



# Transportation Impact Study

1127 Garrison Road, Fort Erie, ON

TrinityStar Aquila Inc.

3 October 2023

→ The Power of Commitment



# Executive Summary

GHD Limited (GHD) was retained to prepare a Transportation Impact Study (TIS) for the proposed mixed-use development at 1127 Garrison Road, located at the southside of the intersection of Regional Road 3 (Garrison Road) and Garrison Road Public School, in the Town of Fort Erie.

The development consists of 90 residential units of stacked townhouses with an area of approximately 71 square metres (760 square feet) each. The development also consists of 339.5 square metres of commercial space (3,654 square feet) fronting onto Garrison Road. Access to the subject site is proposed via a full-moves driveway along Garrison Road, at the intersection with Garrison Road Public School. The full build-out of the subject site is expected to generate a total of 65 new two-way trips consisting of 20 inbound and 45 outbound trips during weekday a.m. peak hour and 96 new two-way trips consisting of 55 inbound and 41 outbound trips during the weekday p.m. peak hour.

Under the Future Background and Total scenarios for the 2025 and 2030 horizon years, the intersection of Garrison Road and Garrison Road Public School is reported to operate satisfactorily with substantial reserve capacity, low levels of delay, and negligible queueing.

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

Sincerely,

GHD



**Reza Noroozi, P.Eng.**

Project Manager, Transportation

+1 (905) 718-6520

reza.noroozi@ghd.com

# Contents

<b>1.</b>	<b>Introduction</b>	<b>1</b>
<b>2.</b>	<b>Study Area</b>	<b>1</b>
2.1	Study Area	1
2.2	Proposed Development	2
<b>3.</b>	<b>Existing Conditions</b>	<b>2</b>
3.1	Existing Road Network	2
3.2	Pedestrian and Bicycle Routes	2
3.3	Transit Services	3
3.4	Existing Traffic Data	3
<b>4.</b>	<b>Future Background Traffic</b>	<b>4</b>
4.1	Study Horizon Years	4
4.2	Future Road Network Improvements	4
4.3	Corridor Growth	4
4.4	Background Development Traffic	4
4.5	Future Background Traffic Volumes	4
<b>5.</b>	<b>Trip Generation and Distribution</b>	<b>6</b>
5.1	Site Trip Generation	6
5.2	Site Trip Distribution	6
<b>6.</b>	<b>Future Total Traffic</b>	<b>7</b>
<b>7.</b>	<b>Road Geometry</b>	<b>9</b>
7.1	Site Access	9
<b>8.</b>	<b>Traffic Analysis</b>	<b>9</b>
<b>9.</b>	<b>Conclusion</b>	<b>11</b>

## Table index

Table 1	Full Build-Out Estimated Site Trips	6
Table 2	Trip Distribution	6

## Figure index

Figure 1	Site Location	1
Figure 2	Site Plan	2
Figure 3	Niagara Region Transit Routes	3
Figure 4	Baseline 2022 Existing Traffic Volumes	4
Figure 5	2025 Future Background Traffic Volumes	5
Figure 6	2030 Future Background Traffic Volumes	5

Figure 7	Full Build-Out Total Site Trips - 2025	7
Figure 8	2025 Future Total Traffic Volumes	8
Figure 9	2030 Future Total Traffic Volumes	8

## Appendices

Appendix A	Terms of Reference
Appendix B	Site Plan
Appendix C	Traffic Data
Appendix D	Synchro Outputs



# 1. Introduction

GHD Limited (GHD) was retained by TrinityStar Aquila Inc. to prepare a Transportation Impact Study (TIS) for the proposed mixed-use development at 1127 Garrison Road, located at the southside of the intersection of Regional Road 3 (Garrison Road) and Garrison Road Public School in the Town of Fort Erie.

The purpose of this study is to:

- Establish baseline traffic conditions for the study area in 2022 and determine future background operating conditions for a future planning horizon in 2025, corresponding to the full build-out of the development in the same year, followed by a five-year post development analysis for a future planning horizon in 2030.
- Utilize Institute of Transportation Engineer's (ITE) Trip Generation Manual and first principles to estimate the site trips generated by the proposed development and distribute the traffic to the adjacent intersection.
- Determine future operating traffic conditions during the weekday peak periods through intersection capacity analysis.

## 2. Study Area

### 2.1 Study Area

Based on the approved Terms of Reference for the study provided in **Appendix A**, the following intersections were included in the study area:

- Regional Road 3 (Garrison Road) and Garrison Road Public School

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



Figure 1 Site Location

## 2.2 Proposed Development

The proposed site plan for the subject site is shown in **Figure 2**. The development consists of 90 residential units of stacked townhouses with an area of approximately 71 square metres (760 square feet) each. The development also consists of 339.5 square metres of commercial space (3,654 square feet) fronting onto Garrison Road. Access to the subject site is proposed via a full-moves driveway along Garrison Road, at the intersection with Garrison Road Public School. Upon full build-out of the site, internal driveway aisles will connect the driveway to each townhouse and surface parking spaces. Detailed copy of the site plan is provided in **Appendix B**.

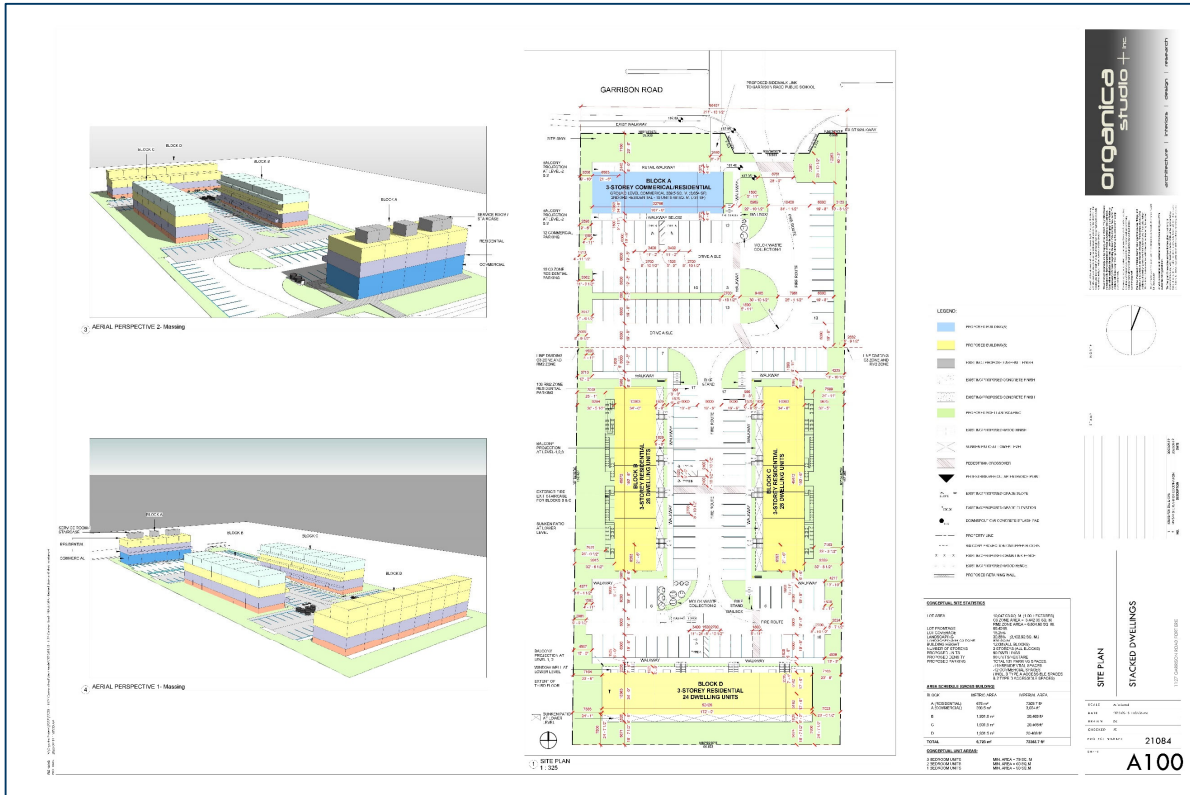


Figure 2 Site Plan

## 3. Existing Conditions

### 3.1 Existing Road Network

Garrison Road is an east-west regional roadway under the jurisdiction of Niagara Region. In the study area it has a five-lane urban cross section. The existing intersection of Garrison Road and Garrison Road Public School is signalized, with an auxiliary left-turn lane in the eastbound and westbound directions. There is dedicated bus lane terminating at the school. The posted speed limit on Garrison Road is 60 kilometres per hour. The speed limit is reduced to 40 kilometres per hour during school hours.

### 3.2 Pedestrian and Bicycle Routes

There are dedicated sidewalks provided on both sides of Garrison Road in the study area. Dedicated cycling facilities are not currently present within the study area.

### 3.3 Transit Services

There are no dedicated bus routes along Garrison Road, however Town of Fort Erie offers on-demand transit services since October 4, 2021. Niagara Region offers a bus service via route 22 between Canadian Drive Hub and Fort Erie Town Hall, which is approximately a 19-minute walk from the proposed site. A map for the route is illustrated in **Figure 3**.



Figure 3 Niagara Region Transit Routes

### 3.4 Existing Traffic Data

GHD contracted Ontario Traffic Inc. (OTI) to collect updated turning movement counts at the only intersection of Garrison Road and Garrison Road Public School within the study area, in October 2022. The baseline 2022 traffic volumes for the a.m. and p.m. peak hours are summarized in **Figure 4**.

The updated turning movement count data from Ontario Traffic Inc. are provided in **Appendix C**.

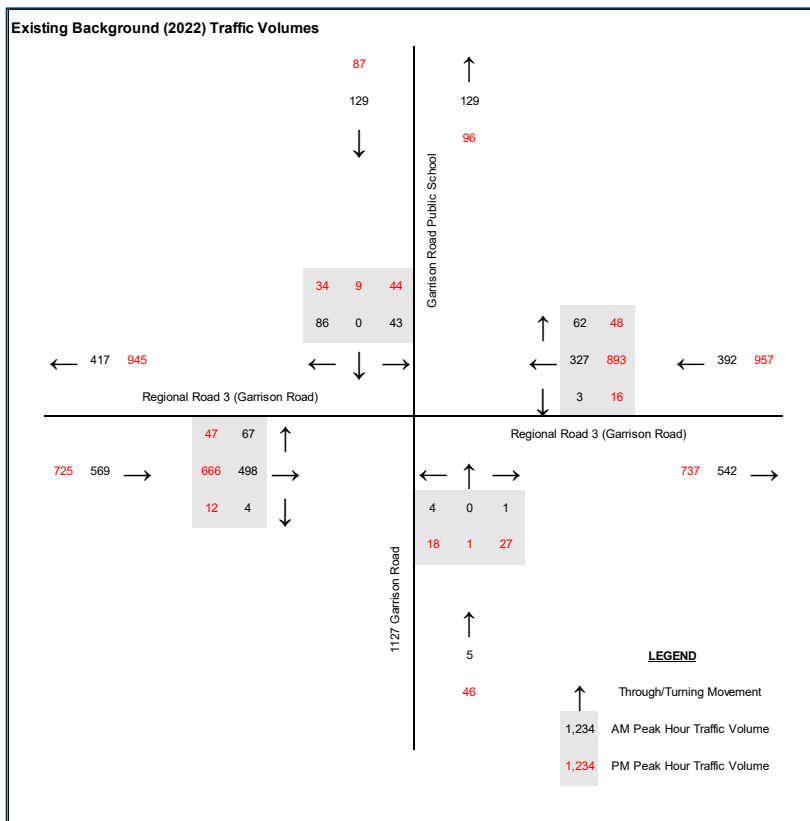


Figure 4 Baseline 2022 Existing Traffic Volumes

## 4. Future Background Traffic

### 4.1 Study Horizon Years

It is expected that the full build-out of the site will be in 2025. 2025 and 2030 future horizon years were selected and are consistent with the Region's requirement of a period of five years post full build-out.

### 4.2 Future Road Network Improvements

No future road network improvements are planned within the study area.

### 4.3 Corridor Growth

GHD applied a two percent compounded annually growth rate to all existing traffic counts to estimate the future traffic volumes under the 2025 and 2030 traffic scenarios.

### 4.4 Background Development Traffic

No background developments are planned within the study area.

### 4.5 Future Background Traffic Volumes

The background traffic volumes for the 2025 and 2030 horizon years were derived by applying a 2% per annum compounded growth rate to the projected 2022 traffic volumes. The resulting 2025 and 2030 future background traffic volumes are summarized in **Figure 5** and **Figure 6**.

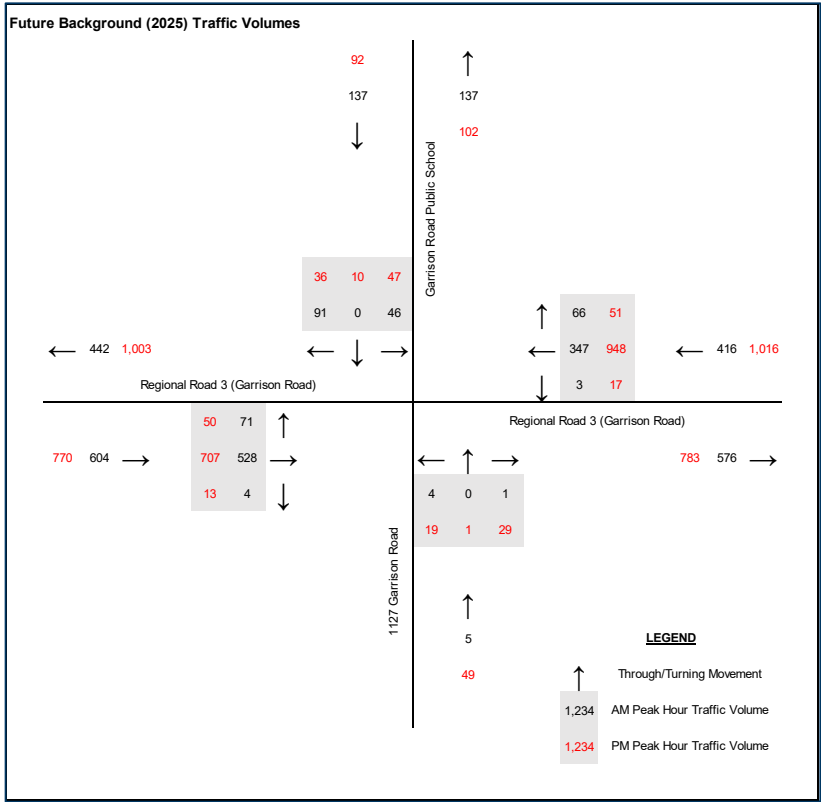


Figure 5 2025 Future Background Traffic Volumes

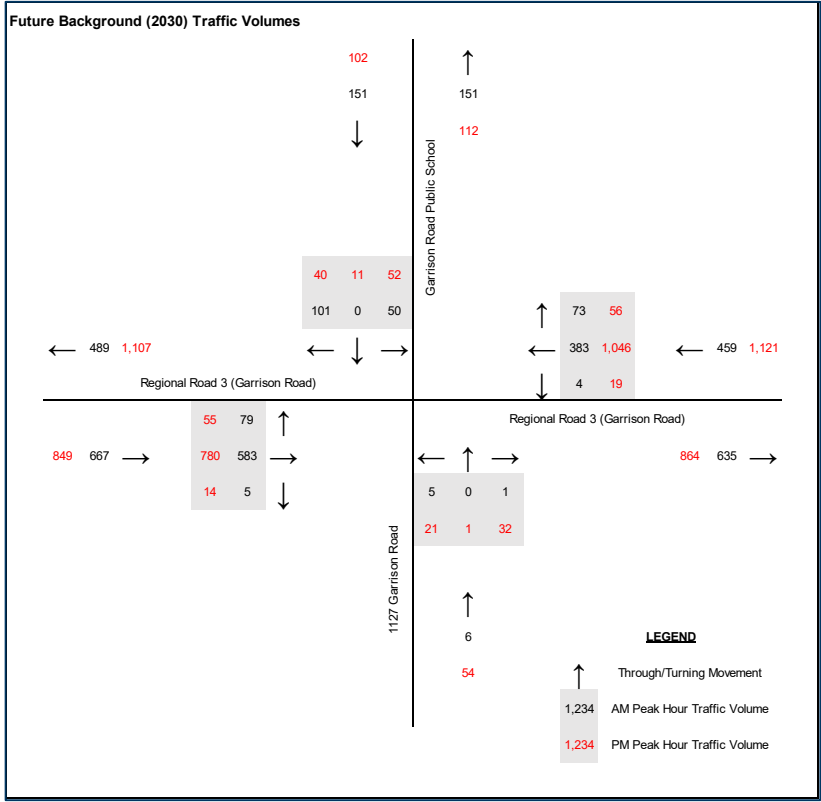


Figure 6 2030 Future Background Traffic Volumes



# 5. Trip Generation and Distribution

## 5.1 Site Trip Generation

The breakdown of the development is as follows:

- 90 stacked townhouse units (area of 65 square meters each) and 325 square metres of retail space

Trip generation for the residential uses were calculated using rates provided in the Institute of Transportation Engineer's (ITE) *Trip Generation Manual*, 11th Edition using Land Use Code (LUC) 220 (Multifamily Housing – Low-Rise) and LUC 822 (Strip Retail Plaza). The Independent Variables used for the trip generation were number of dwelling units for LUC 221 and the area in square feet for LUC 822. Both phases will be completed within the 2027 horizon year, with the estimated trip generation for the full build-out of the site shown in **Table 1**. GHD compared the average rates to the fitted curve equation and adopted the rate that generated the highest volume of site trips for a more conservative analysis.

