000	2000	2000	2000	2000
Total Lost time (s)	7.5	7.5	7.5	7.5	7.5	7.5	3.0	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1720	1883	1601	1825	1847	1439	1847	3659	1538	1808	3730	1685
Fit Permitted	0.69	1.00	1.00	0.70	1.00	1.00	0.20	1.00	1.00	0.47	1.00	1.00
Satd. Flow (perm)	1241	1883	1601	1341	1847	1439	382	3659	1538	903	3730	1685
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	119	91	178	13	111	9	151	487	13	18	1053	161
RTOR Reduction (vph)	0	0	147	0	0	7	0	0	5	0	0	76
Lane Group Flow (vph)	119	91	31	13	111	2	151	487	8	18	1053	85
Confl. Peds. (#/hr)	1					1			3		3	
Heavy Vehicles (%)	6%	2%	2%	0%	4%	12%	4%	5%	9%	6%	3%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		1	6			2	
Permitted Phases	4		4	8		8	6		6	2		2
Actuated Green, G (s)	15.2	15.2	15.2	15.2	15.2	15.2	56.8	56.8	56.8	45.8	45.8	45.8
Effective Green, g (s)	15.2	15.2	15.2	15.2	15.2	15.2	57.8	56.8	56.8	45.8	45.8	45.8
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17	0.17	0.66	0.65	0.65	0.53	0.53	0.53
Clearance Time (s)	7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	216	328	279	234	322	251	388	2388	1004	475	1963	887
v/s Ratio Prot		0.05			0.06		c0.04	0.13			c0.28	
v/s Ratio Perm	c0.10		0.02	0.01		0.00	0.22		0.01	0.02		0.05
v/c Ratio	0.55	0.28	0.11	0.06	0.34	0.01	0.39	0.20	0.01	0.04	0.54	0.10
Uniform Delay, d1	32.8	31.1	30.2	29.9	31.5	29.7	6.9	6.0	5.3	10.0	13.6	10.3
Progression 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
Incremental Delay, d2	3.0	0.5	0.2	0.1	0.6	0.0	0.6	0.2	0.0	0.1	1.1	0.2
Delay (s)	35.8	31.6	30.4	30.0	32.2	29.7	7.5	6.2	5.3	10.1	14.7	10.5
Level of Service	D	C	C	C	C	C	A	A	A	B	B	B
Approach Delay (s)		32.3			31.8			6.5			14.0	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	98.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 1: Monkman Court/Archerhill Court & Vandorf Sideroad
 FB 2030 PM Peak Hour - Sensitivity
 07/15/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (veh/h)	5	496	5	13	361	5	3	0	9	3	0	2
Future Volume (Veh/h)	5	496	5	13	361	5	3	0	9	3	0	2
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	522	5	14	380	5	3	0	9	3	0	2
Pedestrians							2			1		
Lane Width (m)							3.7			3.7		
Walking Speed (m/s)							1.1			1.1		
Percent Blockage							0			0		
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)				116								
pX, platoon unblocked	0.95					0.95	0.95		0.95	0.95	0.95	
vC, conflicting volume	386		529			949	950	526	955	950	384	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	332		529			922	924	526	928	924	329	
tC, single (s)	4.3		4.1			7.1	6.5	6.3	7.4	6.5	6.2	
tC, 2 stage (s)												
tF (s)	2.4		2.2			3.5	4.0	3.4	3.8	4.0	3.3	
p0 queue free %	100		99			99	100	98	99	100	100	
cM capacity (veh/h)	1080		1046			236	252	531	201	252	683	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	532	399	12	5								
Volume Left	5	14	3	3								
Volume Right	5	5	9	2								
cSH	1080	1046	405	280								
Volume to Capacity	0.00	0.01	0.03	0.02								
Queue Length 95th (m)	0.1	0.3	0.7	0.4								
Control Delay (s)	0.1	0.4	14.2	18.1								
Lane LOS	A	A	B	C								
Approach Delay (s)	0.1	0.4	14.2	18.1								
Approach LOS			B	C								
Intersection Summary												
Average Delay			0.5									
Intersection Capacity Utilization			38.4%	ICU Level of Service	A							
Analysis Period (min)			15									

Timings
 2: Bayview Avenue & Vandorf Sideroad
 FB 2030 PM Peak Hour - Sensitivity
 07/15/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	162	109	221	5	89	36	136	898	19	16	572	144
Future Volume (vph)	162	109	221	5	89	36	136	898	19	16	572	144
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	4		4	8	8	8	1	6	6	2	2	2
Permitted Phases	4	4	4	8	8	8	1	6	6	2	2	2
Detector Phase	4	4	4	8	8	8	1	6	6	2	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	17.5	17.5	17.5	17.5	17.5	17.5	11.0	47.5	47.5	47.5	47.5	47.5
Total Split (s)	31.5	31.5	31.5	31.5	31.5	31.5	11.0	58.5	58.5	47.5	47.5	47.5
Total Split (%)	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	12.2%	65.0%	65.0%	52.8%	52.8%	52.8%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	3.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	1.0	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max	Max	Max
Act Effect Green (s)	16.7	16.7	16.7	16.7	16.7	16.7	54.8	51.3	51.3	40.2	40.2	40.2
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.66	0.62	0.62	0.48	0.48	0.48
v/c Ratio	0.64	0.30	0.47	0.02	0.25	0.10	0.25	0.41	0.02	0.06	0.33	0.17
Control Delay	41.6	29.4	7.0	24.8	28.6	0.5	7.6	9.6	0.1	14.8	14.7	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.6	29.4	7.0	24.8	28.6	0.5	7.6	9.6	0.1	14.8	14.7	3.3
LOS	D	C	A	C	C	A	A	A	A	B	B	A
Approach Delay	23.3			20.7			9.2			12.5		
Approach LOS	C			C			A			B		
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 83												
Natural Cycle: 80												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.64												
Intersection Signal Delay: 13.7							Intersection LOS: B					
Intersection Capacity Utilization 101.1%							ICU Level of Service G					
Analysis Period (min) 15												
Splits and Phases: 2: Bayview Avenue & Vandorf Sideroad												
↔ 01	↔ 02	↔ 04										
11 s	47.5 s	31.5 s										
↔ 06	↔ 08											
58.5 s	31.5 s											

HCM Signalized Intersection Capacity Analysis
2: Bayview Avenue & Vandorf Sideroad

FB 2030 PM Peak Hour - Sensitivity
07/15/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	162	109	221	5	89	36	136	898	19	16	572	144
Future Volume (vph)	162	109	221	5	89	36	136	898	19	16	572	144
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	2000	2000	2000	2000	2000	2000
Total Lost time (s)	7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	1921	1565	1825	1883	1585	1846	3767	1380	1795	3767	1646
Fit Permitted	0.70	1.00	1.00	0.68	1.00	1.00	0.37	1.00	1.00	0.30	1.00	1.00
Satd. Flow (perm)	1324	1921	1565	1312	1883	1585	720	3767	1380	572	3767	1646
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	171	115	233	5	94	38	143	945	20	17	602	152
RTOR Reduction (vph)	0	0	186	0	0	30	0	0	8	0	0	78
Lane Group Flow (vph)	171	115	47	5	94	8	143	945	12	17	602	74
Confl. Peds. (#/hr)							2					2
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	1%	0%	3%	0%	2%	3%	4%	2%	22%	7%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		1	6			2	
Permitted Phases	4		4	8		8	6		6	2		2
Actuated Green, G (s)	16.7	16.7	16.7	16.7	16.7	16.7	51.3	51.3	51.3	40.3	40.3	40.3
Effective Green, g (s)	16.7	16.7	16.7	16.7	16.7	16.7	51.3	51.3	51.3	40.3	40.3	40.3
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.62	0.62	0.62	0.49	0.49	0.49
Clearance Time (s)	7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	266	386	314	263	378	318	539	2328	852	277	1829	799
v/s Ratio Prot		0.06			0.05		0.02	c0.25			0.16	
v/s Ratio Perm	c0.13		0.03	0.00		0.00	0.14		0.01	0.03		0.04
v/c Ratio	0.64	0.30	0.15	0.02	0.25	0.02	0.27	0.41	0.01	0.06	0.33	0.09
Uniform Delay, d1	30.4	28.2	27.3	26.6	27.9	26.6	6.8	8.1	6.1	11.3	13.1	11.5
Progression 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
Incremental Delay, d2	5.2	0.4	0.2	0.0	0.3	0.0	0.3	0.5	0.0	0.4	0.5	0.2
Delay (s)	35.7	28.6	27.5	26.6	28.2	26.6	7.1	8.6	6.1	11.7	13.6	11.7
Level of Service	D	C	C	C	C	C	A	A	A	B	B	B
Approach Delay (s)		30.4			27.7			8.4			13.2	
Approach LOS		C			C			A			B	
Intersection Summary												
HCM 2000 Control Delay			15.4							B		
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			83.0						19.0			
Intersection Capacity Utilization			101.1%							G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
1: Monkman Court/Archerhill Court & Vandorf Sideroad

