

# **Noise Feasibility Study**

## **Proposed Mixed-Use/Residential Development**

### **1107 Garrison Road**

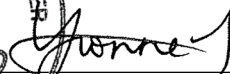
### **Fort Erie, Ontario**

Prepared for:


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Toronto, Ontario  
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Prepared by



  
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HGC Project Number: 02000395

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**Figure 1: Key Plan**

**Figure 2a: Proposed Site Plan Showing Prediction Locations**

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**Appendix A: Road Traffic Data**

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## 1 Introduction & Summary

HGC Engineering was retained by 1107 Garrison Road Limited Partnership Ltd to conduct a noise feasibility study for a proposed mixed-use/residential development located at 1107 Garrison Road, in Fort Erie, Ontario. The proposed development will consist of a 4-storey residential building and a 3-storey commercial/residential building. The study is required by the Region of Niagara as part of the planning and approvals process.

The primary source of noise impacting the site was determined to be road traffic on Garrison Road. Road traffic data was obtained from the Region of Niagara. Relevant traffic data was used to predict future traffic sound levels at the proposed mixed-use/residential development. The predicted sound levels were compared to the guidelines of the Ministry of Environment, Conservation and Parks (MECP) and the Region to develop noise control recommendations.

The sound level predictions indicate that the future road traffic sound levels will exceed MECP guidelines at the proposed buildings. Central air conditioning is required for the 3-storey mixed-use building adjacent to Garrison Road. Upgraded glazing constructions are required for the north façade of the 3-storey mixed-use building with exposure to Garrison Road. Forced-air ventilation systems with ducts sized to accommodate the future installation for central air conditioning by the occupant or an alternative means of ventilation to open windows are required for the proposed 4-storey residential building. Warning clauses are recommended to inform future residents of the proximity to existing and proposed commercial uses, existing institutional uses and the traffic noise excesses at the proposed buildings.

When detailed floor plans and building elevations are available, a detailed noise study should be completed to refine acoustic recommendations for the proposed mixed-use building. In addition, an acoustical consultant should review the mechanical drawings and details of demising constructions, when available, to help ensure that the noise impact of the development on itself, are maintained within acceptable levels at the proposed buildings.

An analysis was also conducted to determine the potential impact of noise from rooftop units on the proposed 3-storey mixed-use building on the proposed 4-residential building. Detailed information regarding the type or model of the proposed rooftop mechanical units were not known at the time of



ACOUSTICS



NOISE



VIBRATION

the study, but reasonable estimates of the size and tonnage have been used based on experience with similar projects to determine the sound levels associated with the proposed commercial building.

A 3D computer model of the area was created, using acoustic modelling software, in order to predict the sound levels at the proposed residential building. The results indicate that the sound emissions from the proposed commercial/residential building on proposed residential receptors to the south will be below the MECP minimum exclusionary sound level limits. Physical mitigation measures are not required for the rooftop equipment associated with the proposed commercial/residential building.

## 2 Site Description & Noise Sources

The proposed development is located at the south side of Garrison Road, specifically at 1107 Garrison Road in Fort Erie, Ontario. Figure 1 shows a key plan of the subject site. A site plan prepared by Archisystem Inc. dated November 27, 2020 is shown in Figure 2a. The proposed development will include a 4-storey residential building and a 3-storey commercial/residential building.

A site visit was made by HGC Engineering personnel in November 2020 to make observations of the acoustic environment, and to identify the significant noise sources in the vicinity. The acoustical environment surrounding the site is urban in nature. Road traffic on Garrison Road is the primary source of sound impacting the proposed development. Lands surrounding the subject site include existing commercial and institutional uses. Garrison Road Public School is located to the north of the subject site. During the site visit, traffic sounds dominated the site, nevertheless, a noise warning clause informing future owners and occupants of the proposed residential building on the subject site, of the proximity to existing institutional and commercial facilities is recommended as included in Section 5.4. There are no other significant stationary sources of noise within 500 m of the site.



### 3 Noise Level Criteria

#### 3.1 Road Traffic Noise

Guidelines for acceptable levels of road traffic noise applicable to residential developments are given in the MECP publication NPC-300, “Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning”, release date October 21, 2013 and are listed in Table 1 below. The values in Table 1 are energy equivalent (average) sound levels [L<sub>EQ</sub>] in units of A-weighted decibels [dBA].

**Table 1: MECP Road Traffic Noise Criteria [dBA]**

Space	Daytime L <sub>EQ</sub> (16 hour) Road	Nighttime L <sub>EQ</sub> (8 hour) Road
Outdoor Living Areas	55 dBA	--
Inside Living/Dining Rooms	45 dBA	45 dBA
Inside Bedrooms	45 dBA	40 dBA

Daytime refers to the period between 07:00 and 23:00, while nighttime refers to the period between 23:00 and 07:00. The term "Outdoor Living Area" (OLA) is used in reference to an outdoor patio, a backyard, a terrace or other area where passive recreation is expected to occur. Balconies that are less than 4 m in depth are not considered to be outdoor living areas under MECP guidelines.

The guidelines in the MECP publication allow the sound level in an OLA to be exceeded by up to 5 dBA, without mitigation, if warning clauses are placed in the purchase and rental agreements to the property. Where OLA sound levels exceed 60 dBA, physical mitigation is required to reduce the OLA sound level to below 60 dBA and as close to 55 dBA as technically, economically and administratively feasible.

A central air conditioning system as an alternative means of ventilation to open windows is required for all dwellings where nighttime sound levels outside bedroom/living/dining room windows exceed 60 dBA or daytime sound levels outside bedroom/living/dining room windows exceed 65 dBA.

Forced-air ventilation with ducts sized to accommodate the future installation of air conditioning is required when nighttime sound levels at bedroom/living/dining room windows are in the range of 51

to 60 dBA or when daytime sound levels at bedroom/living/dining room windows are in the range of 56 to 65 dBA.

