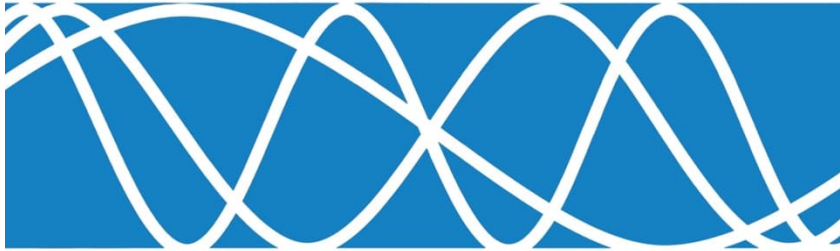


# Noise and Vibration Feasibility Study

## Proposed Residential Development, 51 – 55 Hawkesville Road Town of Woolwich, Ontario

May 22, 2026  
HGC Project #: 02300687



Prepared for:

Polocorp Inc.  
379 Queen Street South  
Kitchener, Ontario  
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Version Control  
Project Name/Address

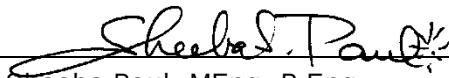
| Ver. | Date             | Version Description                                                                    | Prepared By |
|------|------------------|----------------------------------------------------------------------------------------|-------------|
| 1.0  | January 22, 2025 | Noise and Vibration Feasibility Study in support of the planning and approvals process | V. Garcia   |
| 2.0  | March 27, 2026   | Update to include an updated site plan                                                 | V. Garcia   |
| 3.0  | May 22, 2026     | Updated to include to address to peer review comments                                  | V. Garcia   |

Prepared by:

  
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# 1 INTRODUCTION AND SUMMARY

HGC Noise Vibration Acoustics (HGC) was retained by Polocorp Inc. to conduct a noise and vibration feasibility study for a proposed residential development located at 51 – 55 Hawkesville Road, Township of Woolwich, Regional Municipality of Waterloo (RMOW), Ontario. The study is required by the RMOW as part of the approvals process.

This report has been updated to address peer review comments dated April 15, 2026.

The primary sources of noise are road traffic on Hawkesville Road to the north and rail traffic on the Waterloo Central Railway to the west. Forecasted traffic data for the Hawkesville Road was obtained from the RMOW. Rail traffic data was obtained via unattended vibration measurements and HGC past project files in the area. Traffic data was used to predict future traffic sound levels at the proposed development. The predicted sound levels were evaluated with respect to the guidelines of the RMOW and the Ministry of the Environment, Conservation and Parks (MECP).

The study finds that the traffic noise exceeds the MECP sound level criteria during daytime and nighttime hours at the proposed residential development. Air conditioning is required for dwellings closest to the railway. The provision for the future installation of air conditioning at the occupant's discretion is required for dwellings further from the railway or adjacent to the roadway. A brick veneer or a masonry equivalent construction is required for buildings in the first row from the railway. Upgraded window glazing constructions are recommended for dwellings closest to the railway. Exterior building constructions meeting the minimum requirements of the Ontario Building Code will provide sufficient acoustical insulation for the interior spaces of the buildings further from the railway.



Associated acoustical requirements are specified in this report. Warning clauses are recommended to inform future residents of the road and rail traffic noise impacts and to address sound level excesses.

## 2 SITE DESCRIPTION AND NOISE SOURCES

An aerial photo and key plan are attached as Figure 1. A proposed conceptual lotting plan prepared by Polocorp Inc., dated May 19, 2026, is attached as Figure 2 also showing the prediction locations. The development is proposed to include stacked townhouses, street townhouses, and single-detached dwellings along with associated roadways and parking areas.

The site is located at 51 – 55 Hawkesville Road in Woolwich, RMOW, Ontario. The primary sources of noise are road traffic on Hawkesville Road to the north and rail traffic on the Waterloo Central Railway line to the west. The railway is owned and operated by Southern Ontario Locomotive Restoration Society (SOLRS). It is classified as a spur line and operates both freights and tourist passenger trains. The tourist train is a seasonal operation during the months of May to October as noted on their website. Canadian National (CN) railway operates their freight trains during the nighttime hours on this railway line. A Tas Trucking facility is currently located on the subject site which will be removed. The surrounding lands are primarily residential and agricultural lands. To the northeast of the site is a Calvary United Church. Approximately 230 m to the northwest of the subject site is Frey's Hatchery. There are several existing dwellings closer to the hatchery than the proposed development. Similarly, there is a farm with large silos approximately 310 m to the west of the site. There is an intervening dwelling closer to this facility than the subject site. A Home Hardware distribution centre is located approximately 500 m to the south of the site also with existing dwellings closer to this facility than the proposed development. There are no other significant sources of stationary noise within 500 m of the subject site.

## 3 CRITERIA FOR ACCEPTABLE SOUND AND VIBRATION LEVELS

### 3.1 Road and Rail Traffic Noise Criteria

Guidelines for acceptable levels of road and rail 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 [LEQ] in units of A weighted decibels [dBA]. The Region of Waterloo’s Implementation Guideline for Noise Policies, Policy Adopted by Regional Council July 14, 1999, Last Updated October 22, 2019 was also referenced. The Federation of Canadian Municipalities (FCM) and Railway Association of Canada (RAC) “Guidelines for New Development in Proximity to Railway Operations”, dated May 2013 (RAC/FCM guidelines were also reviewed dated November 2006).

Table 1: Road and Rail Traffic Noise Criteria

| Space                      | Daytime $LEQ(16 \text{ hour})$<br>Road / Rail | Nighttime $LEQ(8 \text{ hour})$<br>Road / Rail |
|----------------------------|-----------------------------------------------|------------------------------------------------|
| Outdoor Living Areas       | 55 dBA                                        | --                                             |
| Inside Living/Dining Rooms | 45 dBA / 40 dBA                               | 45 dBA / 40 dBA                                |
| Inside Bedrooms            | 45 dBA / 40 dBA                               | 40 dBA / 35 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.

Indoor guidelines for rail noise are 5 dBA more stringent than for road noise, to account for the low frequency (rumbling) character of locomotive sound, and its greater potential to transmit through exterior wall/window assemblies.

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.

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

### 3.2 Ground-borne Vibration from Rail Traffic

The railway guidelines require measurements of ground-borne vibration when residential dwelling units are to be located within 75 metres of a principal branch line such as the CN Waterloo Spur.

Vibration is typically measured in terms of oscillatory velocity or acceleration. The limits for acceptable ground-borne vibration are an RMS velocity of 0.14 mm/s (17 dB re 1 mm/s) between frequencies of 4 and 200 Hz. CN often considers RMS velocities in the range of 0.14 to 0.20 mm/s to be a marginal exceedance.

CN limits for acceptable ground-borne vibration are also presented as a curve of maximum allowable vibratory acceleration levels, in units of decibels relative to the acceleration due to gravity (dB re 1g), versus one-third octave band frequency. The CN criteria have been overlaid on the graphs of measured vibration for easy reference (Appendix D).

## 4 TRAFFIC SOUND LEVEL ASSESSMENT

### 4.1 Road Traffic Data

Road traffic data for Hawkesville Road was obtained from the Region of Waterloo in the form of projected Annual Average Daily Traffic (AADT) values projected to 2035. The data and is included in Appendix A. The data was further projected to the year 2036 using a 2.5%/year growth rate. The speed limit on Hawkesville Road is 50 km/h. The commercial percentage of traffic comprising of trucks is 11.3% split into 2.7% medium trucks and 8.6% heavy trucks. A day/night split of 90%/10% was used in the analysis. The traffic data is summarized in Table 2 below.

Table 2: Projected Road Traffic Data to 2036

| Roadway          | AADT  | Day / Night Split<br>[ % ] | Trucks Percentage<br>( % ) |       | Speed Limit<br>[ km / h ] |
|------------------|-------|----------------------------|----------------------------|-------|---------------------------|
|                  |       |                            | Medium                     | Heavy |                           |
| Hawkesville Road | 3,782 | 90 / 10                    | 2.7                        | 8.6   | 50                        |

### 4.2 Rail Traffic Data

Rail traffic data for the Waterloo Central Railway, Guelph Subdivision, Spur line, was obtained from HGC past project files, originally obtained from CN, and is included in Appendix B. The number of trains were confirmed via unattended vibration measurements. Updated data was requested from CN, but no response was provided. This CN line is used for way freight operations and tourist passenger trains on a seasonal basis between the months of May to October. The number of tourist passenger trains is found on the Waterloo Central Railway website. A maximum of three times are indicated on a selected day for a total of

six passbys. The number of passbys is not expected to grow. The maximum permissible train speed in the area of the site is 16 kph (10 mph) for the way freight trains. In conformance with CN assessment requirements, the maximum speeds, maximum number of cars and locomotives per train were used in the traffic noise analysis to yield a worst case estimate of train noise. The data was projected to the year 2036 using a 2.5% per year growth rate. Table 3 summarises the rail traffic data used in the analysis.

Table 3: Rail Traffic Data Projected to 2036

| Type of Train               | Number of Trains<br>Day / Night | Number of Locomotives | Number of Cars | Maximum Speed<br>[km / h] |
|-----------------------------|---------------------------------|-----------------------|----------------|---------------------------|
| Way Freight                 | 0.0 / 2.6                       | 2                     | 25             | 16                        |
| Tourist Passenger<br>Trains | 6.2 / 0.0                       | 1                     | 3              | 16                        |

### 4.3 Traffic Noise Predictions

Future traffic sound levels were predicted using STAMSON version 5.04, a computer algorithm developed by the MECP. Sample STAMSON output is included in Appendix C.

Sound levels were predicted at the plane of the living/dining room and bedroom windows during the daytime hours and at the bedroom and living/dining room windows during nighttime hours to investigate ventilation requirements. Train whistle noise for the at grade crossing at Hawkesville Road has been included in the calculations at the façade only. The results of these predictions, without mitigation, are summarized in Table 4.

Table 4: Future Traffic Sound Levels, [dBA], Without Mitigation

| Prediction Location | Description                                             | Daytime in OLA<br>L <sub>EQ</sub> (16 hour) | Daytime at Façade                                  | Nighttime at Façade                               |
|---------------------|---------------------------------------------------------|---------------------------------------------|----------------------------------------------------|---------------------------------------------------|
|                     |                                                         |                                             | L <sub>EQ</sub> (16 hour)<br>Road / + Rail / Total | L <sub>EQ</sub> (8 hour)<br>Road / + Rail / Total |
| [A]                 | Stacked townhouses with exposure to railway and roadway | --                                          | 57 / 71 / 71                                       | 51 / 70 / 70                                      |
| [B]                 | Stacked townhouses with exposure to railway             | --                                          | <55 / 70 / 70                                      | <50 / 70 / 70                                     |
| [C]                 | Townhouse with flanking exposure to railway             | <55                                         | <55 / <55 / <55                                    | <50 / 56 / 56                                     |
| [D]                 | Stacked townhouse with fronting exposure to roadway     | --                                          | 61 / 59 / 63                                       | 55 / 59 / 60                                      |
| [E]                 | Townhouses with flanking exposure to roadway            | 58                                          | 62 / <55 / 63                                      | 55 / 53 / 57                                      |
| [F]                 | Townhouse with some exposure to roadway                 | --                                          | <55 / <55 / <55                                    | <50 / <50 / <50                                   |

Note: +Train whistle noise included

## 5 DISCUSSION AND RECOMMENDATIONS

The predictions indicate that traffic sound levels exceed MECP limits during daytime and nighttime hours at some of the proposed façades of the buildings. The following recommendations are provided.

### 5.1 Outdoor Living Areas

Balconies may be provided for the back-to-back townhouses. Balconies are not considered to be outdoor amenity areas by the MECP if they are less than 4 m in depth. No sound level predictions are required for balconies less than 4 m in depth.