Future Total 2030 AM Peak Hour
07/15/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔	↔	
Traffic Volume (veh/h)	7	362	5	2	403	26	4	0	13	50	1	11
Future Volume (Veh/h)	7	362	5	2	403	26	4	0	13	50	1	11
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	393	5	2	438	28	4	0	14	54	1	12
Pedestrians							2			2		
Lane Width (m)							3.7			3.7		
Walking Speed (m/s)							1.1			1.1		
Percent Blockage							0			0		
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)				116								
pX, platoon unblocked	0.94					0.94	0.94		0.94	0.94	0.94	
vC, conflicting volume	468			400		882	886	398	884	874	454	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	400			400		841	845	398	843	833	385	
tC, single (s)	4.1			4.6		7.1	6.5	6.2	7.1	6.5	6.7	
tC, 2 stage (s)												
tF (s)	2.2			2.7		3.5	4.0	3.3	3.5	4.0	3.8	
p0 queue free %	99			100		98	100	98	79	100	98	
cM capacity (veh/h)	1095			939		259	277	655	259	282	533	
Direction_Lane #	EB 1	WB 1	NB 1	SB 1	SB 2							
Volume Total	406	468	18	54	13							
Volume Left	8	2	4	54	0							
Volume Right	5	28	14	0	12							
cSH	1095	939	489	259	499							
Volume to Capacity	0.01	0.00	0.04	0.21	0.03							
Queue Length 95th (m)	0.2	0.0	0.9	5.8	0.6							
Control Delay (s)	0.2	0.1	12.6	22.5	12.4							
Lane LOS	A	A	B	C	B							
Approach Delay (s)	0.2	0.1	12.6	20.5								
Approach LOS			B	C								
Intersection Summary												
Average Delay			1.8									
Intersection Capacity Utilization			40.1%		ICU Level of Service		A					
Analysis Period (min)			15									

Timings
2: Bayview Avenue & Vandorf Sideroad

Future Total 2030 AM Peak Hour
07/15/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	133	95	187	12	106	9	147	463	12	17	1000	165
Future Volume (vph)	133	95	187	12	106	9	147	463	12	17	1000	165
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	4		4		8		8		1		6	
Permitted Phases	4	4	4	8	8	8	6	6	2	2	2	2
Detector Phase	4	4	4	8	8	8	1	6	6	2	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	17.5	17.5	17.5	17.5	17.5	17.5	11.0	47.5	47.5	47.5	47.5	47.5
Total Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	11.0	68.0	68.0	57.0	57.0	57.0
Total Split (%)	24.9%	24.9%	24.9%	24.9%	24.9%	24.9%	12.2%	75.1%	75.1%	63.0%	63.0%	63.0%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	3.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	1.0	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	7.5	7.5	3.0	7.5	7.5	7.5	7.5	7.5
Lead/Lag							Lead		Lag		Lag	
Lead-Lag Optimize?							Yes		Yes		Yes	
Recall Mode	None	Max	Max	Max	Max	Max						
Act Effct Green (s)	15.9	15.9	15.9	15.9	15.9	15.9	65.3	60.8	60.8	49.7	49.7	49.7
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17	0.17	0.71	0.66	0.66	0.54	0.54	0.54
v/c Ratio	0.65	0.31	0.45	0.06	0.35	0.03	0.62	0.38	0.01	0.04	0.99	0.18
Control Delay	49.6	34.8	8.1	30.6	35.7	0.1	25.0	9.0	0.0	12.2	48.4	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.6	34.8	8.1	30.6	35.7	0.1	25.0	9.0	0.0	12.2	48.4	3.7
LOS	D	C	A	C	D	A	C	A	A	B	D	A
Approach Delay	27.5				32.9		12.6				41.6	
Approach LOS	C				C		B				D	
Intersection Summary												
Cycle Length: 90.5												
Actuated Cycle Length: 91.7												
Natural Cycle: 90												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.99												
Intersection Signal Delay: 31.0							Intersection LOS: C					
Intersection Capacity Utilization 99.5%							ICU Level of Service F					
Analysis Period (min) 15												

Splits and Phases: 2: Bayview Avenue & Vandorf Sideroad

↔ Ø1	↔ Ø2	↔ Ø4
11 s	57 s	22.5 s
↔ Ø5	↔ Ø8	
68 s	22.5 s	

HCM Signalized Intersection Capacity Analysis
2: Bayview Avenue & Vandorf Sideroad

Future Total 2030 AM Peak Hour
07/15/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↘	↔	↑	↘	↔	↑	↘	↔	↑	↘
Traffic Volume (vph)	133	95	187	12	106	9	147	463	12	17	1000	165
Future Volume (vph)	133	95	187	12	106	9	147	463	12	17	1000	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	2000	2000	2000	2000	2000	2000
Total Lost time (s)	7.5	7.5	7.5	7.5	7.5	7.5	3.0	7.5	7.5	7.5	7.5	7.5
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
Frb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1883	1601	1825	1847	1426	1847	1926	1538	1808	1963	1685
Fit Permitted	0.68	1.00	1.00	0.69	1.00	1.00	0.07	1.00	1.00	0.49	1.00	1.00
Satd. Flow (perm)	1239	1883	1601	1330	1847	1426	145	1926	1538	925	1963	1685
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	140	100	197	13	112	9	155	487	13	18	1053	174
RTOR Reduction (vph)	0	0	163	0	0	7	0	0	4	0	0	68
Lane Group Flow (vph)	140	100	34	13	112	2	155	487	9	18	1053	106
Confl. Peds. (#/hr)	1					1			3		3	
Heavy Vehicles (%)	6%	2%	2%	0%	4%	12%	4%	5%	9%	6%	3%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		1	6			2	
Permitted Phases	4		4	8		8	6		6	2		2
Actuated Green, G (s)	15.9	15.9	15.9	15.9	15.9	15.9	60.8	60.8	60.8	49.8	49.8	49.8
Effective Green, g (s)	15.9	15.9	15.9	15.9	15.9	15.9	61.8	60.8	60.8	49.8	49.8	49.8
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17	0.17	0.67	0.66	0.66	0.54	0.54	0.54
Clearance Time (s)	7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	214	326	277	230	320	247	246	1276	1019	502	1066	915
v/s Ratio Prot		0.05			0.06		c0.05	0.25			c0.54	
v/s Ratio Perm	c0.11		0.02	0.01		0.00	0.37		0.01	0.02		0.06
v/c Ratio	0.65	0.31	0.12	0.06	0.35	0.01	0.63	0.38	0.01	0.04	0.99	0.12
Uniform Delay, d1	35.3	33.1	32.0	31.6	33.4	31.4	21.3	7.0	5.2	9.8	20.7	10.2
Progression 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
Incremental Delay, d2	7.0	0.5	0.2	0.1	0.7	0.0	5.2	0.9	0.0	0.1	24.8	0.3
Delay (s)	42.3	33.6	32.2	31.7	34.0	31.4	26.5	7.8	5.3	9.9	45.4	10.5
Level of Service	D	C	C	C	C	C	C	A	A	A	D	B
Approach Delay (s)		35.8			33.6			12.2			40.0	
Approach LOS		D			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	31.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	91.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	99.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
1: Monkman Court/Archerhill Court & Vandorf Sideroad