Building components such as walls, windows and doors must be designed to achieve indoor sound level criteria when the plane of the window nighttime sound level exceeds 60 dBA or the daytime sound level exceeds 65 dBA due to road traffic noise.

Warning clauses are required to notify future residents of possible excesses when nighttime sound levels exceed 50 dBA at the plane of the window and daytime sound levels exceed 55 dBA in the outdoor living area and at the plane of the window due to road traffic.

## 4 Traffic Noise Assessment

### 4.1 Road Traffic Data

Road traffic information for Garrison Road was obtained from the Region of Niagara, in the form of turning movement counts from 2019, and is provided in Appendix A. A commercial vehicle percentage of 3% was used in the analysis and was further split into 1.2% and 1.8% for medium and heavy trucks, respectively. A day/night split of 90%/10% was included in the calculations. The data was projected to the year 2041 using a 2.5%/year growth rate since the Region of Niagara requires that future sound level predictions be based on 20-year average daily traffic forecasts. A posted speed limit of 60 km/h was also applied in the analysis. Table 2 summarizes the traffic volume data used in this study.

**Table 2: Projected Road Traffic Data**

Road Name		Cars	Medium Trucks	Heavy Trucks	Total
Garrison Road	Daytime	18 411	228	342	18 980
	Nighttime	2 046	25	38	2 109
	<b>Total</b>	<b>20 457</b>	<b>253</b>	<b>380</b>	<b>21 089</b>

## 4.2 Traffic Noise Predictions

To assess the levels of road traffic noise which will impact the study area in the future, sound level predictions were made using STAMSON version 5.04. Sample STAMSON output is included in Appendix B.

Sound levels were predicted at the plane of the top storey windows of the proposed buildings during daytime and nighttime hours to investigate ventilation requirements. Sound level predictions are summarized in Table 3.

The distance setbacks of the buildings indicated on the site plan were used in the analysis, along with an aerial photo to determine the distance of the proposed buildings to the roadways. The acoustic recommendations may be subject to modifications if the site plan is changed significantly.

**Table 3: Daytime and Nighttime Predicted Future Sound Levels [dBA], Without Mitigation**

Prediction Location	Building	Description	Daytime - at Façade Total LEQ(16)	Nighttime - at Façade Total LEQ(8)
A	4-storey Residential Building	North Façade	57	51
B		East Façade	<55	<50
C		South Façade	<55	<50
D		West Façade	<55	<50
E	3-storey Residential/ Commercial Building	North Façade	66	59
F		East Façade	63	56
G		South Façade	<55	<50
H		West Façade	63	56

## 5 Traffic Noise Recommendations

The predictions indicate that the future traffic sound levels at the proposed buildings will exceed MECP guidelines. Recommendations for noise control measures to address these excesses are discussed below.

## 5.1 Outdoor Living Areas

The proposed buildings may have balconies that are less than 4 m in depth. These areas are not considered to be outdoor amenity areas under MECP guidelines, and therefore are exempt from traffic noise assessment.

## 5.2 Indoor Living Areas & Ventilation Requirements

### Central Air Conditioning

The predicted daytime sound level at the north façade of the proposed 3-storey mixed-use building (Prediction Location [E]) will be greater than 65 dBA. To address these excesses, the MECP guidelines recommend that the proposed building be equipped with central air conditioning systems, so that the windows can be closed. This building is indicated in Figure 2b.

The guidelines also recommend warning clauses for these dwelling units. Window or through-the-wall air conditioning units are not recommended for any residential units because of the noise they produce and because the units penetrate through the exterior wall which degrades the overall noise insulating properties of the envelope. Suitable units may be housed in their own closet with an access door for maintenance. The location, installation and sound ratings of the outdoor air conditioning devices should minimize noise impacts and comply with criteria of MECP publication NPC-300.

### Provision for Central Air Conditioning

The proposed 4-storey residential building will have predicted nighttime sound levels in the range of 51 to 60 dBA and daytime levels in the range of 56 to 65 dBA. These dwelling units require the provision for the future installation of central air conditioning systems. This requirement is typically satisfied through the installation of forced air ventilation systems with ductwork sized for the future installation of central air conditioning by the occupant. The use of central air conditioning will exceed this requirement. This building is indicated in Figure 2b.

The guidelines also recommend warning clauses for these dwelling units. Window or through-the-wall air conditioning units are not recommended for any residential units because of the noise they produce and because the units penetrate through the exterior wall which degrades the overall noise insulating properties of the envelope. The location, installation and sound ratings of the outdoor air





conditioning devices should minimize noise impacts and comply with criteria of MECP publication NPC-300.

### **5.3 Building Façade Constructions**

Future road traffic sound levels at the north façade of the 3-storey mixed-use building (Prediction Location [E]) will be greater than 65 dBA during the daytime. MECP guidelines recommend that the windows, walls and doors be designed so that the indoor sound levels comply with MECP noise criteria.

Calculations have been performed to determine the building envelope construction likely to be required to maintain indoor sound levels within MECP guidelines. The calculation methods were developed by the National Research Council (NRC). They are based on the predicted future sound levels at the building facades and the anticipated area of the façade components (walls, windows and doors) relative to the floor area of the adjacent room.

The minimum necessary specification for the north façade (Prediction Location [E]) of the 3-storey mixed-use building is Acoustical Insulation Factor, AIF-26 for living/dining rooms, based on the possibility of sound entering the building through walls and windows. As a general guideline, a glazing construction with two panes of 3 mm glass and 13 mm airspace will be sufficient as long as the window to floor area ratio does not exceed 63% for living/dining room windows. Any building construction meeting the minimum requirements of the Ontario Building Code will provide sufficient acoustical insulation for the bedrooms.

Any building construction meeting the minimum requirements of the Ontario Building Code will provide sufficient acoustical insulation for the remaining façades of the proposed 3-storey mixed-use building as well as the proposed 4-storey residential building.

