FINAL

# Noise and Vibration Impact Study

10194549 Canada

Lot 16 through Lot 19, Concession 2, Lansdowne, ON

Prepared for:

10194549 Canada

Lot 16 through Lot 19, Concession 2

Lansdowne, ON

Attn: Mr. Shane Kelly

February 10, 2020

Pinchin File: 236746



MEMBER OF THE PINCHIN GROUP

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## EXECUTIVE SUMMARY

10194549 Canada retained Pinchin Ltd. (Pinchin) to prepare a noise and vibration impact feasibility study for its proposed mixed use Development located at Lot 16 through Lot 19, Concession 2, Lansdowne, ON. This report has been prepared to support the site plan control application for the proposed Development.

Site visits were conducted by Pinchin on October 29 and 30, 2019. During the site visits, the existing stationary sources were verified and train passby vibration measurements were conducted to quantify the groundborne vibration.

An assessment of the road and rail traffic noise impacts on the proposed development was completed by examining the individual and cumulative acoustic contributions of road and/or rail noise sources on the proposed Development. Applicable noise control measures were recommended so that the MECP road and rail noise guidelines can be met at affected facades and outdoor living area locations. The recommended noise control measures are typical of residential developments adjacent to roadways and railway corridors.

The vibration measurement results show that the vibration impact is within the acceptable range as defined by the CN vibration guideline limit. Vibration mitigation measures such as special vibration isolation foundations are therefore not required for this Development.

This feasibility study has also reviewed the potential noise impacts of nearby stationary sources on the proposed project, the project on the existing community. Noise impacts were found to be within acceptable limits as defined in MECP Publication NPC 300.

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# 1.0 INTRODUCTION AND SCOPE

## 1.1 Statement of Understanding

Pinchin Ltd. (Pinchin) was retained by 10194549 Canada (Client) to prepare a noise and vibration impact feasibility study for its proposed mixed use Development in Lansdowne, Ontario. The legal description of the Development is located at Lot 16 through Lot 19, Concession 2, Lansdowne, ON. This report has been prepared to support the site plan control application for the proposed Development.

Based on the information available to Pinchin, it is understood that the Client proposed a mixed use Development at two sites: the West Site and the East site. The West Site is located to the west of County Road 3 (Prince Street). The West Site will include a recreation centre and an entertainment facility (Go Kart). The CN railway tracks are located to the north of the site.

The East Site is bounded by CN railway tracks to the north, County Road 3 to the west, and County Road 2 to the south. The East Site will include mostly residential dwellings of various elevations, a retirement/nursing home and a hotel. Scaled area plan and site plans for the Development are provided in Figures 1 to 3, Appendix B.

# 2.0 NOISE CRITERIA

The applicable guidelines for new residential development are those outlined in the Ministry of the Environment, Conservation and Parks (MECP) land use planning Publication NPC-300 [1]. The applicable noise criteria for this proposed development are described as follows:

## 2.1 Outdoor Noise Criteria

The daytime noise criterion for outdoor amenity areas (outdoor living areas, OLA) is 55 dBA for road and rail noise sources. Where it is not technically, economically, or administratively feasible to meet the 55 dBA limit, up to 60 dBA is permissible with warning clauses. Where the daytime sound level is greater than 60 dBA, control measures are required to reduce the sound level to 60 dBA or less.

## 2.2 Indoor Noise Criteria

For road traffic noise sources, the indoor sound level limits for the living/dining areas are 45 dBA during daytime hours (7:00 am – 11:00 pm). For sleeping quarters, the indoor sound level limit is 40 dBA during nighttime hours (11:00 pm- 7:00 am). Where a railway is involved, the corresponding sound level limits are 5 dB lower to address the low frequency noise that is characteristic of a train passby. Therefore, the interior sound level limits for living/dining and sleeping areas are 40 dBA and 35 dBA, respectively in the case of rail noise.

### 2.3 Exterior Building Façade Noise Criteria

Where the sound levels at the exterior of the building facades exceed 55 dBA at living/dining room windows during daytime hours and 50 dBA at bedroom windows during nighttime periods, the unit must be provided with forced air heating with provision for central air conditioning. Where the sound levels exceed by more than 10 dB (i.e. 65 dBA at living/dining room windows and 60 dBA at bedroom windows), central air conditioning must be incorporated into the building design prior to occupancy. Warning clauses are applicable as well.

### 2.4 Noise Criteria for Stationary Sources

For non-transportation sources (i.e. rooftop HVACs and exhausts, etc.), the applicable Ministry of Environment, Conservation and Parks (MECP) noise criteria at a point of reception (POR) are dictated by Publication NPC-300 [1] for Class 2 Areas. These guidelines state that the one-hour sound exposures (Leq, 1 hour) from stationary noise sources in Class 2 areas shall not exceed:

- the higher of 50 dBA or background noise between 0700h and 1900h;
- the higher of 50 dBA or background noise between 1900h and 2300h; and
- the higher of 45 dBA or background noise between 2300h and 0700h.

## 3.0 VIBRATION CRITERIA

Groundborne vibration arising from rail and wheel interaction can manifest itself as an impact issue by transmitting into the ground and propagating to the proposed areas of reception. The proposed and existing buildings will dynamically respond to this vibration and the result may be re-radiated energy into the living quarters. Groundborne vibration in itself can give rise to conditions of excitation of primary and secondary building structures and will be perceived as a rumble and/or rattling of fixtures, wall hangings in the dwelling unit.

Typically the nearest facades that are within 75 m from the railway right-of-way are assessed with respect to rail groundborne vibration. The nearest facades in the site specific case are in the range of 75 m from railway right-of-way. As a result, vibration measurements were conducted at a selected location along the railway tracks, in order to determine the unique site specific groundborne vibration characteristics.

Vibration is assessed in accordance with the CN Principal Main Line Requirements [4]. The overall groundborne vibration shall not exceed 0.14 mm/s RMS (root mean square) at the proposed residences.

## 4.0 NOISE AND VIBRATION IMPACT ASSESSMENT

The main sources of transportation noise affecting this Development include County Road 2, County Road 3, and the CN Railway Kingston West Subdivision. The sound levels at the proposed development due to road and rail traffic were calculated using the MECP software STAMSON, Version 5.04 [2].

### 4.1 Road Traffic Data

The Annual Average Daily Traffic (AADT) volumes for the two local roads in 2018 were obtained from the United Counties of Leeds and Grenville, Ontario. The traffic data were projected to year 2030 using annual growth rates determined based on the historical traffic volume data. The commercial vehicles were estimated at 2% for both medium and heavy trucks. The details of road traffic data and STAMSON calculation samples are provided in Appendix C.

### 4.2 Rail Traffic Data

The CN Kingston West Subdivision is located to the north of the Development sites. The distance from the nearest track to the residential property line is approximately 80. Rail traffic data were obtained from CN and, as required by CN, were escalated by 2.5% per year for a 10-year period. There are at grade level crossings in the vicinity of the study area; hence, train whistle has been included in this assessment. The details of rail traffic data and STAMSON calculation samples are provided in Appendix C.

Using the above projected road and rail traffic data, the applicable sound levels were calculated using STAMSON and are included in Table 1, Appendix A.

### 4.3 Stationary Sources

At the time this report was prepared, detailed mechanical equipment had not been finalized. However, based on discussions with the Client and information provided by potential suppliers, it is anticipated that both the recreation centre and the entertainment facility will have some outdoor mechanical units. Based on discussions with the Client, it was assumed that the recreation centre will have two cooling towers on the roof. For the proposed entertainment facility, it was assumed that there would two air handling units also located on the roof. Manufacturer sound data for similar sized equipment from Pinchin's past projects were used in this assessment. Details of the equipment sound data are provided in Table 2, Appendix A.

To evaluate the noise impacts from the proposed mechanical equipment, four points of reception (R1 to R4) were selected from the nearby existing and future homes. Receptors R1 and R2 represent existing one storey homes located on the west side of County Road 3. Receptor R3 represents a proposed one storey home within the Development, and is located along the east side of County Road 3. Receptor R4

represents a proposed four storey apartment within the Development, and is located along the east side of County Road 3.

The predicted stationary source noise impact at the selected receptors is summarized in Table 3, Appendix A. Noise impact contour map is presented in Figure 4, Appendix B.

Based on observations during the site visits, it was observed that there are a few commercial operations along County Road 3 and Railway Street. Along County Road 3, the commercial operations include an auto repair shop, a medical clinic and a funeral home. At Railway Street, there is a hardware store and a vehicle storage yard.

It was observed during the site visits that the commercial operations along County Road 3 do not have significant stationary sources such as paint booths, exhausts, etc. There was no actual work done at the vehicle storage yard along Railway Street. The vehicles typically leave the yard for outside work during regular business hours.

Based on the above Pinchin observations and discussions with the stationary source owners, it is our opinion that these commercial operations do not generate significant noise impact on the proposed Development. Consequently, these stationary sources were deemed acoustically insignificant.