Future Total 2030 PM Peak Hour
07/15/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔	↔	
Traffic Volume (veh/h)	11	496	5	13	361	68	3	1	9	39	1	11
Future Volume (Veh/h)	11	496	5	13	361	68	3	1	9	39	1	11
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	12	522	5	14	380	72	3	1	9	41	1	12
Pedestrians							2			1		
Lane Width (m)							3.7			3.7		
Walking Speed (m/s)							1.1			1.1		
Percent Blockage							0			0		
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)				116								
pX, platoon unblocked	0.93						0.93	0.93		0.93	0.93	0.93
vC, conflicting volume	453			529			1007	1032	526	1003	998	417
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	378			529			972	998	526	967	962	339
tC, single (s)	4.3			4.1			7.1	6.5	6.3	7.4	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.5	4.0	3.4	3.8	4.0	3.3
p0 queue free %	99			99			99	100	98	78	100	98
cM capacity (veh/h)	1015			1046			209	221	531	183	232	660
Direction_Lane #	EB 1	WB 1	NB 1	SB 1	SB 2							
Volume Total	539	466	13	41	13							
Volume Left	12	14	3	41	0							
Volume Right	5	72	9	0	12							
cSH	1015	1046	363	183	578							
Volume to Capacity	0.01	0.01	0.04	0.22	0.02							
Queue Length 95th (m)	0.3	0.3	0.8	6.3	0.5							
Control Delay (s)	0.3	0.4	15.3	30.3	11.4							
Lane LOS	A	A	C	D	B							
Approach Delay (s)	0.3	0.4	15.3	25.7								
Approach LOS			C	D								
Intersection Summary												
Average Delay			1.8									
Intersection Capacity Utilization			45.1%		ICU Level of Service		A					
Analysis Period (min)			15									

Timings
2: Bayview Avenue & Vandorf Sideroad

Future Total 2030 PM Peak Hour
07/15/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	187	115	227	5	102	36	163	898	19	16	572	167
Future Volume (vph)	187	115	227	5	102	36	163	898	19	16	572	167
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	4		4		8		8		1		6	
Permitted Phases	4	4	4	8	8	8	6	6	2	2	2	2
Detector Phase	4	4	4	8	8	8	1	6	6	2	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	17.5	17.5	17.5	17.5	17.5	17.5	11.0	47.5	47.5	47.5	47.5	47.5
Total Split (s)	31.5	31.5	31.5	31.5	31.5	31.5	11.0	58.5	58.5	47.5	47.5	47.5
Total Split (%)	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	12.2%	65.0%	65.0%	52.8%	52.8%	52.8%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	3.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	1.0	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?							Yes				Yes	
Recall Mode	None	Max	Max	Max	Max	Max						
Act Effect Green (s)	17.9	17.9	17.9	17.9	17.9	17.9	54.8	51.3	51.3	40.2	40.2	40.2
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21	0.21	0.65	0.61	0.61	0.48	0.48	0.48
v/c Ratio	0.71	0.30	0.46	0.02	0.27	0.09	0.40	0.78	0.02	0.11	0.64	0.20
Control Delay	44.8	29.0	6.8	24.6	28.5	0.4	9.7	20.0	0.1	17.0	21.7	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.8	29.0	6.8	24.6	28.5	0.4	9.7	20.0	0.1	17.0	21.7	3.2
LOS	D	C	A	C	C	A	A	C	A	B	C	A
Approach Delay	25.1				21.3		18.1				17.5	
Approach LOS	C				C		B				B	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 84.2												
Natural Cycle: 80												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.78												
Intersection Signal Delay: 19.6							Intersection LOS: B					
Intersection Capacity Utilization 114.0%							ICU Level of Service H					
Analysis Period (min) 15												
Splits and Phases: 2: Bayview Avenue & Vandorf Sideroad												

HCM Signalized Intersection Capacity Analysis
2: Bayview Avenue & Vandorf Sideroad

Future Total 2030 PM Peak Hour
07/15/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Traffic Volume (vph)	187	115	227	5	102	36	163	898	19	16	572	167
Future Volume (vph)	187	115	227	5	102	36	163	898	19	16	572	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	2000	2000	2000	2000	2000	2000
Total Lost time (s)	7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
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
Frb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	1921	1551	1825	1883	1585	1847	1983	1380	1795	1983	1646
Fit Permitted	0.69	1.00	1.00	0.68	1.00	1.00	0.25	1.00	1.00	0.18	1.00	1.00
Satd. Flow (perm)	1309	1921	1551	1305	1883	1585	494	1983	1380	334	1983	1646
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	197	121	239	5	107	38	172	945	20	17	602	176
RTOR Reduction (vph)	0	0	188	0	0	30	0	0	8	0	0	92
Lane Group Flow (vph)	197	121	51	5	107	8	172	945	12	17	602	84
Confl. Peds. (#/hr)							2					2
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	1%	0%	3%	0%	2%	3%	4%	2%	22%	7%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		1	6			2	
Permitted Phases	4		4	8		8	6		6	2		2
Actuated Green, G (s)	17.9	17.9	17.9	17.9	17.9	17.9	51.3	51.3	51.3	40.3	40.3	40.3
Effective Green, g (s)	17.9	17.9	17.9	17.9	17.9	17.9	51.3	51.3	51.3	40.3	40.3	40.3
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21	0.21	0.61	0.61	0.61	0.48	0.48	0.48
Clearance Time (s)	7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	278	408	329	277	400	336	413	1208	840	159	949	787
v/s Ratio Prot		0.06			0.06		0.03	c0.48			0.30	
v/s Ratio Perm	c0.15		0.03	0.00		0.01	0.22		0.01	0.05		0.05
v/c Ratio	0.71	0.30	0.15	0.02	0.27	0.02	0.42	0.78	0.01	0.11	0.63	0.11
Uniform Delay, d1	30.7	27.9	27.0	26.2	27.7	26.2	9.7	12.3	6.5	12.1	16.4	12.1
Progression 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
Incremental Delay, d2	8.0	0.4	0.2	0.0	0.4	0.0	0.7	5.1	0.0	1.4	3.2	0.3
Delay (s)	38.7	28.3	27.2	26.2	28.0	26.3	10.3	17.4	6.5	13.4	19.7	12.3
Level of Service	D	C	C	C	C	C	B	B	A	B	B	B
Approach Delay (s)		31.5			27.5			16.1			17.9	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			20.6							C		
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			84.2					Sum of lost time (s)	19.0			
Intersection Capacity Utilization			114.0%					ICU Level of Service		H		
Analysis Period (min)			15									
c Critical Lane Group												

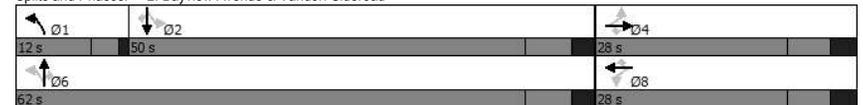
HCM Unsignalized Intersection Capacity Analysis
 1: Monkman Court/Archerhill Court & Vandorf Sideroad
 FT 2030 AM Peak Hour - Sensitivity
 07/15/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↕			↔	↔	
Traffic Volume (veh/h)	7	362	5	2	403	26	4	0	13	50	1	11
Future Volume (Veh/h)	7	362	5	2	403	26	4	0	13	50	1	11
Sign Control	Free			Free			Stop		Stop			
Grade	0%			0%			0%		0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	393	5	2	438	28	4	0	14	54	1	12
Pedestrians							2		2			
Lane Width (m)							3.7		3.7			
Walking Speed (m/s)							1.1		1.1			
Percent Blockage							0		0			
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)				116								
pX, platoon unblocked	0.94							0.94	0.94	0.94	0.94	0.94
vC, conflicting volume	468	400			882			886	398	884	874	454
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	401	400			842			846	398	844	833	386
tC, single (s)	4.1	4.6			7.1			6.5	6.2	7.1	6.5	6.7
tC, 2 stage (s)												
tF (s)	2.2	2.7			3.5			4.0	3.3	3.5	4.0	3.8
p0 queue free %	99	100			98			100	98	79	100	98
cM capacity (veh/h)	1095	939			259			277	655	259	282	533
Direction_Lane #	EB 1	WB 1	NB 1	SB 1	SB 2							
Volume Total	406	468	18	54	13							
Volume Left	8	2	4	54	0							
Volume Right	5	28	14	0	12							
cSH	1095	939	489	259	499							
Volume to Capacity	0.01	0.00	0.04	0.21	0.03							
Queue Length 95th (m)	0.2	0.0	0.9	5.8	0.6							
Control Delay (s)	0.2	0.1	12.6	22.5	12.4							
Lane LOS	A	A	B	C	B							
Approach Delay (s)	0.2	0.1	12.6	20.5								
Approach LOS	B			C								
Intersection Summary												
Average Delay	1.8											
Intersection Capacity Utilization	40.1%			ICU Level of Service		A						
Analysis Period (min)	15											