#### **Further Analysis**

When detailed floor plans and building elevations are available for the 3-storey mixed-use building, an acoustical consultant should provide revised glazing construction based on actual window to floor area ratios.

## 5.4 Warning Clauses

The MECP guidelines recommend that warning clauses be included in the property and tenancy agreements and offers of purchase and sale for proposed buildings with anticipated traffic sound level excesses and to inform them of existing/proposed institutional and commercial uses nearby. The following noise warning clauses are required.

Suggested wording for future dwellings with sound level excesses is given below.

Type A:

Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the Municipality's and the Ministry of the Environment, Conservation and Parks' noise criteria.

Suitable wording for future dwellings requiring central air conditioning systems is given below.

Type B:

This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the Municipality's and the Ministry of Environment, Conservation and Parks' noise criteria.

Suitable wording for future dwellings requiring forced air ventilation systems is given below.

Type C:

This dwelling unit has been fitted with a forced air heating system and the ducting etc., was sized to accommodate central air conditioning. Installation of central air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the noise criteria of the Municipality and the Ministry of the Environment, Conservation and Parks. (Note: The location and installation of the outdoor air conditioning device should be done so as to minimize the noise impacts and comply with criteria of MECP publication NPC-216, Residential Air Conditioning Devices.)



Suggested wording for future dwelling units in close proximity to commercial and institutional uses is given below.

Type D:

Purchasers are advised that due to the proximity to existing commercial and institutional uses, sound levels from the facilities may be at times be audible.

These sample clauses are provided by the MECP as examples and can be modified by the Municipality as required.

## 6 Stationary Noise Assessment

### 6.1 Criteria Governing Stationary (Industrial) Noise Sources

An industrial or commercial facility is classified in MECP guidelines as a stationary source of sound (as compared to sources such as traffic or construction, for example) for noise assessment purposes. The rooftop mechanical equipment associated with the proposed 3-storey mixed-use building can be classified as stationary sources of sound. Noise source locations are shown in Figure 3.

The Ministry of the Environment, Conservation and Parks (MECP) provides guidelines for the assessment of stationary noise sources. NPC-300 “Environment Noise Guideline Stationary and Transportation sources – Approval and Planning” referenced with regard to traffic noise is also intended for use in the planning of noise sensitive land uses adjacent to residential buildings (sensitive receptors).

The criteria is based on the background sound level at sensitive points of reception (which are typically residences) in the quietest hour that the source can be in operation. Background sound includes sound from road traffic and natural sounds, but excludes the sources under assessment. For relatively quiet areas where background sound may fall to low levels during some hours, NPC-300 stipulates various minimum limits. In Class 1 areas such as this, these limits are 50 dBA for daytime periods (07:00 to 23:00) and 45 dBA at night (23:00 to 07:00). To ensure a conservative analysis, the minimum exclusionary limits will be adopted at the existing and proposed residences.

Sources sound levels for typical rooftop mechanical units and assumed operational information

(outlined below) were used as input to a predictive computer model (*Cadna-A version 2021 MRI (32 bit) : build 183.5110*), in order to estimate the sound levels from the existing and proposed rooftop mechanical units. The computer model is based on the methods from ISO Standard 9613-2.2, “Acoustic – Attenuation of Sound During Propagation Outdoors”, which accounts for reduction in sound level with distance due to geometrical spreading, air absorption, ground attenuation and acoustical shielding by intervening structures. Assumptions regarding the operating duty cycles of the equipment (100% during the daytime, and 50% during the night-time) were included based on our experience with other projects.

## **6.2 Assessment of Noise Emissions from Proposed Rooftop Mechanical Equipment at Proposed Sensitive Receptors**

Sound power levels for the rooftop mechanical equipment at the proposed 3-storey mixed-use building were estimated based on manufacturer’s data for similar mechanical equipment used in similar past projects. Rooftop equipment was assumed to include two 10-Ton Lennox models with sound power levels of 87 dBA. The results of this assessment indicate predicted sound levels of 46 dBA during the daytime and 43 dBA during the nighttime at the proposed 4-storey residential building to the south. These predicted sound levels are less than the MECP minimum exclusionary limit of 50 dBA during the daytime hours and 45 dBA during the nighttime hours, based on a typical worst-case operating scenario.

It is concluded that sounds from the rooftop mechanical equipment associated with the proposed 3-storey mixed-use building are anticipated to comply with the MECP guidelines at the proposed sensitive receptors to the south, and physical mitigation is not required.

## **6.3 Impact of the Development on Itself**

Section 5.9.1 of the Ontario Building Code (OBC) specifies the minimum required sound insulation characteristics for demising partitions, in terms of Sound Transmission Class (STC) values. In order to maintain adequate acoustical privacy between separate suites in a multi-tenant building, inter-suite walls should meet or exceed STC-50. Walls separating a suite from a noisy space such as a refuse chute, or elevator shaft, should meet or exceed STC-55. In addition, it is recommended that the floor/ceiling constructions separating suites from any amenity or commercial spaces also meet or

exceed STC-55. Tables 1 and 2 in Section SB-3 of the Supplementary Guideline to the OBC provide a comprehensive list of constructions that will meet the above requirements.

Tarion's Builder Bulletin B19R requires the internal design of condominium projects to integrate suitable acoustic features to insulate the suites from noise from each other and amenities in accordance with the OBC, and limit the potential intrusions of mechanical and electrical services of the buildings on its residents. If B19R certification is needed, an acoustical consultant is required to review the mechanical and electrical drawings and details of demising constructions and mechanical/electrical equipment, when available, to help ensure that the noise impact of the development on itself is maintained within acceptable levels.

## 7 Summary & Recommendations

The following list and Table 4 summarize the recommendations made in this report. The reader is referred to previous sections of the report where these recommendations are applied and discussed in more detail.