### 4.4 Railway Vibration

Groundborne vibration measurements were conducted, during a site visit on October 29, 2019, at a location identified in Figure 1. The location was chosen as it was located at approximately the same distance to the tracks as the nearest dwellings (units 117 to 123) in the East Site Plan.

Both CN freight and VIA passenger trains were measured during the site visit. The measurement and analysis indicate that the groundborne vibration levels were found to be below the CN Requirements for groundborne vibration level of 0.14 mm/s RMS. The measurement results are provided in Table 4, Appendix A, and Figures 5 to 12, Appendix B.

The measurement weather conditions and instrumentation are provided in Appendices E and F, respectively.

### 4.5 Noise Impact of the Development on Itself

The proposed residential development is required to satisfy the general requirements of the Ontario Building Code. The construction of the partitions within a residential building shall meet the following minimum STC (Sound Transmission Class) requirements.

| | |
|---|---|
| Suite/Suite – Wall or Floor | STC of 50 |
| Suite/Elevator Hoist way or Refuse Chute | STC of 55 |

## 5.0 NOISE CONTROL REQUIREMENTS AND RECOMMENDATIONS

The predicted sound levels at the worst case receptor locations are summarized in Table 1, Appendix A, for both road and rail noise under both daytime and nighttime conditions. Upgraded window glazing that is slightly beyond the minimum Ontario Building Code (OBC) requirements were determined as per the CMHC guideline [3] and are outlined below.

### 5.1 Lots 117-123

These lots are located at the northeast corner of the East Site. The dwellings will be two storey detached homes. The property line in the backyards is approximately 80 m to the nearest railway track. It is anticipated that the building facades are within 100 m of the railway tracks.

As shown in Table 1, Appendix A, the predicted day and nighttime noise levels from the rail traffic are 63 dBA and 61 dBA, respectively. Since the combined 24-hour noise level is greater than 60 dBA, and the building is within 100 m of the tracks, it is required that the exterior walls facing the railway tracks are to be built to a minimum of brick veneer or masonry equivalent construction. This requirement is provided in accordance with the MECP Publication NPC-300. In addition, window upgrading, and the installation of central air conditioning systems are also required, as well as Warning clause Type D.

To protect the outdoor living areas (i.e. backyards) associated with these lots, it is recommended that an acoustic barrier of at least 1.8 m high be constructed along the property line facing the railway tracks. In addition, Warning clause Type B is required.

The acoustic barrier may be constructed from a combination of materials such as earth, wood, metal, brick, concrete, etc. The acoustic barriers must have a minimum surface density of 20 kg/m$^2$. The barriers should be structurally sound, appropriately designed to withstand wind and snow load, and constructed without cracks or surface gaps. Any gaps under the barriers that are necessary for drainage purposes should be minimized and localized, so that the acoustical performance of the barriers is maintained.

Details of noise level prediction, indoor noise level calculations, and determination of control measures are provided in Table D1, Appendix D.

### 5.2 Lots 77-84, 124

These lots are located at the northwest corner of the East Site. The dwellings will be one storey detached homes, except Lot 124. The predicted day and nighttime noise levels from the rail traffic are 59 dBA and 57 dBA, respectively.

Based on the predicted noise levels, these buildings should be designed with provisions for the installation of central air conditioning in the future, at the occupant's discretion. Warning clause Type C is also required to be included in agreements of offers of purchase/sale, and lease/rental. Details of Warning clause Type C is provided in Appendix G.

Details of noise level prediction, indoor noise level calculations, and determination of control measures are provided in Table D2, Appendix D.

### 5.3 Lot 31

This lot is located at the southwest corner in the East Site Plan. The dwelling will be a one storey detached home. The predicted road traffic noise impacts are 56 dBA and 49 dBA during day and nighttime, respectively.

Based on the predicted noise levels, the building should be designed with provisions for the installation of central air conditioning in the future, at the occupant's discretion. Warning clause Type C is also required to be included in agreements of offers of purchase/sale, and lease/rental. Details of Warning clause Type C is provided in Appendix G.

### 5.4 Lots 149 and 150

These lots are located along County Road 3, near Lot 31 In the East Site Plan. The dwellings will be a 3-4 storey apartments. The predicted road traffic noise impacts are 54 dBA and 48 dBA during day and nighttime, respectively.

Based on the predicted noise levels, no additional noise control measures or warning clauses are required.

### 5.5 Retirement/Nursing Home

The building is located on the south side of the East Site plan, along County Road 2. The predicted road traffic noise impacts are 43 dBA and 40 dBA during day and nighttime, respectively.

Based on the predicted noise levels, no additional noise control measures or warning clauses are required.

A review of the site plans indicate that all other lots (including the hotel) are located further away from the respective noise sources than the above identified lots. As such, it is our opinion that the above identified lots represent the worst noise exposures to stationary and traffic noise sources. The impacts on the other lots were deemed meeting applicable guideline limits. No special control measures and warning clauses are warranted.

As per the CN requirements, the following recommendations are provided for Client's consideration:

- Prior to the issuance of building permits, the building plans should be reviewed by an acoustical consultant to ensure compliance with the applicable guidelines.
- Prior to final occupancy, the building/dwellings should be inspected by an acoustical consultant to ensure the required mitigative measures have been incorporated.

In addition, the CN's warning clause (E) is also required to be included in all development agreements, offers to purchase, and agreements of Purchase and Sale or Lease of each dwelling unit within 300 m of the railway right-of-way. Details of the CN warning clause are included Appendix G.

Since the setbacks from the residential buildings to the railway right-of-way well exceed the minimum 30 m requirement. In addition, the residential buildings are separated from the railway by a public road, existing residential homes and commercial buildings. Therefore, it is our opinion that a safety berm and a 5.5 m high noise barrier as indicated in the CN's Principal Main Line Requirements are not required.

### 5.6 Construction Equipment

Typically, both construction noise and vibration effects are temporary in nature and are exempt from NPC-300. However, it is suggested that good industry practices be followed in an effort to mitigate the noise and vibration effects at sensitive receptor locations. Specifically, the following suggestions are provided for consideration:

- Major construction activities, where possible should be scheduled to take place during daytime hours or in accordance with the Town's applicable bylaws.
- Construction equipment including noise mitigation measures (e.g. mufflers) should be properly maintained.
- Construction equipment should be turned off when not in use.
- The noise levels of the construction equipment should not exceed the applicable limits outlined in the MECP Publication NPC-115.
- If noise or vibration is a significant issue in the community, a noise/vibration monitoring program should be developed to ensure compliance with the local bylaws and provincial guidelines.
- To maintain positive community relations, the public should be kept informed about the construction plans and efforts to minimize the noise and vibration effects.
- In case of complaints during the construction activity, prompt actions should be taken to investigate the causes and address the issues in a timely manner.

## 6.0 CONCLUSIONS

A noise and vibration assessment of the road and rail traffic noise and vibration impacts on the proposed development was completed by examining the individual contributions of road and/or rail noise sources. Applicable noise control measures were recommended so that the MECP road and rail noise guidelines can be met at affected facades and outdoor locations. The recommended noise control measures are typical of residential developments adjacent to arterial roadways and railway corridors in the study area along this principal main line study area.

Noise impact from stationary noise sources associated with the Development was also found to be acceptable as defined by MECP Publication NPC 300.

The vibration measurement results show that the vibration impact is well within the CN Rail guideline limit for groundborne vibration. As a result, vibration mitigation measures such as special upgraded foundation walls are not required for this development.

This noise and vibration impact feasibility study has also considered the noise impact of the project on the environment, which is expected to be minimal; and it has also provided guidelines and recommendations to address the potential impact of the development on itself.

In conclusion, with the implementation of the recommended noise control measures and warning clauses, noise impacts from traffic and stationary sources will meet the guideline limits outlined in the MECP Publication NPC 300 and CN Requirements.

## 7.0 TERMS AND LIMITATIONS

This work was performed subject to the Terms and Limitations presented or referenced in the proposal for this project.

Information provided by Pinchin is intended for Client use only. Pinchin will not provide results or information to any party unless disclosure by Pinchin is required by law. Any use by a third party of reports or documents authored by Pinchin or any reliance by a third party on or decisions made by a third party based on the findings described in said documents, is the sole responsibility of such third parties. Pinchin accepts no responsibility for damages suffered by any third party as a result of decisions made or actions conducted. No other warranties are implied or expressed.

## 8.0 REFERENCES

1. Ministry of the Environment Publication NPC-300, "Environmental Noise Guideline – Stationary and Transportation Sources-Approval and Planning", August 2013.
2. Ministry of the Environment's STAMSON/STEAM Computer Programme, (Version 5.04), 1989.
3. Canadian Mortgage and Housing Corporation (CMHC), Road and Rail Noise: Effects on Housing, 1981.
4. CN, Principal Main Line Requirements, June 2008.