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

**Table 1 Full Build-Out Estimated Site Trips**

Proposed Land Use	Land Use Code	Land Use Description	Independent Variable	Time Period	Trip Type	Value	Fitted Curve Equation:	Directional Distribution		Calculated Trip Ends		
								Entering	Exiting	Total Trips	Entry	Exit
Residential	220	Multifamily Housing (Low-Rise)	Residential Units	Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m.	Vehicle	90	$T = 0.31(X) + 22.85$	24%	76%	51	12	39
				Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m.	Vehicle	90	$\ln(T) = 0.94 \ln(X) + 0.27$	63%	37%	59	37	22
Commercial	822	Strip Retail Plaza (<40k)	1000 Sq. Ft. GFA	Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m.	Vehicle	3.5	$\ln(T) = 0.66 \ln(X) + 1.84$	60%	40%	14	8	6
				Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m.	Vehicle	3.5	$\ln(T) = 0.71 \ln(X) + 2.72$	50%	50%	37	18	19
<b>Morning (AM) Peak Hour Total</b>									<b>65</b>	<b>20</b>	<b>45</b>	
<b>Afternoon (PM) Peak Hour Total</b>									<b>96</b>	<b>55</b>	<b>41</b>	

The full build-out of the subject site is expected to generate a total of 65 new two-way trips consisting of 20 inbound and 45 outbound trips during weekday a.m. peak hour and 96 new two-way trips consisting of 55 inbound and 41 outbound trips during the weekday p.m. peak hour.

## 5.2 Site Trip Distribution

The distribution of the site-generated traffic was based on the review of existing travel patterns. Trip distribution is summarized in **Table 2**.

**Table 2 Trip Distribution**

Origin/Destination	AM Peak Hour		PM Peak Hour	
	Percentage of Inbound Trips	Percentage of Outbound Trips	Percentage of Inbound Trips	Percentage of Outbound Trips
Regional Road 3 (Garrison Road) East	41%	57%	57%	44%
Regional Road 3 (Garrison Road) West	59%	43%	43%	56%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

The site is assumed to be completed in the 2025 planning horizon. The estimated site trips generated by the subject site and distributed to the study area road network for the weekday a.m. and p.m. peak hours are shown in **Figure 7**.

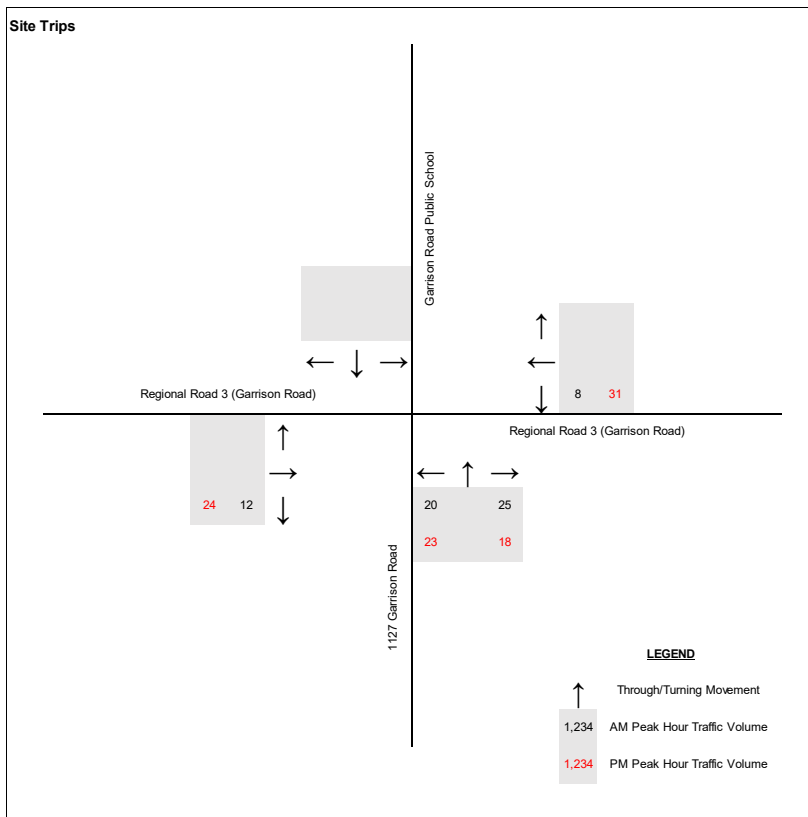


Figure 7 Full Build-Out Total Site Trips - 2025

## 6. Future Total Traffic

The future total traffic conditions in the weekday a.m. and p.m. peak hours for the 2025 and 2030 planning horizon years was derived by combining the projected future background traffic with the corresponding estimated site generated traffic. The resulting traffic volumes are presented in **Figure 8** and **Figure 9**.

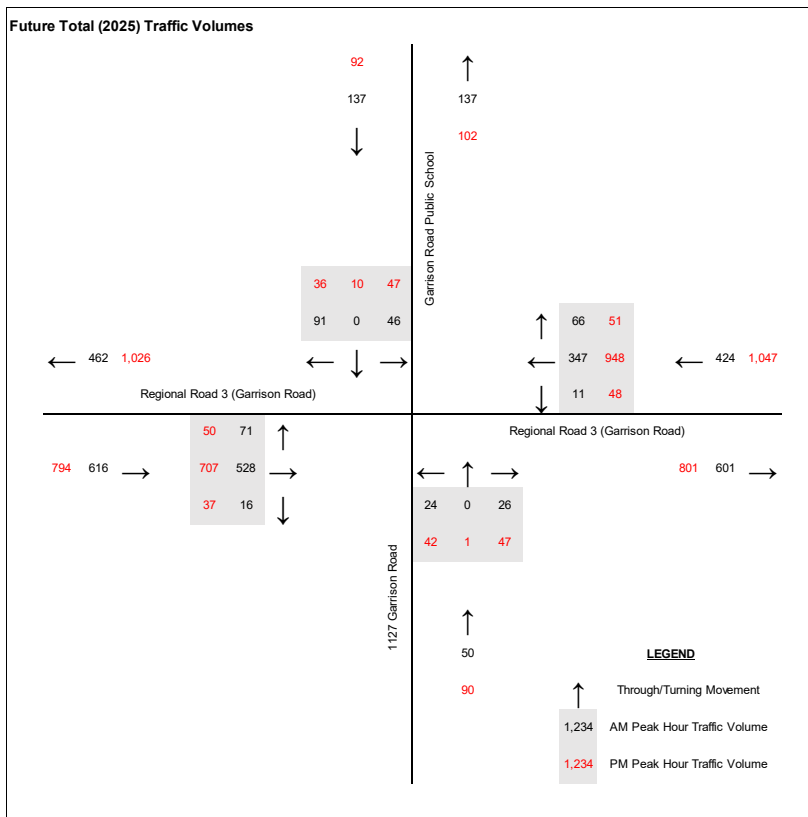


Figure 8 2025 Future Total Traffic Volumes

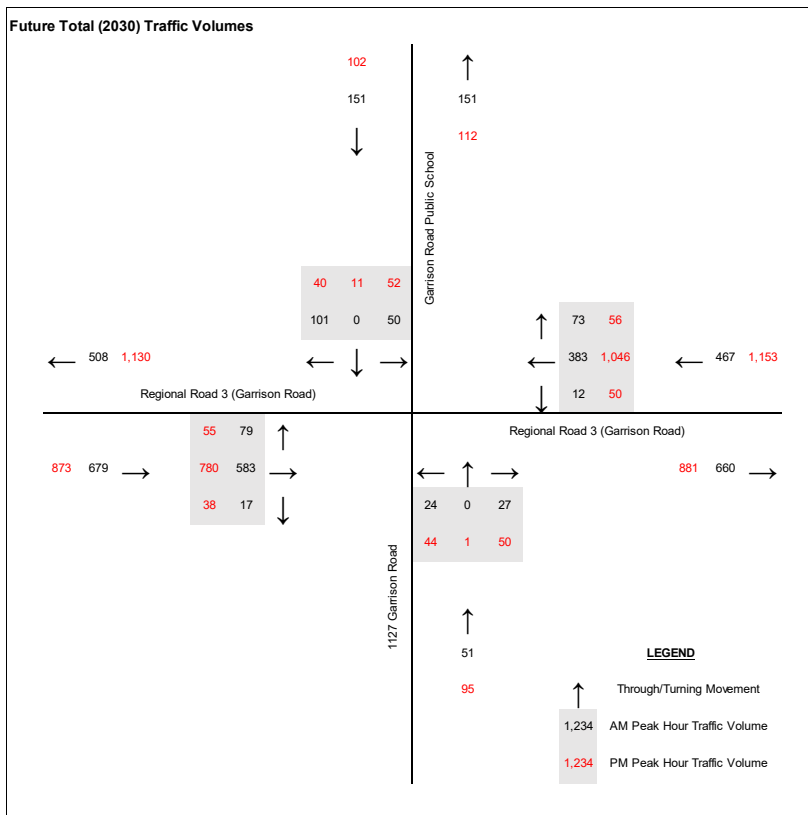


Figure 9 2030 Future Total Traffic Volumes

# 7. Road Geometry

## 7.1 Site Access

As shown in the site plan in **Figure 2** the drive aisle at the site access is aligned with the access to Garrison Road Public School. The width at the narrowest point of the curvature is 8.0 metres. As per the Transportation Association of Canada (TAC) *Geometric Design Guide for Canadian Roadways, Chapter 8 – Access*, Table 8.9.1 specifies that the minimum required width for a two-way residential driveway should be between 2.0 and 7.3 meters. As the proposed width of the site access is 8.0 metres, it satisfies the minimum driveway width requirements. For the driveway to operate properly, both from the adjacent roadway and internal driveways, it is recommended to provide a no conflict and storage zone within the driveway. This zone is referred as clear throat length and is measured from the ends of the driveway curb at the adjacent roadway and the point of first conflict on site. Table 8.9.3 in *Chapter 8 - Access* specifies a minimum clear throat length of 8 metres for residential developments with less than 100 units. Based on the dimensions illustrated on the site plan, the clear throat length at the site access conforms with the applicable guidelines.

# 8. Traffic Analysis

The capacity analysis identifies how well the intersections and driveways are operating. The analysis contained within this report utilized the *Highway Capacity Manual (HCM) 2000* procedure within the Synchro Version 11 Software package. The reported intersection volume-to-capacity ratios ( $v/c$ ) are a measure of the saturation volume for each turning movement, while the levels-of-service (LOS) are a measure of the average delay for each turning movement. Queuing characteristics are reported as the predicted 95th percentile queue for each turning movement. Both pedestrian crossing volumes and heavy vehicle proportions are included in the analyses. The peak hour factors from the traffic counts were used to analyse existing and future traffic conditions.

The analysis includes identification and required modifications, such as the bus only lane at the intersection where the addition of background growth or background growth plus site-generated traffic volumes causes the following:

### Niagara Region

'Critical' intersections and movements for a signalized intersection include:

- V/C ratios for overall intersections operations, through movements, or shared through/turning movements increase to 0.85 or above;
- V/C ratios for exclusive movements increase to 0.90 or above; or
- 95th percentile queue length for individual movements that are projected to, or exceed, the storage length.

The following table summarizes the HCM capacity results for the study intersections during the weekday a.m. and p.m. peak hours under existing (2022), future background (2025 and 2030) and future total (2025 and 2030) traffic conditions. The detailed calculation sheets are provided in **Appendix D**.

Scenario	AM Peak Hour		PM Peak Hour	
	V/C (LOS) seconds	95 <sup>th</sup> % Que.	V/C (LOS) seconds	95 <sup>th</sup> % Que
Existing 2022	Overall: <b>0.33 (B) 12.0</b> EBL = 0.24 (B) 11.1 EBTR = 0.45 (B) 12.0 WBL = 0.01 (A) 9.8 WBTR = 0.35 (B) 11.4 NBLTR = 0.01 (B) 13.3 SBLTR = 0.15 (B) 13.9 WBR(Bus) = 0.12(C) 21.6	EBL = 15.1 m EBTR = 39.0 m WBL = 1.8 m WBTR = 29.4 m NBLTR = 2.8 m SBLTR = 14.5 m WBR (Bus) = 4.5 m	Overall: <b>0.55 (A) 6.3</b> EBL = 0.22 (A) 4.8 EBTR = 0.37 (A) 5.1 WBL = 0.05 (A) 4.1 WBTR = 0.52 (A) 5.9 NBLTR = 0.17 (B) 16.0 SBLTR = 0.25 (B) 16.4 WBR(Bus) = - (A) -	EBL = 7.3 m EBTR = 28.7 m WBL = 2.7 m WBTR = 44.2 m NBLTR = 12.7 m SBLTR = 17.7 m WBR (Bus) = 0 m
Future Background 2025	Overall: <b>0.35 (B) 12.2</b> EBL = 0.27 (B) 11.3 EBTR = 0.48 (B) 12.2 WBL = 0.01 (A) 9.9 WBTR = 0.37 (B) 11.5 NBLTR = 0.01 (B) 13.2 SBLTR = 0.17 (B) 13.9 WBR(Bus) = 0.14 (C) 22.0	EBL = 16.4m EBTR = 42.6 m WBL = 1.8 m WBTR = 32.0 m NBLTR = 2.9 m SBLTR = 16.2 m WBR (Bus) = 4.9 m	Overall: <b>0.54 (A) 6.1</b> EBL = 0.22 (A) 4.2 EBTR = 0.36 (A) 4.4 WBL = 0.05 (A) 3.4 WBTR = 0.50 (A) 5.1 NBLTR = 0.21 (C) 21.7 SBLTR = 0.31 (C) 22.4 WBR(Bus) = - (A) -	EBL = 8.1 m EBTR = 31.5 m WBL = 2.9 m WBTR = 49.4 m NBLTR = 13.4 m SBLTR = 18.7 m WBR (Bus) = 0 m
Future Background 20230	Overall: <b>0.39 (B) 12.4</b> EBL = 0.31 (B) 11.5 EBTR = 0.51 (B) 12.3 WBL = 0.02 (A) 9.8 WBTR = 0.39 (B) 11.6 NBLTR = 0.02 (B) 13.9 SBLTR = 0.21 (B) 14.8 WBR(Bus) = 0.16 (C) 23.1	EBL = 19.2 m EBTR = 49.8 m WBL = 2.1 m WBTR = 37.0 m NBLTR = 3.4 m SBLTR = 19.9 m WBR (Bus) = 5.6 m	Overall: <b>0.58 (A) 7.2</b> EBL = 0.30 (A) 5.4 EBTR = 0.40 (A) 5.4 WBL = 0.07 (A) 4.1 WBTR = 0.56 (A) 6.5 NBLTR = 0.20 (C) 22.1 SBLTR = 0.32 (C) 23.0 WBR(Bus) = - (A) -	EBL = 10.7 m EBTR = 37.4 m WBL = 3.4 m WBTR = 60.1 m NBLTR = 14.2 m SBLTR = 20.7 m WBR (Bus) = 0 m
Future Total 2025	Overall: <b>0.36 (B) 12.3</b> EBL = 0.26 (B) 11.3 EBTR = 0.49 (B) 12.2 WBL = 0.05 (B) 9.9 WBTR = 0.37 (B) 11.5 NBLTR = 0.15 (B) 13.2 SBLTR = 0.17 (B) 13.9 WBR(Bus) = 0.14 (C) 22.1	EBL = 16.5 m EBTR = 43.8 m WBL = 4.2 m WBTR = 32.2 m NBLTR = 13.8 m SBLTR = 16.3 m WBR (Bus) = 5.0 m	Overall: <b>0.55 (A) 6.6</b> EBL = 0.22 (A) 4.4 EBTR = 0.38 (A) 4.7 WBL = 0.15 (A) 4.0 WBTR = 0.51 (A) 5.4 NBLTR = 0.37 (C) 22.5 SBLTR = 0.30 (C) 22.0 WBR(Bus) = - (A) -	EBL = 8.6 m EBTR = 34.8 m WBL = 7.1 m WBTR = 52.3 m NBLTR = 21.5 m SBLTR = 18.6 m WBR (Bus) = 0 m
Future Total 2030	Overall: <b>0.40 (B) 12.5</b> EBL = 0.31 (B) 11.5 EBTR = 0.52 (B) 12.5 WBL = 0.06 (A) 10.0 WBTR = 0.39 (B) 11.6 NBLTR = 0.15 (B) 14.6 SBLTR = 0.22 (B) 14.9 WBR(Bus) = 0.16 (C) 23.3	EBL = 19.2 m EBTR = 51.2 m WBL = 4.6 m WBTR = 37.1 m NBLTR = 14.9 m SBLTR = 20.1 m WBR (Bus) = 5.7 m	Overall: <b>0.58 (A) 7.2</b> EBL = 0.30 (A) 5.4 EBTR = 0.40 (A) 5.4 WBL = 0.07 (A) 4.1 WBTR = 0.56 (A) 6.5 NBLTR = 0.20 (C) 22.1 SBLTR = 0.32 (C) 23.0 WBR(Bus) = - (A) -	EBL = 11.2 m EBTR = 40.2 m WBL = 7.9 m WBTR = 62.2 m NBLTR = 22.4 m SBLTR = 20.6 m WBR (Bus) = 0 m

Under existing traffic conditions and future horizon years, the overall intersection has a reported maximum v/c ratio of 0.40 LOS B and 0.58 LOS A during the a.m. and p.m. peak hours respectively. This intersection is expected to be operating satisfactorily under existing and all future conditions, with reserve capacity, acceptable levels of delay, and no queuing concerns. There are no geometric improvements recommended at this intersection in response to the site traffic generated from the subject development.