### For transportation noise sources

1. Central air conditioning will be required for the 3-storey mixed-use building. Forced air ventilation systems with ductwork sized for the future installation of central air conditioning by the occupant or an alternative means of ventilation to open windows will be required for the 4-storey residential building. The location, installation and sound ratings of the air conditioning devices should comply with NPC-300.
2. Building constructions meeting the minimum requirements of the Ontario Building Code will be sufficient for the 4-storey residential building. Upgraded building constructions will be required for the north façade of the 3-storey mixed-use building. When detailed floor plans and building elevations are available for the proposed 3-storey mixed-use building, an acoustical consultant should provide revised glazing construction based on actual window to floor area ratios.
3. The use of warning clauses in the property and tenancy agreements is recommended to inform future residents of the traffic level excesses and the proximity to commercial and institutional uses, which are included in Section 5.4.

- Tarion Builder’s Bulletin B19R requires that the internal design of condominium projects integrates suitable acoustic features to insulate the suites from noise from each other and amenities in accordance with the OBC, and limit the potential intrusions of mechanical and electrical services of the buildings on its residents. If B19R certification is needed, an acoustical consultant is required to review the mechanical and electrical drawings and details of demising constructions and mechanical/electrical equipment, when available, to help ensure that the noise impact of the development on itself are maintained within acceptable levels.

*For stationary noise sources*

- Two 10-Ton Lennox models were assumed on the roof of the proposed 3-storey commercial building. This rooftop equipment should be selected to have a sound power level rating of 87 dBA or less.
- If alternate rooftop units are chosen or the location of the mechanical units are modified, an acoustical engineer should verify that with the selected HVAC equipment and locations, acceptable sound levels will result at all offsite residential receptors.

**Table 4: Summary of Noise Control Requirements and Noise Warning Clauses**

Prediction Location	Building	Description	Acoustic Barrier	Ventilation Requirements*	Type of Warning Clause	Upgraded Glazing Construction (LRDR/BR)
A	4-storey Residential Building	North Façade	--	Forced Air	A, C, D	OBC
B		East Façade	--			
C		South Façade	--			
D		West Façade	--			
E	3-storey Residential/ Commercial Building	North Façade	--	Central A/C	A, B, D	LR/DR: AIF-26 + BR: OBC
F		East Façade	--			OBC
G		South Façade	--			OBC
H		West Façade	--			OBC

Notes:

\* The location, installation and sound rating of the air conditioning condensers must be compliant with MECP Guideline NPC-300 as applicable.

+ When floor plans and building elevations are available, an acoustical consultant should refine glazing constructions based on actual window to floor area ratios.

-- no specific requirement

LR/DR – Living Room/Dining Room

BR – Bedroom

OBC – Ontario Building Code

## 7.1 Implementation

To ensure that the noise control recommendations outlined above are fully implemented, it is recommended that:

1. Prior to the issuance of building permits for this development, a Professional Engineer qualified to perform acoustical engineering services in the Province of Ontario should review the architectural plans and building elevations for the 3-storey mixed-use building to refine glazing requirements based on actual window to floor areas ratios.
2. Prior to the issuance of building permits for this development, the Municipality's building inspector or a Professional Engineer qualified to perform acoustical engineering services in the Province of Ontario should certify that the noise control measures have been properly incorporated, installed and constructed.
3. Prior to the issuance of building permits for this development, a Professional Engineer qualified to perform acoustical engineering services in the Province of Ontario should review the mechanical drawings and specifications for the mechanical equipment to certify that the MECP sound levels will be met at all noise sensitive receptors.