The predicted sound level in the rear yard of the townhouse blocks with flanking exposure to Hawkesville Road is 58 dBA, 3 dBA in excess of the MECP limit of 55 dBA. The 3 dBA sound level excess is acceptable to the MECP if it is acceptable to the municipality with the use of a noise warning clause.

For the remaining dwelling units, the predicted sound levels in the rear yards are less than 55 dBA. No further mitigation is required.

## 5.2 Indoor Living Areas

### Air Conditioning

The predicted nighttime sound levels outside the windows of the future dwellings with exposure to the railway will be greater than 60 dBA during the night during the nighttime hours (prediction locations [A] and [B]). To address these excesses, the MECP guidelines recommend that these dwellings be equipped with central air conditioning systems, so that the windows can be closed.

### Provision for the Future Installation of Air Conditioning

The predicted sound level at the future dwellings further from the railway and/or adjacent to Hawkesville Road (prediction locations [C], [D], and [E]) are between 56 and 65 dBA during the day and between 51 and 60 dBA during the nighttime hours. To address these excesses, the MECP guidelines recommend that these dwelling units provided for the provision for the future installation of air conditioning at the occupant's discretion. The guidelines also recommend warning clauses for the dwelling units. Window or through-the-wall air conditioning units are not recommended for the dwelling 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. Acceptable units are those 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, as applicable.



Ventilation requirements are shown in Figure 3.

### 5.3 Building Façade Constructions

Since the daytime and nighttime sound levels at the facades of the future dwellings closest to the railway will be more than 55 dBA during the night due to rail traffic noise. Upgraded building and glazing constructions are required for these dwellings.

#### Exterior Wall Construction

According to MECP and CN guidelines, brick veneer or masonry equivalent exterior wall constructions are required when dwellings are within 100 metres from the railway right of way or are in the first row from the railway line. This applies to the south, west, and north façades of the stacked townhouses and townhouses in the first row from the railway. Brick veneer or masonry equivalent exterior requirements are shown in Figure 4.

When building elevations are available, an acoustical consultant should review the drawings for conformance with the noise study.

#### Exterior Doors

There may be glazed sliding patio doors for entry onto the balconies. The glazing areas on the doors are to be counted as part of the total window glazing area. If sliding patio doors are to be used, they should include seals sufficient to limit air leakage to minimum achievable levels.

#### Acoustical Requirements for Glazing

At the time of this report, detailed floor plans and elevations were not available for the proposed dwellings. Assuming a typical window to floor area of 35% (25% fixed and 10% operable) for the living/dining rooms and bedrooms, the minimum acoustical requirement for the basic window glazing, including glass in fixed sections, sliding doors, and operable windows.



Preliminary STC requirements for the building are included in Table 5 below.

Table 5: Preliminary Minimum Glazing Requirements

| Prediction Location | Description                                             | Minimum STC Requirements for Glazing <sup>1,2</sup> |
|---------------------|---------------------------------------------------------|-----------------------------------------------------|
| [A]                 | Stacked townhouses with exposure to railway and roadway | <sup>3</sup> STC-40                                 |
| [B]                 | Stacked townhouses with exposure to railway             | <sup>3</sup> STC-40                                 |
| [C]                 | Townhouse with flanking exposure to railway             | <sup>3</sup> OBC                                    |
| [D]                 | Stacked townhouse with fronting exposure to roadway     | <sup>4</sup> STC-30                                 |
| [E]                 | Townhouses with flanking exposure to roadway            | <sup>4</sup> OBC                                    |
| [F]                 | Townhouse with some exposure to roadway                 | <sup>4</sup> OBC                                    |

<sup>1</sup>Based on assumed window to floor area ratios of 35% for living/dining rooms bedrooms. When detailed floor plans and building elevations are available, the window glazing requirements should be refined.

<sup>2</sup>STC Requirement refers to fixed glazing. Small leaks through operable doors and windows are assumed, tight weather seals should be provided to reduce such leakage to the extent feasible.

<sup>3</sup>Sound entering through windows and walls comprising of brick veneer (100% wall to floor area ratio) or a masonry equivalent construction.

<sup>4</sup>Sound entering through windows and walls

The back-to-back townhouses have significant STC requirements. It may be difficult to find suitable STC constructions. It is suggested that the window to floor area ratios be minimized as much as possible along the north, west, and south façades. Sliding patio doors should not be included into bedrooms, swing doors are more suitable for units with exposure to the railway. Operable sections, including doors and operable windows, must be well-fitted and weather-stripped in order to achieve the upper range of target STC values.

Note that acoustic performance varies with manufacturer's construction details, and these are only guidelines to provide some indication of the type of glazing likely to be required. Acoustical test data for the selected assemblies should be



requested from the suppliers, to ensure that the stated acoustic performance levels will be achieved by their assemblies.

#### Further Review

When detailed floor plans and building elevations are available for the buildings, the glazing requirements should be refined based on actual window to floor area ratios and the exterior wall construction should be confirmed to meet railway requirements.

### 5.4 Rail Vibration Impact

Measurements were performed on the site at grade, at approximately 30 m (location M1 on Figure 2) from the railway right-of-way. Unattended vibration measurements using a Svantek 977 Sound Level Meter with a Wilcoxon Research type 793V velocity transducer were obtained from April 22 to 25, 2024. The results of the measurements are presented in Table 6 showing the maximum vibration level measurements during each of the train pass-bys. Appendix D shows the pass-bys of six of the highest measured trains at location M1.

Table 6: Maximum RMS Vibration Velocity Measurements of Train Pass-bys

| Train Pass-by | Measurement Location | Type of Train | Measured Level (mm/s) | Criteria (mm/s) |
|---------------|----------------------|---------------|-----------------------|-----------------|
| 1             | M1                   | Way Freight   | 0.06                  | 0.14            |
| 2             | M1                   | Way Freight   | 0.07                  | 0.14            |
| 3             | M1                   | Way Freight   | 0.06                  | 0.14            |
| 4             | M1                   | Way Freight   | 0.06                  | 0.14            |
| 5             | M1                   | Way Freight   | 0.06                  | 0.14            |
| 6             | M1                   | Way Freight   | 0.06                  | 0.14            |

The results indicate that the vibration levels are below criteria at 30 m from the right-of-way. We note that the closest dwelling façade within Block 21 are at approximately 20 m from the railway right-of-way. Supplementary vibration

measurements at 20 m from the right-of-way will be conducted to determine impact of vibration at this distance prior to site plan approval for this Block 21.

## 6 WARNING CLAUSES

The RMOW guidelines recommend that warning clauses be included in the development agreements, purchase and tenancy agreements and offers of the purchase and sale for the dwelling units. These are provided below.

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

Type A:

Purchasers/tenants are advised that sound levels due to increasing road traffic and rail traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment.

Suitable wording for future dwellings requiring the provision for adding central air conditioning at the occupant's discretion is given below.

Type C:

This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound limits of the Municipality and the Ministry of the Environment.

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

Type D:

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 sound level limits of the Municipality and the Ministry of the Environment.



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

CN requires a standard warning clause as this development is located near a principal mainline. The following sample clause is typical of those included in agreements of purchase and sale or lease on the Lands that are within 300 meters of the railway right-of-way.

Type I:

Warning: Canadian National Railway Company or its assigns or successors in interest has or have a rights-of-way within 300 metres from the land the subject hereof. There may be alterations to or expansions of the railway facilities on such rights-of-way in the future including the possibility that the railway or its assigns or successors as aforesaid may expand its operations, which expansion may affect the living environment of the residents in the vicinity, notwithstanding the inclusion of any noise and vibration attenuating measures in the design of the development and individual dwelling(s). CNR will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid rights-of-way.

## 7 SUMMARY AND RECOMMENDATIONS

The following recommendations are provided with regard to noise control.

Please refer to previous sections of this report where these recommendations are discussed in more detail.

1. Air conditioning systems are required for dwellings closest to the railway. The provision for the future installation of air conditioning at the occupant's discretion is required for dwellings further from the railway. The location, installation and sound ratings of the air conditioning devices should comply with NPC-300.
2. Brick veneer or equivalent masonry construction is required for dwellings in the first row from the railway. Upgraded building constructions are required for dwellings with some exposure to the railway. When detailed floor plans and building elevations are available for the dwelling units, window glazing requirements should be refined based on actual window

to floor area ratios. Window to floor area ratios for the stacked townhouses should be minimized along the north, west, and southern façades to minimize the STC requirements for these windows. Any building and double-glazed window construction meeting the minimum requirements of the OBC will provide sufficient acoustical insulation for the indoor spaces of the remaining proposed dwellings.

3. Supplementary vibration measurements should be conducted at 20 m from the railway right-of-way prior to site plan approval for Block 21, to assess potential vibration impacts from train pass-bys on the proposed dwellings.
4. Warning clauses are required in the property and tenancy agreements and offers of purchase and sale of all the residential units in order to inform future owners/tenants of the sound level excesses.



Table 7: Summary of Noise Control Requirements and Noise Warning Clauses

| Prediction Location | Description                                             | Acoustic Barrier | *Ventilation Requirements | Type of Warning Clause | Brick++ Exterior Façade | STC Requirements LR/BR |
|---------------------|---------------------------------------------------------|------------------|---------------------------|------------------------|-------------------------|------------------------|
| [A]                 | Stacked townhouses with exposure to railway and roadway | --               | Central A/C               | A, D, I                | ✓                       | +STC-40                |
| [B]                 | Stacked townhouses with exposure to railway             | --               | Central A/C               | A, D, I                | ✓                       | +STC-40                |
| [C]                 | Townhouse with flanking exposure to railway             | --               | Provision for A/C         | A, C, I                | ✓                       | +OBC                   |
| [D]                 | Stacked townhouse with fronting exposure to roadway     | --               | Provision for A/C         | A, C, I                | --                      | ^STC-30                |
| [E]                 | Townhouses with flanking exposure to roadway            | --               | Provision for A/C         | A, C, I                | --                      | ^OBC                   |
| [F]                 | Townhouse with some exposure to roadway                 | --               | --                        | I                      | --                      | ^OBC                   |
| --                  | Remaining dwellings                                     | --               | --                        | I                      | --                      | ^OBC                   |

Note:

-- no specific requirement

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

# Based on assumed window to floor area ratios. When detailed floor plans and building elevations are available, the glazing requirements should be refined based on actual window to floor area ratios.

+ Sound entering through windows and masonry or equivalent construction exterior walls

++ Brick veneer or a masonry equivalent construction

^ Sound entering through windows and walls

## 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 ensure noise control measures outlined have been incorporated.

2. Prior to the issuance of occupancy permits for this development, the City'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 installed and constructed.