## 9. Conclusion

The development consists of 90 residential units of stacked townhouses with an area of approximately 71 square metres (760 square feet) each. The development also consists of 339.5 square metres of commercial space (3654 square feet) fronting onto Garrison Road. Access to the subject site is proposed via a full-moves driveway along Garrison Road, at the intersection with Garrison Road Public School.

The full build-out of the subject site is expected to generate a total of 65 new two-way trips consisting of 20 inbound and 45 outbound trips during weekday a.m. peak hour and 96 new two-way trips consisting of 55 inbound and 41 outbound trips during the weekday p.m. peak hour.

Under the Future Background and Total scenarios for the 2025 and 2030 horizon years, the intersection of Garrison Road and Garrison Road Public School is reported to operate satisfactorily with substantial reserve capacity, low levels of delay, and negligible queueing.

# Appendix A

## Terms of Reference

## TIS Terms of Reference - 1127 Garrison Road, Fort Erie

Jordan Frost <Jordan.Frost@ghd.com>

Thu 9/15/2022 2:13 PM

To: Dunsmore, Susan <Susan.Dunsmore@niagararegion.ca>

Cc: Muhammad Safder Haider <MuhammadSafder.Haider@ghd.com>

Hello Susan,

GHD Limited has been retained by Wolfpack Build Inc./Niagara Planning Group to undertake a Transportation Impact Study (TIS) for a proposed development situated at 1127 Garrison Road in Fort Erie, Ontario. As per the Pre-Consultation Agreement, please distribute GHD's proposed TIS Terms of Reference to the Transportation Services Division for review, comment, and approval.

### TIS Terms of Reference

- **Development Address**
  - 1127 Garrison Road, Fort Erie, Ontario
- **Analysis Methodology**
  - Niagara Region, *Transportation Impact Study Guidelines*, 2012
  - Synchro Studio V11 and *Highway Capacity Manual*, Sixth Edition
  - Institute of Transportation Engineers, *Trip Generation Manual*, 11 Edition
  - Transportation Association of Canada, *Geometric Design Guide for Canadian Roadways*, 2017 (Amended in 2019 and 2020)
- **Analysis Intersections**
  - Regional Road 3 (Garrison Road) and Garrison Road Public School/1127 Garrison Road
- **Analysis Periods**
  - Typical weekday between Tuesday and Thursday in the Winter, Spring, or Fall
  - Morning (AM) peak hour between 6:00 AM and 9:00 AM based on eight-hour turning movement count
  - Afternoon (PM) peak hour between 3:00 PM and 6:00 PM based on eight-hour turning movement count
- **Planning Horizons**
  - Base year (2022)
  - Full build-out year
  - Five years post full build-out
- **Analysis Scenarios**
  - Base year background traffic
  - Full build-out year background traffic
  - Full build-out year total traffic
  - Five years post full build-out background traffic
  - Five years post full build-out total traffic
- **Background Traffic Volume Growth Rate**
  - Assumed two-percent per year linear growth for through movements
- **Adjacent Development Traffic**
  - Confirm approved adjacent developments to be included within this analysis generating additional background traffic
  - Provide TIS report(s) for approved adjacent developments identified including trip generation for subject development

Specifics relating to intersection control warrants and turn-lane warrants will not be assessed as the intersection is already signalized with dedicated left-turn lanes. Parking will not be included within the TIS as it is under municipal jurisdiction.

If there are any comments or questions, please contact me as per my coordinates below.

Regards,

**Jordan Frost**  
P.Eng., PTOE  
Project Manager, Transportation

**GHD**  
Proudly employee-owned | [ghd.com](http://ghd.com)  
261 Martindale Road Unit #3 St.Catharines ON L2W 1A2 Canada  
D +1 905 346 3875 M +1 905 246 2221 E [jordan.frost@ghd.com](mailto:jordan.frost@ghd.com)

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Connect



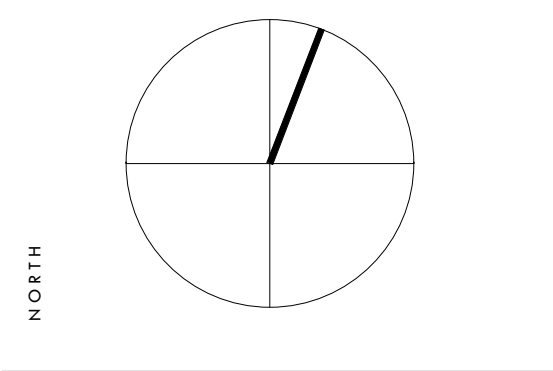
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# Appendix B

Site Plan



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STAMP

NO.	DATE
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50	2023/09/19

**SITE PLAN**

**STACKED DWELLINGS**

1127 GARRISON ROAD, FORT ERIE

SCALE As Indicated

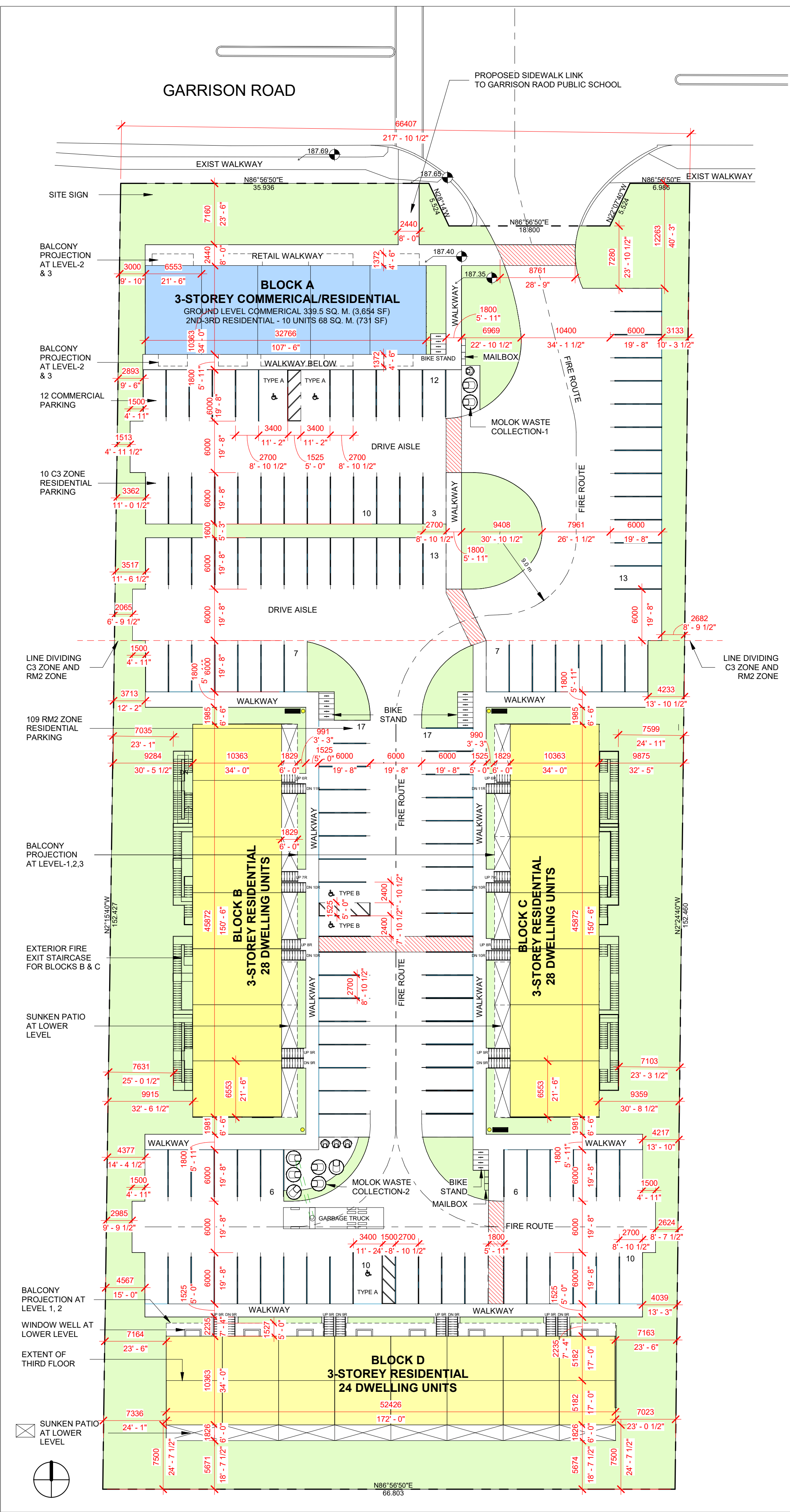
DATE 2023-09-19 11:07:35 AM

DRAWN DK

CHECKED JC

PROJECT NUMBER 21084

SHEET



**CONCEPTUAL SITE STATISTICS**

LOT AREA	10,047.03 SQ. M. (1.00 HECTARES)
C3 ZONE AREA	3,442.35 SQ. M.
RM2 ZONE AREA	6,604.68 SQ. M.
LOT FRONTAGE	66.40 M.
LOT COVERAGE	18.25%
LANDSCAPING	30.88%
LANDSCAPING	920 SQ.M. (3,102.92 SQ. M.)
BUILDING HEIGHT	12.0M (ALL BLOCKS)
NUMBER OF STOREYS	3 STOREYS (ALL BLOCKS)
PROPOSED UNITS	90 DWELLINGS
PROPOSED DENSITY	TOTAL 131 PARKING SPACES
PROPOSED PARKING	-119 RESIDENTIAL SPACES
	-12 COMMERCIAL SPACES
	(INCL 3 TYPE A ACCESSIBLE SPACES & 2 TYPE B ACCESSIBLE SPACES)

**AREA SCHEDULE (GROSS BUILDING)**

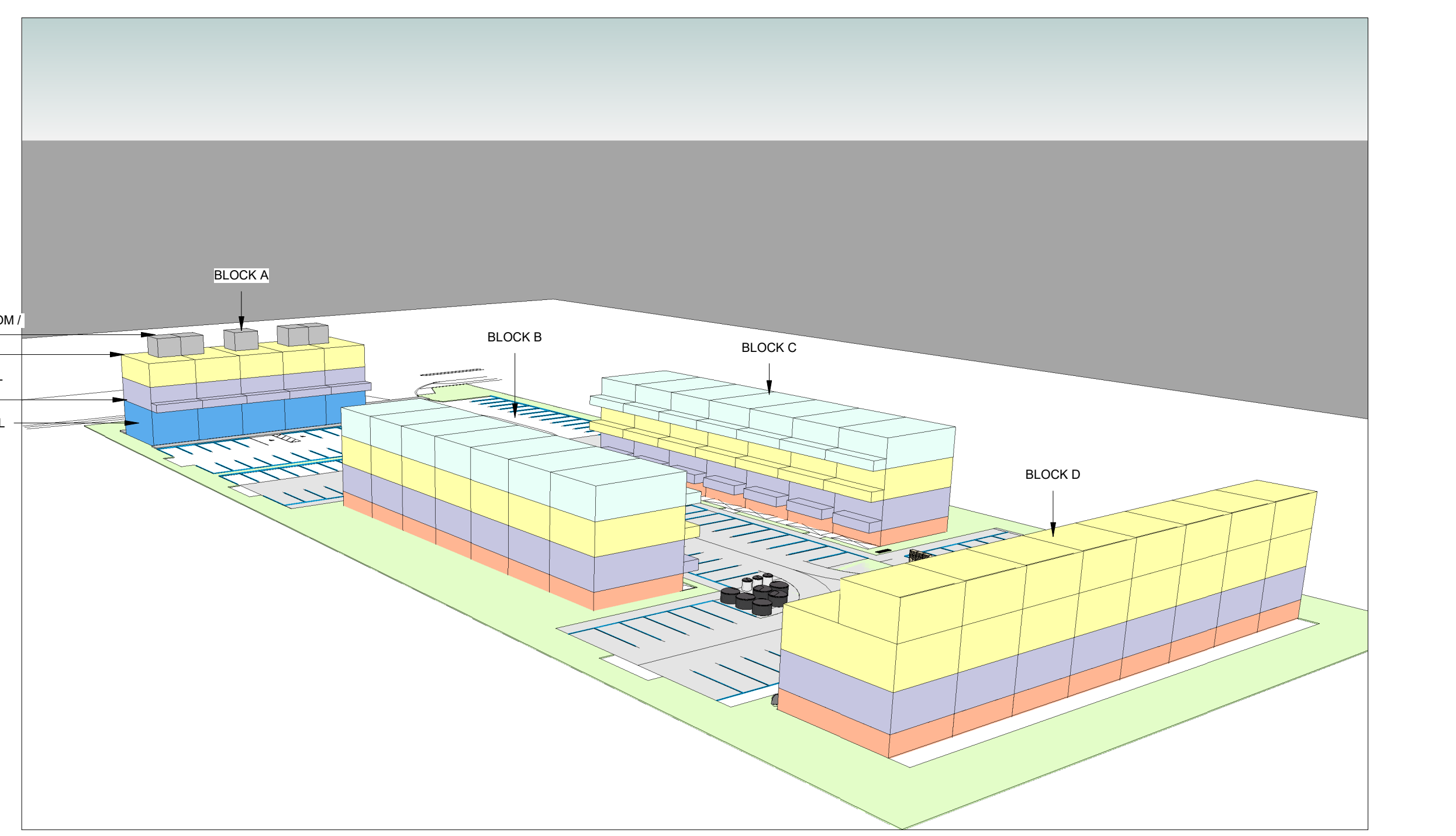
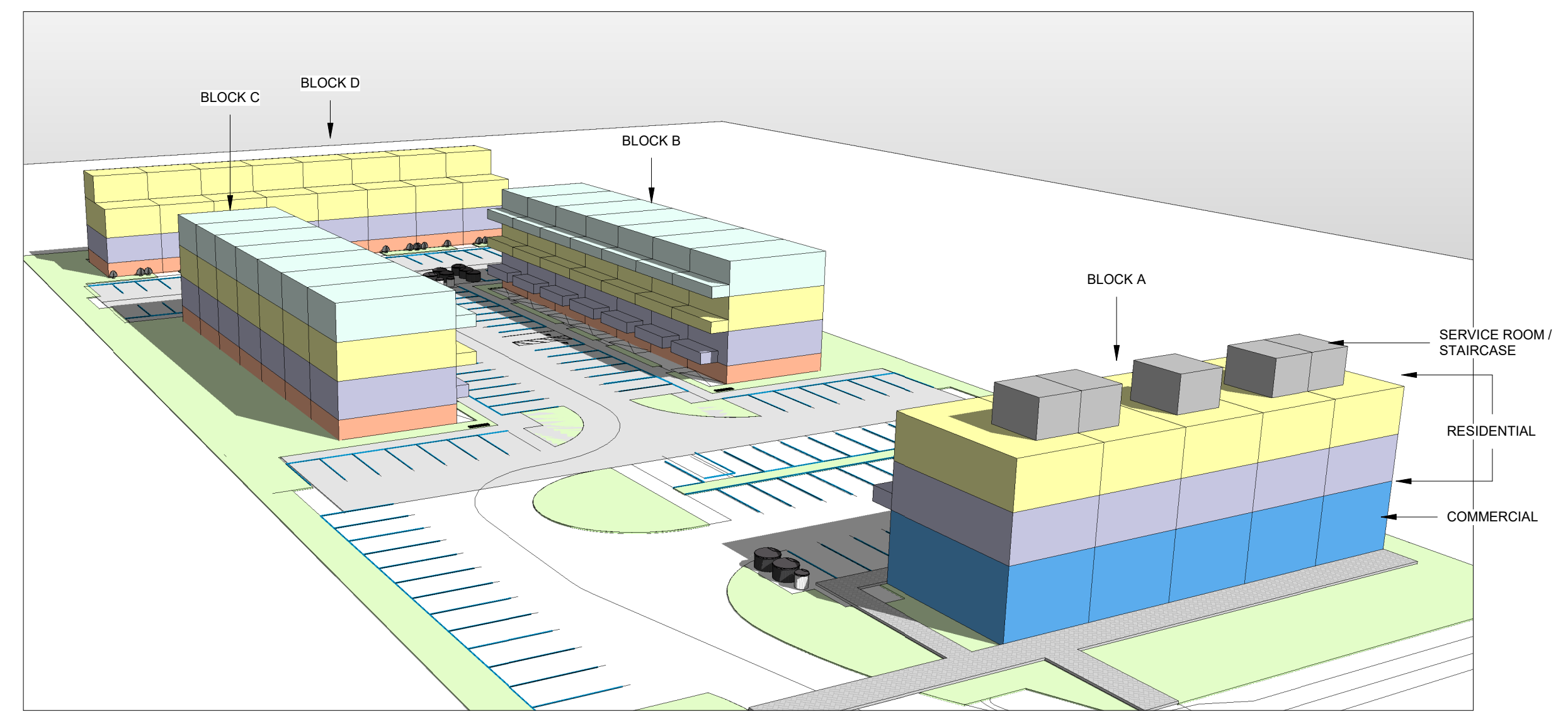
BLOCK	METRIC AREA	IMPERIAL AREA
A (RESIDENTIAL)	679 m <sup>2</sup>	7308.7 ft <sup>2</sup>
A (COMMERCIAL)	339.5 m <sup>2</sup>	3,654 ft <sup>2</sup>
B	1,901.5 m <sup>2</sup>	20,468 ft <sup>2</sup>
C	1,901.5 m <sup>2</sup>	20,468 ft <sup>2</sup>
D	1,901.5 m <sup>2</sup>	20,468 ft <sup>2</sup>
<b>TOTAL</b>	<b>6,723 m<sup>2</sup></b>	<b>72365.7 ft<sup>2</sup></b>