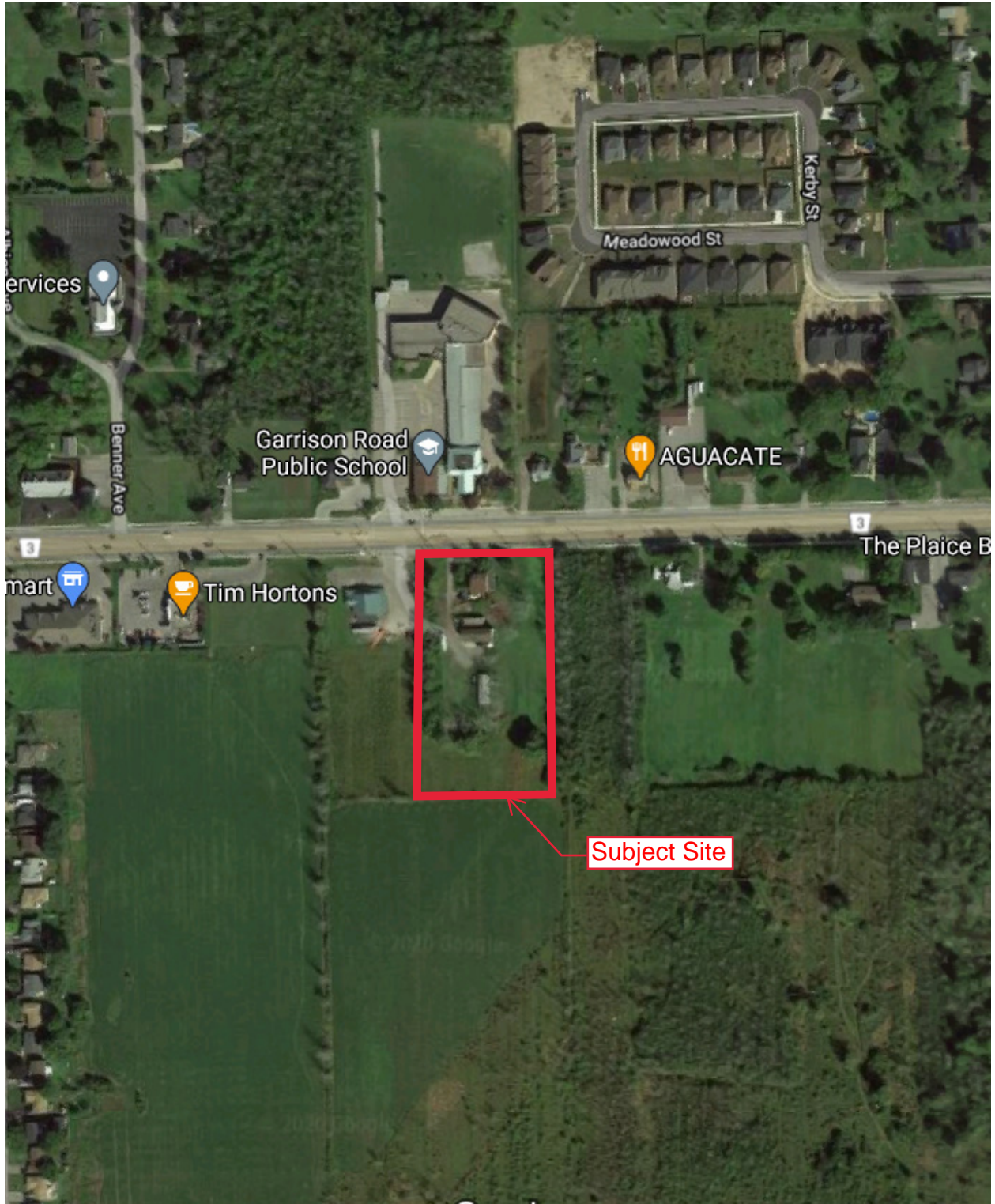


Figure 1: Key Plan





## LEGEND

Forced air heating with ducts sized for the future installation of air conditioning by the occupant



Central Air Conditioning



Property Location 1:2000

Required	Proposed
Site Specific Core Mixed-Use Density: 200 units/acre	150 units/acre
Minimum Lot Coverage: 25%	35%
Minimum Lot Area: 10,000 sq ft	12,000 sq ft
Minimum Building Height: 4 stories	5 stories
Minimum Floor Area per Unit: 1,000 sq ft	1,200 sq ft
Minimum Parking: 1 space per unit	2 spaces per unit
Minimum Green Space: 10% of site	15% of site
Minimum Tree Canopy: 10%	15%
Minimum Stormwater Management: 10%	15%
Minimum Pedestrian Access: 10%	15%
Minimum Bicycle Access: 10%	15%
Minimum Transit Access: 10%	15%
Minimum Security: 10%	15%
Minimum Energy Efficiency: 10%	15%
Minimum Sustainability: 10%	15%
Minimum Health and Safety: 10%	15%
Minimum Quality of Life: 10%	15%
Minimum Social Equity: 10%	15%
Minimum Community Engagement: 10%	15%
Minimum Transparency: 10%	15%