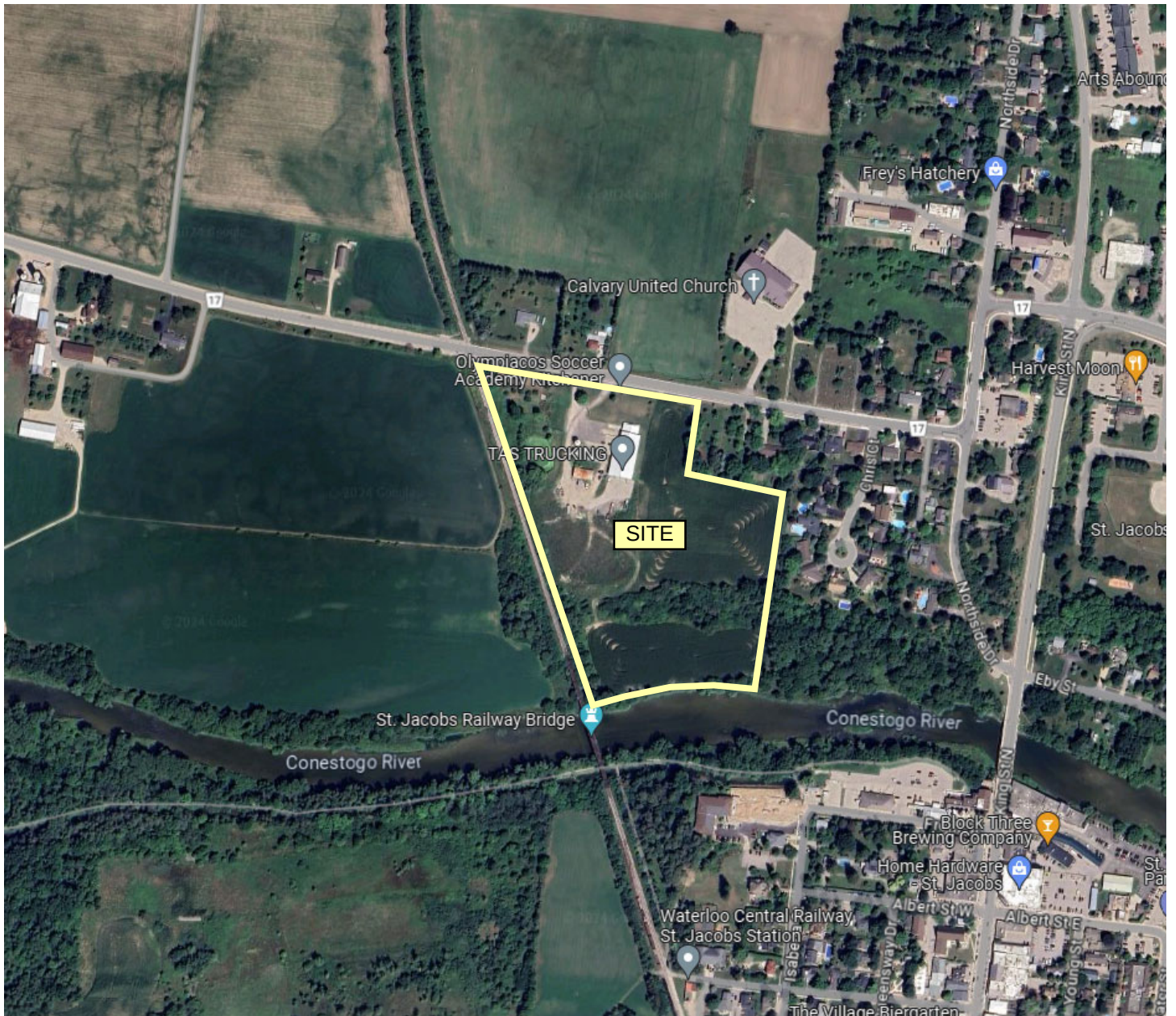


Figure 1 - Key Plan



NOISE



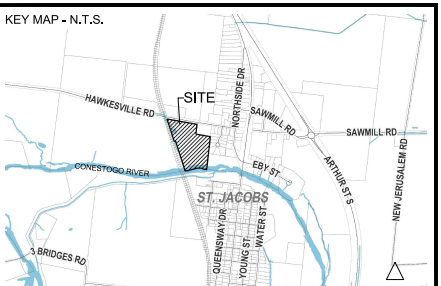
VIBRATION



ACOUSTICS



- LEGEND
- Dripline Limit
  - Dripline 10m Buffer
  - Railway 15m Setback
  - GRCA Floodline
  - GRCA Regulation Limit
  - Top of Stable Slope
  - Slope 6m Setback



### CONCEPTUAL LOTTING PLAN

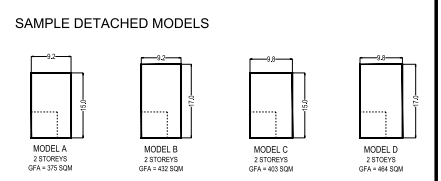
PART OF LOT 37, GERMAN COMPANT TRACT,  
TOWNSHIP OF WOOLWICH  
REGIONAL MUNICIPALITY OF WATERLOO

51 HAWKESVILLE ROAD, ST. JACOBS

SCALE = 1:800 (metric)

LOTING SCHEDULE

| TYPOLGY                    | UNITS | POPULATION | AREA (ha.) |
|----------------------------|-------|------------|------------|
| Stacked Townhouse          | 50    | 122.0      | 0.924      |
| Street Townhouse Lot (20') | 49    | 119.6      | 1.097      |
| Single Detached Lot (36')  | 11    | 35.7       | 0.448      |
| Single Detached Lot (40')  | 5     | 16.2       | 0.283      |
| Single Detached Lot (50')  | 1     | 3.2        | 0.063      |
| TOTAL                      | 66    | ±297       | 3.025      |



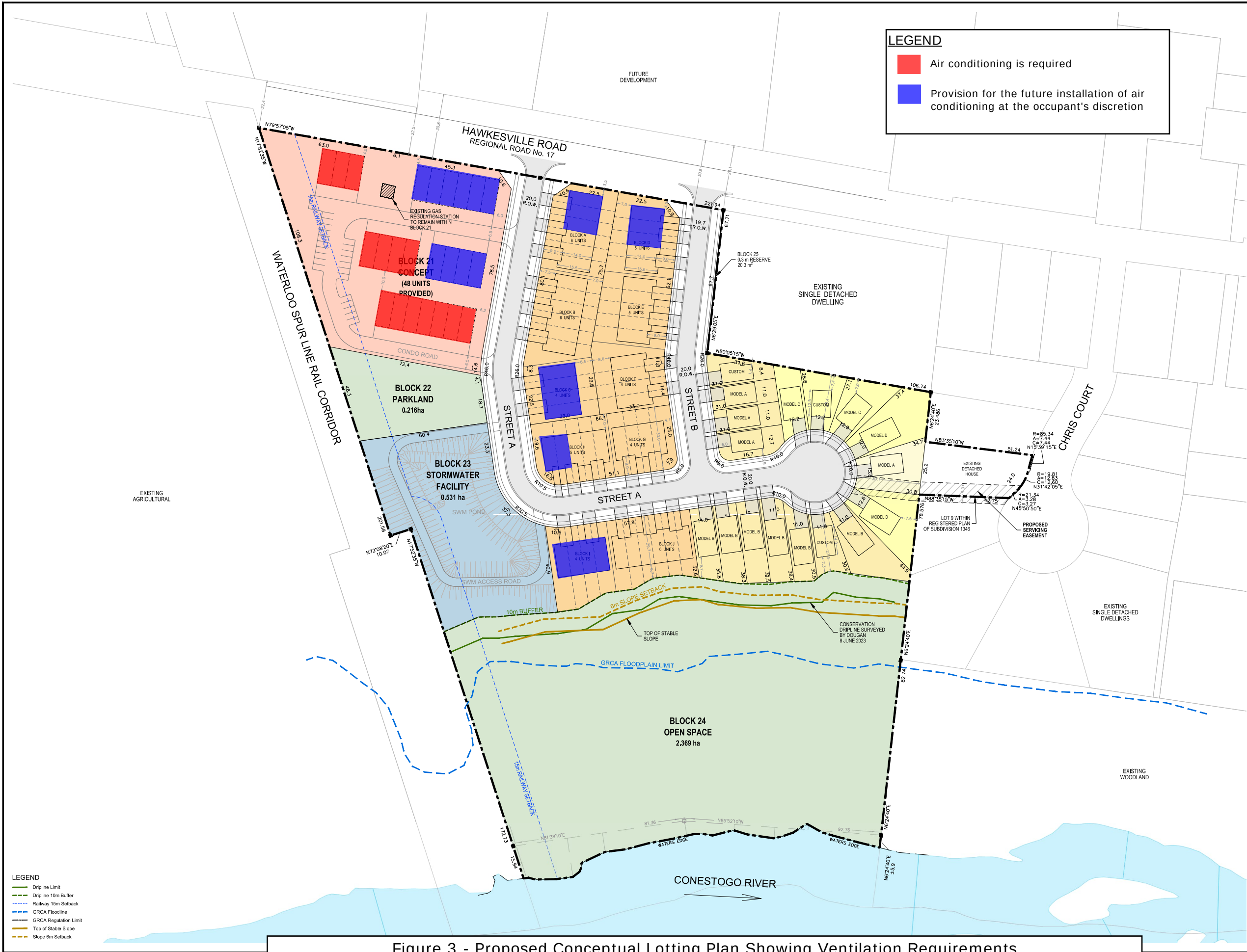
APPROVALS

| REVISIONS  |    |                                              |
|------------|----|----------------------------------------------|
| DATE       | BY | DESCRIPTION                                  |
| 2026.05.19 | ND | ISSUED FOR DPS (SUB. 2) & OPA / ZBA (SUB. 4) |
|            |    |                                              |
|            |    |                                              |
|            |    |                                              |
|            |    |                                              |

**POLOCORP** 379 Queen Street South  
Kitchener, ON N2T 1W6  
polocorpinc.com  
519-745-3249

DATE: 2026.05.19 SCALE 1:800 (metric)  
PROJECT: 1010 (Hawkesville) DRAWN BY: GFE/ND  
FILE: dps1010-2026.05.19 - ND.dwg

Figure 2 - Proposed Conceptual Lotting Plan Showing Prediction Locations



KEY MAP - N.T.S.

## CONCEPTUAL LOTTING PLAN

PART OF LOT 37, GERMAN COMPANT TRACT,  
TOWNSHIP OF WOOLWICH  
REGIONAL MUNICIPALITY OF WATERLOO

51 HAWKESVILLE ROAD, ST. JACOBS

SCALE = 1:800 (metric)

LOTING SCHEDULE

| TYPOLGY                    | UNITS     | POPULATION  | AREA (ha.)   |
|----------------------------|-----------|-------------|--------------|
| Stacked Townhouse          | 50        | 122.0       | 0.924        |
| Street Townhouse Lot (20') | 49        | 119.6       | 1.097        |
| Single Detached Lot (36')  | 11        | 35.7        | 0.448        |
| Single Detached Lot (40')  | 5         | 16.2        | 0.283        |
| Single Detached Lot (50')  | 1         | 3.2         | 0.063        |
| <b>TOTAL</b>               | <b>66</b> | <b>±297</b> | <b>3.025</b> |

SAMPLE DETACHED MODELS

APPROVALS

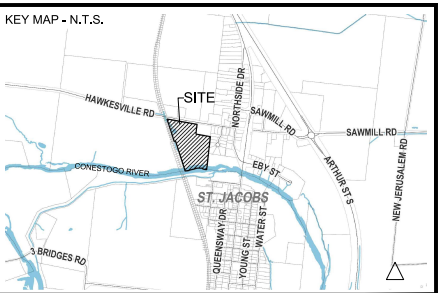
| REVISIONS  |    |                                              |
|------------|----|----------------------------------------------|
| DATE       | BY | DESCRIPTION                                  |
| 2026.05.19 | ND | ISSUED FOR DPS (SUB. 2) & OPA / ZBA (SUB. 4) |
|            |    |                                              |
|            |    |                                              |
|            |    |                                              |
|            |    |                                              |

379 Queen Street South  
Kitchener, ON N2T 1W6  
polocorpinc.com  
519-745-3249

DATE: 2026.05.19  
PROJECT: 1010 (Hawkesville)  
FILE: dps1010-2026.05.19 - ND.dwg

SCALE 1:800 (metric)  
DRAWN BY: GFE/ND

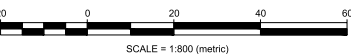
Figure 3 - Proposed Conceptual Lotting Plan Showing Ventilation Requirements



# CONCEPTUAL LOTTING PLAN

PART OF LOT 37, GERMAN COMPANT TRACT,  
TOWNSHIP OF WOOLWICH  
REGIONAL MUNICIPALITY OF WATERLOO

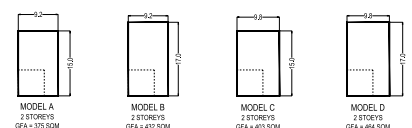
51 HAWKESVILLE ROAD, ST. JACOBS



## LOTTING SCHEDULE

| TYPOLOGY                   | UNITS | POPULATION | AREA (ha.) |
|----------------------------|-------|------------|------------|
| Stacked Townhouse          | 50    | 122.0      | 0.924      |
| Street Townhouse Lot (20') | 49    | 119.6      | 1.097      |
| Single Detached Lot (36')  | 11    | 35.7       | 0.448      |
| Single Detached Lot (40')  | 5     | 16.2       | 0.283      |
| Single Detached Lot (50')  | 1     | 3.2        | 0.063      |
| TOTAL                      | 66    | ±297       | 3.025      |