**CONCEPTUAL UNIT AREAS:**

3 BEDROOM UNITS	MIN. AREA = 79 SQ. M
2 BEDROOM UNITS	MIN. AREA = 60 SQ. M
1 BEDROOM UNITS	MIN. AREA = 50 SQ. M

**1 SITE PLAN**  
1:325



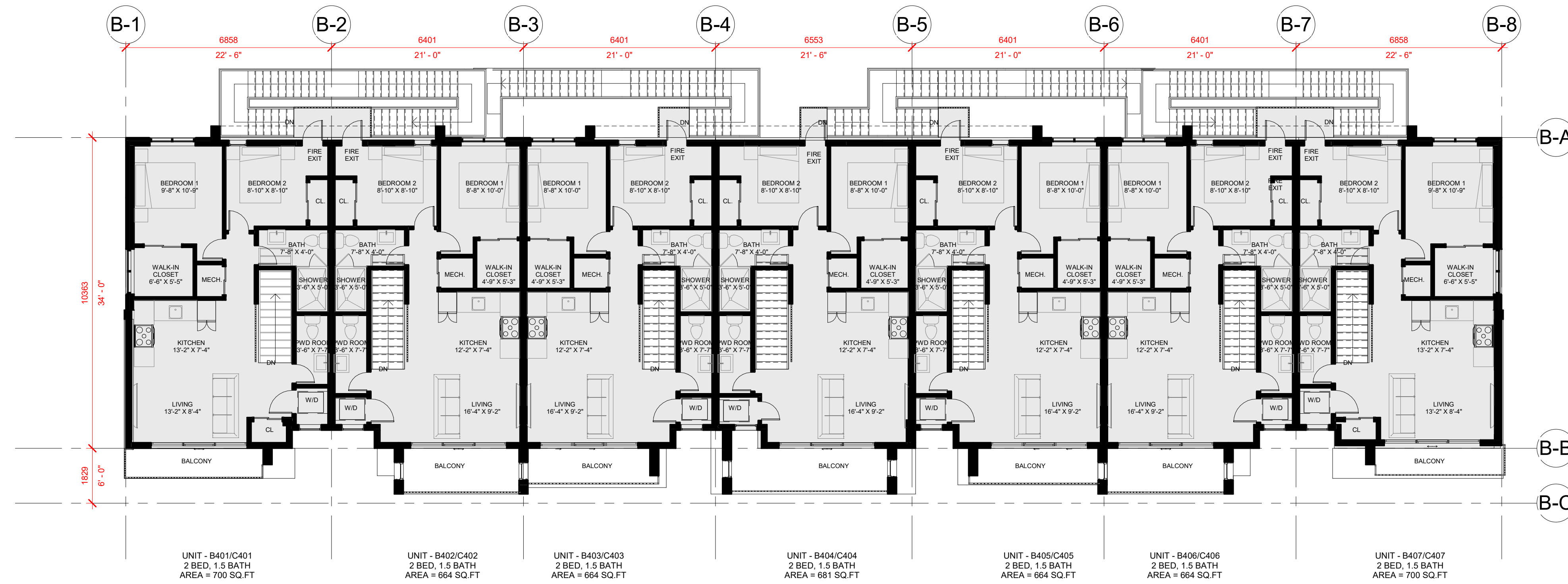
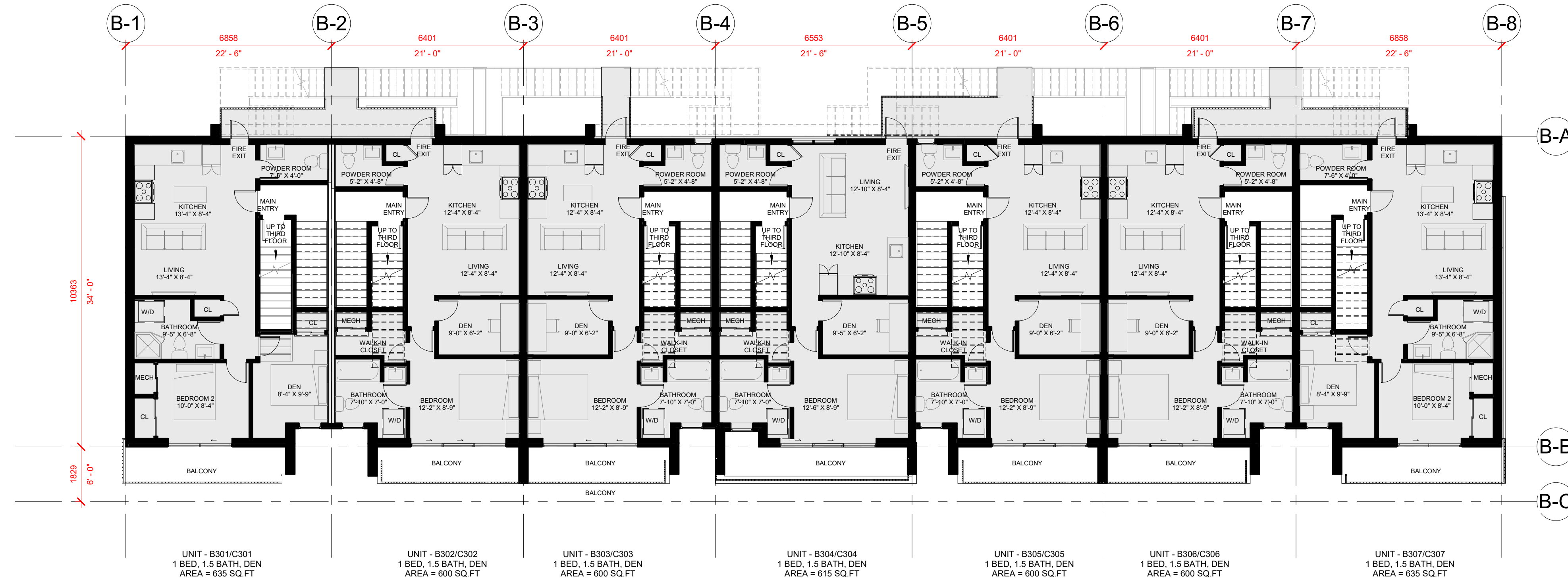
FILE NAME: X:\Organica\Projects\2022\20281-1127 Garrison Road\Phase 1\1127 Garrison Road - 3A & 3C - Revised Stair and Block Construction  
 PLOT DATE: 2023-09-19 11:07:35 AM





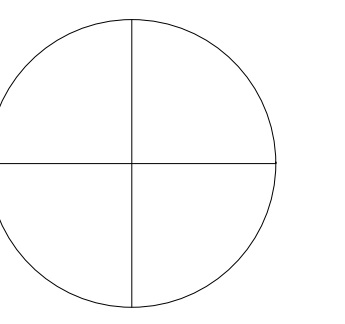






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NORTH



STAMP

NO.	DESCRIPTION	DATE
1.	ISSUED FOR 3/A & 3/A	2023/09/19

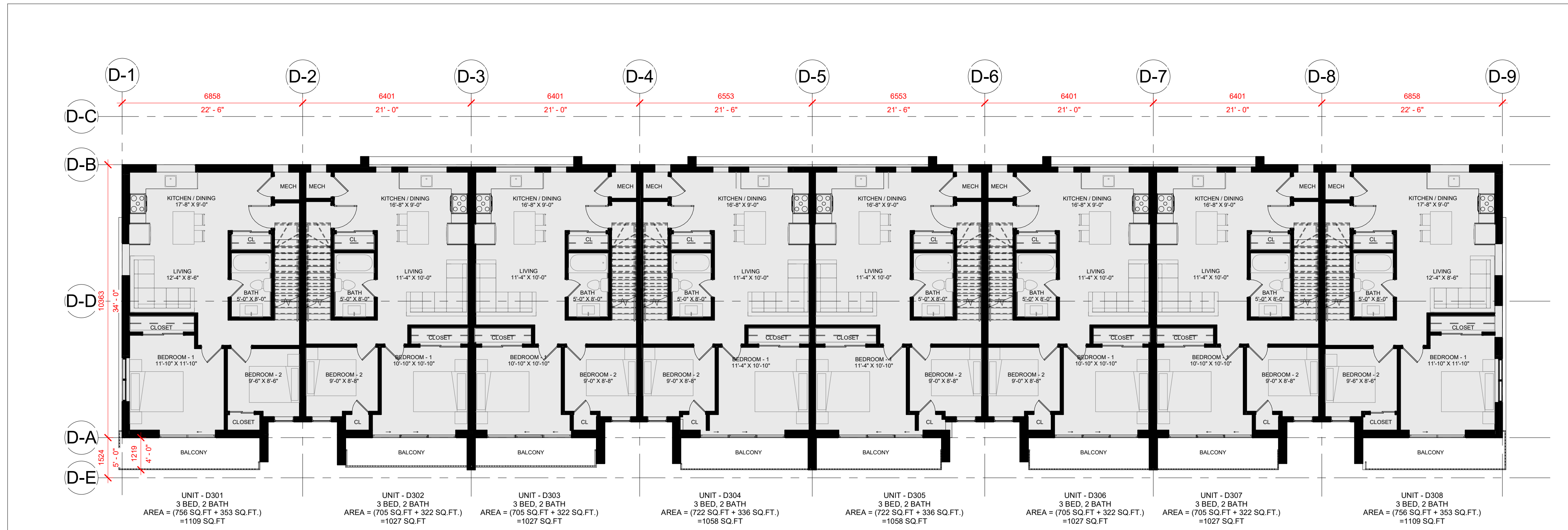
**BLOCKS B & C - FLOOR PLANS**  
**STACKED DWELLINGS**  
1127 GARRISON ROAD, FORT ERIE

SCALE	1 : 100
DATE	2023-09-19 11:07:44 AM
DRAWN	Author
CHECKED	Checker
PROJECT NUMBER	21084

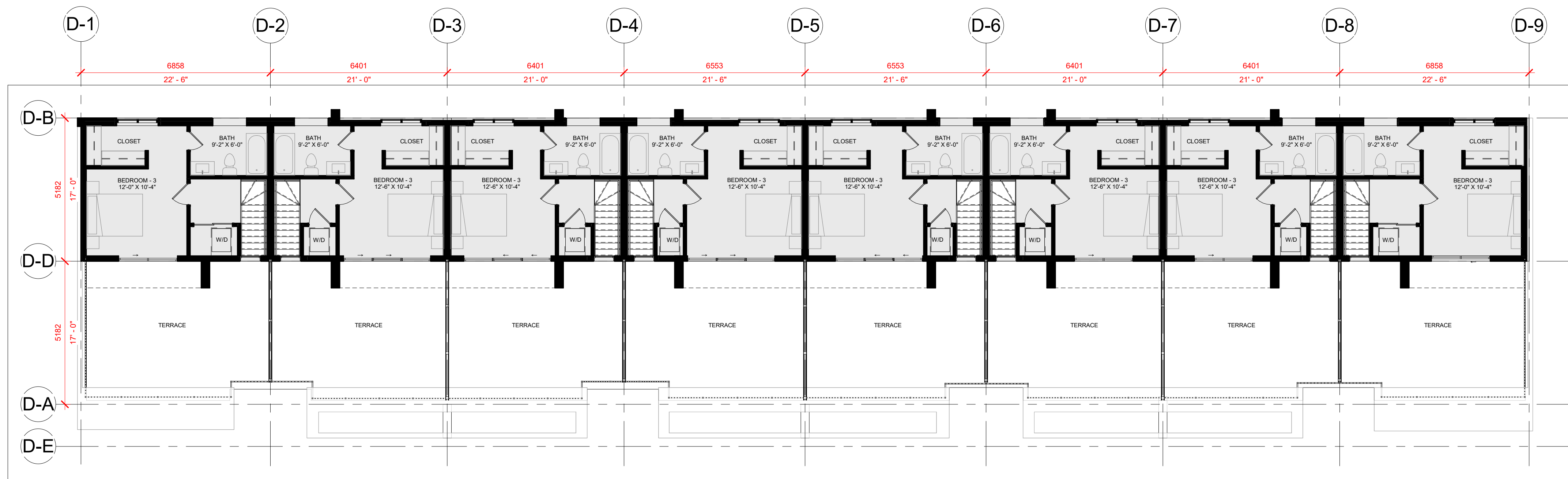
SHEET  
**A202**





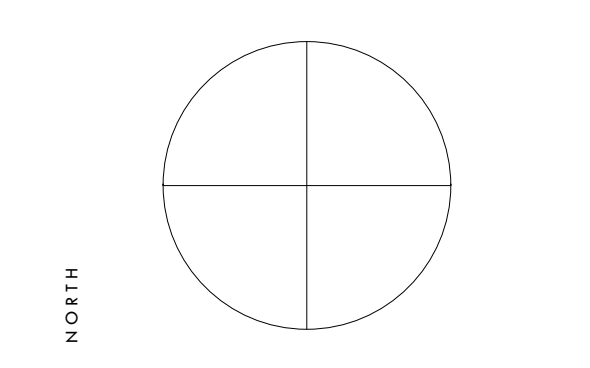


1 Block D - Second Level  
 1 : 100



2 Block D - Third Level  
 1 : 100

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NO.	DATE	DESCRIPTION
1	2023/09/19	ISSUED FOR BIA & OSA

BLOCKS D - FLOOR PLANS  
 STACKED DWELLINGS  
 1127 GARRISON ROAD, FORT ERIE

SCALE	1 : 100
DATE	2023-09-19 11:07:49 AM
DRAWN	Author
CHECKED	Checker
PROJECT NUMBER	21084
SHEET	























# Appendix C

Traffic Data





## Project #22-349 - GHD

### Intersection Count Report

**Intersection:** Garrison Rd & Garrison Rd Public School-Commercial Access

**Municipality:** Fort Erie

**Count Date:** Thursday, Oct 13, 2022

**Site Code:** 2234900001

**Count Categories:** Cars, Trucks, Bicycles, Pedestrians

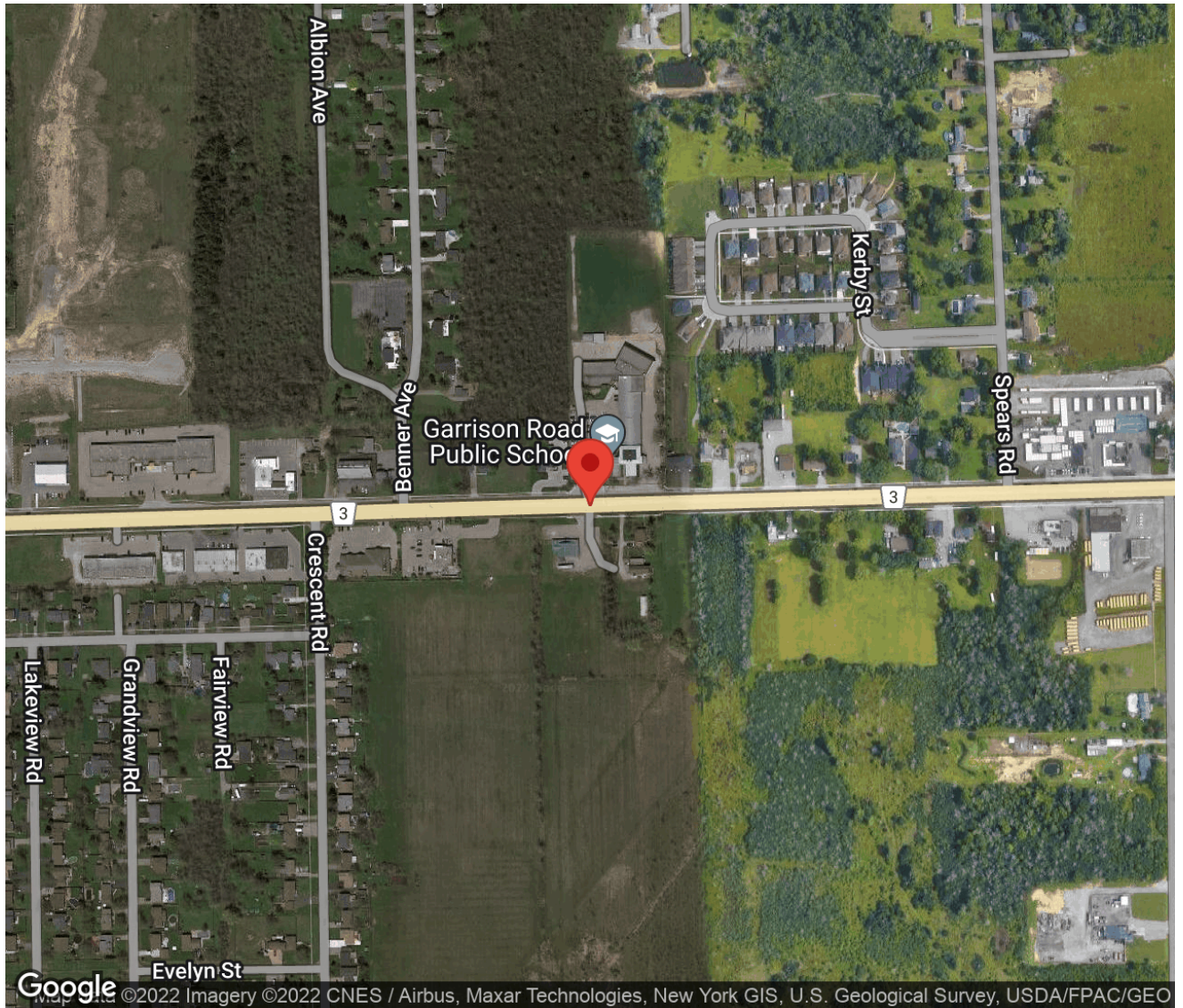
**Count Period:** 06:00-09:00, 11:00-13:00, 15:00-18:00