Minimum Accountability: 10%	15%
Minimum Integrity: 10%	15%
Minimum Honesty: 10%	15%
Minimum Fairness: 10%	15%
Minimum Respect: 10%	15%
Minimum Compassion: 10%	15%
Minimum Empathy: 10%	15%
Minimum Kindness: 10%	15%
Minimum Gentleness: 10%	15%
Minimum Patience: 10%	15%
Minimum Humility: 10%	15%
Minimum Modesty: 10%	15%
Minimum Simplicity: 10%	15%
Minimum Clarity: 10%	15%
Minimum Openness: 10%	15%
Minimum Trustworthiness: 10%	15%
Minimum Reliability: 10%	15%
Minimum Consistency: 10%	15%
Minimum Predictability: 10%	15%
Minimum Stability: 10%	15%
Minimum Endurance: 10%	15%
Minimum Longevity: 10%	15%
Minimum Perseverance: 10%	15%
Minimum Persistence: 10%	15%
Minimum Determination: 10%	15%
Minimum Resolute: 10%	15%
Minimum Firmness: 10%	15%
Minimum Conviction: 10%	15%
Minimum Confidence: 10%	15%
Minimum Assurance: 10%	15%
Minimum Certainty: 10%	15%
Minimum Security: 10%	15%
Minimum Safety: 10%	15%
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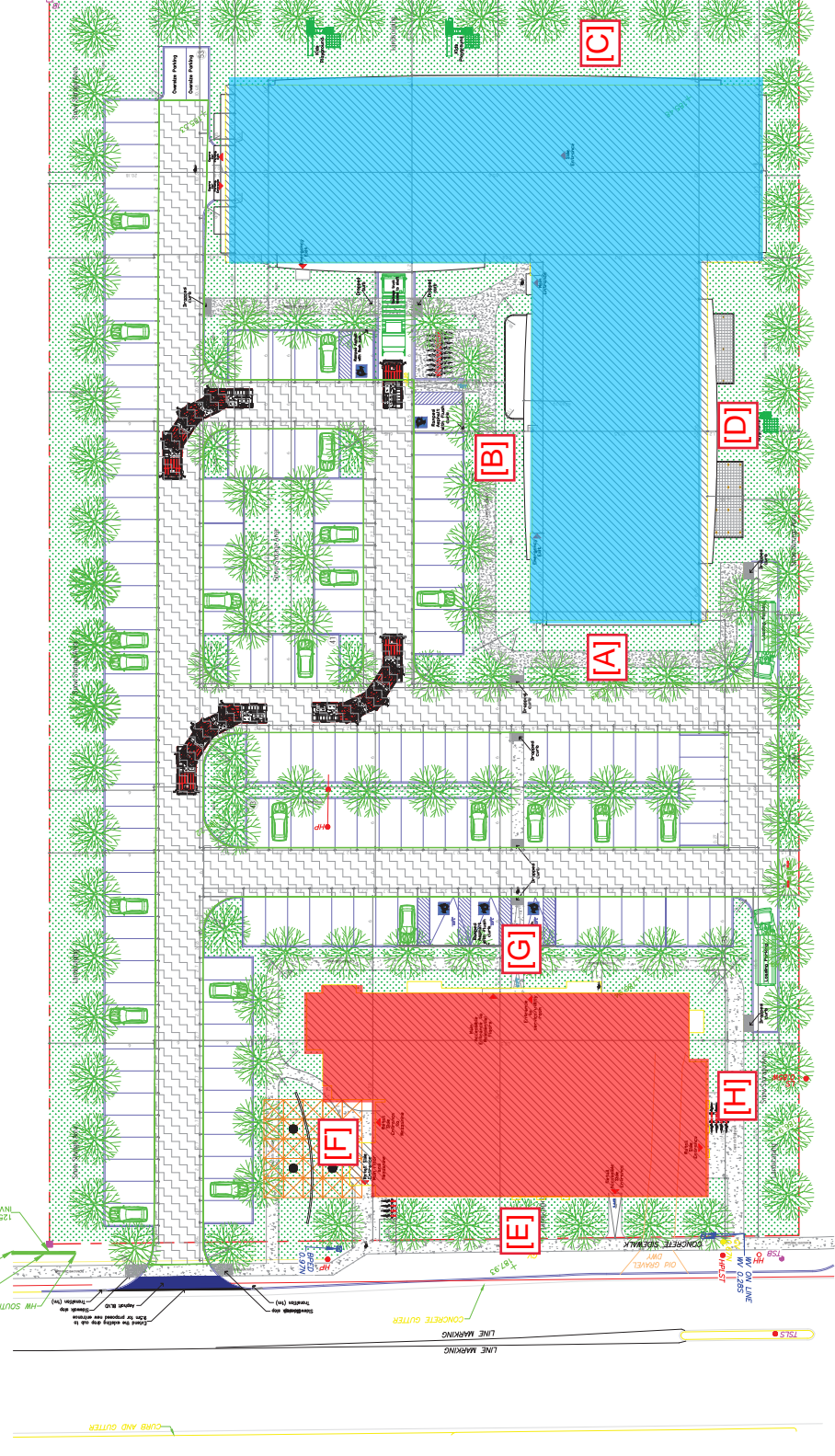