## SAMPLE DETACHED MODELS



## APPROVALS

| REVISIONS  |    |                                              |
|------------|----|----------------------------------------------|
| DATE       | BY | DESCRIPTION                                  |
| 2026.05.19 | ND | ISSUED FOR DPS (SUB. 2) & OPA / ZBA (SUB. 4) |
|            |    |                                              |
|            |    |                                              |
|            |    |                                              |
|            |    |                                              |

379 Queen Street South  
Kitchener, ON N2T 1W6  
polocorpinc.com  
519-745-3249

DATE: 2026.05.19  
PROJECT: 1010 (Hawkesville)  
FILE: dps1010-2026.05.19 - ND.dwg

SCALE 1:800 (metric)  
DRAWN BY: GFE/ND

Figure 4 - Proposed Conceptual Lotting Plan Showing Brick Exterior Requirements

# Appendix A

## Road Traffic Data



NOISE



VIBRATION



ACOUSTICS

[www.hgcacoustics.com](http://www.hgcacoustics.com)

| Region of Waterloo AADT Forecast for Noise Studies |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Development/Location                            | 51 Hawkesville Road, Woolwich                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 2. Current AADT (2024)                             | Hawkesville Rd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                                    | 2,800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 3. Forecast AADT (2034)                            | Hawkesville Rd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                                    | 3,600                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 4. Commercial Vehicle Rates                        | Hawkesville Rd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| % Medium Trucks                                    | 2.7%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| % Heavy Trucks                                     | 8.6%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 5. Posted Speed Limit                              | Hawkesville Rd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                                    | 50 km/h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 6. Day/Night Splits                                | Regional Standard 90/10 Day/Night Split                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 7. Expiry                                          | 31-Dec-2025                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 8. Notes                                           | <p>This forecast is intended for the purpose of carrying out a noise study for <b>51 Hawkesville Road in the Township of Woolwich</b>. The above AADTs represents forecasted traffic volumes on Hawkesville Road.</p> <p>The Waterloo Spur railway is within 500m. Rail traffic forecasts will need to be obtained to determine the noise impact.</p> <p>This forecast remains valid up to the date indicated above. The Region of Waterloo should be contacted for an updated forecast if there are plans to use this forecast beyond the above validity period.</p> |

# Appendix B

## Rail Traffic Data



NOISE



VIBRATION



ACOUSTICS

Canadian  
National  
Railway  
Properties Inc.

Propriétés  
ferroviaires du  
Canadien  
National Inc.



277 Front Street West  
Floor 8  
Toronto, Ontario  
M5V 2X7

Telephone: (416) 217-6961  
Facsimile: (416) 217-6743

277, rue Front ouest  
8<sup>e</sup> étage  
Toronto (Ontario)  
M5V 2X7

Téléphone: (416) 217-6961  
Télécopieur: (416) 217-6743

## SPUR LINE REQUIREMENTS

- A. Safety setback of dwellings from the railway rights-of-way to be a minimum of 15 metres.
- B. The Owner shall install and maintain a chain link fence of minimum 1.83 metre height along the mutual property line.
- C. The following clause should be inserted in all development agreements, offers to purchase, and agreements of Purchase and Sale or Lease of each dwelling unit within 300m of the railway right-of-way: "Warning: Canadian National Railway Company or its assigns or successors in interest has or have a rights-of-way within 300 metres from the land the subject hereof. There may be alterations to or expansions of the railway facilities on such rights-of-way in the future including the possibility that the railway or its assigns or successors as aforesaid may expand its operations, which expansion may affect the living environment of the residents in the vicinity, notwithstanding the inclusion of any noise and vibration attenuating measures in the design of the development and individual dwelling(s). CNR will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid rights-of-way."
- D. Any proposed alterations to the existing drainage pattern affecting railway property must receive prior concurrence from the Railway and be substantiated by a drainage report to the satisfaction of the Railway.

---

April 1996

## Transmittal Form

|              |                                                                                                                                          |                |                                                                             |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------------------|
| Date         | May 16, 2011                                                                                                                             | Project Number | 60114380-0800-11-12                                                         |
| Contact      | Sheeba Paul, MEng. P.Eng.                                                                                                                | Routing        | spaul@hgcengineering.com                                                    |
| Company      | HGC Engineering Ltd.                                                                                                                     |                |                                                                             |
| Address      | 2000 Argentia Road, Plaza One, Suite 203<br>Mississauga, ON L5N 1P7                                                                      |                |                                                                             |
| Telephone #  | 905-826-4044                                                                                                                             |                |                                                                             |
| Sent By      | Warren D'Andrade                                                                                                                         | Copies To      | Nick Coleman, CN – email<br>Steve Sieunarine, Region of<br>Waterloo – email |
| Project Name | Train Traffic Data – Waterloo Spur in the vicinity of Duke Street and Bismark Avenue,<br>Kitchener, Ontario – Approximately at Mile 0.60 |                |                                                                             |

☐ Urgent ☒ For Your Use ☐ For Review ☐ For Your Information ☐ Confidential

Comments: Please find attached the requested Train Traffic Data.  
Should you have any questions, please do not hesitate to contact the undersigned at  
905-238-0007 ext. 8214.

Sent Via: ☐ mail ☐ courier ☐ picked up ☐ by hand ☒ email ☐ fax ☐ other

Authorized Signature:



Name (please print):

Warren D'Andrade

Title:

E.I.T.

Sheeba Paul, M.Eng. P.Eng.  
HGC Engineering Ltd.  
2000 Argentia Road, Plaza One, Suite 203  
Mississauga, ON L5N 1P7

Dear Sheeba:

**Project No: 60114380-0800-11-12**

**Regarding: Train Traffic Data – Waterloo Spur in the vicinity of Duke Street and Bismark Avenue  
in Kitchener, Ontario – Approximately at Mile 0.60**

The following is provided in response to your April 29, 2010 request for information regarding rail traffic in the vicinity of Duke Street and Bismark Avenue in Kitchener, Ontario, at approximately Mile 0.60 on the Waterloo Spur.

Typical daily traffic volumes are recorded below. However, traffic volumes may fluctuate due to overall economic conditions, varying traffic demands, weather conditions, track maintenance programs, statutory holidays and traffic detours that when required may be heavy although temporary.

Typical daily traffic volumes at this site location are as follows:

**\*Maximum train speed is given in Miles per Hour**

| <b>Northbound</b>    | <b>0700 - 1900</b> |                     |                   |                   |
|----------------------|--------------------|---------------------|-------------------|-------------------|
| <b>Type of Train</b> | <b>Volumes</b>     | <b>Max. Consist</b> | <b>Max. Speed</b> | <b>Max. Power</b> |
| <b>Freight</b>       | 0                  | 140                 | 10                | 4                 |
| <b>Way Freight</b>   | 0                  | 25                  | 10                | 2                 |
| <b>Passenger</b>     | 0                  | 15                  | 10                | 2                 |

| <b>Southbound</b>    | <b>0700 - 1900</b> |                     |                   |                   |
|----------------------|--------------------|---------------------|-------------------|-------------------|
| <b>Type of Train</b> | <b>Volumes</b>     | <b>Max. Consist</b> | <b>Max. Speed</b> | <b>Max. Power</b> |
| <b>Freight</b>       | 0                  | 140                 | 10                | 4                 |
| <b>Way Freight</b>   | 0                  | 25                  | 10                | 2                 |
| <b>Passenger</b>     | 0                  | 15                  | 10                | 2                 |

| <b>Northbound</b>    | <b>1900 - 0700</b> |                     |                   |                   |
|----------------------|--------------------|---------------------|-------------------|-------------------|
| <b>Type of Train</b> | <b>Volumes</b>     | <b>Max. Consist</b> | <b>Max. Speed</b> | <b>Max. Power</b> |
| <b>Freight</b>       | 0                  | 140                 | 10                | 4                 |
| <b>Way Freight</b>   | 1                  | 25                  | 10                | 2                 |
| <b>Passenger</b>     | 0                  | 15                  | 10                | 2                 |

| <b>Southbound</b>    | <b>1900 - 0700</b> |                     |                   |                   |
|----------------------|--------------------|---------------------|-------------------|-------------------|
| <b>Type of Train</b> | <b>Volumes</b>     | <b>Max. Consist</b> | <b>Max. Speed</b> | <b>Max. Power</b> |
| <b>Freight</b>       | 0                  | 140                 | 10                | 4                 |
| <b>Way Freight</b>   | 1                  | 25                  | 10                | 2                 |
| <b>Passenger</b>     | 0                  | 15                  | 10                | 2                 |

The volumes recorded reflect northbound and southbound freight, way freight and passenger operations on the Waterloo Spur.

Except where anti-whistling bylaws are in effect, engine-warning whistles and bells are normally sounded at all at-grade crossings. There are thirteen at-grade crossings in the immediate vicinity of the study area, at Breithaupt Street (M.0.15), Ahrens Street (M.0.17), Wellington Street (M.0.25), Louisa Street (M.0.32), Weber Street (M.0.35), Wilhelm Street (M.0.44), Guelph Street (M.0.68), Roger Street (M.0.97), Moore Avenue (M.1.16), Union Street (M.1.23), John Street (M.1.30), Allen Street (M.1.40), and Willow Street (M.1.53). Anti-whistling bylaws are in effect at these thirteen crossings. Please note that engine warning whistles may be sounded in cases of emergency, as a safety and or warning precaution at pedestrian crossings and occasionally for operating requirements.

With respect to equipment restrictions, the gross weight of the heaviest permissible car is 263,000 lbs. The single mainline track is constructed of bolted rail throughout the study area.

The Canadian National Railway continues to be strongly opposed to locating developments near railway facilities and rights-of-way due to potential safety and environmental conflicts. Development adjacent to the Railway Right-of-Way is not appropriate without sound impact mitigation measures to reduce the incompatibility. For confirmation of the applicable rail noise, vibration and safety standards, Mr. Nick Coleman, Canadian National Railway Properties at 905-760-5007 should be contacted directly.

We trust the above information will satisfy your current request.