**Weather:** Clear

**Comments:**

## Traffic Count Map

Intersection: Garrison Rd & Garrison Rd Public School-  
Commercial Access  
Site Code: 223490001  
Municipality: Fort Erie  
Count Date: Oct 13, 2022





# Traffic Count Summary

Intersection: Garrison Rd & Garrison Rd Public School-  
 Commercial Access  
 Site Code: 2234900001  
 Municipality: Fort Erie  
 Count Date: Oct 13, 2022

## Garrison Rd Public School - Traffic Summary

Hour	North Approach Totals						South Approach Totals						Total
	Includes Cars, Trucks, Bicycles						Includes Cars, Trucks, Bicycles						
	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	
06:00 - 07:00	0	0	1	0	1	0	0	0	0	0	0	0	1
07:00 - 08:00	1	0	2	0	3	0	0	0	0	0	0	0	3
08:00 - 09:00	43	0	86	0	129	0	4	0	1	0	5	19	134
BREAK													
11:00 - 12:00	6	0	18	0	24	0	1	0	1	0	2	3	26
12:00 - 13:00	11	0	8	0	19	0	1	0	1	0	2	6	21
BREAK													
15:00 - 16:00	10	0	37	0	47	15	3	1	2	0	6	27	53
16:00 - 17:00	40	8	27	0	75	139	10	0	11	0	21	75	96
17:00 - 18:00	54	6	40	0	100	124	24	1	42	0	67	66	167
<b>GRAND TOTAL</b>	<b>165</b>	<b>14</b>	<b>219</b>	<b>0</b>	<b>398</b>	<b>278</b>	<b>43</b>	<b>2</b>	<b>58</b>	<b>0</b>	<b>103</b>	<b>196</b>	<b>501</b>



## Traffic Count Summary

Intersection: Garrison Rd & Garrison Rd Public School-  
Commercial Access  
Site Code: 2234900001  
Municipality: Fort Erie  
Count Date: Oct 13, 2022

### Garrison Rd - Traffic Summary

Hour	East Approach Totals						West Approach Totals						Total
	Includes Cars, Trucks, Bicycles						Includes Cars, Trucks, Bicycles						
	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	
<b>06:00 - 07:00</b>	0	121	0	0	121	0	0	189	0	0	189	0	310
<b>07:00 - 08:00</b>	1	237	4	0	242	0	26	292	1	0	319	2	561
<b>08:00 - 09:00</b>	3	327	62	0	392	0	67	498	4	0	569	25	961
BREAK													
<b>11:00 - 12:00</b>	2	541	7	0	550	0	7	550	1	0	558	0	1108
<b>12:00 - 13:00</b>	6	621	7	0	634	0	4	555	4	0	563	4	1197
BREAK													
<b>15:00 - 16:00</b>	2	745	11	0	758	0	8	603	1	0	612	32	1370
<b>16:00 - 17:00</b>	15	840	56	0	911	0	43	624	11	0	678	224	1589
<b>17:00 - 18:00</b>	6	780	15	0	801	0	27	594	5	0	626	204	1427
<b>GRAND TOTAL</b>	<b>35</b>	<b>4212</b>	<b>162</b>	<b>0</b>	<b>4409</b>	<b>0</b>	<b>182</b>	<b>3905</b>	<b>27</b>	<b>0</b>	<b>4114</b>	<b>491</b>	<b>8523</b>



## Traffic Count Data

Intersection: Garrison Rd & Garrison Rd Public School-Commercial Access  
 Site Code: 2234900001  
 Municipality: Fort Erie  
 Count Date: Oct 13, 2022

### North Approach - Garrison Rd Public School

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
06:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00	1	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
08:00	2	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0
08:15	15	0	27	0	42	0	0	7	0	7	0	0	0	0	0	0
08:30	14	0	32	0	46	1	0	5	0	6	0	0	0	0	0	0
08:45	11	0	13	0	24	0	0	1	0	1	0	0	0	0	0	0
<b>SUBTOTAL</b>	43	0	74	0	117	1	0	15	0	16	0	0	0	0	0	0





## Traffic Count Data

Intersection: Garrison Rd & Garrison Rd Public School-Commercial Access  
 Site Code: 2234900001  
 Municipality: Fort Erie  
 Count Date: Oct 13, 2022

### North Approach - Garrison Rd Public School

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	5	0	7	0	12	0	0	11	0	11	0	0	0	0	0	14
15:15	2	0	9	0	11	0	0	1	0	1	0	0	0	0	0	0
15:30	2	0	6	0	8	0	0	0	0	0	0	0	0	0	0	0
15:45	1	0	3	0	4	0	0	0	0	0	0	0	0	0	0	1
16:00	9	3	3	0	15	0	0	0	0	0	0	0	0	0	0	19
16:15	5	3	9	0	17	0	0	0	0	0	0	0	0	0	0	35
16:30	13	2	5	0	20	0	0	0	0	0	0	0	0	0	0	36
16:45	13	0	10	0	23	0	0	0	0	0	0	0	0	0	0	49
17:00	13	4	10	0	27	0	0	0	0	0	0	0	0	0	0	21
17:15	7	0	11	0	18	0	0	0	0	0	0	0	0	0	0	48
17:30	9	0	14	0	23	0	0	0	0	0	0	0	0	0	0	32
17:45	25	2	5	0	32	0	0	0	0	0	0	0	0	0	0	23
<b>SUBTOTAL</b>	104	14	92	0	210	0	0	12	0	12	0	0	0	0	0	278
<b>GRAND TOTAL</b>	164	14	192	0	370	1	0	27	0	28	0	0	0	0	0	278



## Traffic Count Data

Intersection: Garrison Rd & Garrison Rd Public School-Commercial Access  
 Site Code: 2234900001  
 Municipality: Fort Erie  
 Count Date: Oct 13, 2022

### South Approach - Commercial Access

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	3
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
08:30	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
08:45	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4
<b>SUBTOTAL</b>	4	0	1	0	5	0	0	0	0	0	0	0	0	0	0	19







## Traffic Count Data

Intersection: Garrison Rd & Garrison Rd Public School-Commercial Access  
 Site Code: 2234900001  
 Municipality: Fort Erie  
 Count Date: Oct 13, 2022

### South Approach - Commercial Access

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17
15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
15:30	3	1	2	0	6	0	0	0	0	0	0	0	0	0	0	1
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19
16:15	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	11
16:30	5	0	6	0	11	0	0	0	0	0	0	0	0	0	0	18
16:45	5	0	3	0	8	0	0	0	0	0	0	0	0	0	0	27
17:00	8	1	16	0	25	0	0	0	0	0	0	0	0	0	0	8
17:15	7	0	12	0	19	0	0	0	0	0	0	0	0	0	0	16
17:30	6	0	7	0	13	0	0	0	0	0	0	0	0	0	0	28
17:45	3	0	7	0	10	0	0	0	0	0	0	0	0	0	0	14
<b>SUBTOTAL</b>	37	2	55	0	94	0	0	0	0	0	0	0	0	0	0	168
<b>GRAND TOTAL</b>	43	2	58	0	103	0	0	0	0	0	0	0	0	0	0	196



## Traffic Count Data

Intersection: Garrison Rd & Garrison Rd Public School-Commercial Access  
 Site Code: 2234900001  
 Municipality: Fort Erie  
 Count Date: Oct 13, 2022

### East Approach - Garrison Rd

Start Time	Cars					Trucks					Bicycles					Total Peds	
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total		
06:00	0	23	0	0	23	0	0	0	0	0	0	0	0	0	0	0	0
06:15	0	20	0	0	20	0	1	0	0	1	0	0	0	0	0	0	0
06:30	0	39	0	0	39	0	0	0	0	0	0	0	0	0	0	0	0
06:45	0	34	0	0	34	0	4	0	0	4	0	0	0	0	0	0	0
07:00	0	40	0	0	40	0	6	0	0	6	0	0	0	0	0	0	0
07:15	0	45	1	0	46	0	3	0	0	3	0	0	0	0	0	0	0
07:30	1	51	1	0	53	0	2	0	0	2	0	0	0	0	0	0	0
07:45	0	78	2	0	80	0	12	0	0	12	0	0	0	0	0	0	0
08:00	1	89	8	0	98	0	5	0	0	5	0	0	0	0	0	0	0
08:15	2	67	22	0	91	0	5	1	0	6	0	0	0	0	0	0	0
08:30	0	70	16	0	86	0	8	7	0	15	0	0	0	0	0	0	0
08:45	0	77	7	0	84	0	6	1	0	7	0	0	0	0	0	0	0
<b>SUBTOTAL</b>	4	633	57	0	694	0	52	9	0	61	0	0	0	0	0	0	0



## Traffic Count Data

Intersection: Garrison Rd & Garrison Rd Public School-Commercial Access  
 Site Code: 2234900001  
 Municipality: Fort Erie  
 Count Date: Oct 13, 2022

### East Approach - Garrison Rd

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
11:00	0	122	3	0	125	0	9	0	0	9	0	0	0	0	0	0
11:15	1	118	2	0	121	0	8	0	0	8	0	0	0	0	0	0
11:30	1	122	0	0	123	0	9	0	0	9	0	0	0	0	0	0
11:45	0	147	2	0	149	0	6	0	0	6	0	0	0	0	0	0
12:00	2	154	1	0	157	0	6	0	0	6	0	0	0	0	0	0
12:15	2	146	2	0	150	0	3	0	0	3	0	0	0	0	0	0
12:30	1	147	1	0	149	0	8	0	0	8	0	0	0	0	0	0
12:45	1	152	3	0	156	0	5	0	0	5	0	0	0	0	0	0
<b>SUBTOTAL</b>	8	1108	14	0	1130	0	54	0	0	54	0	0	0	0	0	0



## Traffic Count Data

Intersection: Garrison Rd & Garrison Rd Public School-Commercial Access  
 Site Code: 2234900001  
 Municipality: Fort Erie  
 Count Date: Oct 13, 2022

### East Approach - Garrison Rd

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	1	196	3	0	200	0	8	2	0	10	0	0	0	0	0	0
15:15	0	157	1	0	158	0	5	0	0	5	0	0	0	0	0	0
15:30	1	204	1	0	206	0	5	0	0	5	0	0	0	0	0	0
15:45	0	162	4	0	166	0	8	0	0	8	0	0	0	0	0	0
16:00	2	201	13	0	216	0	6	0	0	6	0	0	0	0	0	0
16:15	3	219	10	0	232	0	3	0	0	3	0	0	0	0	0	0
16:30	10	208	6	0	224	0	4	0	0	4	0	2	0	0	2	0
16:45	0	195	27	0	222	0	2	0	0	2	0	0	0	0	0	0
17:00	3	259	5	0	267	0	1	0	0	1	0	0	0	0	0	0
17:15	1	202	4	0	207	0	0	0	0	0	0	0	0	0	0	0
17:30	1	160	2	0	163	0	3	0	0	3	0	3	0	0	3	0
17:45	1	151	4	0	156	0	1	0	0	1	0	0	0	0	0	0
<b>SUBTOTAL</b>	23	2314	80	0	2417	0	46	2	0	48	0	5	0	0	5	0
<b>GRAND TOTAL</b>	35	4055	151	0	4241	0	152	11	0	163	0	5	0	0	5	0



## Traffic Count Data

Intersection: Garrison Rd & Garrison Rd Public School-Commercial Access  
 Site Code: 2234900001  
 Municipality: Fort Erie  
 Count Date: Oct 13, 2022

### West Approach - Garrison Rd

Start Time	Cars					Trucks					Bicycles					Total Peds	
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total		
06:00	0	40	0	0	40	0	0	0	0	0	0	0	0	0	0	0	0
06:15	0	37	0	0	37	0	2	0	0	2	0	0	0	0	0	0	0
06:30	0	61	0	0	61	0	4	0	0	4	0	0	0	0	0	0	0
06:45	0	44	0	0	44	0	1	0	0	1	0	0	0	0	0	0	0
07:00	0	44	0	0	44	0	3	0	0	3	0	0	0	0	0	0	0
07:15	2	46	0	0	48	0	3	0	0	3	0	0	0	0	0	0	0
07:30	7	86	1	0	94	0	1	0	0	1	0	0	0	0	0	0	0
07:45	16	105	0	0	121	1	4	0	0	5	0	0	0	0	0	0	2
08:00	18	140	1	0	159	1	7	0	0	8	0	0	0	0	0	0	2
08:15	33	92	2	0	127	0	4	0	0	4	0	0	0	0	0	0	16
08:30	13	120	1	0	134	1	9	0	0	10	0	0	0	0	0	0	7
08:45	1	123	0	0	124	0	3	0	0	3	0	0	0	0	0	0	0
<b>SUBTOTAL</b>	90	938	5	0	1033	3	41	0	0	44	0	0	0	0	0	0	27



## Traffic Count Data

Intersection: Garrison Rd & Garrison Rd Public School-Commercial Access  
 Site Code: 2234900001  
 Municipality: Fort Erie  
 Count Date: Oct 13, 2022

### West Approach - Garrison Rd

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
11:00	1	112	1	0	114	0	5	0	0	5	0	0	0	0	0	0
11:15	3	122	0	0	125	0	8	0	0	8	0	1	0	0	1	0
11:30	2	134	0	0	136	0	5	0	0	5	0	0	0	0	0	0
11:45	1	154	0	0	155	0	9	0	0	9	0	0	0	0	0	0
12:00	0	151	0	0	151	0	3	0	0	3	0	0	0	0	0	0
12:15	2	119	0	0	121	0	7	0	0	7	0	0	0	0	0	0
12:30	1	153	3	0	157	0	5	0	0	5	0	0	0	0	0	4
12:45	1	113	1	0	115	0	4	0	0	4	0	0	0	0	0	0
<b>SUBTOTAL</b>	11	1058	5	0	1074	0	46	0	0	46	0	1	0	0	1	4



## Traffic Count Data

Intersection: Garrison Rd & Garrison Rd Public School-Commercial Access  
 Site Code: 2234900001  
 Municipality: Fort Erie  
 Count Date: Oct 13, 2022

### West Approach - Garrison Rd

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	2	131	0	0	133	0	8	0	0	8	0	0	0	0	0	22
15:15	1	155	0	0	156	0	7	0	0	7	0	0	0	0	0	7
15:30	4	158	1	0	163	0	6	0	0	6	0	0	0	0	0	1
15:45	1	127	0	0	128	0	9	0	0	9	0	2	0	0	2	2
16:00	13	131	1	0	145	0	6	0	0	6	0	0	0	0	0	49
16:15	13	129	2	0	144	0	7	0	0	7	0	0	0	0	0	45
16:30	10	165	7	0	182	0	3	0	0	3	0	0	0	0	0	71
16:45	7	180	1	0	188	0	3	0	0	3	0	0	0	0	0	59
17:00	17	178	2	0	197	0	1	0	0	1	0	0	0	0	0	99
17:15	2	145	2	0	149	0	2	0	0	2	0	1	0	0	1	46
17:30	4	128	1	0	133	0	3	0	0	3	0	1	0	0	1	31
17:45	4	133	0	0	137	0	2	0	0	2	0	0	0	0	0	28
<b>SUBTOTAL</b>	78	1760	17	0	1855	0	57	0	0	57	0	4	0	0	4	460
<b>GRAND TOTAL</b>	179	3756	27	0	3962	3	144	0	0	147	0	5	0	0	5	491



## Peak Hour Diagram

### Specified Period

From: 06:00:00  
To: 09:00:00

### One Hour Peak

From: 08:00:00  
To: 09:00:00

**Intersection:** Garrison Rd & Garrison Rd Public School-Commercial Access  
**Site Code:** 2234900001  
**Count Date:** Oct 13, 2022

**Weather conditions:** Clear

**\*\* Signalized Intersection \*\***

**Major Road:** Garrison Rd runs E/W

### North Approach

	Out	In	Total
	115	118	233
	14	11	25
	0	0	0
<b>Totals</b>	<b>129</b>	<b>129</b>	<b>258</b>