Figure 2b: Proposed Site Plan Showing Ventilation Requirements

**NOTES:**

- Asphalt areas to be defined with 15cm high poured concrete curbing proposal will result in the deduction of one (1) parking space per 100 sq ft of asphalt area. A demolition contract approval will be investigated prior to permit.
- Lighting fixtures and area exterior lighting fixtures will be provided by the contractor. The contractor shall provide any glare reduction from snow storage areas.
- Soils survey.
- Asphalt areas.
- Fire route.

PROJECT ARCHITECTS	ARCHISTEEM INC.
PROJECT CLIENT	1007 Garrison Road General Partnership Inc.
PROJECT TITLE	Mixed-Use Condo Development
FILE NO	SP-2020-005
SHEET TITLE	SITE PLAN APPLICATION
SHEET NO.	
SHEET TOTAL	
DATE	
SCALE	
PROJECT LOCATION	1007 Garrison Road, Port Hope, ON, L1A 1W8
PROJECT OWNER	



Figure 3: Proposed Noise Source Locations

**APPENDIX A**  
**Road Traffic Data**

Location..... Garrison Road @ Pettit Road / Daytona Drive

GeoID..... 01681

Municipality. FORT ERIE

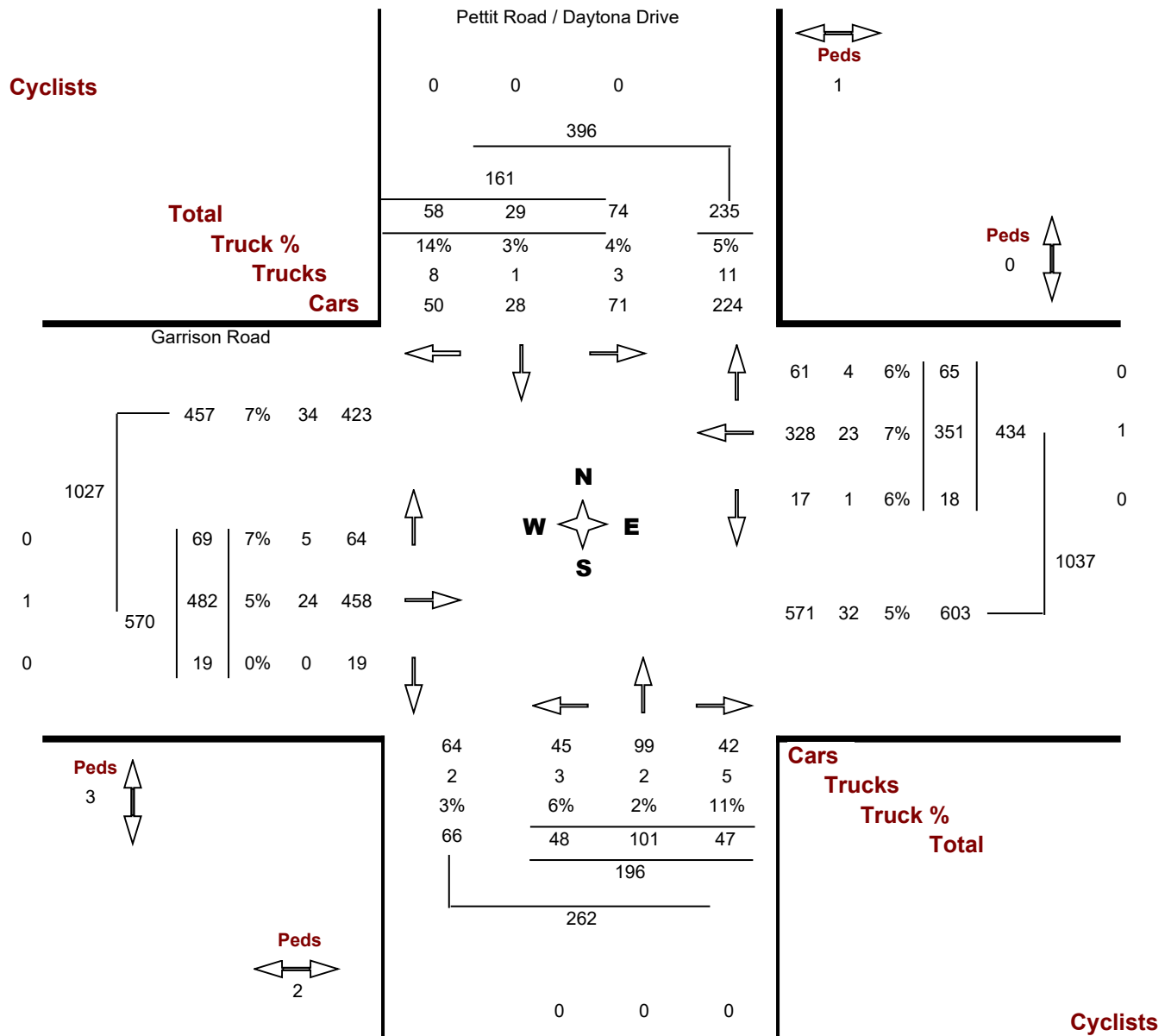
Count Date. Thursday, 23 May, 2019

Traffic Cont.

Count Time. 07:00 AM — 09:00 AM

Major Dir..... East west

Peak Hour.. 07:45 AM — 08:45 AM



Location..... Garrison Road @ Pettit Road / Daytona Drive

GeoID..... 01681

Municipality. FORT ERIE

Count Date. Thursday, 23 May, 2019

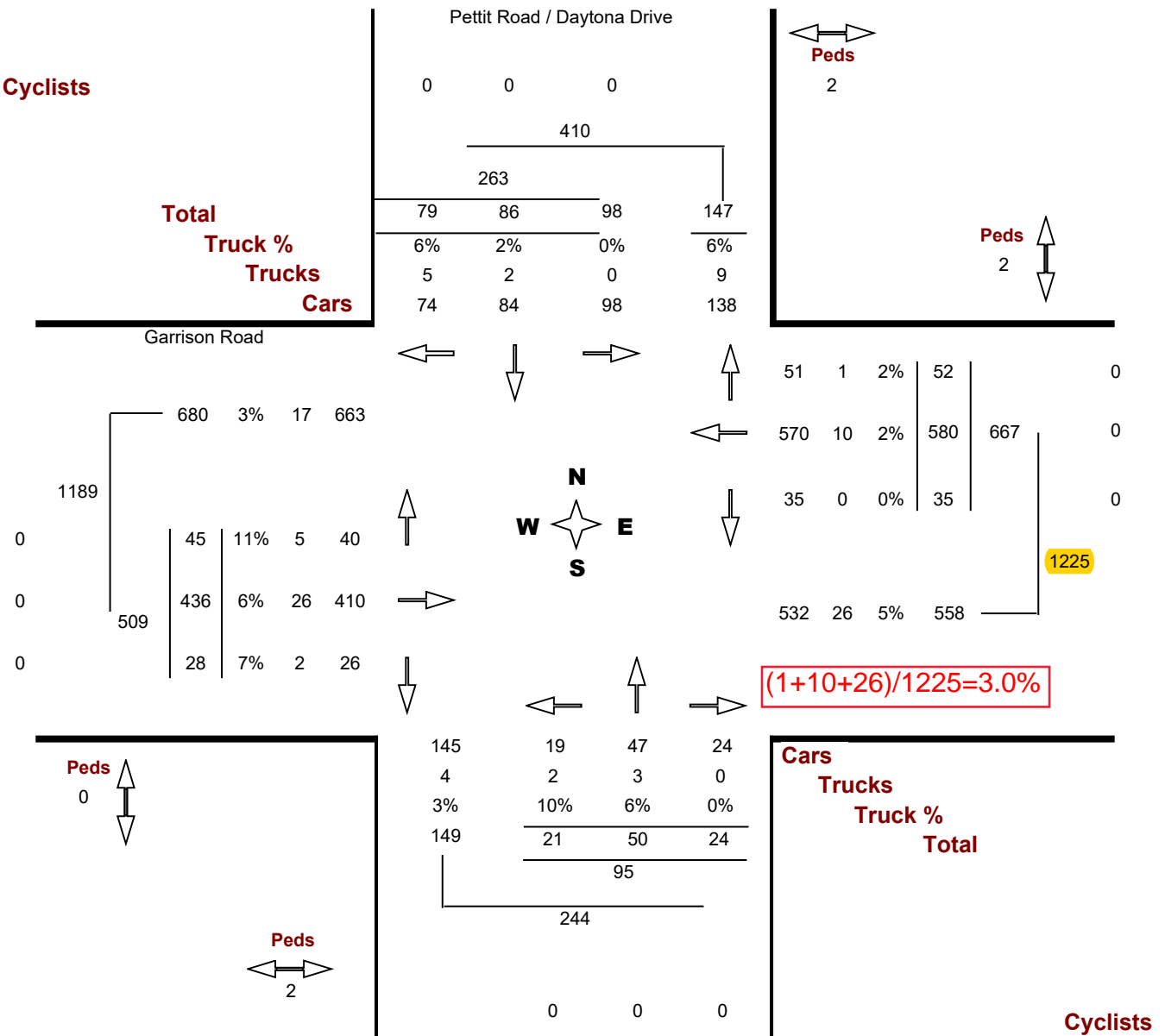
Traffic Cont.