Sincerely,  
**AECOM Canada Ltd.**



Warren D'Andrade  
warren.dandrade@aecom.com

cc: Nick Coleman, CN – email  
Steve Sieunarine, Region of Waterloo – email

# Appendix C

## Sample Calculations



NOISE



VIBRATION



ACOUSTICS

[www.hgcacoustics.com](http://www.hgcacoustics.com)

Filename: a.te                      Time Period: Day/Night 16/8 hours

Description: Stacked townhouses with exposure to railway and roadway

Rail data, segment # 1: CN (day/night)

| Train Type   | ! Trains !<br>! (Left) | ! Trains !<br>! (Right) | ! Speed !<br>!(km/h) | !# loc !<br>!/Train! | !# Cars!<br>!/Train! | ! Eng !<br>! type | !Cont !<br>!weld |
|--------------|------------------------|-------------------------|----------------------|----------------------|----------------------|-------------------|------------------|
| * 1. CN      | ! 0.0/1.3              | ! 0.0/1.3               | ! 16.0               | ! 2.0                | ! 25.0               | !Diesel!          | ! No             |
| * 2. Tourist | ! 3.1/0.0              | ! 3.1/0.0               | ! 16.0               | ! 1.0                | ! 3.0                | !Diesel!          | ! No             |

\* The identified number of trains have been adjusted for future growth using the following parameters:

| Train type:<br>No Name | ! Unadj. Trains !<br>! Left ! Right | ! Annual % !<br>! Increase ! | ! Years of !<br>! Growth ! |
|------------------------|-------------------------------------|------------------------------|----------------------------|
| 1. CN                  | ! 0.0/1.3                           | ! 0.0/1.3                    | ! 2.50 !                   |
| 2. Tourist             | ! 3.0/0.0                           | ! 3.0/0.0                    | ! 2.50 !                   |

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

```

-----
Angle1 Angle2      : -70.00 deg  90.00 deg
Wood depth          :          0    (No woods.)
No of house rows    :          0 / 0
Surface             :          2    (Reflective ground surface)
Receiver source distance : 31.30 / 31.30 m
Receiver height      :  7.50 / 7.50 m
Topography           :          1    (Flat/gentle slope; no barrier)
Whistle Angle        :          70 deg  Track 1
Reference angle      :          0.00
    
```

Results segment # 1: CN (day)

LOCOMOTIVE (0.00 + 53.29 + 0.00) = 53.29 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|
| -70    | 90     | 0.00  | 56.99  | -3.19 | -0.51 | 0.00  | 0.00  | 0.00  | 53.29  |

WHEEL (0.00 + 37.00 + 0.00) = 37.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|



|     |    |      |       |       |       |      |      |      |       |
|-----|----|------|-------|-------|-------|------|------|------|-------|
| -70 | 90 | 0.00 | 40.71 | -3.19 | -0.51 | 0.00 | 0.00 | 0.00 | 37.00 |
|-----|----|------|-------|-------|-------|------|------|------|-------|

LEFT WHISTLE (0.00 + 70.25 + 0.00) = 70.25 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|

|     |    |      |       |       |       |      |      |      |       |
|-----|----|------|-------|-------|-------|------|------|------|-------|
| -70 | 70 | 0.00 | 74.53 | -3.19 | -1.09 | 0.00 | 0.00 | 0.00 | 70.25 |
|-----|----|------|-------|-------|-------|------|------|------|-------|

RIGHT WHISTLE (0.00 + 60.91 + 0.00) = 60.91 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|

|    |    |      |       |       |        |      |      |      |       |
|----|----|------|-------|-------|--------|------|------|------|-------|
| 70 | 86 | 0.00 | 74.53 | -3.19 | -10.43 | 0.00 | 0.00 | 0.00 | 60.91 |
|----|----|------|-------|-------|--------|------|------|------|-------|

Segment Leq : 70.81 dBA

Total Leq All Segments: 70.81 dBA

Results segment # 1: CN (night)

LOCOMOTIVE (0.00 + 56.96 + 0.00) = 56.96 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|

|     |    |      |       |       |       |      |      |      |       |
|-----|----|------|-------|-------|-------|------|------|------|-------|
| -70 | 90 | 0.00 | 60.67 | -3.19 | -0.51 | 0.00 | 0.00 | 0.00 | 56.96 |
|-----|----|------|-------|-------|-------|------|------|------|-------|

WHEEL (0.00 + 44.53 + 0.00) = 44.53 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|

|     |    |      |       |       |       |      |      |      |       |
|-----|----|------|-------|-------|-------|------|------|------|-------|
| -70 | 90 | 0.00 | 48.24 | -3.19 | -0.51 | 0.00 | 0.00 | 0.00 | 44.53 |
|-----|----|------|-------|-------|-------|------|------|------|-------|

LEFT WHISTLE (0.00 + 69.48 + 0.00) = 69.48 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|

|     |    |      |       |       |       |      |      |      |       |
|-----|----|------|-------|-------|-------|------|------|------|-------|
| -70 | 70 | 0.00 | 73.77 | -3.19 | -1.09 | 0.00 | 0.00 | 0.00 | 69.48 |
|-----|----|------|-------|-------|-------|------|------|------|-------|

RIGHT WHISTLE (0.00 + 60.15 + 0.00) = 60.15 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|

|    |    |      |       |       |        |      |      |      |       |
|----|----|------|-------|-------|--------|------|------|------|-------|
| 70 | 86 | 0.00 | 73.77 | -3.19 | -10.43 | 0.00 | 0.00 | 0.00 | 60.15 |
|----|----|------|-------|-------|--------|------|------|------|-------|



Segment Leq : 70.18 dBA

Total Leq All Segments: 70.18 dBA

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

-----  
Car traffic volume : 3019/335 veh/TimePeriod \*  
Medium truck volume : 92/10 veh/TimePeriod \*  
Heavy truck volume : 293/33 veh/TimePeriod \*  
Posted speed limit : 50 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): 3600  
Percentage of Annual Growth : 2.50  
Number of Years of Growth : 2.00  
Medium Truck % of Total Volume : 2.70  
Heavy Truck % of Total Volume : 8.60  
Day (16 hrs) % of Total Volume : 90.00

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

-----  
Angle1 Angle2 : -90.00 deg 0.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 33.40 / 33.40 m  
Receiver height : 7.50 / 7.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00

Results segment # 1: Hawkesville (day)

-----  
Source height = 1.71 m

ROAD (0.00 + 57.13 + 0.00) = 57.13 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|
| -90    | 0      | 0.00  | 63.62  | 0.00  | -3.48 | -3.01 | 0.00  | 0.00  | 0.00  | 57.13  |

-----

Segment Leq : 57.13 dBA

Total Leq All Segments: 57.13 dBA



Results segment # 1: Hawkesville (night)

Source height = 1.72 m

ROAD (0.00 + 50.64 + 0.00) = 50.64 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|
| -90    | 0      | 0.00  | 57.13  | 0.00  | -3.48 | -3.01 | 0.00  | 0.00  | 0.00  | 50.64  |

Segment Leq : 50.64 dBA

Total Leq All Segments: 50.64 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.99 dBA  
(NIGHT): 70.23 dBA



Filename: d.te Time Period: Day/Night 16/8 hours

Description: Stacked townhouse with fronting exposure to roadway

Rail data, segment # 1: CN (day/night)

| Train Type | ! Trains ! (Left) | ! Trains ! (Right) | ! Speed ! (km/h) | !# loc !/Train | !# Cars !/Train | ! Eng type ! | !Cont !weld |
|------------|-------------------|--------------------|------------------|----------------|-----------------|--------------|-------------|
| 1. CN      | ! 0.0/1.3         | ! 0.0/1.3          | ! 16.0           | ! 2.0          | ! 25.0          | !Diesel!     | No          |
| 2. Tourist | ! 3.0/0.0         | ! 3.0/0.0          | ! 16.0           | ! 1.0          | ! 3.0           | !Diesel!     | No          |

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

Angle1 Angle2 : 0.00 deg 90.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 1 / 0  
 Surface : 1 (Absorptive ground surface)  
 Receiver source distance : 87.00 / 87.00 m  
 Receiver height : 7.50 / 7.50 m  
 Topography : 1 (Flat/gentle slope; no barrier)  
 Whistle Angle : 10 deg Track 1  
 Reference angle : 0.00

Results segment # 1: CN (day)

LOCOMOTIVE (0.00 + 41.22 + 0.00) = 41.22 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj  | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|--------|-------|-------|-------|-------|--------|
| 0      | 90     | 0.41  | 56.85  | -10.73 | -4.00 | 0.00  | -0.90 | 0.00  | 41.22  |

WHEEL (0.00 + 23.94 + 0.00) = 23.94 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj  | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|--------|-------|-------|-------|-------|--------|
| 0      | 90     | 0.51  | 40.57  | -11.53 | -4.20 | 0.00  | -0.90 | 0.00  | 23.94  |

LEFT WHISTLE (0.00 + 50.20 + 0.00) = 50.20 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj  | F.Adj  | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|--------|--------|-------|-------|-------|--------|
| 0      | 10     | 0.41  | 74.39  | -10.73 | -12.56 | 0.00  | -0.90 | 0.00  | 50.20  |



RIGHT WHISTLE (0.00 + 57.79 + 0.00) = 57.79 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|

|    |    |      |       |        |       |      |       |      |       |
|----|----|------|-------|--------|-------|------|-------|------|-------|
| 10 | 78 | 0.41 | 74.39 | -10.73 | -4.98 | 0.00 | -0.90 | 0.00 | 57.79 |
|----|----|------|-------|--------|-------|------|-------|------|-------|

Segment Leq : 58.57 dBA

Total Leq All Segments: 58.57 dBA

Results segment # 1: CN (night)

LOCOMOTIVE (0.00 + 45.94 + 0.00) = 45.94 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|

|   |    |      |       |        |       |      |      |      |       |
|---|----|------|-------|--------|-------|------|------|------|-------|
| 0 | 90 | 0.41 | 60.67 | -10.73 | -4.00 | 0.00 | 0.00 | 0.00 | 45.94 |
|---|----|------|-------|--------|-------|------|------|------|-------|

WHEEL (0.00 + 32.51 + 0.00) = 32.51 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|

|   |    |      |       |        |       |      |      |      |       |
|---|----|------|-------|--------|-------|------|------|------|-------|
| 0 | 90 | 0.51 | 48.24 | -11.53 | -4.20 | 0.00 | 0.00 | 0.00 | 32.51 |
|---|----|------|-------|--------|-------|------|------|------|-------|

LEFT WHISTLE (0.00 + 50.48 + 0.00) = 50.48 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|

|   |    |      |       |        |        |      |      |      |       |
|---|----|------|-------|--------|--------|------|------|------|-------|
| 0 | 10 | 0.41 | 73.77 | -10.73 | -12.56 | 0.00 | 0.00 | 0.00 | 50.48 |
|---|----|------|-------|--------|--------|------|------|------|-------|

RIGHT WHISTLE (0.00 + 58.06 + 0.00) = 58.06 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|

|    |    |      |       |        |       |      |      |      |       |
|----|----|------|-------|--------|-------|------|------|------|-------|
| 10 | 78 | 0.41 | 73.77 | -10.73 | -4.98 | 0.00 | 0.00 | 0.00 | 58.06 |
|----|----|------|-------|--------|-------|------|------|------|-------|

Segment Leq : 58.99 dBA

Total Leq All Segments: 58.99 dBA▲

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

|                     |            |                |   |
|---------------------|------------|----------------|---|
| Car traffic volume  | : 2946/327 | veh/TimePeriod | * |
| Medium truck volume | : 90/10    | veh/TimePeriod | * |
| Heavy truck volume  | : 286/32   | veh/TimePeriod | * |
| Posted speed limit  | : 50 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): 3600  
 Percentage of Annual Growth : 2.50  
 Number of Years of Growth : 1.00  
 Medium Truck % of Total Volume : 2.70  
 Heavy Truck % of Total Volume : 8.60  
 Day (16 hrs) % of Total Volume : 90.00

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

-----  
 Angle1 Angle2 : -90.00 deg 90.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 0 / 0  
 Surface : 2 (Reflective ground surface)  
 Receiver source distance : 24.00 / 24.00 m  
 Receiver height : 7.50 / 7.50 m  
 Topography : 1 (Flat/gentle slope; no barrier)  
 Reference angle : 0.00

Results segment # 1: Hawkesville (day)

-----  
 Source height = 1.71 m

ROAD (0.00 + 61.48 + 0.00) = 61.48 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|
| -90    | 90     | 0.00  | 63.52  | 0.00  | -2.04 | 0.00  | 0.00  | 0.00  | 0.00  | 61.48  |

Segment Leq : 61.48 dBA

Total Leq All Segments: 61.48 dBA

Results segment # 1: Hawkesville (night)

-----  
 Source height = 1.72 m

ROAD (0.00 + 54.97 + 0.00) = 54.97 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|
| -90    | 90     | 0.00  | 57.01  | 0.00  | -2.04 | 0.00  | 0.00  | 0.00  | 0.00  | 54.97  |



-----

Segment Leq : 54.97 dBA

Total Leq All Segments: 54.97 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.27 dBA  
(NIGHT): 60.44 dBA