Timings
 2: Bayview Avenue & Vandorf Sideroad
 FT 2030 AM Peak Hour - Sensitivity
 07/15/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↕	↕	↕	↔	↔	↔
Traffic Volume (vph)	133	95	187	12	106	9	147	463	12	17	1000	165
Future Volume (vph)	133	95	187	12	106	9	147	463	12	17	1000	165
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	4		4	8		8	1	6	6		2	2
Permitted Phases	4	4	4	8	8	8	1	6	6	2	2	2
Detector Phase	4	4	4	8	8	8	1	6	6	2	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	17.5	17.5	17.5	17.5	17.5	17.5	11.0	47.5	47.5	47.5	47.5	47.5
Total Split (s)	28.0	28.0	28.0	28.0	28.0	28.0	12.0	62.0	62.0	50.0	50.0	50.0
Total Split (%)	31.1%	31.1%	31.1%	31.1%	31.1%	31.1%	13.3%	68.9%	68.9%	55.6%	55.6%	55.6%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	3.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	1.0	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	7.5	7.5	3.0	7.5	7.5	7.5	7.5	7.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	Max	Max	Max	Max	Max						
Act Effect Green (s)	16.0	16.0	16.0	16.0	16.0	16.0	59.3	54.8	54.8	43.4	43.4	43.4
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.19	0.19	0.69	0.64	0.64	0.51	0.51	0.51
v/c Ratio	0.61	0.28	0.43	0.05	0.32	0.03	0.39	0.21	0.01	0.04	0.56	0.19
Control Delay	42.9	31.2	7.3	27.4	32.0	0.1	8.5	7.6	0.0	13.8	17.2	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.9	31.2	7.3	27.4	32.0	0.1	8.5	7.6	0.0	13.8	17.2	3.1
LOS	D	C	A	C	C	A	A	A	A	B	B	A
Approach Delay	24.2				29.4		7.7				15.2	
Approach LOS	C				C		A				B	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 85.9												
Natural Cycle: 80												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.61												
Intersection Signal Delay: 15.6							Intersection LOS: B					
Intersection Capacity Utilization 99.5%							ICU Level of Service F					
Analysis Period (min) 15												

Splits and Phases: 2: Bayview Avenue & Vandorf Sideroad



HCM Signalized Intersection Capacity Analysis
2: Bayview Avenue & Vandorf Sideroad

FT 2030 AM Peak Hour - Sensitivity
07/15/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↑	↘	↔	↑	↘	↔	↑	↘	↔	↑	↘	
Traffic Volume (vph)	133	95	187	12	106	9	147	463	12	17	1000	165	
Future Volume (vph)	133	95	187	12	106	9	147	463	12	17	1000	165	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	2000	2000	2000	2000	2000	2000	
Total Lost time (s)	7.5	7.5	7.5	7.5	7.5	7.5	3.0	7.5	7.5	7.5	7.5	7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Frb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	1.00	
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1720	1883	1601	1825	1847	1439	1847	3659	1538	1808	3730	1685	
Fit Permitted	0.68	1.00	1.00	0.69	1.00	1.00	0.19	1.00	1.00	0.47	1.00	1.00	
Satd. Flow (perm)	1240	1883	1601	1330	1847	1439	368	3659	1538	903	3730	1685	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	140	100	197	13	112	9	155	487	13	18	1053	174	
RTOR Reduction (vph)	0	0	160	0	0	7	0	0	5	0	0	86	
Lane Group Flow (vph)	140	100	37	13	112	2	155	487	8	18	1053	88	
Confl. Peds. (#/hr)	1					1			3		3		
Heavy Vehicles (%)	6%	2%	2%	0%	4%	12%	4%	5%	9%	6%	3%	2%	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	
Protected Phases		4			8		1	6			2		
Permitted Phases	4		4	8		8	6		6	2		2	
Actuated Green, G (s)	16.0	16.0	16.0	16.0	16.0	16.0	54.8	54.8	54.8	43.4	43.4	43.4	
Effective Green, g (s)	16.0	16.0	16.0	16.0	16.0	16.0	55.8	54.8	54.8	43.4	43.4	43.4	
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.19	0.19	0.65	0.64	0.64	0.51	0.51	0.51	
Clearance Time (s)	7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	231	351	298	248	344	268	384	2336	982	456	1886	852	
v/s Ratio Prot		0.05			0.06		c0.04	0.13			c0.28		
v/s Ratio Perm	c0.11		0.02	0.01		0.00	0.22		0.01	0.02		0.05	
v/c Ratio	0.61	0.28	0.12	0.05	0.33	0.01	0.40	0.21	0.01	0.04	0.56	0.10	
Uniform Delay, d1	32.0	30.0	29.1	28.7	30.2	28.4	7.4	6.5	5.6	10.7	14.6	11.1	
Progression 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	
Incremental Delay, d2	4.4	0.4	0.2	0.1	0.6	0.0	0.7	0.2	0.0	0.2	1.2	0.2	
Delay (s)	36.5	30.4	29.2	28.8	30.8	28.4	8.1	6.7	5.6	10.9	15.8	11.3	
Level of Service	D	C	C	C	C	C	A	A	A	B	B	B	
Approach Delay (s)		31.8			30.4			7.0			15.1		
Approach LOS		C			C			A			B		
Intersection Summary													
HCM 2000 Control Delay	16.7		HCM 2000 Level of Service					B					
HCM 2000 Volume to Capacity ratio	0.55												
Actuated Cycle Length (s)	85.8				Sum of lost time (s)				18.0				
Intersection Capacity Utilization	99.5%		ICU Level of Service					F					
Analysis Period (min)	15												

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 1: Monkman Court/Archerhill Court & Vandorf Sideroad
 FT 2030 PM Peak Hour - Sensitivity
 07/15/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Volume (veh/h)	11	496	5	13	361	68	3	1	9	39	1	11
Future Volume (Veh/h)	11	496	5	13	361	68	3	1	9	39	1	11
Sign Control	Free		Free		Stop		Stop		Stop		Stop	
Grade	0%		0%		0%		0%		0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	12	522	5	14	380	72	3	1	9	41	1	12
Pedestrians												
Lane Width (m)					3.7		3.7		3.7		3.7	
Walking Speed (m/s)					1.1		1.1		1.1		1.1	
Percent Blockage					0		0		0		0	
Right turn flare (veh)												
Median type	None		None									
Median storage (veh)												
Upstream signal (m)					116							
pX, platoon unblocked	0.93						0.93	0.93		0.93	0.93	0.93
vC, conflicting volume	453		529				1007	1032	526	1003	998	417
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	378		529				972	998	526	967	962	339
tC, single (s)	4.3		4.1				7.1	6.5	6.3	7.4	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4		2.2				3.5	4.0	3.4	3.8	4.0	3.3
p0 queue free %	99		99				99	100	98	78	100	98
cM capacity (veh/h)	1015		1046				209	221	531	183	232	660
Direction_Lane #	EB 1	WB 1	NB 1	SB 1	SB 2							
Volume Total	539	466	13	41	13							
Volume Left	12	14	3	41	0							
Volume Right	5	72	9	0	12							
cSH	1015	1046	363	183	578							
Volume to Capacity	0.01	0.01	0.04	0.22	0.02							
Queue Length 95th (m)	0.3	0.3	0.8	6.3	0.5							
Control Delay (s)	0.3	0.4	15.3	30.3	11.4							
Lane LOS	A	A	C	D	B							
Approach Delay (s)	0.3	0.4	15.3	25.7								
Approach LOS			C	D								
Intersection Summary												
Average Delay			1.8									
Intersection Capacity Utilization			45.1%		ICU Level of Service		A					
Analysis Period (min)			15									

Timings
 2: Bayview Avenue & Vandorf Sideroad
 FT 2030 PM Peak Hour - Sensitivity
 07/15/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Volume (vph)	187	115	227	5	102	36	163	898	19	16	572	167
Future Volume (vph)	187	115	227	5	102	36	163	898	19	16	572	167
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	4		4		8		8		1		6	
Permitted Phases	4	4	4	8	8	8	6	6	2	2	2	2
Detector Phase	4	4	4	8	8	8	1	6	6	2	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	17.5	17.5	17.5	17.5	17.5	17.5	11.0	47.5	47.5	47.5	47.5	47.5
Total Split (s)	31.5	31.5	31.5	31.5	31.5	31.5	11.0	58.5	58.5	47.5	47.5	47.5
Total Split (%)	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	12.2%	65.0%	65.0%	52.8%	52.8%	52.8%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	3.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	1.0	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?							Yes				Yes	
Recall Mode	None	Max	Max	Max	Max	Max						
Act Effect Green (s)	17.9	17.9	17.9	17.9	17.9	17.9	54.8	51.3	51.3	40.2	40.2	40.2
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21	0.21	0.65	0.61	0.61	0.48	0.48	0.48
v/c Ratio	0.71	0.30	0.46	0.02	0.27	0.09	0.31	0.41	0.02	0.06	0.33	0.20
Control Delay	44.8	29.0	6.7	24.6	28.5	0.4	8.4	10.2	0.1	15.2	15.3	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.8	29.0	6.7	24.6	28.5	0.4	8.4	10.2	0.1	15.2	15.3	3.2
LOS	D	C	A	C	C	A	A	B	A	B	B	A
Approach Delay	25.0				21.3		9.7				12.6	
Approach LOS	C				C		A				B	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 84.2												
Natural Cycle: 80												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.71												
Intersection Signal Delay: 14.5							Intersection LOS: B					
Intersection Capacity Utilization 102.4%							ICU Level of Service G					
Analysis Period (min) 15												
Splits and Phases: 2: Bayview Avenue & Vandorf Sideroad												