**APPENDIX A**

**Tables**

**(4 Pages)**

**Table 1: Road and Rail Traffic Noise Impact Predictions**

| Building | Point of Reception Description | Predicted Road Noise Level, (Leq, dBA) [1] | | Predicted Rail Noise Level, (Leq, dBA) [1] | | Predicted Total Noise Level (Leq, dBA) [1] | |
|---|---|---|---|---|---|---|---|
| | | Daytime (16 hr) | Nighttime (8 hr) | Daytime (16 hr) | Nighttime (8 hr) | Daytime (16 hr) | Nighttime (8 hr) |
| Lot 31 | 1-Storey Home, Along County Road 3 | **56** | **49** | | | 56 | 49 |
| Lots 149, 150 | 4-Storey Apartments, Along County Road 3 | **54** | **48** | | | 54 | 48 |
| Lots 77-84, 124 | 1-Storey Homes, Facing CN Railway | | | **59** | **57** | 59 | 57 |
| OLAs - Lots 117-123 | OLAs, Facing CN Railway | | | **62** | | 62 | |
| OLAs - Lots 117-123 | With Acoustic Barriers | | | **60** | | 60 | |
| Lots 117-123 | Two-Storeys, Northeast Corner of the Site | | | **63** | **61** | 63 | 61 |
| RET | 1-Storey, Retirement/Nursing Home | **43** | **40** | | | 43 | 40 |

**Notes:**

- Daytime hours are between 7:00 am and 11:00 pm and nighttime hours are between 11:00 pm and 7:00 am.
- The blank field indicates the noise impact is insigficant due to the shielding by the buildings.

[1] STAMSON predicted sound levels at the planes of windows or outdoor living areas in dBA.

**Table 2: Stationary Noise Source Summary Table**

| Source ID [1] | Source Description | 1/1 Octave Band Sound Power Level (dB, Ref. 10-12 W) [2] | | | | | | | | | | Source Location [3] | Sound Characteristics [4] | Noise Control Measures [5] | Source of Data [6] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | $L_w$(A) | | | | |
| CT1 | Cooling Tower | | 95 | 94 | 89 | 87 | 86 | 82 | 80 | 77 | **91** | O | S | U | Man |
| CT2 | Cooling Tower | | 95 | 94 | 89 | 87 | 86 | 82 | 80 | 77 | **91** | O | S | U | Man |
| MAU1 | Make-up Air Unit | 86 | 99 | 94 | 92 | 92 | 88 | 85 | 81 | 77 | **94** | O | S | U | Man |
| MAU2 | Make-up Air Unit | 86 | 99 | 94 | 92 | 92 | 88 | 85 | 81 | 77 | **94** | O | S | U | Man |

**Notes:**

[1] Wherever possible, the Source ID is identical with that used in the ESDM report.

[2] Sound Power Levels of continuous noise sources, in dBA, do not include sound characteristic adjustments per NPC-104. Values are unadjusted, unmitigated PWLs.
Sound Power Levels of impulsive noise sources, in dBAI, are A-weighted incorporating an impulsive time weighting.

[3] Source Location:
O - located/installed outside the building, including on the roof
I - located/installed inside the building

[4] Sound Characteristic
S = Steady I = Impulsive T = Tonal
Q = Quasi-Steady Impulsive B = Buzzing C = Cyclic

[5] Noise Control Measures
S = Silencer/Muffler L = Lagging O = other
A = Acoustic lining, plenum E = acoustic enclosure U = uncontrolled
B = Barrier, berm, screening

[6] Mea - Measured Man - Manufacturer's Data
Cal = Engineering Calculations ### - Same as ID ###

**Table 3: Acoustic Assessment Summary Table - Stationary Sources**

| Point of Reception ID | Point of Reception Description | Time Period [1] | Total Level at POR ($L_{eq}$, 1-hr) [2] | Verified by Acoustic Audit (Yes/No) | Performance Limit ($L_{eq}$ 1-hr) [3] | Compliance with Performance Limit (Yes/No) |
|---|---|---|---|---|---|---|
| R1 | One Storey Home West of County Road 3 | Daytime | 36 | No | 50 | Yes |
| | | Evening | 36 | No | 50 | Yes |
| | | Nighttime | 36 | No | 45 | Yes |
| R2 | One Storey Home West of County Road 3 | Daytime | 45 | No | 50 | Yes |
| | | Evening | 45 | No | 50 | Yes |
| | | Nighttime | 45 | No | 45 | Yes |
| R3 | One Storey Home East of County Road 3 | Daytime | 37 | No | 50 | Yes |
| | | Evening | 37 | No | 50 | Yes |
| | | Nighttime | 37 | No | 45 | Yes |
| R4 | Four Storey Apartment East of County Road 3 | Daytime | 39 | No | 50 | Yes |
| | | Evening | 39 | No | 50 | Yes |
| | | Nighttime | 39 | No | 45 | Yes |

**Notes:**

[1] The predictable worst-case one (1) hour period was considered in the study.

[2] Worst-case one hour equivalent sound level from all applicable sources operating in dBA.

[3] NPC-300 exclusionary sound level limits of one hour Leq for Class 2 Areas.

**Table 4: Summary of Vibration Measurement Results**

| Measurement No. [1] | Train Description | Maximum Vibration Velocity, mm/s ($V_{rms}$, 1 s) [2] | Performance Limit, mm/s ($V_{rms}$, 1 s) [3] | Compliance with Performance Limit (Yes/No) |
|---|---|---|---|---|
| 003 | VIA Passenger Trains, Both Directions | 0.06 | 0.14 | Yes |
| 004 | CN Freight Train Going East | 0.10 | 0.14 | Yes |
| 005 | VIA Passenger Train Going East | 0.04 | 0.14 | Yes |
| 006 | VIA Passenger Train Going West | 0.05 | 0.14 | Yes |
| 007 | CN Freight Train Going West | 0.07 | 0.14 | Yes |
| 008 | VIA Passenger Train Going East | 0.04 | 0.14 | Yes |
| 009 | VIA Passenger Train Going East | 0.06 | 0.14 | Yes |
| 010 | VIA Passenger Train Going West | 0.04 | 0.14 | Yes |

**Notes:**

[1] The measurement location was approximately 103 m to the middle of the train tracks.
[2] Measured maximum vibration velocity level in mm/s, with an RMS averaging time constant of 1 second.
[3] CN vibration guideline limit in mm/s, with an RMS averaging time constant of 1 second.

**APPENDIX B**

**Figures & Drawings**

**(8 Pages)**

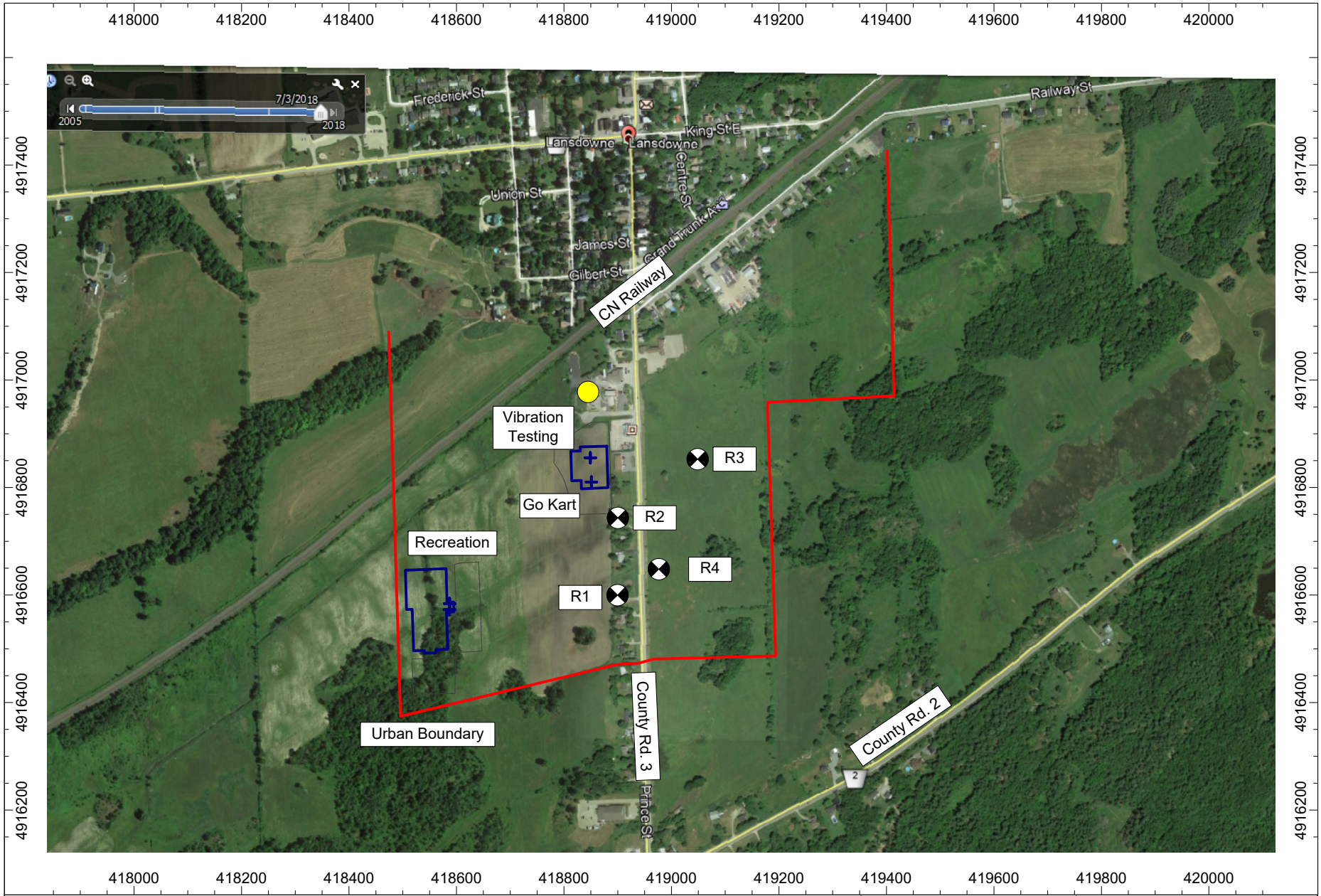


**Figure 1 - Scaled Area Plan, Showing the Development, Receptors and Vibration Measurement Location**

N

| | |
|---|---|
| Drawn by: WNL | |
| Scale: 1:10,000 | |
| Date: January 21, 2020 | |