Count Time. 03:00 PM — 06:00 PM

Major Dir..... East west

Peak Hour.. 03:30 PM — 04:30 PM

**Cyclists**

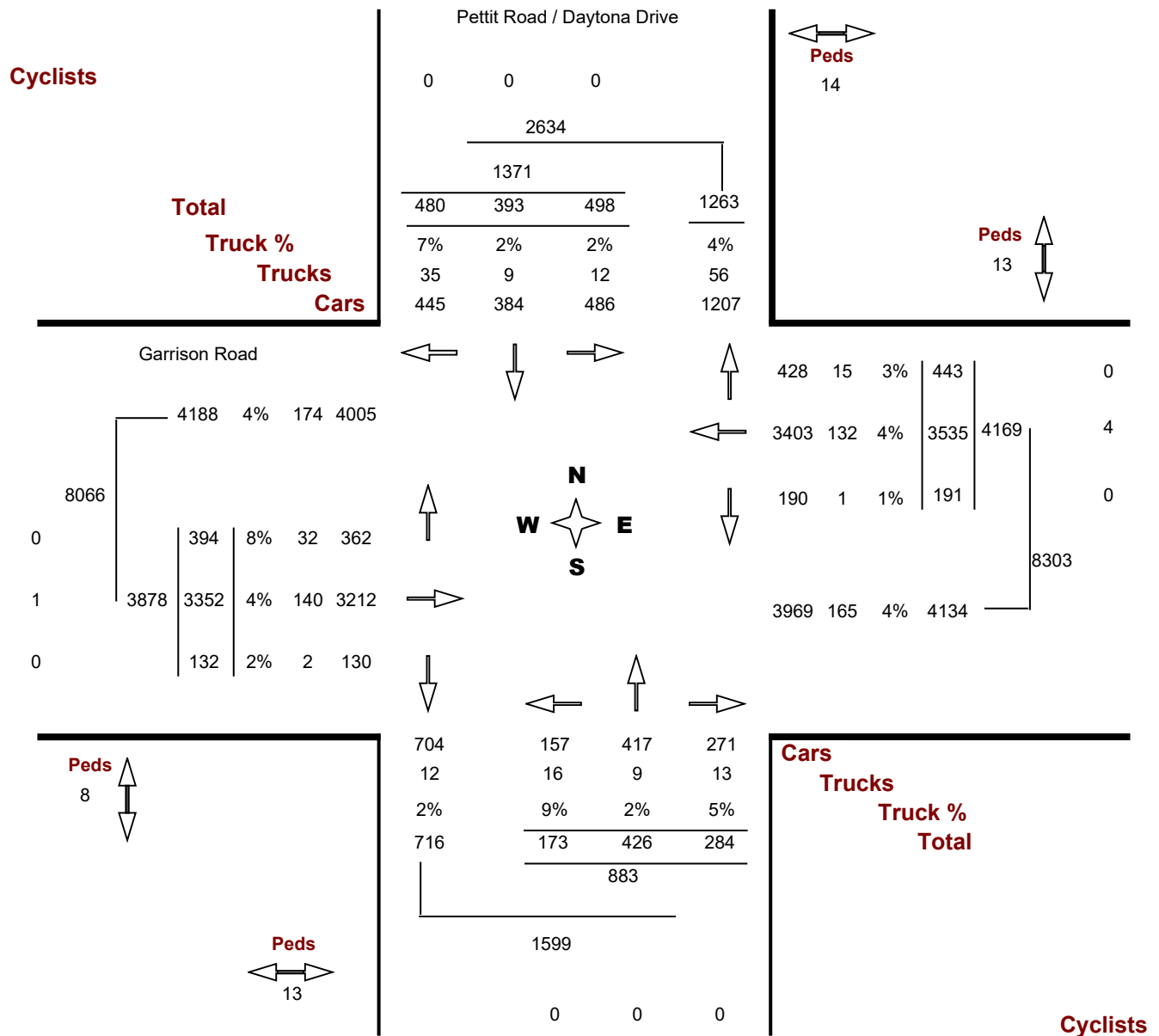


**Location.....** Garrison Road @ Pettit Road / Daytona Drive

**Municipality.....** FORT ERIE

**GeoID.....** 01681

**Count Date.....** Thursday, 23 May, 2019



**APPENDIX B**  
**Sample STAMSON 5.04 Output**



STAMSON 5.0                  NORMAL REPORT                  Date: 07-01-2021 13:04:33  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: e.te                                  Time Period: Day/Night 16/8 hours  
Description: **Predicted daytime and nighttime sound levels at the north façade of the proposed 3-storey mixed-use building adjacent to Garrison Road, Prediction Location [E].**

Road data, segment # 1: Garrison (day/night)

-----  
Car traffic volume    : 18411/2046    veh/TimePeriod    \*  
Medium truck volume  :     228/25     veh/TimePeriod    \*  
Heavy truck volume   :     342/38     veh/TimePeriod    \*  
Posted speed limit   :     60 km/h  
Road gradient         :     0 %  
Road pavement        :     1 (Typical asphalt or concrete)

\* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 12250  
Percentage of Annual Growth        : 2.50  
Number of Years of Growth          : 22.00  
Medium Truck % of Total Volume     : 1.20  
Heavy Truck % of Total Volume      : 1.80  
Day (16 hrs) % of Total Volume     : 90.00

Data for Segment # 1: Garrison (day/night)

-----  
Angle1    Angle2                   : -90.00 deg    90.00 deg  
Wood depth                    :     0           (No woods.)  
No of house rows               :     0 / 0  
Surface                         :     1           (Absorptive ground surface)  
Receiver source distance       : 18.00 / 18.00 m  
Receiver height                : 10.00 / 10.00 m  
Topography                     :     1           (Flat/gentle slope; no barrier)  
Reference angle                :     0.00

Results segment # 1: Garrison (day)

-----  
Source height = 1.16 m

ROAD (0.00 + 65.98 + 0.00) = 65.98 dBA  
Angle1 Angle2    Alpha RefLeq    P.Adj    D.Adj    F.Adj    W.Adj    H.Adj    B.Adj SubLeq  
-----  
-90      90      0.42    68.11    0.00    -1.12    -1.01    0.00    0.00    0.00    65.98  
-----

Segment Leq : 65.98 dBA

Total Leq All Segments: 65.98 dBA

Results segment # 1: Garrison (night)

Source height = 1.16 m

ROAD (0.00 + 59.44 + 0.00) = 59.44 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.42	61.57	0.00	-1.12	-1.01	0.00	0.00	0.00	59.44

Segment Leq : 59.44 dBA

Total Leq All Segments: 59.44 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.98  
(NIGHT): 59.44