HCM Signalized Intersection Capacity Analysis
2: Bayview Avenue & Vandorf Sideroad

FT 2030 PM Peak Hour - Sensitivity
07/15/2021

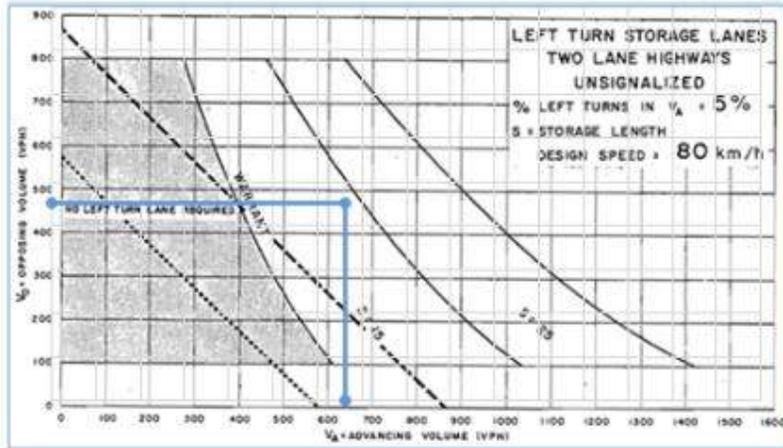
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Traffic Volume (vph)	187	115	227	5	102	36	163	898	19	16	572	167
Future Volume (vph)	187	115	227	5	102	36	163	898	19	16	572	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	2000	2000	2000	2000	2000	2000
Total Lost time (s)	7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	1921	1565	1825	1883	1585	1846	3767	1380	1795	3767	1646
Fit Permitted	0.69	1.00	1.00	0.68	1.00	1.00	0.37	1.00	1.00	0.30	1.00	1.00
Satd. Flow (perm)	1309	1921	1565	1305	1883	1585	715	3767	1380	572	3767	1646
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	197	121	239	5	107	38	172	945	20	17	602	176
RTOR Reduction (vph)	0	0	188	0	0	30	0	0	8	0	0	92
Lane Group Flow (vph)	197	121	51	5	107	8	172	945	12	17	602	84
Confl. Peds. (#/hr)							2					2
Confl. Bikes (#/hr)			1					1				
Heavy Vehicles (%)	1%	0%	3%	0%	2%	3%	4%	2%	22%	7%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		1	6			2	
Permitted Phases	4		4	8		8	6		6	2		2
Actuated Green, G (s)	17.9	17.9	17.9	17.9	17.9	17.9	51.3	51.3	51.3	40.3	40.3	40.3
Effective Green, g (s)	17.9	17.9	17.9	17.9	17.9	17.9	51.3	51.3	51.3	40.3	40.3	40.3
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21	0.21	0.61	0.61	0.61	0.48	0.48	0.48
Clearance Time (s)	7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	278	408	332	277	400	336	529	2295	840	273	1802	787
v/s Ratio Prot		0.06			0.06		0.03	c0.25			0.16	
v/s Ratio Perm	c0.15		0.03	0.00		0.01	0.17		0.01	0.03		0.05
v/c Ratio	0.71	0.30	0.15	0.02	0.27	0.02	0.33	0.41	0.01	0.06	0.33	0.11
Uniform Delay, d1	30.7	27.9	27.0	26.2	27.7	26.2	7.3	8.6	6.5	11.8	13.6	12.1
Progression 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
Incremental Delay, d2	8.0	0.4	0.2	0.0	0.4	0.0	0.4	0.5	0.0	0.4	0.5	0.3
Delay (s)	38.7	28.3	27.2	26.2	28.0	26.3	7.7	9.1	6.5	12.2	14.1	12.3
Level of Service	D	C	C	C	C	C	A	A	A	B	B	B
Approach Delay (s)		31.5			27.5			8.9			13.7	
Approach LOS		C			C			A			B	
Intersection Summary												
HCM 2000 Control Delay			16.2								B	
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			84.2					19.0				
Intersection Capacity Utilization			102.4%								G	
Analysis Period (min)			15									
c Critical Lane Group												

APPENDIX G

Left Turn Lane Warrant Analysis

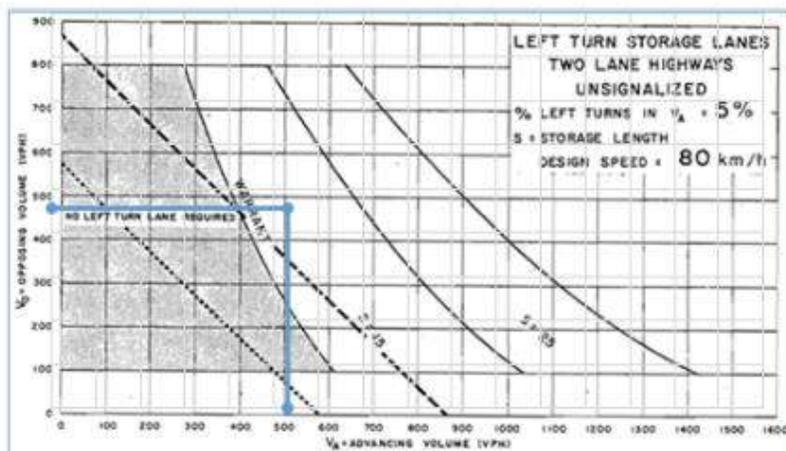
Left-Turn Warrant Analysis

AM Peak Hour



Left-Turn Warrant Analysis

PM Peak Hour



APPENDIX H

SimTraffic Analysis

SimTraffic Simulation Summary

Baseline 2021 AM Peak Hour
06/15/2021

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:50	6:50	6:50	6:50	6:50	6:50
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2023	2021	2059	2030	2001	2027
Vehs Exited	2012	2016	2066	2039	1983	2024
Starting Vehs	27	39	50	50	31	39
Ending Vehs	38	44	43	41	49	42
Travel Distance (km)	1586	1588	1620	1600	1565	1592
Travel Time (hr)	44.9	44.0	47.4	45.3	43.8	45.1
Total Delay (hr)	15.1	14.1	16.9	15.1	14.6	15.1
Total Stops	1194	1176	1332	1220	1174	1217
Fuel Used (l)	124.3	123.8	128.2	125.1	121.0	124.5

Interval #0 Information Seeding

Start Time	6:50
End Time	7:00
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	2023	2021	2059	2030	2001	2027
Vehs Exited	2012	2016	2066	2039	1983	2024
Starting Vehs	27	39	50	50	31	39
Ending Vehs	38	44	43	41	49	42
Travel Distance (km)	1586	1588	1620	1600	1565	1592
Travel Time (hr)	44.9	44.0	47.4	45.3	43.8	45.1
Total Delay (hr)	15.1	14.1	16.9	15.1	14.6	15.1
Total Stops	1194	1176	1332	1220	1174	1217
Fuel Used (l)	124.3	123.8	128.2	125.1	121.0	124.5

Queuing and Blocking Report

Baseline 2021 AM Peak Hour
06/15/2021

Intersection: 1: Monkman Court/Archerhill Court & Vandorf Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	7.7	2.9	10.5	13.0
Average Queue (m)	0.4	0.2	4.0	1.9
95th Queue (m)	3.4	2.9	11.5	8.7
Link Distance (m)	320.8	98.3	55.7	272.4
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Bayview Avenue & Vandorf Sideroad