### Garrison Rd Public School

	0	0	0	0
	13	0	1	0
	73	0	42	0
<b>Totals</b>	<b>86</b>	<b>0</b>	<b>43</b>	<b>0</b>

### East Approach

	Out	In	Total
	359	518	877
	33	24	57
	0	0	0
<b>Totals</b>	<b>392</b>	<b>542</b>	<b>934</b>

### Garrison Rd

				Totals
	0	0	0	<b>0</b>
	0	2	65	<b>67</b>
	0	23	475	<b>498</b>
	0	0	4	<b>4</b>

Peds: 0

Peds: 25



Peds: 0

Peds: 19

### Garrison Rd

Totals			
	0	0	0
	62	53	9
	327	303	24
	3	3	0

### West Approach

	Out	In	Total
	544	380	924
	25	37	62
	0	0	0
<b>Totals</b>	<b>569</b>	<b>417</b>	<b>986</b>

Totals				
	4	0	1	0
	0	0	0	0
	0	0	0	0

### South Approach

	Out	In	Total
	5	7	12
	0	0	0
	0	0	0
<b>Totals</b>	<b>5</b>	<b>7</b>	<b>12</b>

Commercial Access

- Cars

- Trucks

- Bicycles

### Comments



## Peak Hour Summary

Intersection: Garrison Rd & Garrison Rd Public School-Commercial Access  
 Site Code: 2234900001  
 Count Date: Oct 13, 2022  
 Period: 06:00 - 09:00

### Peak Hour Data (08:00 - 09:00)

Start Time	North Approach Garrison Rd Public School						South Approach Commercial Access						East Approach Garrison Rd						West Approach Garrison Rd						Total Vehicles
	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	
08:00	2	0	1	0	0	3	1	0	1	0	3	2	1	94	8	0	0	103	19	147	1	0	2	167	275
08:15	15	0	34	0	0	49	0	0	0	0	10	0	2	72	23	0	0	97	33	96	2	0	16	131	277
08:30	15	0	37	0	0	52	1	0	0	0	2	1	0	78	23	0	0	101	14	129	1	0	7	144	298
08:45	11	0	14	0	0	25	2	0	0	0	4	2	0	83	8	0	0	91	1	126	0	0	0	127	245
<b>Grand Total</b>	<b>43</b>	<b>0</b>	<b>86</b>	<b>0</b>	<b>0</b>	<b>129</b>	<b>4</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>19</b>	<b>5</b>	<b>3</b>	<b>327</b>	<b>62</b>	<b>0</b>	<b>0</b>	<b>392</b>	<b>67</b>	<b>498</b>	<b>4</b>	<b>0</b>	<b>25</b>	<b>569</b>	<b>1095</b>
<b>Approach %</b>	33.3	0	66.7	0	-	-	80	0	20	0	-	-	0.8	83.4	15.8	0	-	-	11.8	87.5	0.7	0	-	-	
<b>Totals %</b>	3.9	0	7.9	0	11.8	0.4	0	0.1	0	0.5	0.3	29.9	5.7	0	35.8	6.1	45.5	0.4	0	52					
<b>PHF</b>	<b>0.72</b>	<b>0</b>	<b>0.58</b>	<b>0</b>	<b>0.62</b>	<b>0.5</b>	<b>0</b>	<b>0.25</b>	<b>0</b>	<b>0.63</b>	<b>0.38</b>	<b>0.87</b>	<b>0.67</b>	<b>0</b>	<b>0.95</b>	<b>0.51</b>	<b>0.85</b>	<b>0.5</b>	<b>0</b>	<b>0.85</b>	<b>0.92</b>				
<b>Cars</b>	42	0	73	0	115	4	0	1	0	5	3	303	53	0	359	65	475	4	0	544	1023				
<b>% Cars</b>	97.7	0	84.9	0	89.1	100	0	100	0	100	100	92.7	85.5	0	91.6	97	95.4	100	0	95.6	93.4				
<b>Trucks</b>	1	0	13	0	14	0	0	0	0	0	0	24	9	0	33	2	23	0	0	25	72				
<b>% Trucks</b>	2.3	0	15.1	0	10.9	0	0	0	0	0	0	7.3	14.5	0	8.4	3	4.6	0	0	4.4	6.6				
<b>Bicycles</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<b>% Bicycles</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<b>Peds</b>					0	-				19	-				0	-				25	-	44			
<b>% Peds</b>					0	-				43.2	-				0	-				56.8	-				

## Peak Hour Diagram

### Specified Period

From: 11:00:00  
To: 13:00:00

### One Hour Peak

From: 11:45:00  
To: 12:45:00

**Intersection:** Garrison Rd & Garrison Rd Public School-Commercial Access  
**Site Code:** 2234900001  
**Count Date:** Oct 13, 2022

**Weather conditions:** Clear

**\*\* Signalized Intersection \*\***

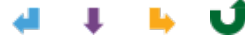
**Major Road:** Garrison Rd runs E/W

### North Approach

	Out	In	Total
	20	10	30
	0	0	0
	0	0	0
<b>Totals</b>	<b>20</b>	<b>10</b>	<b>30</b>

### Garrison Rd Public School

	0	0	0	0
	0	0	0	0
	10	0	10	0
<b>Totals</b>	<b>10</b>	<b>0</b>	<b>10</b>	<b>0</b>



Peds: 0

### East Approach

	Out	In	Total
	605	587	1192
	23	24	47
	0	0	0
<b>Totals</b>	<b>628</b>	<b>611</b>	<b>1239</b>

### Garrison Rd

				Totals
	0	0	0	0
	0	0	4	4
	0	24	577	601
	0	0	3	3

Peds: 4



Peds: 0

Peds: 3

### Garrison Rd

Totals			
	0	0	0
	6	6	0
	617	594	23
	5	5	0

### West Approach

	Out	In	Total
	584	605	1189
	24	23	47
	0	0	0
<b>Totals</b>	<b>608</b>	<b>628</b>	<b>1236</b>

Totals				
	1	0	0	0
	0	0	0	0
	0	0	0	0

Commercial Access

### South Approach

	Out	In	Total
	1	8	9
	0	0	0
	0	0	0
<b>Totals</b>	<b>1</b>	<b>8</b>	<b>9</b>

- Cars

- Trucks

- Bicycles

### Comments



## Peak Hour Summary

Intersection: Garrison Rd & Garrison Rd Public School-Commercial Access  
 Site Code: 2234900001  
 Count Date: Oct 13, 2022  
 Period: 11:00 - 13:00

### Peak Hour Data (11:45 - 12:45)

Start Time	North Approach Garrison Rd Public School						South Approach Commercial Access						East Approach Garrison Rd						West Approach Garrison Rd						Total Vehicles
	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	
11:45	3	0	3	0	0	6	0	0	0	0	2	0	0	153	2	0	0	155	1	163	0	0	0	164	325
12:00	0	0	3	0	0	3	0	0	0	0	1	0	2	160	1	0	0	163	0	154	0	0	0	154	320
12:15	2	0	0	0	0	2	0	0	0	0	0	0	2	149	2	0	0	153	2	126	0	0	0	128	283
12:30	5	0	4	0	0	9	1	0	0	0	0	1	1	155	1	0	0	157	1	158	3	0	4	162	329
<b>Grand Total</b>	<b>10</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>20</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>1</b>	<b>5</b>	<b>617</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>628</b>	<b>4</b>	<b>601</b>	<b>3</b>	<b>0</b>	<b>4</b>	<b>608</b>	<b>1257</b>
Approach %	50	0	50	0	-	-	100	0	0	0	-	-	0.8	98.2	1	0	-	0.7	98.8	0.5	0	-	-		
Totals %	0.8	0	0.8	0	1.6	0.1	0	0	0	0	0.1	0.4	49.1	0.5	0	50	0.3	47.8	0.2	0	48.4				
<b>PHF</b>	<b>0.5</b>	<b>0</b>	<b>0.63</b>	<b>0</b>	<b>0.56</b>	<b>0.25</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.25</b>	<b>0.63</b>	<b>0.96</b>	<b>0.75</b>	<b>0</b>	<b>0.96</b>	<b>0.5</b>	<b>0.92</b>	<b>0.25</b>	<b>0</b>	<b>0.93</b>	<b>0.96</b>			
Cars	10	0	10	0	0	20	1	0	0	0	1	5	594	6	0	605	4	577	3	0	584	1210			
% Cars	100	0	100	0	0	100	100	0	0	0	100	100	96.3	100	0	96.3	100	96	100	0	96.1	96.3			
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	23	0	0	23	0	24	0	0	24	47			
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	3.7	0	0	3.7	0	4	0	0	3.9	3.7			
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
% Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Peds					0	-					3	-					0	-					4	-	7
% Peds					0	-					42.9	-					0	-					57.1	-	

## Peak Hour Diagram

### Specified Period

From: 15:00:00  
To: 18:00:00

### One Hour Peak

From: 16:15:00  
To: 17:15:00

**Intersection:** Garrison Rd & Garrison Rd Public School-Commercial Access  
**Site Code:** 2234900001  
**Count Date:** Oct 13, 2022

**Weather conditions:** Clear

**\*\* Signalized Intersection \*\***

**Major Road:** Garrison Rd runs E/W

### North Approach

	Out	In	Total
	87	96	183
	0	0	0
	0	0	0
<b>Totals</b>	<b>87</b>	<b>96</b>	<b>183</b>

### Garrison Rd Public School

	0	0	0	0
	0	0	0	0
	34	9	44	0
<b>Totals</b>	<b>34</b>	<b>9</b>	<b>44</b>	<b>0</b>



**Peds: 141**

### East Approach

	Out	In	Total
	945	723	1668
	10	14	24
	2	0	2
<b>Totals</b>	<b>957</b>	<b>737</b>	<b>1694</b>

### Garrison Rd

				Totals	
0	0	0	0	<b>0</b>	
0	0	47	47	<b>47</b>	
0	14	652	666	<b>666</b>	
0	0	12	12	<b>12</b>	

**Peds: 274**



**Peds: 0**

**Peds: 64**

### Garrison Rd

Totals			
<b>0</b>	0	0	0
<b>48</b>	48	0	0
<b>893</b>	881	10	2
<b>16</b>	16	0	0

### West Approach

	Out	In	Total
	711	933	1644
	14	10	24
	0	2	2
<b>Totals</b>	<b>725</b>	<b>945</b>	<b>1670</b>

Totals				
<b>18</b>	18	1	27	0
<b>0</b>	0	0	0	0
<b>0</b>	0	0	0	0

**Commercial Access**

### South Approach

	Out	In	Total
	46	37	83
	0	0	0
	0	0	0
<b>Totals</b>	<b>46</b>	<b>37</b>	<b>83</b>

- Cars

- Trucks

- Bicycles

### Comments



## Peak Hour Summary

Intersection: Garrison Rd & Garrison Rd Public School-Commercial Access  
 Site Code: 2234900001  
 Count Date: Oct 13, 2022  
 Period: 15:00 - 18:00

### Peak Hour Data (16:15 - 17:15)

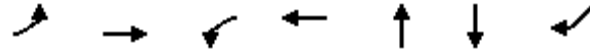
Start Time	North Approach Garrison Rd Public School						South Approach Commercial Access						East Approach Garrison Rd						West Approach Garrison Rd						Total Vehicles
	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	
16:15	5	3	9	0	35	17	0	0	2	0	11	2	3	222	10	0	0	235	13	136	2	0	45	151	405
16:30	13	2	5	0	36	20	5	0	6	0	18	11	10	214	6	0	0	230	10	168	7	0	71	185	446
16:45	13	0	10	0	49	23	5	0	3	0	27	8	0	197	27	0	0	224	7	183	1	0	59	191	446
17:00	13	4	10	0	21	27	8	1	16	0	8	25	3	260	5	0	0	268	17	179	2	0	99	198	518
<b>Grand Total</b>	<b>44</b>	<b>9</b>	<b>34</b>	<b>0</b>	<b>141</b>	<b>87</b>	<b>18</b>	<b>1</b>	<b>27</b>	<b>0</b>	<b>64</b>	<b>46</b>	<b>16</b>	<b>893</b>	<b>48</b>	<b>0</b>	<b>0</b>	<b>957</b>	<b>47</b>	<b>666</b>	<b>12</b>	<b>0</b>	<b>274</b>	<b>725</b>	<b>1815</b>
<b>Approach %</b>	50.6	10.3	39.1	0	-	-	39.1	2.2	58.7	0	-	-	1.7	93.3	5	0	-	-	6.5	91.9	1.7	0	-	-	
<b>Totals %</b>	2.4	0.5	1.9	0	4.8		1	0.1	1.5	0	2.5		0.9	49.2	2.6	0	52.7		2.6	36.7	0.7	0	39.9		
<b>PHF</b>	<b>0.85</b>	<b>0.56</b>	<b>0.85</b>	<b>0</b>	<b>0.81</b>		<b>0.56</b>	<b>0.25</b>	<b>0.42</b>	<b>0</b>	<b>0.46</b>		<b>0.4</b>	<b>0.86</b>	<b>0.44</b>	<b>0</b>	<b>0.89</b>		<b>0.69</b>	<b>0.91</b>	<b>0.43</b>	<b>0</b>	<b>0.92</b>		<b>0.88</b>
<b>Cars</b>	44	9	34	0	87	46	18	1	27	0	46	46	16	881	48	0	945	945	47	652	12	0	711	711	1789
<b>% Cars</b>	100	100	100	0	100	100	100	100	100	0	100	100	100	98.7	100	0	98.7	98.7	100	97.9	100	0	98.1	98.1	98.6
<b>Trucks</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	10	10	0	14	0	0	14	14	24
<b>% Trucks</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	0	0	1	1	0	2.1	0	0	1.9	1.9	1.3
<b>Bicycles</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2	0	0	0	0	0	0	2
<b>% Bicycles</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0.2	0.2	0	0	0	0	0	0	0.1
<b>Peds</b>					141	-					64	-					0	-					274	-	479
<b>% Peds</b>					29.4	-					13.4	-					0	-					57.2	-	

# Appendix D

## Synchro Outputs

Queues

1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road





















Lane Group	EBL2	EBT	WBL	WBT	NBT	SBT	SWR
Lane Group Flow (vph)	73	545	3	413	5	140	10
v/c Ratio	0.21	0.39	0.01	0.30	0.01	0.27	0.05
Control Delay	12.4	11.0	10.7	10.4	14.0	6.7	15.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.4	11.0	10.7	10.4	14.0	6.7	15.8
Queue Length 50th (m)	2.6	11.0	0.1	7.9	0.2	0.8	0.4
Queue Length 95th (m)	15.1	39.0	1.8	29.4	2.8	14.5	4.5
Internal Link Dist (m)		142.3		370.7	22.3	35.7	
Turn Bay Length (m)	20.0		20.0				
Base Capacity (vph)	726	2908	582	2850	753	869	519
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.19	0.01	0.14	0.01	0.16	0.02
Intersection Summary							



# HCM Signalized Intersection Capacity Analysis

## 1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road

													
Movement	EBL2	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	67	498	4	3	327	53	4	0	1	43	0	86	
Future Volume (vph)	67	498	4	3	327	53	4	0	1	43	0	86	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Lane Width	3.0	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
Total Lost time (s)	4.0	4.0		4.0	4.0			4.1			4.1		
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00		
Frt	1.00	1.00		1.00	0.98			0.97			0.91		
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.98		
Satd. Flow (prot)	1521	3220		1521	3156			1587			1519		
Flt Permitted	0.50	1.00		0.40	1.00			0.76			0.89		
Satd. Flow (perm)	803	3220		644	3156			1257			1375		
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)	73	541	4	3	355	58	4	0	1	47	0	93	
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	84	0	
Lane Group Flow (vph)	73	544	0	3	413	0	0	5	0	0	56	0	
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA		
Protected Phases		2			6			8			4		
Permitted Phases	2			6			8			4			
Actuated Green, G (s)	16.4	16.4		16.4	16.4			8.9			8.9		
Effective Green, g (s)	19.0	19.0		19.0	19.0			13.9			13.9		
Actuated g/C Ratio	0.38	0.38		0.38	0.38			0.28			0.28		
Clearance Time (s)	6.6	6.6		6.6	6.6			9.1			9.1		
Vehicle Extension (s)	2.5	2.5		2.5	2.5			2.5			2.5		
Lane Grp Cap (vph)	302	1213		242	1189			346			379		
v/s Ratio Prot		c0.17			0.13								
v/s Ratio Perm	0.09			0.00				0.00			c0.04		
v/c Ratio	0.24	0.45		0.01	0.35			0.01			0.15		
Uniform Delay, d1	10.8	11.8		9.8	11.3			13.3			13.8		
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00		
Incremental Delay, d2	0.3	0.2		0.0	0.1			0.0			0.1		
Delay (s)	11.1	12.0		9.8	11.4			13.3			13.9		
Level of Service	B	B		A	B			B			B		
Approach Delay (s)		11.9			11.4			13.3			13.9		
Approach LOS		B			B			B			B		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			12.0									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.33										
Actuated Cycle Length (s)			50.4									Sum of lost time (s)	16.1
Intersection Capacity Utilization			45.5%									ICU Level of Service	A
Analysis Period (min)			15										