10194549 Canada, Lot 16 through Lot 19, Concession 2, Lansdowne, ON

Pinchin Project: 236746

PINCHIN

LANSDOWNE

PART 1
PLAN 28R-2813

Railway Street

PROPOSED ROAD

PROPOSED ROAD

COUNTY ROAD 3 (PRINCESS STREET)

BLOCK147

BLOCK 148

BLOCK 149

BLOCK 150

BLOCK 151

BLOCK 152

BLOCK 153

BLOCK C

BLOCK H

BLOCK A

PARKLAND
CORRIDOR

6m PEDESTRIAN LINK

PRIVATELY
SERVICED
LAND

Hotel

P

P

Retirement /Nursing
Home

MULTI-UNIT
DWELLING

MULTI-UNIT
DWELLING

URBAN BOUNDARY

Detail 'A'
Not to Scale

County Road No. 2

Woodbine St.

Dominion St.

Swastika St.

Figure 2 - West Site Plan

| No. | Revision/Issue | Date |
|---|---|---|
| | | |

Forefront Engineering Inc

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Client
10194549 CANADA
c/o SHANE KELLY

Project
LANSDOWNE DEVELOPMENT

Drawing
EAST SITE CONCEPT PLAN

| Drawn by: | Checked by: | Project No. |
|---|---|---|
| BCAT | KMN | |
| Designed by: | Approved by: | Drawing No. |
| KMN | KMN | SK.1 |
| Date: SEPTEMBER 2019 | | |
| Scale: 1:3500 | | |

RESIDENTIAL

RESIDENTIAL

COMMERCIAL

INSTITUTIONAL

WILLIAMS MARINE LAND

DRAFT PLAN BOUNDARY

TOP OF BERM

BUILDING SETBACK

BLOCK 1

50,000 SQ. FT.
INDOOR
GO-KART
TRACK
(150 SPACES)

COMMERCIAL

County Rd 3 (Prince Street)

BLOCK D

BLOCK 2

RECREATION
CENTRE
WITH
PARKING
(298 SPACES)

PROPOSED ROAD

VACANT

BLOCK 3

RESIDENTIAL

County Road No. 3

URBAN BOUNDARY

Figure 3 - East Site Plan

| No. | Revision/Issue | Date |
|---|---|---|
| | | |

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Client
10194549 CANADA
c/o SHANE KELLY

Project
LANSDOWNE DEVELOPMENT

Drawing
WEST SITE CONCEPT PLAN

| Drawn by: | Checked by: | Project No. |
|---|---|---|
| JB | JB | |
| Designed by: | Approved by: | Drawing No. |
| KMN | KMN | GEN |
| Date: APRIL 2019 | | |
| Scale: 1:3000 | | |

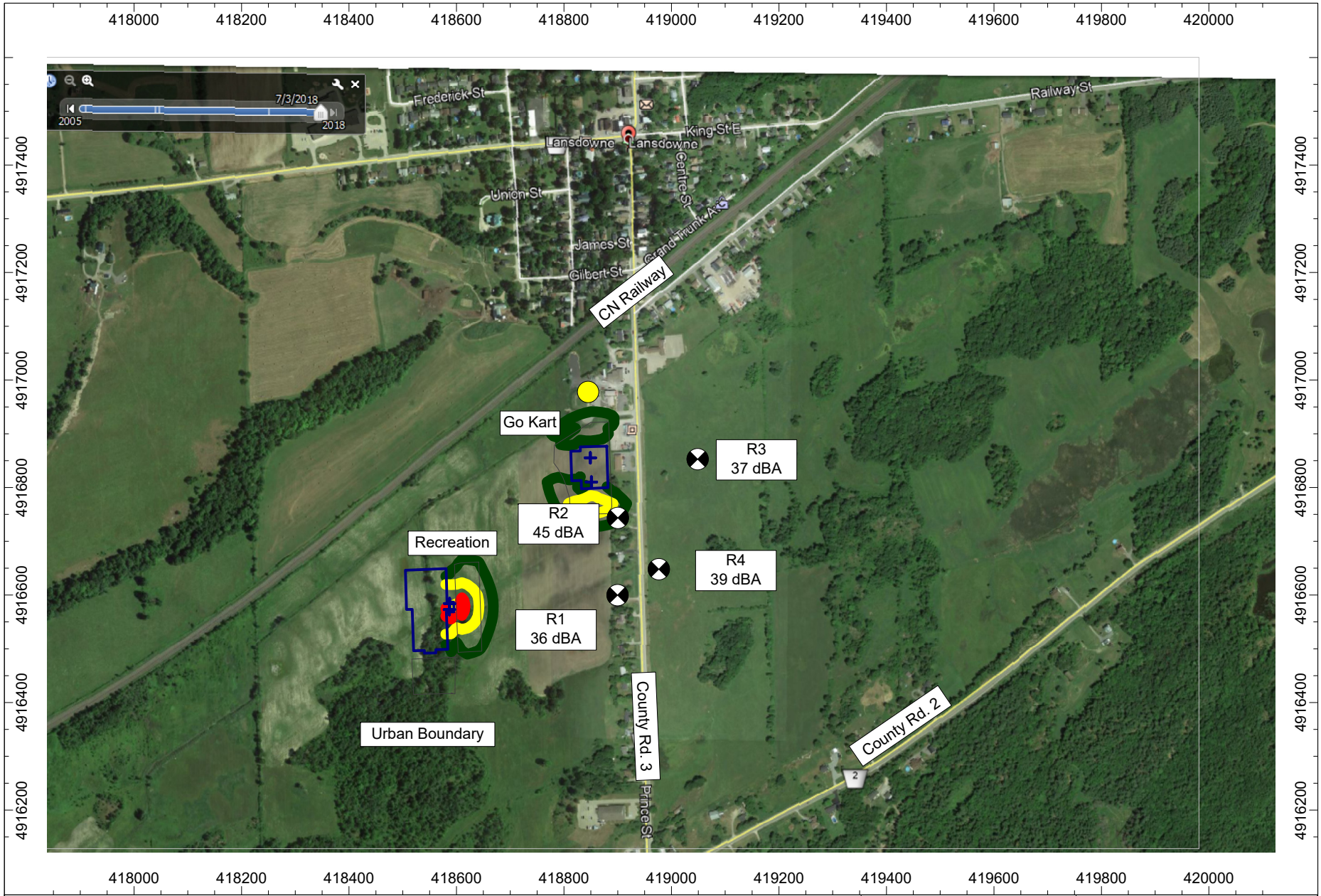



**Figure 4 - Noise Impact from Stationary Noise Sources**

N

| | |
|---|---|
| Drawn by: WNL | |
| Scale: 1:10,000 | |
| Date: January 21, 2020 | |