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	R	L	T	R
Maximum Queue (m)	46.5	50.4	52.6	14.0	42.9	8.6	51.8	56.7	10.3	14.1	174.8	52.6
Average Queue (m)	22.0	16.0	22.2	2.8	16.6	1.3	25.3	22.0	0.6	2.3	81.1	9.2
95th Queue (m)	38.0	34.8	40.5	9.8	32.7	6.0	42.8	44.5	4.1	9.1	140.8	31.8
Link Distance (m)												
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	50.0		60.0	60.0		60.0	75.0		70.0	75.0		70.0
Storage Blk Time (%)	0	0	0					0				12
Queuing Penalty (veh)	1	0	1					0				21

Network Summary

Network wide Queuing Penalty: 22

SimTraffic Simulation Summary

Baseline 2021 PM Peak Hour
06/15/2021

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:50	4:50	4:50	4:50	4:50	4:50
End Time	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2208	2212	2147	2153	2114	2167
Vehs Exited	2194	2211	2148	2151	2117	2165
Starting Vehs	44	41	40	41	34	39
Ending Vehs	58	42	39	43	31	43
Travel Distance (km)	1591	1591	1552	1552	1528	1563
Travel Time (hr)	43.6	43.5	41.4	41.6	41.1	42.2
Total Delay (hr)	13.3	13.2	11.9	11.9	12.0	12.5
Total Stops	1208	1183	1117	1130	1094	1145
Fuel Used (l)	125.5	124.9	121.9	121.5	119.7	122.7

Interval #0 Information Seeding

Start Time	4:50
End Time	5:00
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	2208	2212	2147	2153	2114	2167
Vehs Exited	2194	2211	2148	2151	2117	2165
Starting Vehs	44	41	40	41	34	39
Ending Vehs	58	42	39	43	31	43
Travel Distance (km)	1591	1591	1552	1552	1528	1563
Travel Time (hr)	43.6	43.5	41.4	41.6	41.1	42.2
Total Delay (hr)	13.3	13.2	11.9	11.9	12.0	12.5
Total Stops	1208	1183	1117	1130	1094	1145
Fuel Used (l)	125.5	124.9	121.9	121.5	119.7	122.7

Queuing and Blocking Report

Baseline 2021 PM Peak Hour
06/15/2021

Intersection: 1: Monkman Court/Archerhill Court & Vandorf Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	9.0	14.0	12.2	16.6
Average Queue (m)	0.3	1.5	2.9	1.8
95th Queue (m)	3.7	7.8	10.4	9.1
Link Distance (m)	326.5	98.2	55.7	276.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Bayview Avenue & Vandorf Sideroad

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	R	L	T	R
Maximum Queue (m)	54.8	46.1	48.7	9.6	33.5	23.5	35.2	116.0	15.5	13.9	73.7	18.2
Average Queue (m)	29.1	16.2	18.8	1.1	12.9	6.8	16.3	54.2	1.8	3.5	32.0	6.1
95th Queue (m)	48.5	33.1	35.0	5.7	26.8	18.0	30.3	95.6	8.1	10.4	59.6	13.6
Link Distance (m)		98.2		456.8		302.6		337.9				
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	50.0		60.0	60.0		60.0	75.0		70.0	75.0		70.0
Storage Blk Time (%)	1	0	0					3				0
Queuing Penalty (veh)	4	0	0					5				0

Network Summary

Network wide Queuing Penalty: 9

SimTraffic Simulation Summary

Future Background 2030 AM Peak Hour
06/15/2021

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:50	6:50	6:50	6:50	6:50	6:50
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2233	2292	2319	2279	2299	2284
Vehs Exited	2215	2306	2324	2272	2265	2277
Starting Vehs	32	56	63	42	45	45
Ending Vehs	50	42	58	49	79	54
Travel Distance (km)	1600	1652	1665	1635	1640	1639
Travel Time (hr)	51.1	68.0	64.9	52.8	62.6	59.9
Total Delay (hr)	20.8	37.0	33.6	22.0	31.7	29.0
Total Stops	1449	2135	2127	1551	1830	1819
Fuel Used (l)	132.3	155.1	151.9	137.0	146.8	144.6

Interval #0 Information Seeding

Start Time	6:50
End Time	7:00
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	2233	2292	2319	2279	2299	2284
Vehs Exited	2215	2306	2324	2272	2265	2277
Starting Vehs	32	56	63	42	45	45
Ending Vehs	50	42	58	49	79	54
Travel Distance (km)	1600	1652	1665	1635	1640	1639
Travel Time (hr)	51.1	68.0	64.9	52.8	62.6	59.9
Total Delay (hr)	20.8	37.0	33.6	22.0	31.7	29.0
Total Stops	1449	2135	2127	1551	1830	1819
Fuel Used (l)	132.3	155.1	151.9	137.0	146.8	144.6

Queuing and Blocking Report

Future Background 2030 AM Peak Hour
06/15/2021

Intersection: 1: Monkman Court/Archerhill Court & Vandorf Sideroad

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (m)	10.4	10.5	16.6
Average Queue (m)	0.3	4.0	2.5
95th Queue (m)	4.5	11.6	11.0
Link Distance (m)	307.0	55.7	278.4
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Bayview Avenue & Vandorf Sideroad

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	R	L	T	R
Maximum Queue (m)	58.6	46.7	50.5	11.3	44.0	13.4	56.1	49.2	11.3	132.9	345.0	160.0
Average Queue (m)	27.3	16.0	24.3	3.1	18.1	2.4	27.7	23.2	0.7	7.9	178.3	56.2
95th Queue (m)	50.3	34.0	42.6	9.7	36.4	9.2	46.1	43.3	4.8	56.1	363.0	171.7
Link Distance (m)		98.2			411.7			316.0			346.2	
Upstream Blk Time (%)											7	
Queuing Penalty (veh)											0	
Storage Bay Dist (m)	50.0		60.0	60.0		60.0	75.0		70.0	75.0		70.0
Storage Blk Time (%)	4	0	0									27
Queuing Penalty (veh)	10	0	0									46

Network Summary

Network wide Queuing Penalty: 55

SimTraffic Simulation Summary

Future Background 2030 PM Peak Hour
07/15/2021

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:50	4:50	4:50	4:50	4:50	4:50
End Time	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2529	2494	2408	2459	2473	2473
Vehs Exited	2506	2487	2395	2461	2494	2467
Starting Vehs	39	45	44	56	58	49
Ending Vehs	62	52	57	54	37	52
Travel Distance (km)	1785	1772	1715	1748	1762	1756
Travel Time (hr)	51.6	52.3	47.9	51.5	51.1	50.9
Total Delay (hr)	17.8	18.7	15.5	18.4	17.5	17.6
Total Stops	1488	1505	1350	1493	1407	1448
Fuel Used (l)	141.7	143.0	134.7	141.2	141.2	140.4

Interval #0 Information Seeding

Start Time	4:50
End Time	5:00
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	2529	2494	2408	2459	2473	2473
Vehs Exited	2506	2487	2395	2461	2494	2467
Starting Vehs	39	45	44	56	58	49
Ending Vehs	62	52	57	54	37	52
Travel Distance (km)	1785	1772	1715	1748	1762	1756
Travel Time (hr)	51.6	52.3	47.9	51.5	51.1	50.9
Total Delay (hr)	17.8	18.7	15.5	18.4	17.5	17.6
Total Stops	1488	1505	1350	1493	1407	1448
Fuel Used (l)	141.7	143.0	134.7	141.2	141.2	140.4

Queuing and Blocking Report

Future Background 2030 PM Peak Hour
07/15/2021

Intersection: 1: Monkman Court/Archerhill Court & Vandorf Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	10.6	17.9	15.6	12.6
Average Queue (m)	0.6	2.0	3.3	1.4
95th Queue (m)	5.7	9.6	11.6	7.7
Link Distance (m)	247.6	98.3	55.7	275.5
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Bayview Avenue & Vandorf Sideroad

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	R	L	T	R
Maximum Queue (m)	56.0	50.9	48.6	12.5	41.3	22.9	89.9	156.4	11.0	11.8	93.9	22.2
Average Queue (m)	28.9	18.8	22.5	1.3	13.9	5.9	22.2	79.7	2.0	3.6	47.8	7.5
95th Queue (m)	49.6	39.9	40.2	6.6	29.6	16.3	53.3	132.7	8.0	10.4	81.1	16.1
Link Distance (m)					98.3		429.2		326.3			350.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	50.0		60.0	60.0		60.0	75.0		70.0	75.0		70.0
Storage Blk Time (%)	1	0	0					10				2
Queuing Penalty (veh)	5	0	0					15				3