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Number of exposed facades (1-3)  
Number of Sources (1-3)

| Façada Exposure Adjustments are |                          | APPLICABLE                                 |   |   |      |                                            |       |   |           |                                            |       |   |           |
|---------------------------------|--------------------------|--------------------------------------------|---|---|------|--------------------------------------------|-------|---|-----------|--------------------------------------------|-------|---|-----------|
|                                 |                          | Façada 1                                   |   |   |      | Façada 2                                   |       |   |           | Façada 3                                   |       |   |           |
|                                 |                          | Direction: east                            |   |   |      | Direction: north                           |       |   |           | Direction: south                           |       |   |           |
|                                 |                          | Faç:Src Angle (Shield)                     |   |   |      | Faç:Src Angle                              |       |   |           | Faç:Src Angle                              |       |   |           |
|                                 |                          | (0=parallel,90=perp,180=shield) Adjustment |   |   |      | (0=parallel,90=perp,180=shield) Adjustment |       |   |           | (0=parallel,90=perp,180=shield) Adjustment |       |   |           |
| Minimum Exposure Angle          |                          | Façada SL                                  |   |   |      | Façada SL                                  |       |   |           | Façada SL                                  |       |   |           |
| Source 1                        | From                     | 0 To 90                                    | 0 | 0 | 70.0 | From                                       | To 90 | 0 | 70.000001 | From                                       | To 90 | 0 | 70.000001 |
|                                 | From                     | To 90                                      |   | 0 | 0.0  | From                                       | To 90 | 0 | 0         | From                                       | To 90 | 0 | 0         |
|                                 | From                     | To 90                                      |   | 0 | 0.0  | From                                       | To 90 | 0 | 0         | From                                       | To 90 | 0 | 0         |
|                                 | Total Façada Sound Level |                                            |   |   | 70   |                                            |       | 0 |           |                                            | 0     |   |           |

[illegible]

|                |          |             |          |   |   |
|----------------|----------|-------------|----------|---|---|
| Room Total SPL | 1670.625 | 1327.024565 | 333.3335 | 0 | 0 |
| 35.23          | 0        | 0           | 0        | 0 | 0 |
|                | 0        | 0           | 0        | 0 | 0 |

# Appendix D

## Vibration Measurement Plots



NOISE

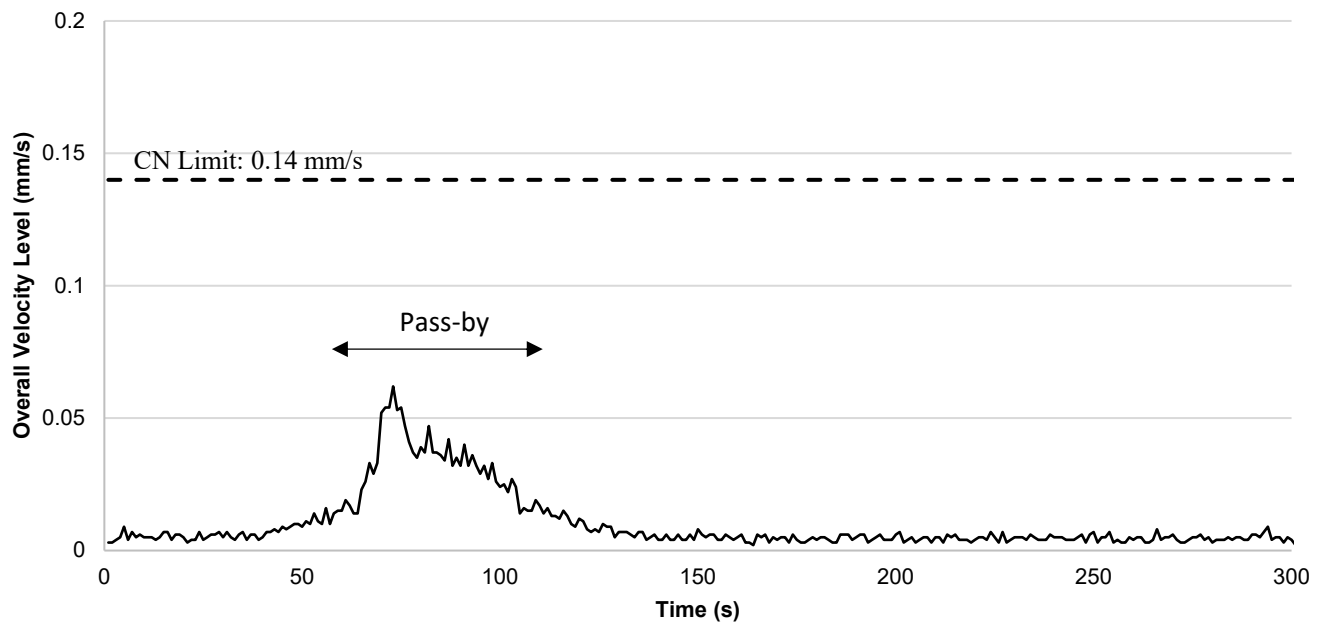


VIBRATION

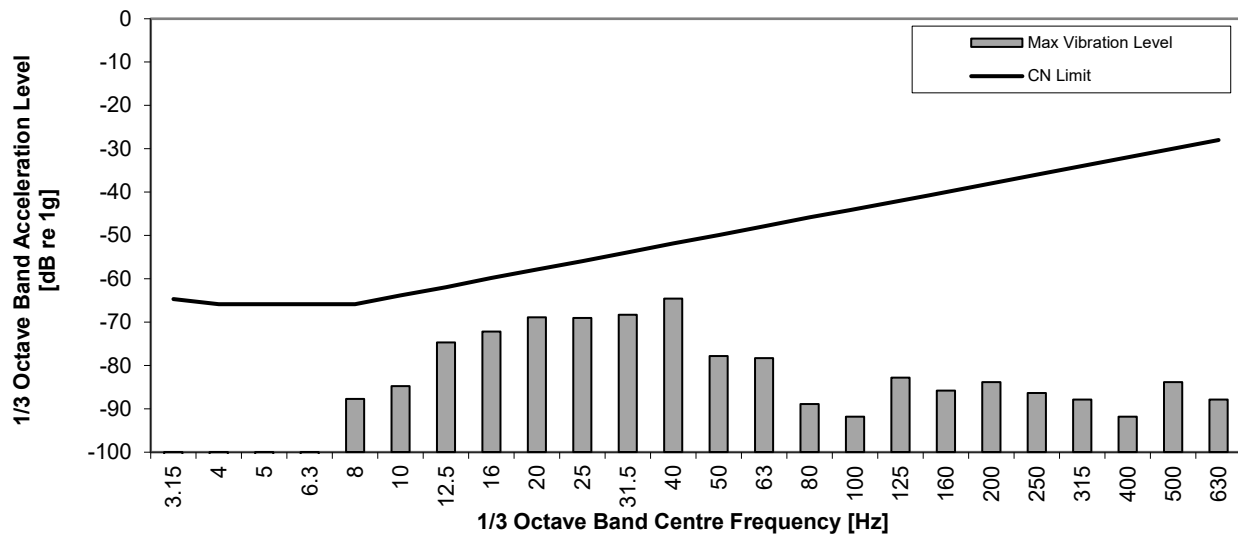


ACOUSTICS

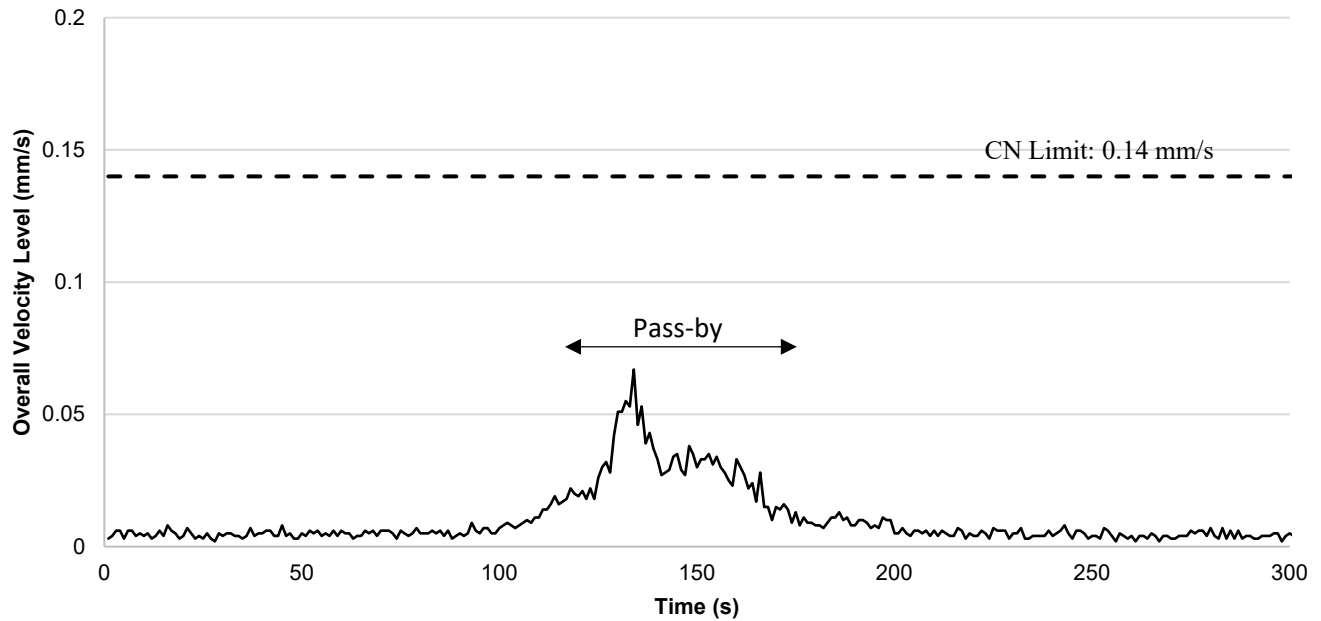
**Pass-by 1 at 30 m from ROW at M1**  
**Measured Vibratory Velocity Level**



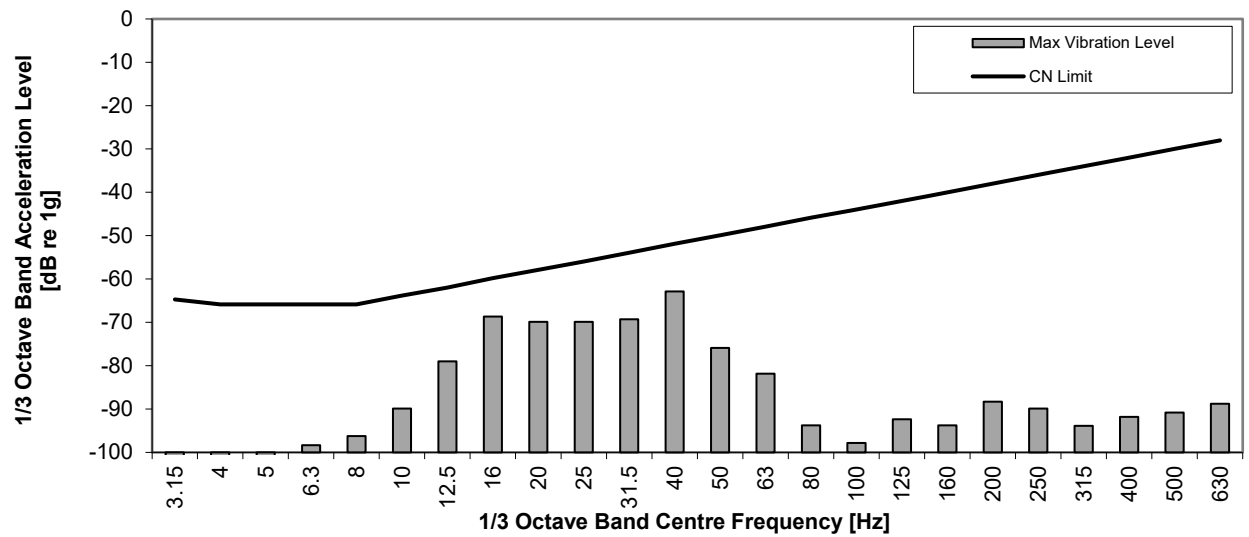
**Pass-by 1 at M1**  
**Acceleration Spectrum @ Peak Level (1 sec. Duration)**