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road



Movement	SWR
Lane Configurations	7
Traffic Volume (vph)	9
Future Volume (vph)	9
Ideal Flow (vphpl)	1750
Lane Width	3.5
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frt	0.86
Flt Protected	1.00
Satd. Flow (prot)	748
Flt Permitted	1.00
Satd. Flow (perm)	748
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	10
RTOR Reduction (vph)	0
Lane Group Flow (vph)	10
Heavy Vehicles (%)	100%
Turn Type	Perm
Protected Phases	
Permitted Phases	9
Actuated Green, G (s)	1.4
Effective Green, g (s)	5.4
Actuated g/C Ratio	0.11
Clearance Time (s)	8.0
Vehicle Extension (s)	4.5
Lane Grp Cap (vph)	80
v/s Ratio Prot	
v/s Ratio Perm	c0.01
v/c Ratio	0.12
Uniform Delay, d1	20.4
Progression Factor	1.00
Incremental Delay, d2	1.2
Delay (s)	21.6
Level of Service	C
Approach Delay (s)	
Approach LOS	
<b>Intersection Summary</b>	

## Queues

### 1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road






















Lane Group	EBL2	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	51	737	17	1023	50	95
v/c Ratio	0.20	0.35	0.05	0.48	0.13	0.23
Control Delay	7.9	6.0	5.2	7.1	18.1	15.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.9	6.0	5.2	7.1	18.1	15.1
Queue Length 50th (m)	1.9	16.1	0.6	25.4	3.0	4.1
Queue Length 95th (m)	7.3	28.7	2.7	44.2	12.7	17.7
Internal Link Dist (m)		142.3		370.7	22.3	35.7
Turn Bay Length (m)	20.0		20.0			
Base Capacity (vph)	325	2722	480	2709	705	715
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.27	0.04	0.38	0.07	0.13

#### Intersection Summary

# HCM Signalized Intersection Capacity Analysis

## 1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road

												
Movement	EBL2	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	666	12	16	893	48	18	1	27	44	9	34
Future Volume (vph)	47	666	12	16	893	48	18	1	27	44	9	34
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	3.0	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0			4.1			4.1	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Fr <sub>t</sub>	1.00	1.00		1.00	0.99			0.92			0.95	
Fl <sub>t</sub> Protected	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1521	3215		1521	3199			1533			1568	
Fl <sub>t</sub> Permitted	0.24	1.00		0.35	1.00			0.84			0.81	
Satd. Flow (perm)	384	3215		567	3199			1312			1309	
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)	51	724	13	17	971	52	20	1	29	48	10	37
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	21	0
Lane Group Flow (vph)	51	736	0	17	1023	0	0	50	0	0	74	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	28.8	28.8		28.8	28.8			6.9			6.9	
Effective Green, g (s)	31.4	31.4		31.4	31.4			11.9			11.9	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.23			0.23	
Clearance Time (s)	6.6	6.6		6.6	6.6			9.1			9.1	
Vehicle Extension (s)	2.5	2.5		2.5	2.5			2.5			2.5	
Lane Grp Cap (vph)	234	1964		346	1954			303			303	
v/s Ratio Prot		0.23			c0.32							
v/s Ratio Perm	0.13			0.03				0.04			c0.06	
v/c Ratio	0.22	0.37		0.05	0.52			0.17			0.25	
Uniform Delay, d <sub>1</sub>	4.5	5.0		4.0	5.7			15.8			16.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d <sub>2</sub>	0.3	0.1		0.0	0.2			0.2			0.3	
Delay (s)	4.8	5.1		4.1	5.9			16.0			16.4	
Level of Service	A	A		A	A			B			B	
Approach Delay (s)		5.1			5.9			16.0			16.4	
Approach LOS		A			A			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			6.3									A
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			51.4								16.1	
Intersection Capacity Utilization			54.7%									A
Analysis Period (min)			15									

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

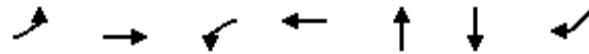
1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road



Movement	SWR
Lane Configurations	↗
Traffic Volume (vph)	0
Future Volume (vph)	0
Ideal Flow (vphpl)	1750
Lane Width	3.5
Total Lost time (s)	
Lane Util. Factor	
Flt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	100%
Turn Type	Perm
Protected Phases	
Permitted Phases	9
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
<b>Intersection Summary</b>	

Queues




















1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road



Lane Group	EBL2	EBT	WBL	WBT	NBT	SBT	SWR
Lane Group Flow (vph)	77	578	3	438	5	149	11
v/c Ratio	0.23	0.42	0.01	0.32	0.01	0.29	0.05
Control Delay	12.8	11.3	10.7	10.6	14.6	7.3	16.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.8	11.3	10.7	10.6	14.6	7.3	16.4
Queue Length 50th (m)	2.7	11.8	0.1	8.5	0.2	1.2	0.4
Queue Length 95th (m)	16.4	42.6	1.8	32.0	2.9	16.2	4.9
Internal Link Dist (m)		142.3		370.7	22.3	35.7	
Turn Bay Length (m)	20.0		20.0				
Base Capacity (vph)	692	2893	545	2835	752	869	519
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.20	0.01	0.15	0.01	0.17	0.02
Intersection Summary							

# HCM Signalized Intersection Capacity Analysis

## 1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road

													
Movement	EBL2	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	71	528	4	3	347	56	4	0	1	46	0	91	
Future Volume (vph)	71	528	4	3	347	56	4	0	1	46	0	91	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Lane Width	3.0	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
Total Lost time (s)	4.0	4.0		4.0	4.0			4.1			4.1		
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00		
Fr <sub>t</sub>	1.00	1.00		1.00	0.98			0.97			0.91		
Fl <sub>t</sub> Protected	0.95	1.00		0.95	1.00			0.96			0.98		
Satd. Flow (prot)	1521	3220		1521	3156			1587			1519		
Fl <sub>t</sub> Permitted	0.48	1.00		0.38	1.00			0.76			0.89		
Satd. Flow (perm)	771	3220		607	3156			1255			1375		
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)	77	574	4	3	377	61	4	0	1	50	0	99	
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	84	0	
Lane Group Flow (vph)	77	577	0	3	438	0	0	5	0	0	65	0	
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA		
Protected Phases		2			6			8			4		
Permitted Phases	2			6			8			4			
Actuated Green, G (s)	16.4	16.4		16.4	16.4			9.1			9.1		
Effective Green, g (s)	19.0	19.0		19.0	19.0			14.1			14.1		
Actuated g/C Ratio	0.38	0.38		0.38	0.38			0.28			0.28		
Clearance Time (s)	6.6	6.6		6.6	6.6			9.1			9.1		
Vehicle Extension (s)	2.5	2.5		2.5	2.5			2.5			2.5		
Lane Grp Cap (vph)	290	1211		228	1187			350			383		
v/s Ratio Prot		c0.18			0.14								
v/s Ratio Perm	0.10			0.00				0.00			c0.05		
v/c Ratio	0.27	0.48		0.01	0.37			0.01			0.17		
Uniform Delay, d <sub>1</sub>	10.9	12.0		9.9	11.4			13.2			13.8		
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00		
Incremental Delay, d <sub>2</sub>	0.4	0.2		0.0	0.1			0.0			0.2		
Delay (s)	11.3	12.2		9.9	11.5			13.2			13.9		
Level of Service	B	B		A	B			B			B		
Approach Delay (s)		12.1			11.5			13.2			13.9		
Approach LOS		B			B			B			B		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			12.2									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.35										
Actuated Cycle Length (s)			50.5									Sum of lost time (s)	16.1
Intersection Capacity Utilization			46.7%									ICU Level of Service	A
Analysis Period (min)			15										

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road



Movement	SWR
Lane Configurations	7
Traffic Volume (vph)	10
Future Volume (vph)	10
Ideal Flow (vphpl)	1750
Lane Width	3.5
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frt	0.86
Flt Protected	1.00
Satd. Flow (prot)	748
Flt Permitted	1.00
Satd. Flow (perm)	748
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	11
RTOR Reduction (vph)	0
Lane Group Flow (vph)	11
Heavy Vehicles (%)	100%
Turn Type	Perm
Protected Phases	
Permitted Phases	9
Actuated Green, G (s)	1.3
Effective Green, g (s)	5.3
Actuated g/C Ratio	0.10
Clearance Time (s)	8.0
Vehicle Extension (s)	4.5
Lane Grp Cap (vph)	78
v/s Ratio Prot	
v/s Ratio Perm	c0.01
v/c Ratio	0.14
Uniform Delay, d1	20.5
Progression Factor	1.00
Incremental Delay, d2	1.4
Delay (s)	22.0
Level of Service	C
Approach Delay (s)	
Approach LOS	
<b>Intersection Summary</b>	



Queues




















1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road



Lane Group	EBL2	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	54	782	18	1085	54	101
v/c Ratio	0.20	0.34	0.05	0.47	0.17	0.31
Control Delay	7.5	5.3	4.9	6.4	21.9	19.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.5	5.3	4.9	6.4	21.9	19.1
Queue Length 50th (m)	2.1	17.7	0.6	28.2	5.3	7.4
Queue Length 95th (m)	8.1	31.5	2.9	49.4	13.4	18.7
Internal Link Dist (m)		142.3		370.7	22.3	35.7
Turn Bay Length (m)	20.0		20.0			
Base Capacity (vph)	261	2284	385	2272	563	561
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.34	0.05	0.48	0.10	0.18
Intersection Summary						

# HCM Signalized Intersection Capacity Analysis

## 1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road

												
Movement	EBL2	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	707	13	17	948	51	19	1	29	47	10	36
Future Volume (vph)	50	707	13	17	948	51	19	1	29	47	10	36
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	3.0	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0			4.1			4.1	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Fr <sub>t</sub>	1.00	1.00		1.00	0.99			0.92			0.95	
Fl <sub>t</sub> Protected	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1521	3215		1521	3199			1531			1569	
Fl <sub>t</sub> Permitted	0.23	1.00		0.34	1.00			0.87			0.81	
Satd. Flow (perm)	368	3215		542	3199			1352			1307	
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)	54	768	14	18	1030	55	21	1	32	51	11	39
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	22	0
Lane Group Flow (vph)	54	781	0	18	1085	0	0	54	0	0	79	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	40.4	40.4		40.4	40.4			7.3			7.3	
Effective Green, g (s)	43.0	43.0		43.0	43.0			12.3			12.3	
Actuated g/C Ratio	0.68	0.68		0.68	0.68			0.19			0.19	
Clearance Time (s)	6.6	6.6		6.6	6.6			9.1			9.1	
Vehicle Extension (s)	2.5	2.5		2.5	2.5			2.5			2.5	
Lane Grp Cap (vph)	249	2180		367	2169			262			253	
v/s Ratio Prot		0.24			c0.34							
v/s Ratio Perm	0.15			0.03				0.04			c0.06	
v/c Ratio	0.22	0.36		0.05	0.50			0.21			0.31	
Uniform Delay, d <sub>1</sub>	3.8	4.3		3.4	5.0			21.5			21.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d <sub>2</sub>	0.3	0.1		0.0	0.1			0.3			0.5	
Delay (s)	4.2	4.4		3.4	5.1			21.7			22.4	
Level of Service	A	A		A	A			C			C	
Approach Delay (s)		4.4			5.1			21.7			22.4	
Approach LOS		A			A			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			6.1									A
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			63.4							16.1		
Intersection Capacity Utilization			57.0%									B
Analysis Period (min)			15									

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

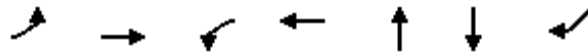
1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road



Movement	SWR
Lane Configurations	↗
Traffic Volume (vph)	0
Future Volume (vph)	0
Ideal Flow (vphpl)	1750
Lane Width	3.5
Total Lost time (s)	
Lane Util. Factor	
Flt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	100%
Turn Type	Perm
Protected Phases	
Permitted Phases	9
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
<b>Intersection Summary</b>	

Queues




















1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road



Lane Group	EBL2	EBT	WBL	WBT	NBT	SBT	SWR
Lane Group Flow (vph)	86	639	4	483	6	164	12
v/c Ratio	0.27	0.45	0.02	0.34	0.02	0.32	0.06
Control Delay	13.5	11.5	10.8	10.7	15.7	8.4	18.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.5	11.5	10.8	10.7	15.7	8.4	18.1
Queue Length 50th (m)	3.1	13.3	0.1	9.5	0.2	1.8	0.5
Queue Length 95th (m)	19.2	49.8	2.1	37.0	3.4	19.9	5.6
Internal Link Dist (m)		142.3		370.7	22.3	35.7	
Turn Bay Length (m)	20.0		20.0				
Base Capacity (vph)	640	2877	490	2820	716	843	502
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.22	0.01	0.17	0.01	0.19	0.02
Intersection Summary							

# HCM Signalized Intersection Capacity Analysis

## 1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road

													
Movement	EBL2	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	79	583	5	4	383	62	5	0	1	50	0	101	
Future Volume (vph)	79	583	5	4	383	62	5	0	1	50	0	101	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Lane Width	3.0	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
Total Lost time (s)	4.0	4.0		4.0	4.0			4.1			4.1		
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00		
Fr <sub>t</sub>	1.00	1.00		1.00	0.98			0.98			0.91		
Fl <sub>t</sub> Protected	0.95	1.00		0.95	1.00			0.96			0.98		
Satd. Flow (prot)	1521	3220		1521	3157			1592			1518		
Fl <sub>t</sub> Permitted	0.45	1.00		0.34	1.00			0.75			0.89		
Satd. Flow (perm)	717	3220		549	3157			1238			1375		
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)	86	634	5	4	416	67	5	0	1	54	0	110	
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	84	0	
Lane Group Flow (vph)	86	638	0	4	483	0	0	6	0	0	80	0	
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA		
Protected Phases		2			6			8			4		
Permitted Phases	2			6			8			4			
Actuated Green, G (s)	17.9	17.9		17.9	17.9			9.4			9.4		
Effective Green, g (s)	20.5	20.5		20.5	20.5			14.4			14.4		
Actuated g/C Ratio	0.39	0.39		0.39	0.39			0.27			0.27		
Clearance Time (s)	6.6	6.6		6.6	6.6			9.1			9.1		
Vehicle Extension (s)	2.5	2.5		2.5	2.5			2.5			2.5		
Lane Grp Cap (vph)	280	1259		214	1235			340			377		
v/s Ratio Prot		c0.20			0.15								
v/s Ratio Perm	0.12			0.01				0.00			c0.06		
v/c Ratio	0.31	0.51		0.02	0.39			0.02			0.21		
Uniform Delay, d <sub>1</sub>	11.0	12.1		9.8	11.5			13.8			14.6		
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00		
Incremental Delay, d <sub>2</sub>	0.5	0.2		0.0	0.1			0.0			0.2		
Delay (s)	11.5	12.3		9.8	11.6			13.9			14.8		
Level of Service	B	B		A	B			B			B		
Approach Delay (s)		12.2			11.6			13.9			14.8		
Approach LOS		B			B			B			B		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			12.4									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.39										
Actuated Cycle Length (s)			52.4									Sum of lost time (s)	16.1
Intersection Capacity Utilization			48.8%									ICU Level of Service	A
Analysis Period (min)			15										

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis







1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road



Movement	SWR
Lane Configurations	7
Traffic Volume (vph)	11
Future Volume (vph)	11
Ideal Flow (vphpl)	1750
Lane Width	3.5
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frt	0.86
Flt Protected	1.00
Satd. Flow (prot)	748
Flt Permitted	1.00
Satd. Flow (perm)	748
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	12
RTOR Reduction (vph)	0
Lane Group Flow (vph)	12
Heavy Vehicles (%)	100%
Turn Type	Perm
Protected Phases	
Permitted Phases	9
Actuated Green, G (s)	1.4
Effective Green, g (s)	5.4
Actuated g/C Ratio	0.10
Clearance Time (s)	8.0
Vehicle Extension (s)	4.5
Lane Grp Cap (vph)	77
v/s Ratio Prot	
v/s Ratio Perm	c0.02
v/c Ratio	0.16
Uniform Delay, d1	21.4
Progression Factor	1.00
Incremental Delay, d2	1.6
Delay (s)	23.1
Level of Service	C
Approach Delay (s)	
Approach LOS	
<b>Intersection Summary</b>	




















Queues

1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road

						
Lane Group	EBL2	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	60	863	21	1198	59	112
v/c Ratio	0.30	0.40	0.07	0.56	0.20	0.37
Control Delay	10.4	6.3	5.5	7.9	22.2	20.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.4	6.3	5.5	7.9	22.2	20.0
Queue Length 50th (m)	2.5	21.0	0.7	34.2	5.8	8.6
Queue Length 95th (m)	10.7	37.4	3.4	60.1	14.2	20.7
Internal Link Dist (m)		142.3		370.7	22.3	35.7
Turn Bay Length (m)	20.0		20.0			
Base Capacity (vph)	203	2133	319	2122	497	497
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.40	0.07	0.56	0.12	0.23
<b>Intersection Summary</b>						