Network Summary

Network wide Queuing Penalty: 24

SimTraffic Simulation Summary

FB 2030 AM Peak Hour - Sensitivity
07/15/2021

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:50	6:50	6:50	6:50	6:50	6:50
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2247	2335	2327	2305	2349	2312
Vehs Exited	2246	2333	2341	2308	2349	2317
Starting Vehs	39	46	43	41	37	41
Ending Vehs	40	48	29	38	37	38
Travel Distance (km)	1613	1675	1678	1656	1683	1661
Travel Time (hr)	41.1	42.5	43.5	42.5	42.9	42.5
Total Delay (hr)	10.7	11.0	12.0	11.2	11.4	11.3
Total Stops	1101	1144	1164	1125	1072	1120
Fuel Used (l)	125.1	130.7	130.0	129.1	129.6	128.9

Interval #0 Information Seeding

Start Time	6:50
End Time	7:00
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	2247	2335	2327	2305	2349	2312
Vehs Exited	2246	2333	2341	2308	2349	2317
Starting Vehs	39	46	43	41	37	41
Ending Vehs	40	48	29	38	37	38
Travel Distance (km)	1613	1675	1678	1656	1683	1661
Travel Time (hr)	41.1	42.5	43.5	42.5	42.9	42.5
Total Delay (hr)	10.7	11.0	12.0	11.2	11.4	11.3
Total Stops	1101	1144	1164	1125	1072	1120
Fuel Used (l)	125.1	130.7	130.0	129.1	129.6	128.9

Queuing and Blocking Report

FB 2030 AM Peak Hour - Sensitivity
07/15/2021

Intersection: 1: Monkman Court/Archerhill Court & Vandorf Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	8.0	10.3	12.3	14.7
Average Queue (m)	0.4	0.3	3.4	2.7
95th Queue (m)	3.7	5.3	11.1	10.9
Link Distance (m)	307.0	94.5	55.7	278.4
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Bayview Avenue & Vandorf Sideroad

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (m)	45.5	35.6	35.6	12.4	37.5	12.1	48.4	39.4	30.3	4.6	12.1	64.6
Average Queue (m)	23.7	15.5	16.0	3.4	17.0	1.8	23.2	17.1	8.3	0.5	2.1	39.6
95th Queue (m)	41.9	30.5	28.8	10.7	32.3	7.6	41.5	32.5	20.8	2.7	7.8	60.7
Link Distance (m)		94.5			407.9			315.5	315.5			345.7
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	50.0		60.0	60.0		60.0	75.0			70.0	75.0	
Storage Blk Time (%)	1	0										0
Queuing Penalty (veh)	2	0										0

Intersection: 2: Bayview Avenue & Vandorf Sideroad

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	62.2	20.2
Average Queue (m)	28.4	6.3
95th Queue (m)	52.8	14.5
Link Distance (m)	345.7	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		70.0
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Network Summary

Network wide Queuing Penalty: 2

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:50	4:50	4:50	4:50	4:50	4:50
End Time	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2423	2510	2440	2428	2418	2445
Vehs Exited	2421	2511	2422	2439	2423	2443
Starting Vehs	36	42	29	50	48	41
Ending Vehs	38	41	47	39	43	42
Travel Distance (km)	1720	1782	1736	1726	1717	1736
Travel Time (hr)	43.3	45.2	43.9	43.7	43.2	43.9
Total Delay (hr)	10.6	11.4	11.0	11.1	10.7	10.9
Total Stops	1163	1220	1221	1208	1195	1199
Fuel Used (l)	131.4	138.6	134.0	133.6	132.0	133.9

Interval #0 Information Seeding

Start Time	4:50
End Time	5:00
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	2423	2510	2440	2428	2418	2445
Vehs Exited	2421	2511	2422	2439	2423	2443
Starting Vehs	36	42	29	50	48	41
Ending Vehs	38	41	47	39	43	42
Travel Distance (km)	1720	1782	1736	1726	1717	1736
Travel Time (hr)	43.3	45.2	43.9	43.7	43.2	43.9
Total Delay (hr)	10.6	11.4	11.0	11.1	10.7	10.9
Total Stops	1163	1220	1221	1208	1195	1199
Fuel Used (l)	131.4	138.6	134.0	133.6	132.0	133.9

Intersection: 1: Monkman Court/Archerhill Court & Vandorf Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	6.5	19.5	12.9	11.4
Average Queue (m)	0.4	1.8	2.9	1.5
95th Queue (m)	3.2	9.9	10.7	7.6
Link Distance (m)	247.6	94.5	55.7	275.5
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Bayview Avenue & Vandorf Sideroad

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (m)	53.0	47.3	31.9	9.7	31.6	19.1	34.2	60.7	55.7	12.4	13.9	47.5
Average Queue (m)	27.3	18.3	15.6	1.0	13.4	4.3	17.4	32.3	24.0	1.3	3.1	25.9
95th Queue (m)	44.9	36.0	27.1	5.4	26.8	12.5	30.6	49.8	45.2	6.6	9.4	44.0
Link Distance (m)		94.5			425.4			325.8	325.8			349.5
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	50.0		60.0	60.0		60.0	75.0			70.0	75.0	
Storage Blk Time (%)	1	0						0	0			
Queuing Penalty (veh)	3	0						0	0			

Intersection: 2: Bayview Avenue & Vandorf Sideroad

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	39.0	17.3
Average Queue (m)	13.8	6.4
95th Queue (m)	32.7	14.3
Link Distance (m)	349.5	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		70.0
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 3

SimTraffic Simulation Summary

Future Total 2030 AM Peak Hour
07/15/2021

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:50	6:50	6:50	6:50	6:50	6:50
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2295	2379	2362	2401	2395	2368
Vehs Exited	2284	2408	2372	2413	2387	2374
Starting Vehs	50	77	79	79	64	67
Ending Vehs	61	48	69	67	72	60
Travel Distance (km)	1868	1969	1933	1974	1960	1941
Travel Time (hr)	62.1	73.6	67.3	81.0	69.9	70.8
Total Delay (hr)	26.9	36.5	31.0	43.7	33.1	34.2
Total Stops	1847	2315	1976	2742	2130	2202
Fuel Used (l)	155.1	173.4	163.2	181.9	168.1	168.4

Interval #0 Information Seeding

Start Time	6:50
End Time	7:00
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	2295	2379	2362	2401	2395	2368
Vehs Exited	2284	2408	2372	2413	2387	2374
Starting Vehs	50	77	79	79	64	67
Ending Vehs	61	48	69	67	72	60
Travel Distance (km)	1868	1969	1933	1974	1960	1941
Travel Time (hr)	62.1	73.6	67.3	81.0	69.9	70.8
Total Delay (hr)	26.9	36.5	31.0	43.7	33.1	34.2
Total Stops	1847	2315	1976	2742	2130	2202
Fuel Used (l)	155.1	173.4	163.2	181.9	168.1	168.4

Queuing and Blocking Report

Future Total 2030 AM Peak Hour
07/15/2021

Intersection: 1: Monkman Court/Archerhill Court & Vandorf Sideroad

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	L	TR
Maximum Queue (m)	27.2	9.2	12.0	18.2	21.1
Average Queue (m)	1.5	0.3	4.8	8.0	4.8
95th Queue (m)	11.5	5.4	12.5	15.1	16.3
Link Distance (m)	332.8	96.3	55.8	42.3	42.3
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Bayview Avenue & Vandorf Sideroad

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	R	L	T	R
Maximum Queue (m)	77.6	80.8	71.5	10.9	41.2	11.6	54.5	54.4	7.7	111.0	394.4	170.0
Average Queue (m)	41.8	24.0	29.1	2.7	19.6	2.1	29.8	24.5	0.8	7.3	211.9	80.4
95th Queue (m)	74.2	59.7	52.0	9.2	36.2	8.3	49.7	47.1	4.2	53.5	407.7	211.3
Link Distance (m)		96.3			417.0			384.9			410.6	
Upstream Blk Time (%)	0	0	0								3	
Queuing Penalty (veh)	0	1	0								0	
Storage Bay Dist (m)	50.0		60.0	60.0		60.0	75.0		70.0	75.0		70.0
Storage Blk Time (%)	19	0	0				0	0			32	
Queuing Penalty (veh)	54	0	1				0	0			59	