10194549 Canada, Lot 16 through Lot 19, Concession 2, Lansdowne, ON

Pinchin Project: 236746

PINCHIN

**Figure 5 - #003, VIA Passenger Trains (2 Total)**

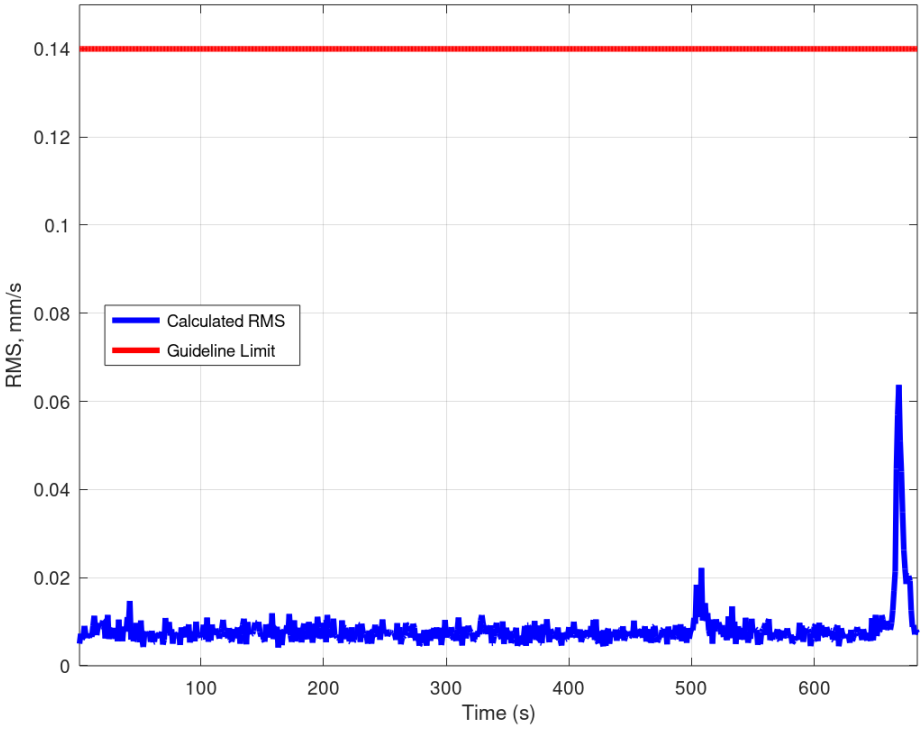



**Figure 6 - #004, CN Freight Train Going East**

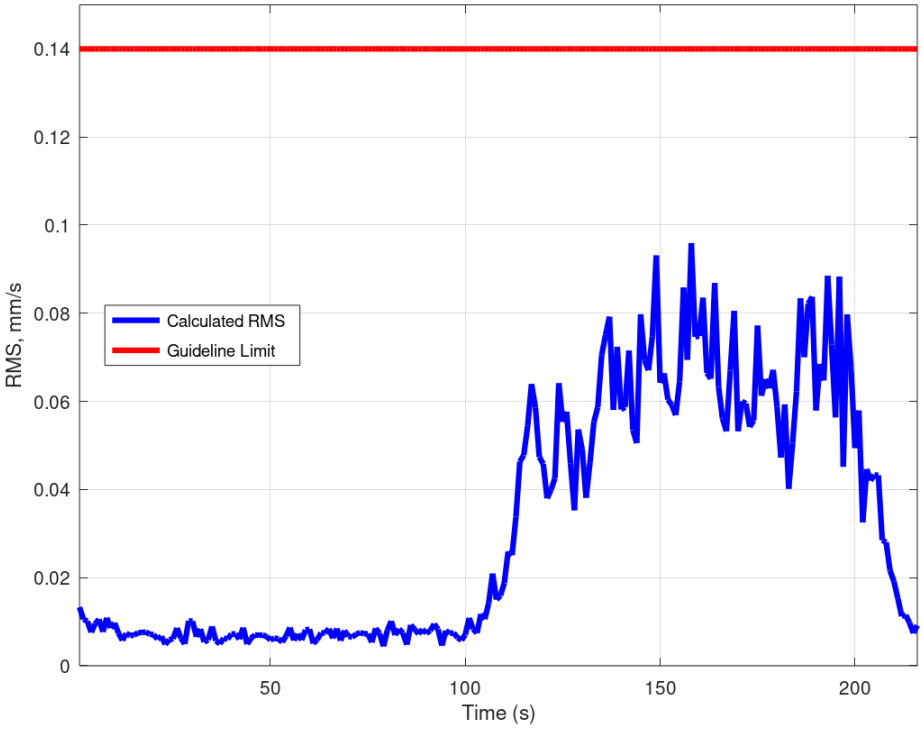


**Figure 7 - #005, VIA Passenger Train Going East**

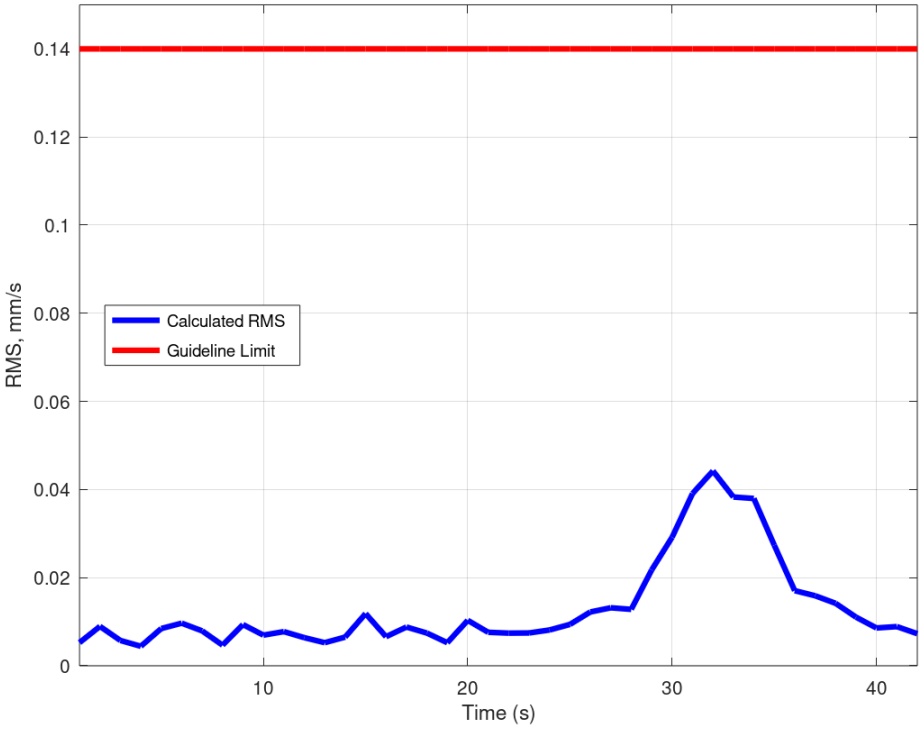