# HCM Signalized Intersection Capacity Analysis

## 1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road

												
Movement	EBL2	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	780	14	19	1046	56	21	1	32	52	11	40
Future Volume (vph)	55	780	14	19	1046	56	21	1	32	52	11	40
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	3.0	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0			4.1			4.1	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Fr <sub>t</sub>	1.00	1.00		1.00	0.99			0.92			0.95	
Fl <sub>t</sub> Protected	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1521	3215		1521	3199			1531			1569	
Fl <sub>t</sub> Permitted	0.19	1.00		0.30	1.00			0.87			0.81	
Satd. Flow (perm)	307	3215		482	3199			1356			1308	
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)	60	848	15	21	1137	61	23	1	35	57	12	43
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	21	0
Lane Group Flow (vph)	60	862	0	21	1198	0	0	59	0	0	91	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	42.8	42.8		42.8	42.8			9.9			9.9	
Effective Green, g (s)	45.4	45.4		45.4	45.4			14.9			14.9	
Actuated g/C Ratio	0.66	0.66		0.66	0.66			0.22			0.22	
Clearance Time (s)	6.6	6.6		6.6	6.6			9.1			9.1	
Vehicle Extension (s)	2.5	2.5		2.5	2.5			2.5			2.5	
Lane Grp Cap (vph)	203	2133		319	2123			295			284	
v/s Ratio Prot		0.27			c0.37							
v/s Ratio Perm	0.20			0.04				0.04			c0.07	
v/c Ratio	0.30	0.40		0.07	0.56			0.20			0.32	
Uniform Delay, d <sub>1</sub>	4.8	5.3		4.0	6.2			21.9			22.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d <sub>2</sub>	0.6	0.1		0.1	0.3			0.2			0.5	
Delay (s)	5.4	5.4		4.1	6.5			22.1			23.0	
Level of Service	A	A		A	A			C			C	
Approach Delay (s)		5.4			6.4			22.1			23.0	
Approach LOS		A			A			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			7.2			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			68.4			Sum of lost time (s)				16.1		
Intersection Capacity Utilization			61.0%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group



# HCM Signalized Intersection Capacity Analysis

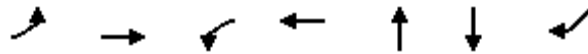
1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road



Movement	SWR
Lane Configurations	↗
Traffic Volume (vph)	0
Future Volume (vph)	0
Ideal Flow (vphpl)	1750
Lane Width	3.5
Total Lost time (s)	
Lane Util. Factor	
Flt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	100%
Turn Type	Perm
Protected Phases	
Permitted Phases	9
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
<b>Intersection Summary</b>	

Queues




















1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road



Lane Group	EBL2	EBT	WBL	WBT	NBT	SBT	SWR
Lane Group Flow (vph)	77	591	12	438	54	149	11
v/c Ratio	0.23	0.43	0.05	0.32	0.13	0.29	0.05
Control Delay	12.8	11.3	11.1	10.6	14.5	7.4	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.8	11.3	11.1	10.6	14.5	7.4	16.6
Queue Length 50th (m)	2.7	12.1	0.4	8.5	2.0	1.2	0.4
Queue Length 95th (m)	16.5	43.8	4.2	32.2	13.8	16.3	5.0
Internal Link Dist (m)		142.3		370.7	22.3	35.7	
Turn Bay Length (m)	20.0		20.0				
Base Capacity (vph)	690	2880	533	2831	773	850	518
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.21	0.02	0.15	0.07	0.18	0.02
Intersection Summary							

# HCM Signalized Intersection Capacity Analysis

## 1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road

													
Movement	EBL2	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	71	528	16	11	347	56	24	0	26	46	0	91	
Future Volume (vph)	71	528	16	11	347	56	24	0	26	46	0	91	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Lane Width	3.0	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
Total Lost time (s)	4.0	4.0		4.0	4.0			4.1			4.1		
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00		
Fr <sub>t</sub>	1.00	1.00		1.00	0.98			0.93			0.91		
Fl <sub>t</sub> Protected	0.95	1.00		0.95	1.00			0.98			0.98		
Satd. Flow (prot)	1521	3210		1521	3156			1541			1519		
Fl <sub>t</sub> Permitted	0.48	1.00		0.37	1.00			0.82			0.87		
Satd. Flow (perm)	770	3210		594	3156			1294			1346		
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)	77	574	17	12	377	61	26	0	28	50	0	99	
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	84	0	
Lane Group Flow (vph)	77	589	0	12	438	0	0	54	0	0	65	0	
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA		
Protected Phases		2			6			8			4		
Permitted Phases	2			6			8			4			
Actuated Green, G (s)	16.6	16.6		16.6	16.6			9.2			9.2		
Effective Green, g (s)	19.2	19.2		19.2	19.2			14.2			14.2		
Actuated g/C Ratio	0.38	0.38		0.38	0.38			0.28			0.28		
Clearance Time (s)	6.6	6.6		6.6	6.6			9.1			9.1		
Vehicle Extension (s)	2.5	2.5		2.5	2.5			2.5			2.5		
Lane Grp Cap (vph)	291	1213		224	1192			361			376		
v/s Ratio Prot		c0.18			0.14								
v/s Ratio Perm	0.10			0.02				0.04			c0.05		
v/c Ratio	0.26	0.49		0.05	0.37			0.15			0.17		
Uniform Delay, d <sub>1</sub>	10.9	12.0		10.0	11.4			13.8			13.9		
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00		
Incremental Delay, d <sub>2</sub>	0.4	0.2		0.1	0.1			0.1			0.2		
Delay (s)	11.3	12.3		10.1	11.6			13.9			14.0		
Level of Service	B	B		B	B			B			B		
Approach Delay (s)		12.1			11.5			13.9			14.0		
Approach LOS		B			B			B			B		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			12.3									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.36										
Actuated Cycle Length (s)			50.8									Sum of lost time (s)	16.1
Intersection Capacity Utilization			48.3%									ICU Level of Service	A
Analysis Period (min)			15										

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road



Movement	SWR
Lane Configurations	7
Traffic Volume (vph)	10
Future Volume (vph)	10
Ideal Flow (vphpl)	1750
Lane Width	3.5
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frt	0.86
Flt Protected	1.00
Satd. Flow (prot)	748
Flt Permitted	1.00
Satd. Flow (perm)	748
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	11
RTOR Reduction (vph)	0
Lane Group Flow (vph)	11
Heavy Vehicles (%)	100%
Turn Type	Perm
Protected Phases	
Permitted Phases	9
Actuated Green, G (s)	1.3
Effective Green, g (s)	5.3
Actuated g/C Ratio	0.10
Clearance Time (s)	8.0
Vehicle Extension (s)	4.5
Lane Grp Cap (vph)	78
v/s Ratio Prot	
v/s Ratio Perm	c0.01
v/c Ratio	0.14
Uniform Delay, d1	20.7
Progression Factor	1.00
Incremental Delay, d2	1.4
Delay (s)	22.1
Level of Service	C
Approach Delay (s)	
Approach LOS	
<b>Intersection Summary</b>	

Queues




















1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road



Lane Group	EBL2	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	54	808	52	1085	98	101
v/c Ratio	0.21	0.35	0.14	0.48	0.30	0.29
Control Delay	8.0	5.8	6.4	6.8	23.7	18.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.0	5.8	6.4	6.8	23.7	18.5
Queue Length 50th (m)	2.2	19.8	2.0	30.4	10.0	7.4
Queue Length 95th (m)	8.6	34.8	7.1	52.3	21.5	18.6
Internal Link Dist (m)		142.3		370.7	22.3	35.7
Turn Bay Length (m)	20.0		20.0			
Base Capacity (vph)	263	2308	376	2304	541	562
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.35	0.14	0.47	0.18	0.18
Intersection Summary						

# HCM Signalized Intersection Capacity Analysis

## 1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road

												
Movement	EBL2	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	707	37	48	948	51	42	1	47	47	10	36
Future Volume (vph)	50	707	37	48	948	51	42	1	47	47	10	36
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	3.0	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0			4.1			4.1	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Fr <sub>t</sub>	1.00	0.99		1.00	0.99			0.93			0.95	
Fl <sub>t</sub> Protected	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1521	3200		1521	3199			1541			1569	
Fl <sub>t</sub> Permitted	0.23	1.00		0.33	1.00			0.83			0.82	
Satd. Flow (perm)	364	3200		522	3199			1312			1325	
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)	54	768	40	52	1030	55	46	1	51	51	11	39
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	22	0
Lane Group Flow (vph)	54	806	0	52	1085	0	0	98	0	0	79	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	40.2	40.2		40.2	40.2			8.0			8.0	
Effective Green, g (s)	42.8	42.8		42.8	42.8			13.0			13.0	
Actuated g/C Ratio	0.67	0.67		0.67	0.67			0.20			0.20	
Clearance Time (s)	6.6	6.6		6.6	6.6			9.1			9.1	
Vehicle Extension (s)	2.5	2.5		2.5	2.5			2.5			2.5	
Lane Grp Cap (vph)	243	2143		349	2142			266			269	
v/s Ratio Prot		0.25			c0.34							
v/s Ratio Perm	0.15			0.10				c0.07			0.06	
v/c Ratio	0.22	0.38		0.15	0.51			0.37			0.30	
Uniform Delay, d <sub>1</sub>	4.1	4.7		3.9	5.3			21.9			21.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d <sub>2</sub>	0.3	0.1		0.1	0.1			0.6			0.4	
Delay (s)	4.4	4.7		4.0	5.4			22.5			22.0	
Level of Service	A	A		A	A			C			C	
Approach Delay (s)		4.7			5.3			22.5			22.0	
Approach LOS		A			A			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			6.6	HCM 2000 Level of Service				A				
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			63.9	Sum of lost time (s)				16.1				
Intersection Capacity Utilization			56.2%	ICU Level of Service				B				
Analysis Period (min)			15									

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

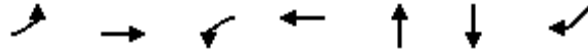
1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road



Movement	SWR
Lane Configurations	↗
Traffic Volume (vph)	0
Future Volume (vph)	0
Ideal Flow (vphpl)	1750
Lane Width	3.5
Total Lost time (s)	
Lane Util. Factor	
Flt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	100%
Turn Type	Perm
Protected Phases	
Permitted Phases	9
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
<b>Intersection Summary</b>	

Queues

1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road






















Lane Group	EBL2	EBT	WBL	WBT	NBT	SBT	SWR
Lane Group Flow (vph)	86	652	13	483	55	164	12
v/c Ratio	0.27	0.45	0.05	0.34	0.13	0.32	0.06
Control Delay	13.5	11.5	11.2	10.7	15.5	8.5	18.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.5	11.5	11.2	10.7	15.5	8.5	18.5
Queue Length 50th (m)	3.1	13.6	0.4	9.5	2.1	1.8	0.5
Queue Length 95th (m)	19.2	51.2	4.6	37.1	14.9	20.1	5.7
Internal Link Dist (m)		142.3		370.7	22.3	35.7	
Turn Bay Length (m)	20.0		20.0				
Base Capacity (vph)	639	2865	478	2816	754	824	499
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.23	0.03	0.17	0.07	0.20	0.02
Intersection Summary							



# HCM Signalized Intersection Capacity Analysis

## 1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road

													
Movement	EBL2	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	79	583	17	12	383	62	24	0	27	50	0	101	
Future Volume (vph)	79	583	17	12	383	62	24	0	27	50	0	101	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Lane Width	3.0	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
Total Lost time (s)	4.0	4.0		4.0	4.0			4.1			4.1		
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00		
Frt	1.00	1.00		1.00	0.98			0.93			0.91		
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.98		
Satd. Flow (prot)	1521	3210		1521	3157			1539			1518		
Flt Permitted	0.45	1.00		0.33	1.00			0.83			0.87		
Satd. Flow (perm)	716	3210		536	3157			1311			1347		
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)	86	634	18	13	416	67	26	0	29	54	0	110	
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	84	0	
Lane Group Flow (vph)	86	650	0	13	483	0	0	55	0	0	80	0	
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA		
Protected Phases		2			6			8			4		
Permitted Phases	2			6			8			4			
Actuated Green, G (s)	18.1	18.1		18.1	18.1			9.5			9.5		
Effective Green, g (s)	20.7	20.7		20.7	20.7			14.5			14.5		
Actuated g/C Ratio	0.39	0.39		0.39	0.39			0.28			0.28		
Clearance Time (s)	6.6	6.6		6.6	6.6			9.1			9.1		
Vehicle Extension (s)	2.5	2.5		2.5	2.5			2.5			2.5		
Lane Grp Cap (vph)	281	1260		210	1240			360			370		
v/s Ratio Prot		c0.20			0.15								
v/s Ratio Perm	0.12			0.02				0.04			c0.06		
v/c Ratio	0.31	0.52		0.06	0.39			0.15			0.22		
Uniform Delay, d1	11.0	12.2		10.0	11.5			14.5			14.7		
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00		
Incremental Delay, d2	0.5	0.3		0.1	0.1			0.1			0.2		
Delay (s)	11.5	12.5		10.0	11.6			14.6			14.9		
Level of Service	B	B		B	B			B			B		
Approach Delay (s)		12.3			11.6			14.6			14.9		
Approach LOS		B			B			B			B		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			12.5									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.40										
Actuated Cycle Length (s)			52.7									Sum of lost time (s)	16.1
Intersection Capacity Utilization			50.7%									ICU Level of Service	A
Analysis Period (min)			15										

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road



Movement	SWR
Lane Configurations	7
Traffic Volume (vph)	11
Future Volume (vph)	11
Ideal Flow (vphpl)	1750
Lane Width	3.5
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frt	0.86
Flt Protected	1.00
Satd. Flow (prot)	748
Flt Permitted	1.00
Satd. Flow (perm)	748
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	12
RTOR Reduction (vph)	0
Lane Group Flow (vph)	12
Heavy Vehicles (%)	100%
Turn Type	Perm
Protected Phases	
Permitted Phases	9
Actuated Green, G (s)	1.4
Effective Green, g (s)	5.4
Actuated g/C Ratio	0.10
Clearance Time (s)	8.0
Vehicle Extension (s)	4.5
Lane Grp Cap (vph)	76
v/s Ratio Prot	
v/s Ratio Perm	c0.02
v/c Ratio	0.16
Uniform Delay, d1	21.6
Progression Factor	1.00
Incremental Delay, d2	1.7
Delay (s)	23.3
Level of Service	C
Approach Delay (s)	
Approach LOS	
<b>Intersection Summary</b>	

Queues




















1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road



Lane Group	EBL2	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	60	889	54	1198	103	112
v/c Ratio	0.30	0.42	0.18	0.57	0.35	0.36
Control Delay	11.0	6.7	7.2	8.2	24.9	19.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.0	6.7	7.2	8.2	24.9	19.5
Queue Length 50th (m)	2.7	23.1	2.2	36.1	10.6	8.6
Queue Length 95th (m)	11.2	40.2	7.9	62.2	22.4	20.6
Internal Link Dist (m)		142.3		370.7	22.3	35.7
Turn Bay Length (m)	20.0		20.0			
Base Capacity (vph)	200	2108	305	2104	475	493
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.42	0.18	0.57	0.22	0.23
Intersection Summary						

# HCM Signalized Intersection Capacity Analysis

## 1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road

												
Movement	EBL2	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	780	38	50	1046	56	44	1	50	52	11	40
Future Volume (vph)	55	780	38	50	1046	56	44	1	50	52	11	40
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	3.0	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	4.0	4.0		4.0	4.0			4.1			4.1	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Fr <sub>t</sub>	1.00	0.99		1.00	0.99			0.93			0.95	
Fl <sub>t</sub> Protected	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1521	3201		1521	3199			1541			1569	
Fl <sub>t</sub> Permitted	0.19	1.00		0.29	1.00			0.83			0.81	
Satd. Flow (perm)	304	3201		464	3199			1307			1310	
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)	60	848	41	54	1137	61	48	1	54	57	12	43
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	21	0
Lane Group Flow (vph)	60	887	0	54	1198	0	0	103	0	0	91	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	42.8	42.8		42.8	42.8			10.5			10.5	
Effective Green, g (s)	45.4	45.4		45.4	45.4			15.5			15.5	
Actuated g/C Ratio	0.66	0.66		0.66	0.66			0.22			0.22	
Clearance Time (s)	6.6	6.6		6.6	6.6			9.1			9.1	
Vehicle Extension (s)	2.5	2.5		2.5	2.5			2.5			2.5	
Lane Grp Cap (vph)	200	2106		305	2104			293			294	
v/s Ratio Prot		0.28			c0.37							
v/s Ratio Perm	0.20			0.12				c0.08			0.07	
v/c Ratio	0.30	0.42		0.18	0.57			0.35			0.31	
Uniform Delay, d <sub>1</sub>	5.0	5.6		4.6	6.5			22.5			22.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d <sub>2</sub>	0.6	0.1		0.2	0.3			0.5			0.4	
Delay (s)	5.6	5.7		4.8	6.7			23.1			22.7	
Level of Service	A	A		A	A			C			C	
Approach Delay (s)		5.7			6.7			23.1			22.7	
Approach LOS		A			A			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			7.7			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			69.0			Sum of lost time (s)				16.1		
Intersection Capacity Utilization			60.1%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

1: 1127 Garrison Road/Garrison Road Public School & Regional Road 3 (Garrison Road) & Garrison Road



Movement	SWR
Lane Configurations	7
Traffic Volume (vph)	0
Future Volume (vph)	0
Ideal Flow (vphpl)	1750
Lane Width	3.5
Total Lost time (s)	
Lane Util. Factor	
Flt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	100%
Turn Type	Perm
Protected Phases	
Permitted Phases	9
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	



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