Network Summary

Network wide Queuing Penalty: 114

SimTraffic Simulation Summary

Future Total 2030 PM Peak Hour
07/15/2021

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:50	4:50	4:50	4:50	4:50	4:50
End Time	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2547	2548	2595	2561	2551	2560
Vehs Exited	2560	2532	2611	2565	2543	2562
Starting Vehs	67	43	69	49	38	54
Ending Vehs	54	59	53	45	46	50
Travel Distance (km)	1684	1668	1711	1686	1675	1685
Travel Time (hr)	52.0	51.1	53.9	50.0	50.4	51.5
Total Delay (hr)	19.6	19.1	20.9	17.5	18.1	19.1
Total Stops	1611	1602	1697	1504	1528	1588
Fuel Used (l)	142.8	140.4	144.6	139.2	139.1	141.2

Interval #0 Information Seeding

Start Time	4:50
End Time	5:00
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	2547	2548	2595	2561	2551	2560
Vehs Exited	2560	2532	2611	2565	2543	2562
Starting Vehs	67	43	69	49	38	54
Ending Vehs	54	59	53	45	46	50
Travel Distance (km)	1684	1668	1711	1686	1675	1685
Travel Time (hr)	52.0	51.1	53.9	50.0	50.4	51.5
Total Delay (hr)	19.6	19.1	20.9	17.5	18.1	19.1
Total Stops	1611	1602	1697	1504	1528	1588
Fuel Used (l)	142.8	140.4	144.6	139.2	139.1	141.2

Queuing and Blocking Report

Future Total 2030 PM Peak Hour
07/15/2021

Intersection: 1: Monkman Court/Archerhill Court & Vandorf Sideroad

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	L	TR
Maximum Queue (m)	12.3	24.0	13.9	29.4	8.9
Average Queue (m)	0.8	2.5	3.7	10.1	3.0
95th Queue (m)	5.6	12.5	11.8	23.8	9.8
Link Distance (m)	250.1	96.3	55.8	42.3	42.3
Upstream Blk Time (%)				0	
Queuing Penalty (veh)				0	
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Bayview Avenue & Vandorf Sideroad

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	R	L	T	R
Maximum Queue (m)	59.6	54.3	53.2	8.4	35.5	19.8	94.0	177.4	15.0	15.4	94.7	21.4
Average Queue (m)	33.7	18.2	23.8	1.4	16.1	7.5	27.5	80.2	1.6	3.8	48.5	9.4
95th Queue (m)	54.0	37.5	43.7	6.3	32.8	17.6	68.5	146.3	8.5	10.8	81.8	18.4
Link Distance (m)						440.0		282.9				330.9
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	50.0		60.0	60.0		60.0	75.0		70.0	75.0		70.0
Storage Blk Time (%)	3	0	0					11				2
Queuing Penalty (veh)	9	0	0					19				4

Network Summary

Network wide Queuing Penalty: 33

SimTraffic Simulation Summary

FT 2030 AM Peak Hour - Sensitivity
07/15/2021

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:50	6:50	6:50	6:50	6:50	6:50
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2245	2428	2358	2346	2377	2351
Vehs Exited	2238	2433	2365	2332	2382	2349
Starting Vehs	31	48	51	39	52	42
Ending Vehs	38	43	44	53	47	45
Travel Distance (km)	1835	1996	1924	1909	1946	1922
Travel Time (hr)	44.4	50.1	47.8	48.0	48.9	47.8
Total Delay (hr)	9.9	12.6	11.7	12.1	12.4	11.7
Total Stops	1070	1270	1187	1238	1249	1204
Fuel Used (l)	138.3	153.0	145.2	145.4	148.0	146.0

Interval #0 Information Seeding

Start Time	6:50
End Time	7:00
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	2245	2428	2358	2346	2377	2351
Vehs Exited	2238	2433	2365	2332	2382	2349
Starting Vehs	31	48	51	39	52	42
Ending Vehs	38	43	44	53	47	45
Travel Distance (km)	1835	1996	1924	1909	1946	1922
Travel Time (hr)	44.4	50.1	47.8	48.0	48.9	47.8
Total Delay (hr)	9.9	12.6	11.7	12.1	12.4	11.7
Total Stops	1070	1270	1187	1238	1249	1204
Fuel Used (l)	138.3	153.0	145.2	145.4	148.0	146.0

Queuing and Blocking Report

FT 2030 AM Peak Hour - Sensitivity
07/15/2021

Intersection: 1: Monkman Court/Archerhill Court & Vandorf Sideroad

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	L	TR
Maximum Queue (m)	15.2	10.6	12.2	16.1	19.7
Average Queue (m)	1.0	0.5	4.5	7.1	4.8
95th Queue (m)	7.3	6.0	12.3	14.4	15.5
Link Distance (m)	332.8	92.6	55.8	42.3	42.3
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Bayview Avenue & Vandorf Sideroad

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (m)	52.5	40.7	34.8	14.0	36.5	14.2	47.3	42.2	36.7	9.0	9.4	66.0
Average Queue (m)	28.3	15.0	17.0	2.6	16.2	2.1	22.5	17.4	10.0	1.0	2.3	37.3
95th Queue (m)	48.2	31.1	29.6	9.6	31.4	8.7	38.3	33.8	25.3	4.9	7.6	58.9
Link Distance (m)		92.6			413.2			384.4	384.4			410.1
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	50.0		60.0	60.0		60.0	75.0			70.0	75.0	
Storage Blk Time (%)	1	0										0
Queuing Penalty (veh)	3	0										0

Intersection: 2: Bayview Avenue & Vandorf Sideroad

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	61.2	23.2
Average Queue (m)	27.1	7.9
95th Queue (m)	51.1	17.3
Link Distance (m)	410.1	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		70.0
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Network Summary

Network wide Queuing Penalty: 4

SimTraffic Simulation Summary

FT 2030 PM Peak Hour - Sensitivity
07/15/2021

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:50	4:50	4:50	4:50	4:50	4:50
End Time	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2540	2544	2591	2606	2594	2576
Vehs Exited	2543	2525	2593	2611	2581	2570
Starting Vehs	47	40	53	54	34	46
Ending Vehs	44	59	51	49	47	49
Travel Distance (km)	1666	1666	1700	1704	1694	1686
Travel Time (hr)	44.0	45.3	45.3	45.4	45.8	45.1
Total Delay (hr)	12.0	13.1	12.8	12.5	13.1	12.7
Total Stops	1345	1443	1396	1374	1385	1389
Fuel Used (l)	133.4	136.4	136.3	136.0	136.8	135.8

Interval #0 Information Seeding

Start Time	4:50
End Time	5:00
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	2540	2544	2591	2606	2594	2576
Vehs Exited	2543	2525	2593	2611	2581	2570
Starting Vehs	47	40	53	54	34	46
Ending Vehs	44	59	51	49	47	49
Travel Distance (km)	1666	1666	1700	1704	1694	1686
Travel Time (hr)	44.0	45.3	45.3	45.4	45.8	45.1
Total Delay (hr)	12.0	13.1	12.8	12.5	13.1	12.7
Total Stops	1345	1443	1396	1374	1385	1389
Fuel Used (l)	133.4	136.4	136.3	136.0	136.8	135.8

Queuing and Blocking Report

FT 2030 PM Peak Hour - Sensitivity
07/15/2021

Intersection: 1: Monkman Court/Archerhill Court & Vandorf Sideroad

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	L	TR
Maximum Queue (m)	18.1	18.2	17.4	29.4	8.9
Average Queue (m)	1.5	2.4	3.7	10.2	3.0
95th Queue (m)	8.7	11.9	12.1	23.3	9.8
Link Distance (m)	250.1	92.6	55.8	42.3	42.3
Upstream Blk Time (%)				0	
Queuing Penalty (veh)				0	
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Bayview Avenue & Vandorf Sideroad

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (m)	64.7	54.9	42.9	9.5	37.0	18.2	40.3	58.2	49.4	10.2	12.3	52.0
Average Queue (m)	34.0	18.8	16.8	1.2	16.5	5.3	20.8	33.4	23.3	1.3	2.5	28.4
95th Queue (m)	56.4	39.2	31.0	6.1	31.2	14.0	35.7	52.7	44.2	6.1	8.6	45.9
Link Distance (m)		92.6			436.2			282.4	282.4			330.4
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	50.0		60.0	60.0		60.0	75.0			70.0	75.0	
Storage Blk Time (%)	4	0	0									
Queuing Penalty (veh)	12	0	0									

Intersection: 2: Bayview Avenue & Vandorf Sideroad

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	39.6	19.8
Average Queue (m)	14.9	7.4
95th Queue (m)	32.8	15.2
Link Distance (m)	330.4	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		70.0
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 13