**Figure 8 - #006, VIA Passenger Train Going West**

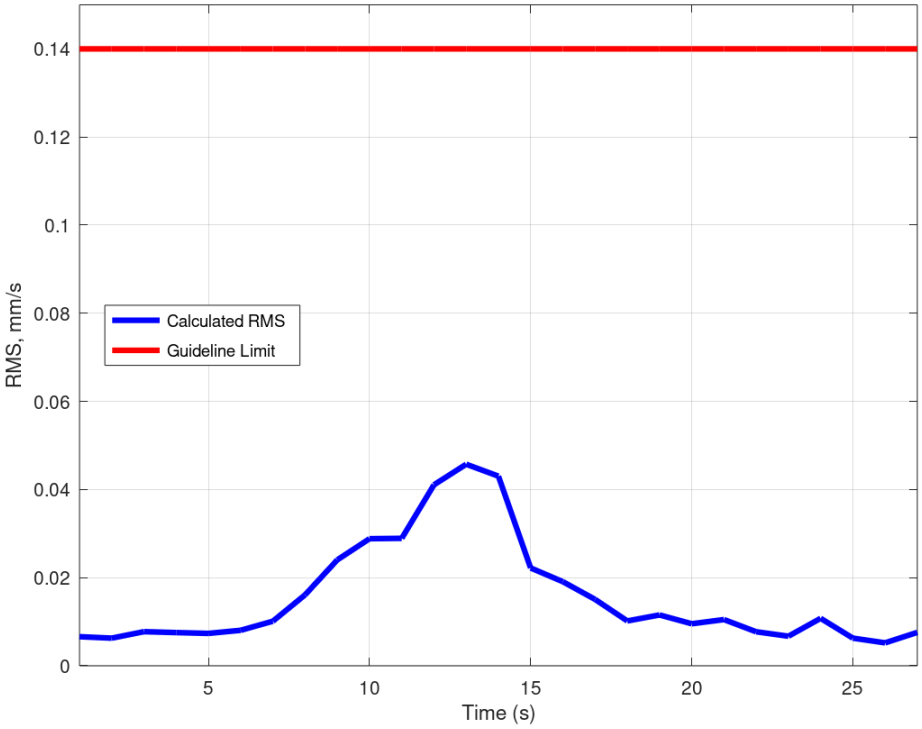


**Figure 9 - #007, CN Freight Train Going West**

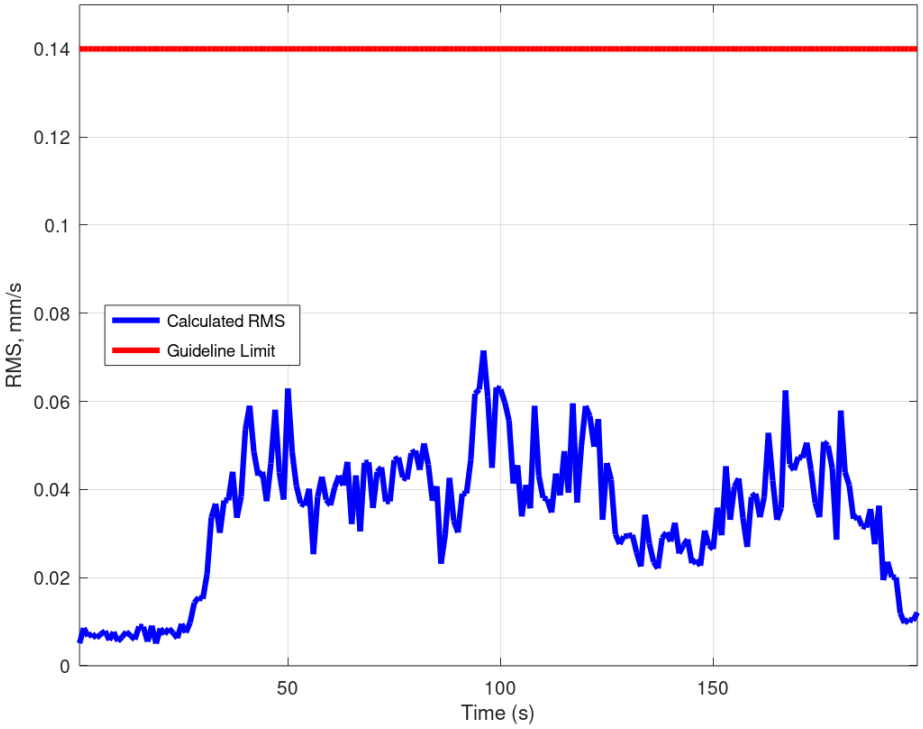



**Figure 10 - #008, VIA Passenger Train Going East**

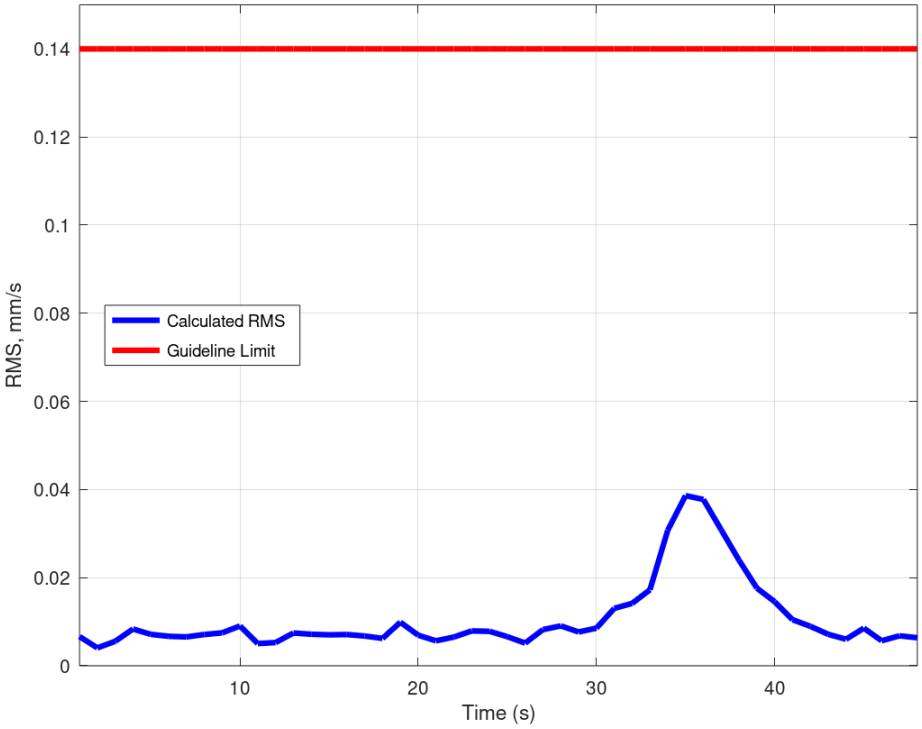


**Figure 11 - #009, VIA Passenger Train Going East**

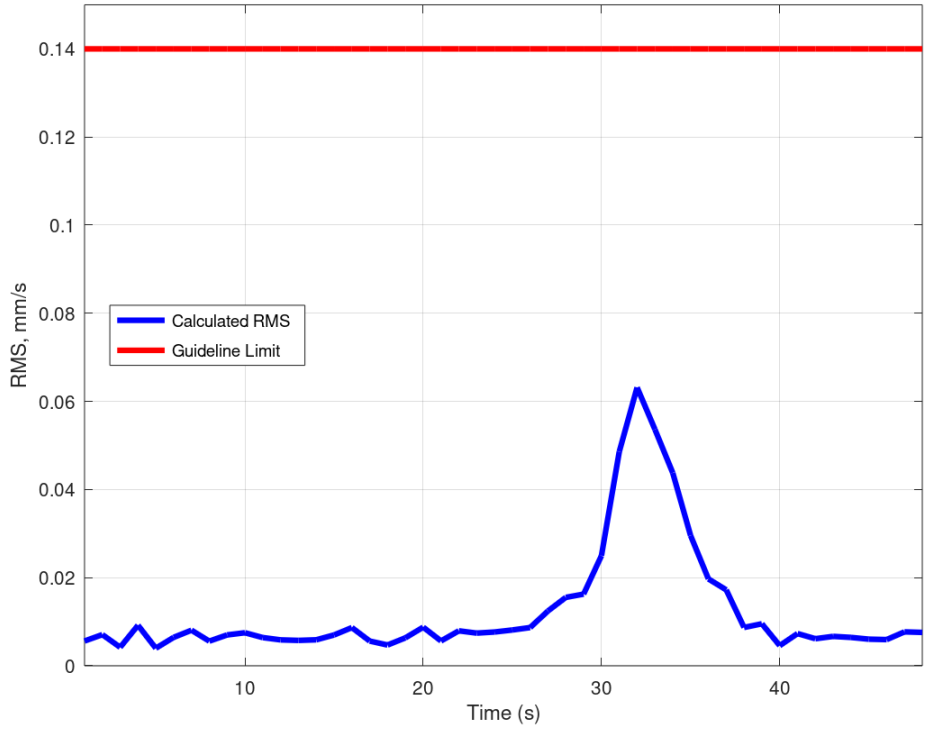
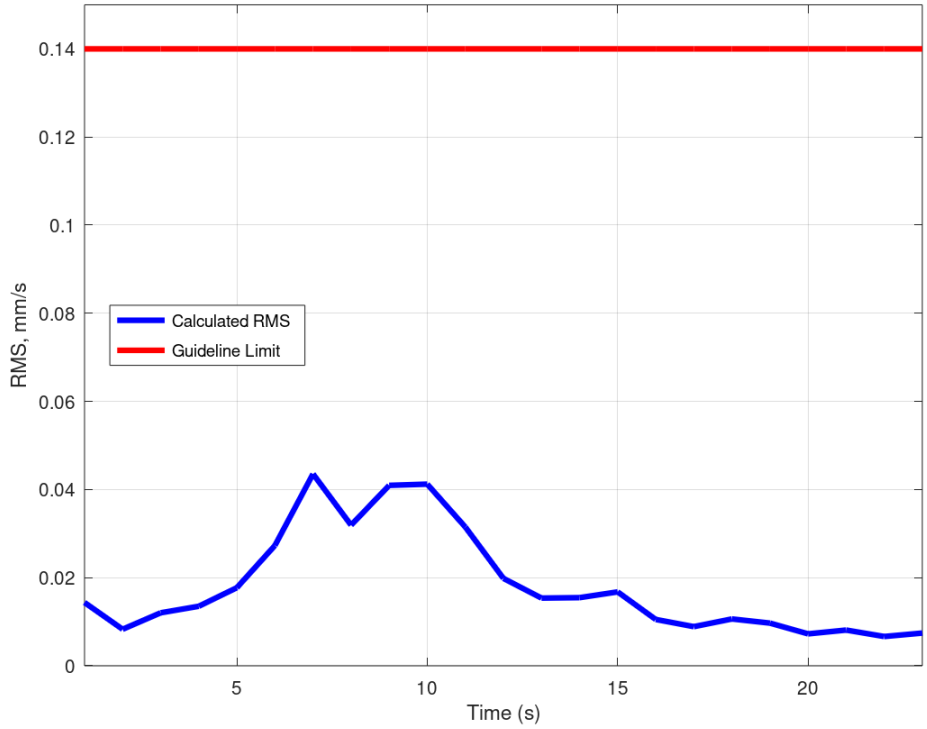