**Pass-by 2 at 30m from ROW at M1  
Measured Vibratory Velocity Level**



**Pass-by 2 at M1  
Acceleration Spectrum @ Peak Level (1 sec. Duration)**



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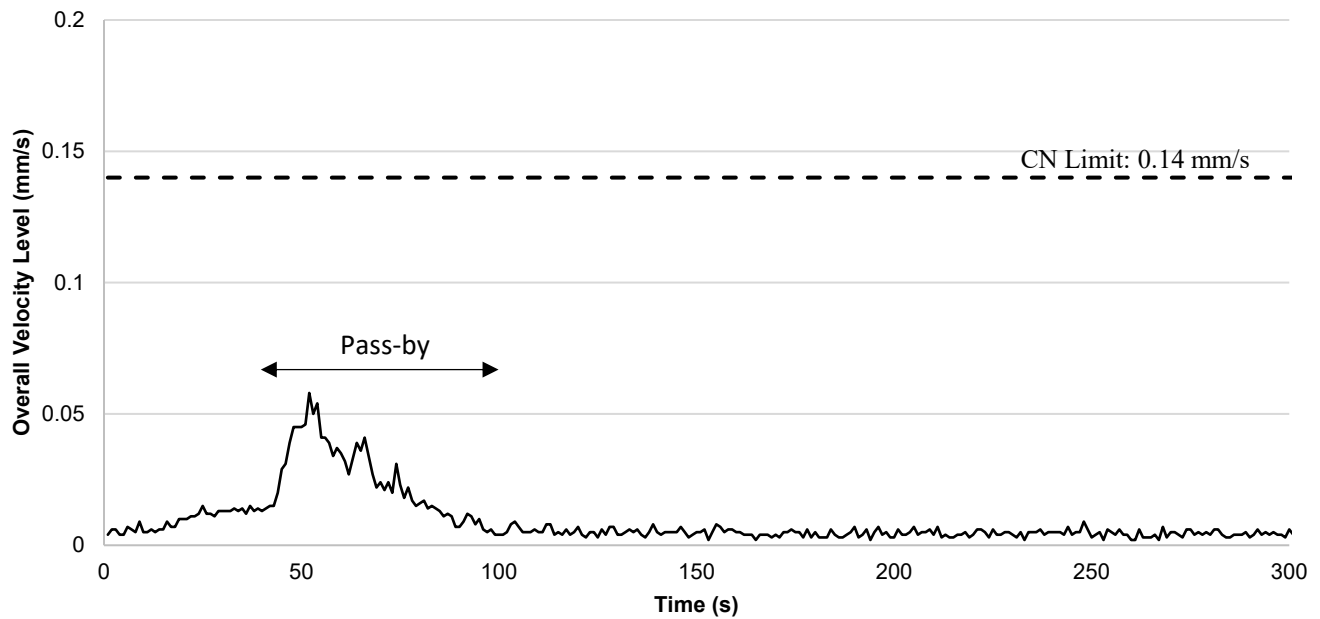


VIBRATION

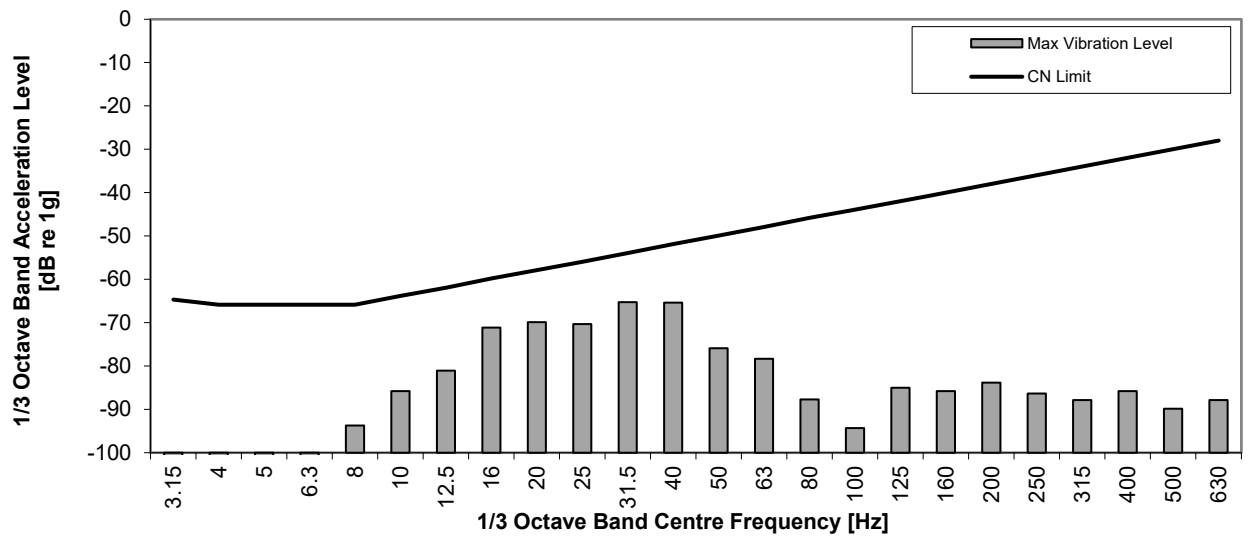


ACOUSTICS

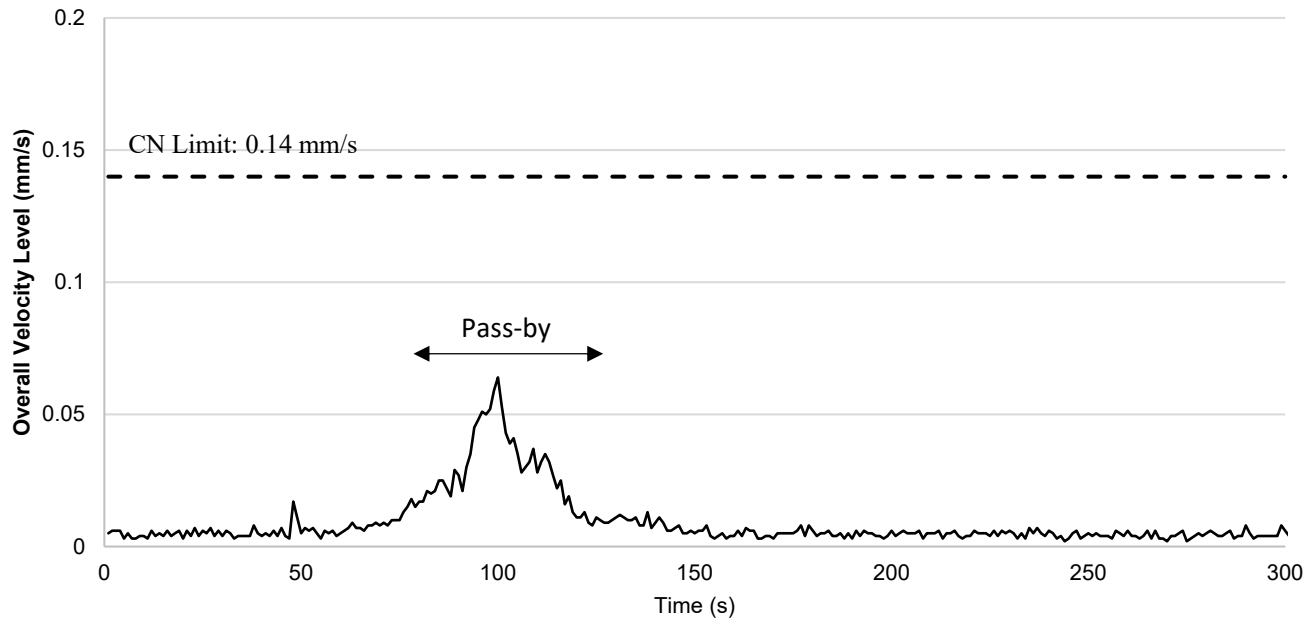
**Pass-by 3 at 30 m from ROW at M1  
Measured Vibratory Velocity Level**



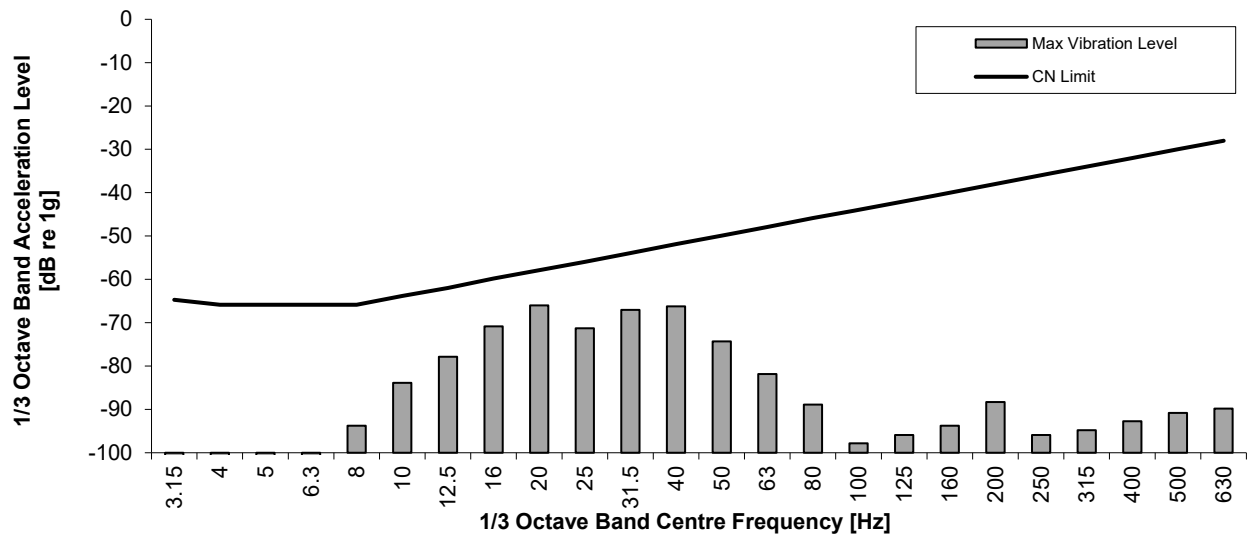
**Pass-by 3 at M1  
Acceleration Spectrum @ Peak Level (1 sec. Duration)**