**Figure 12 - #010, VIA Passenger Train Going West**



**APPENDIX C**

**Road/Rail Traffic Data and STAMSON Calculations**

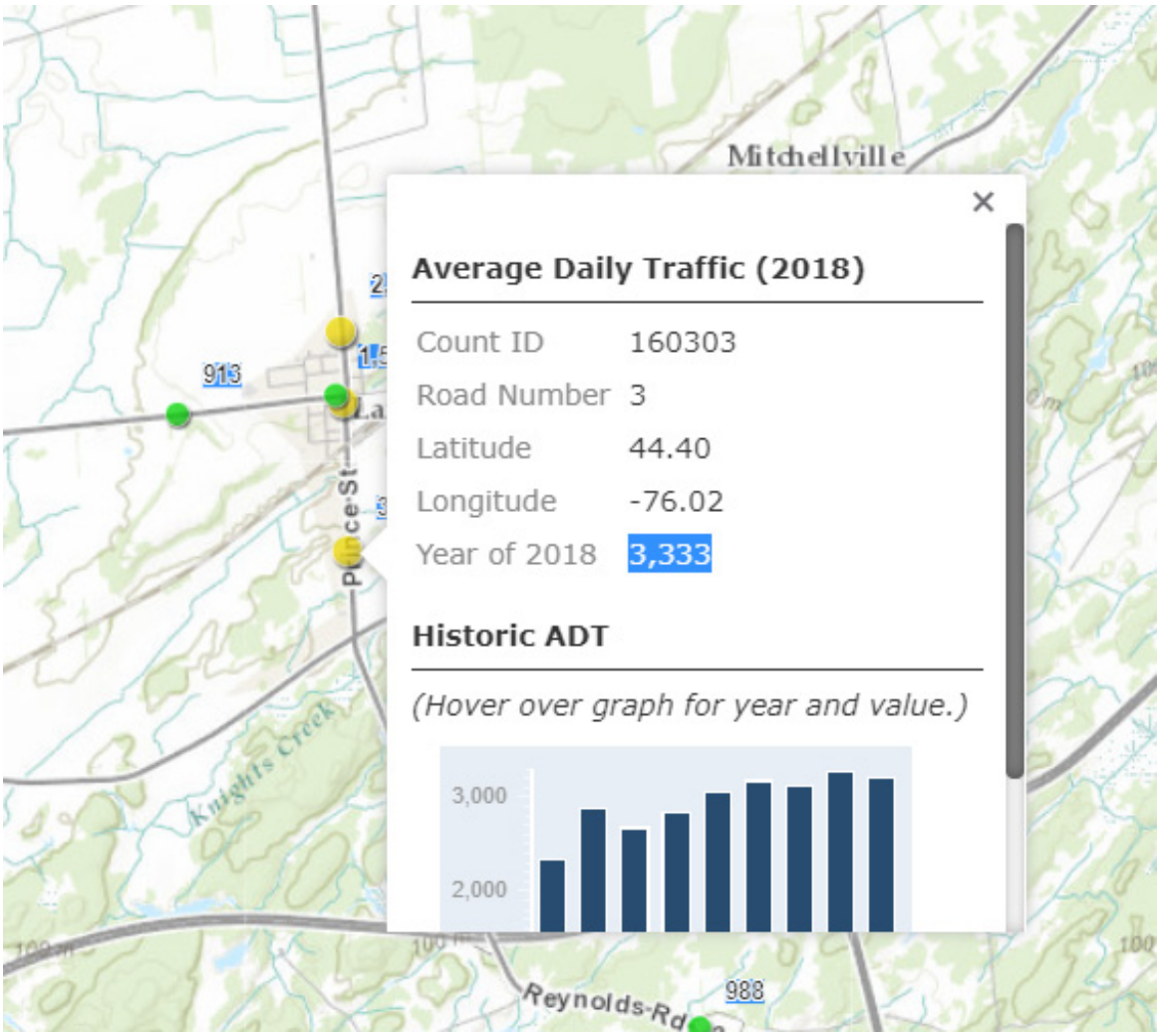
**(21 Pages)**

Table C1 - Road Traffic at Data, Predictions and Adjustments

| | County Road 3 (Prince Street ) | County Road 2 | Notes |
|---|---|---|---|
| AADT - 2018 | 3333 | 1452 | Obtained via Online GIS |
| Annual Increase Rate | 1.20% | 2.1% | Estimated based on historical data |
| AADT - 2030 | 3846 | 1869 | Projected |
| Daytime / Night Split | 90 / 10 | 80 / 20 [1] | As per STAMSON Guidelines |
| Cars | 96% | 96% | For local routes |
| Medium Trucks | 2% | 2% | For local routes |
| Heavy Trucks | 2% | 2% | For local routes |
| Posted Speed Limit, km/hr | 50 | 60 | |

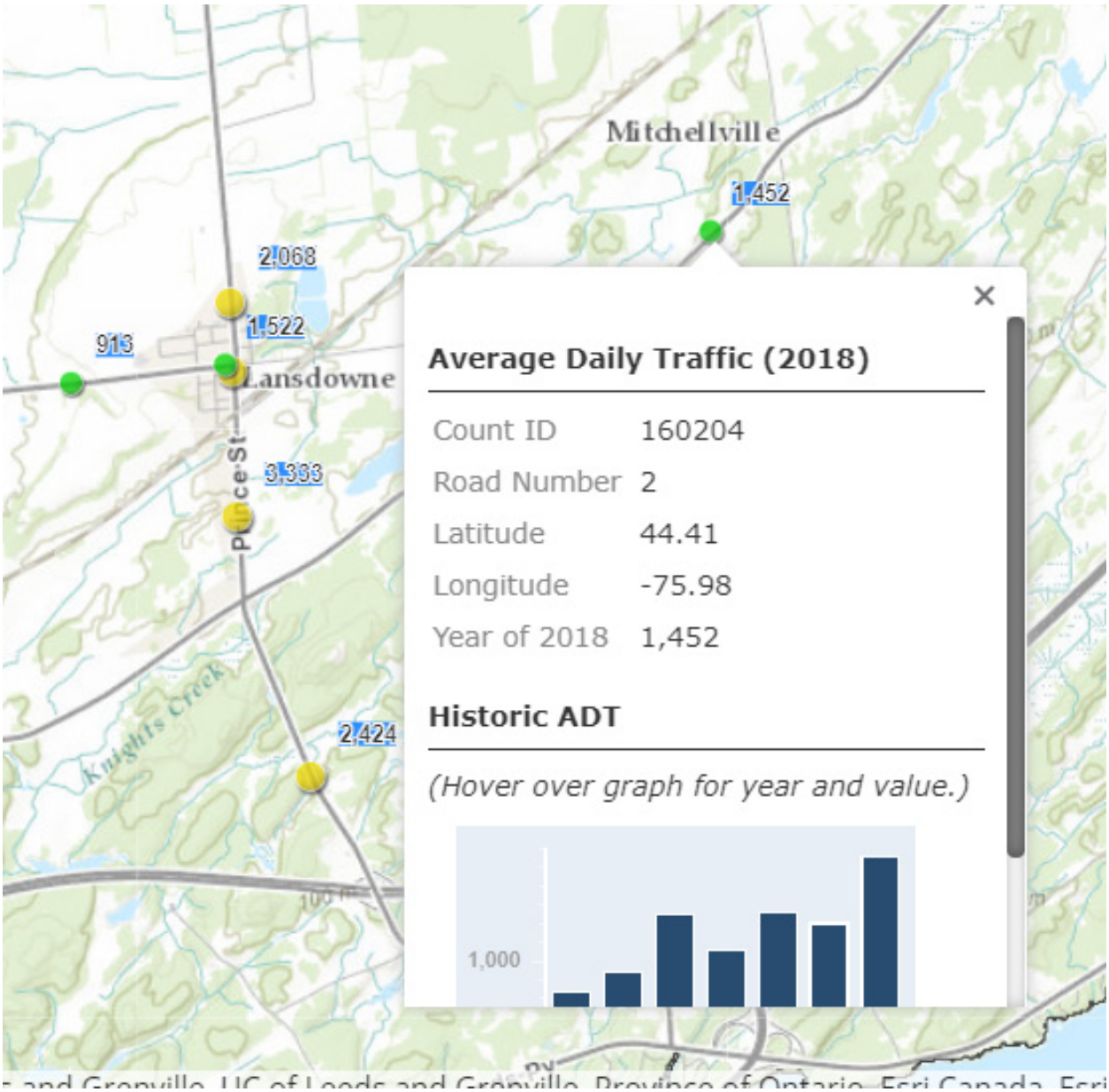
[1]. The 80/20 split was used in order to generate the required minimum hourly vehicles (>40 vph) during nighttime hours.

County Road 3 (Prince St.) 2018 AADT: 3333




https://uclg.maps.arcgis.com/apps/MapSeries/index.html?appid=1b72f532609b402eb2f36fdece43e158

Highway 2, 2018 AADT: 1452




https://uclg.maps.arcgis.com/apps/MapSeries/index.html?appid=1b72f532609b402eb2f36fdece43e158

# Train Count Data

System Engineering
Engineering Services

1 Administration Road
Concord, ON, L4K 1B9
T: 905.669.3264
F: 905.760.3406

## TRANSMITTAL

| | | | |
|---|---|---|---|
| *To:* *Destinataire :* | Pinchin Ltd<br>2470 Milltower Court,<br>Mississauga ON L5N 7W5 | *Project :* | Kingston West-146.70-Prince St, Lansdowne, ON |
| *Att'n:* | Weidong Li | *Routing:* | wli@Pinchin.com |
| *From:* *Expéditeur :* | Michael Vallins | *Date:* | 2019/10/23 |
| *Cc:* | Adjacent Development<br>CN via e-mail | | |

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

**Re: Train Traffic Data – CN Kingston West Subdivision near Prince St in Lansdowne, ON**

Please find attached the requested Train Traffic Data. The application fee in the amount of **$500.00** +HST will be invoiced.