**Pass-by 4 at 30 m from ROW at M1  
Measured Vibratory Velocity Level**



**Pass-by 4 at M1  
Acceleration Spectrum @ Peak Level (1 sec. Duration)**



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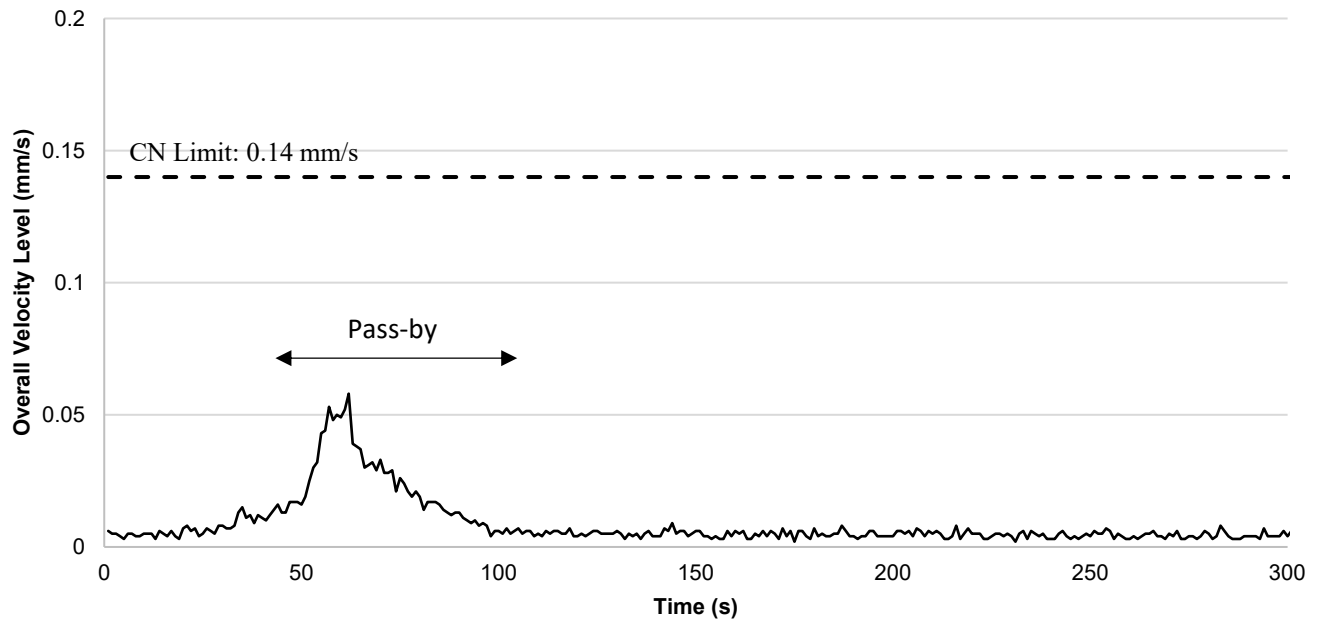


VIBRATION

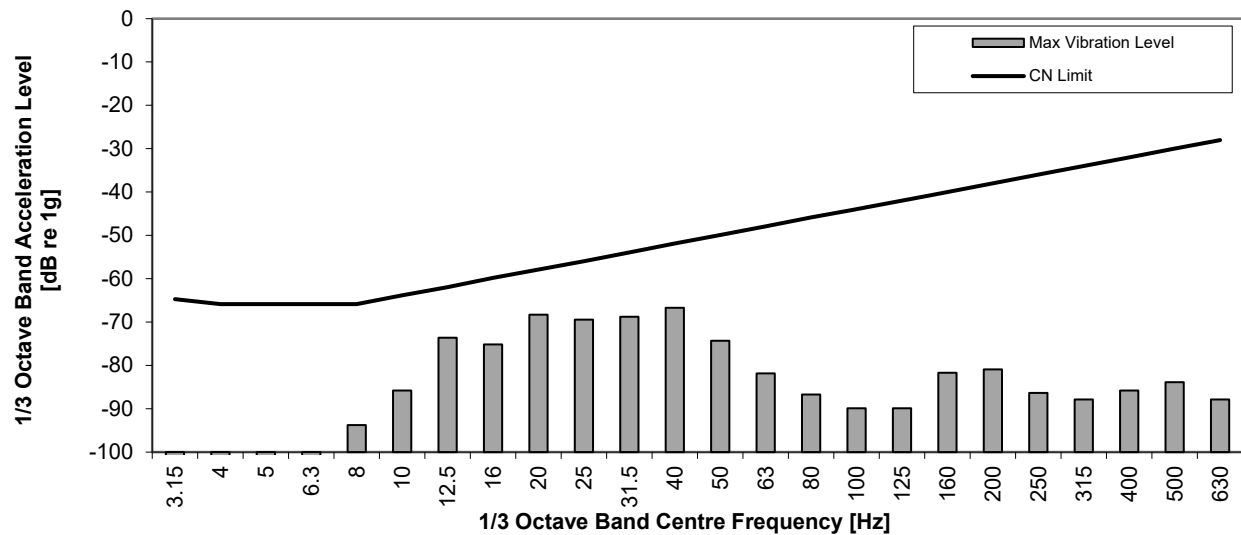


ACOUSTICS

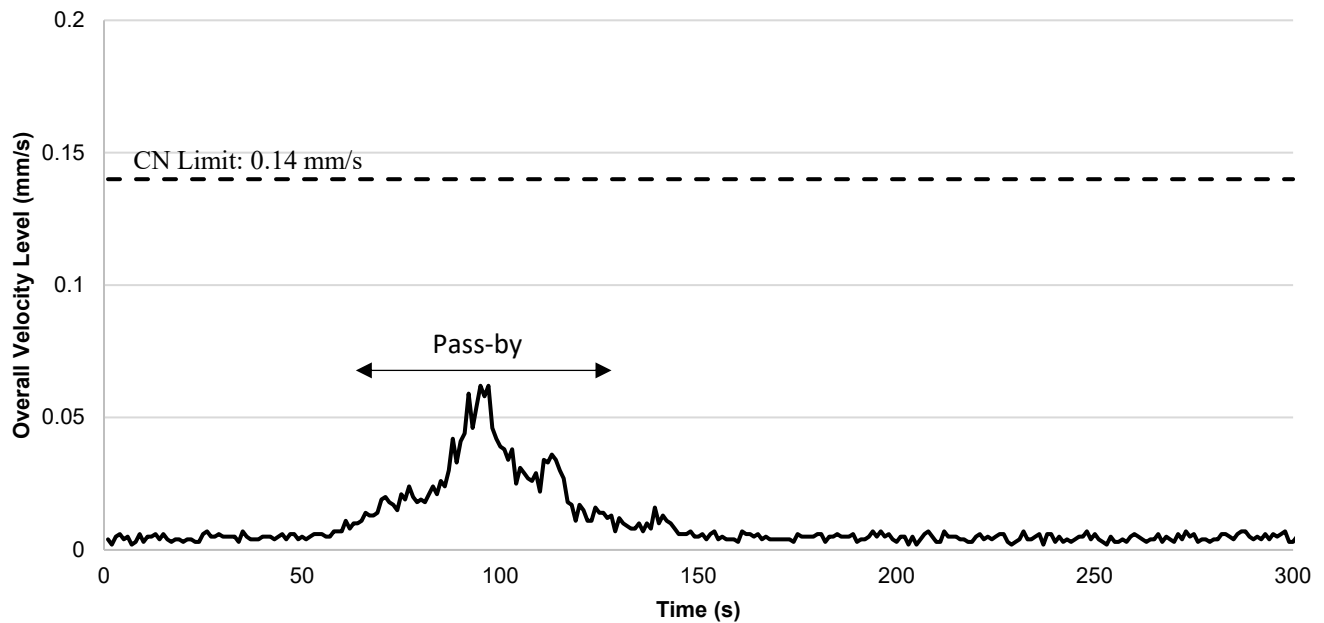
**Pass-by 5 at 30 m from ROW at M1  
Measured Vibratory Velocity Level**



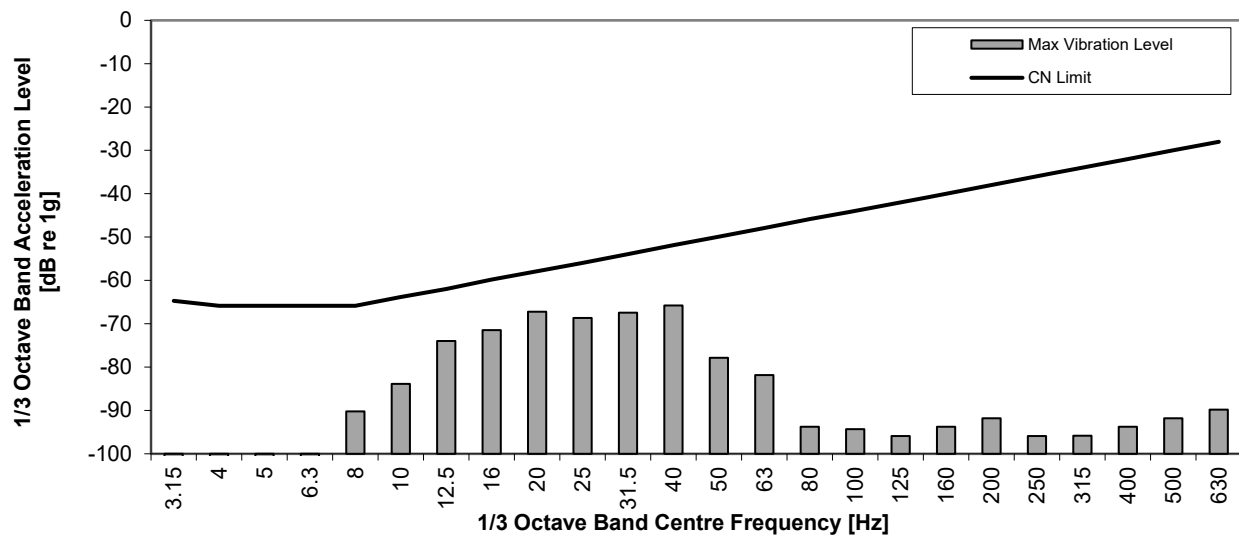
**Pass-by 5 at M1  
Acceleration Spectrum @ Peak Level (1 sec. Duration)**



**Pass-by 6 at 30 m from ROW at M1  
Measured Vibratory Velocity Level**



**Pass-by 6 at M1  
Acceleration Spectrum @ Peak Level (1 sec. Duration)**



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# Appendix E

## Consultant's Statutory Declaration



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## CONSULTANT STATUTORY DECLARATION

|                            |   |                                        |
|----------------------------|---|----------------------------------------|
| <b>CANADA</b>              | ) | In the Matter of the                   |
|                            | ) | Environmental Protection               |
| <b>PROVINCE OF ONTARIO</b> | ) | Act and the Planning Act               |
|                            | ) |                                        |
|                            | ) | And in the Matter of an                |
|                            | ) | Application for a                      |
|                            | ) | Noise and Vibration Feasibility Study, |
|                            | ) | Proposed Residential Development,      |
|                            | ) | 51 – 55 Hawkesville Road, Town of      |
|                            | ) | Woolwich, Ontario                      |

I, Victor Garcia, of the City of Burlington, in the Region of Halton, SOLEMNLY  
DECLARE THAT:

1. I am a Professional Engineer employed by HGC Noise Vibration Acoustics which holds a Certificate of Authorization and have personal knowledge of the matters set out below.
2. I was retained or employed as the principal consultant to undertake the assessment of noise impacts and recommendation of noise mitigation measures for the property described as the proposed residential development located at 51 – 55 Hawkesville Road in the Town of Woolwich, Ontario.
3. I had the expertise required to perform these services. Any assessment activities or recommendations requiring the application of engineering principles have been undertaken or supervised by an engineer qualified to perform such services.
4. The information used in the study entitled Noise and Vibration Feasibility Study, Proposed Residential Development, 51 – 55 Hawkesville Road, Town of Woolwich, Ontario is the best available information as of the date of the study.
5. The sound level calculations, the interpretation of noise attenuation requirements, and the recommended measures are in accordance with Ministry of Environment, Conservation and Parks Guidelines, Region of Waterloo policies, any applicable policy of guidelines or the Area Municipality, and any other applicable policy or guideline.
6. The physical noise attenuation measures proposed in this study are feasible to implement and will provide the level of attenuation indicated in the study.

7. I acknowledge that this study may be subject to a peer review conducted at my cost.
8. I acknowledge that public authorities and future owners, occupants and others may rely on this statement.

AND I make this solemn Declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath.

  
KAZUKI TAKAHASHI (LSO: P08880)  
Notary Public, Paralegal, RCIC  
53 Norn Crescent, Markham  
Ontario L3S 2A9 Canada  
T: 1647-699-3111, 519-312-7777  
Email: expert@laws.services  
canadianlegalcounsel@gmail.com  
www.Laws.Services



)  
)  
)  
\_\_\_\_\_  
  
Victor Garcia

Sworn (or Affirmed/Declared) remotely via video call at the City of Burlington, Province of Ontario, before me, Kazuki Takahashi, at the City of Markham, in the Province of Ontario, pursuant to O. Reg. 431/20, Administering Oaths or Declarations Remotely on May 22, 2026.