Should you have any questions, please do not hesitate to contact the undersigned at 905-669-3264.

Sincerely,
CN Design & Construction

Michael Vallins P.Eng
Manager of Public Works
permits.gld@cn.ca

**Date:** 2019/10/23 Project Number: Kingston West-146.70-Prince St, Lansdowne, ON

Dear Weidong:

**Re: Train Traffic Data – CN Kingston West Subdivision near Prince St in Lansdowne, ON**

The following is provided in response to Weidong's 2019/10/03 request for information regarding rail traffic in the vicinity of Prince St in Lansdowne, ON at approximately Mile 146.70 on CN's Kingston Subdivision.

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. For the purpose of noise and vibration reports, train volumes must be escalated by 2.5% per annum for a 10-year period.

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

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

| | 0700-2300 | | | |
|---|---|---|---|---|
| Type of Train | Volumes | Max.Consist | Max. Speed | Max. Power |
| Freight | 11 | 140 | 65 | 4 |
| Way Freight | 0 | 25 | 65 | 4 |
| Passenger | 31 | 10 | 100 | 2 |

| | 2300-0700 | | | |
|---|---|---|---|---|
| Type of Train | Volumes | Max.Consist | Max. Speed | Max. Power |
| Freight | 6 | 140 | 65 | 4 |
| Way Freight | 0 | 25 | 65 | 4 |
| Passenger | 1 | 10 | 100 | 2 |

The volumes recorded reflect westbound and eastbound freight and passenger operations on CN's Kingston West Subdivision.

Except where anti-whistling bylaws are in effect, engine-warning whistles and bells are normally sounded at all at-grade crossings. There are four (4) at-grade crossings in the immediate vicinity of the study area at Mile 145.39 Farm Xing, Mile 145.75 Farm Xing, Mile 146.70 Prince St and Mile 148.30 Kidd Rd S. Anti-whistling bylaws are not in effect at these crossings. Please note that engine warning whistles may be sounded in cases of emergency, as a safety and or warning precaution at station locations and pedestrian crossings and occasionally for operating requirements.

With respect to equipment restrictions, the gross weight of the heaviest permissible car is 286,000 lbs.

The triple mainline track is considered to be continuously welded rail throughout the study area. The presence of two (2) switches located at Mile 138.40, and Mile 151.30 may exacerbate the noise and vibration caused by train movements.

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, Adjacent Development, Canadian National Railway Properties at Proximity@cn.ca should be contacted directly.

I trust the above information will satisfy your current request.

Sincerely,

Michael Vallins P.Eng
Manager of Public Works

STAMSON 5.0 NORMAL REPORT Date: 22-01-2020 10:34:22
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rl_122.te Time Period: Day/Night 16/8 hours
Description: Road Traffic Noise Impact at Lots 117-123

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

| Train Type | Trains | Speed (km/h) | # loc /Train | # Cars /Train | Eng type | Cont weld |
|---|---|---|---|---|---|---|
| 1. Freight | 11.0/6.0 | 105.0 | 4.0 | 140.0 | Diesel | Yes |
| 2. Passenger | 31.0/1.0 | 150.0 | 2.0 | 10.0 | Diesel | Yes |

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

| | | |
|---|---|---|
| Angle1 Angle2 | -90.00 deg | 90.00 deg |
| Wood depth | 0 | (No woods.) |
| No of house rows | 1 / 1 | |
| House density | 30 % | |
| Surface | 1 | (Absorptive ground surface) |
| Receiver source distance | 100.00 / 100.00 m | |
| Receiver height | 4.50 / 4.50 m | |
| Topography | 1 | (Flat/gentle slope; no barrier) |

No Whistle
Reference angle : 0.00

Results segment # 1: CNKingston (day)

LOCOMOTIVE (0.00 + 62.62 + 0.00) = 62.62 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.50 | 77.51 | -12.32 | -1.17 | 0.00 | -1.40 | 0.00 | 62.62 |

WHEEL (0.00 + 54.15 + 0.00) = 54.15 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.60 | 70.09 | -13.18 | -1.35 | 0.00 | -1.40 | 0.00 | 54.15 |

Segment Leq : 63.20 dBA

Total Leq All Segments: 63.20 dBA

Results segment # 1: CNKingston (night)
---

LOCOMOTIVE (0.00 + 60.63 + 0.00) = 60.63 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.50 | 75.51 | -12.32 | -1.17 | 0.00 | -1.40 | 0.00 | 60.63 |

WHEEL (0.00 + 53.14 + 0.00) = 53.14 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.60 | 69.07 | -13.18 | -1.35 | 0.00 | -1.40 | 0.00 | 53.14 |

Segment Leq : 61.34 dBA

Total Leq All Segments: 61.34 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.20
(NIGHT): 61.34

STAMSON 5.0 NORMAL REPORT Date: 14-11-2019 10:34:31
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rl_122a.te Time Period: Day/Night 16/8 hours
Description: Rail Traffic Noise Impact at OLAs of Lots 117-123

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

| Train Type | Trains | Speed (km/h) | # loc /Train | # Cars /Train | Eng type | Cont weld |
|---|---|---|---|---|---|---|
| 1. Freight | 11.0/6.0 | 105.0 | 4.0 | 140.0 | Diesel | Yes |
| 2. Passenger | 31.0/1.0 | 150.0 | 2.0 | 10.0 | Diesel | Yes |

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

| | | |
|---|---|---|
| Angle1 Angle2 | -90.00 deg | 90.00 deg |
| Wood depth | 0 | (No woods.) |
| No of house rows | 1 / 1 | |
| House density | 50 % | |
| Surface | 1 | (Absorptive ground surface) |
| Receiver source distance | 88.00 / 88.00 | m |
| Receiver height | 1.50 / 1.50 | m |
| Topography | 1 | (Flat/gentle slope; no barrier) |

No Whistle
Reference angle : 0.00

Results segment # 1: CNKingston (day)

LOCOMOTIVE (0.00 + 61.35 + 0.00) = 61.35 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.58 | 77.51 | -12.18 | -1.33 | 0.00 | -2.65 | 0.00 | 61.35 |

WHEEL (0.00 + 53.22 + 0.00) = 53.22 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 70.09 | -12.76 | -1.46 | 0.00 | -2.65 | 0.00 | 53.22 |

Segment Leq : 61.97 dBA

Total Leq All Segments: 61.97 dBA

Results segment # 1: CNKingston (night)
---

LOCOMOTIVE (0.00 + 59.35 + 0.00) = 59.35 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.58 | 75.51 | -12.18 | -1.33 | 0.00 | -2.65 | 0.00 | 59.35 |

WHEEL (0.00 + 52.21 + 0.00) = 52.21 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 69.07 | -12.76 | -1.46 | 0.00 | -2.65 | 0.00 | 52.21 |

Segment Leq : 60.12 dBA

Total Leq All Segments: 60.12 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.97
(NIGHT): 60.12

STAMSON 5.0 NORMAL REPORT Date: 14-11-2019 10:33:40
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rl_122ab.te Time Period: Day/Night 16/8 hours
Description: Rail Traffic Noise Impact at OLAs of Lots 117-123, with Acoustic Fence

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

| Train Type | Trains | Speed (km/h) | # loc /Train | # Cars /Train | Eng type | Cont weld |
|---|---|---|---|---|---|---|
| 1. Freight | 11.0/6.0 | 105.0 | 4.0 | 140.0 | Diesel | Yes |
| 2. Passenger | 31.0/1.0 | 150.0 | 2.0 | 10.0 | Diesel | Yes |

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

| | | |
|---|---|---|
| Angle1 Angle2 | : -90.00 deg | 90.00 deg |
| Wood depth | : 0 | (No woods.) |
| No of house rows | : 1 / 1 | |
| House density | : 50 % | |
| Surface | : 1 | (Absorptive ground surface) |
| Receiver source distance | : 88.00 / 88.00 | m |
| Receiver height | : 1.50 / 1.50 | m |
| Topography | : 2 | (Flat/gentle slope; with barrier) |

No Whistle

| | | |
|---|---|---|
| Barrier angle1 | : -90.00 deg | Angle2 : 90.00 deg |
| Barrier height | : 1.80 m | |
| Barrier receiver distance | : 3.00 / 3.00 | m |
| Source elevation | : 0.00 m | |
| Receiver elevation | : 0.00 m | |
| Barrier elevation | : 0.00 m | |
| Reference angle | : 0.00 | |

Results segment # 1: CNKingston (day)

Barrier height for grazing incidence

| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 4.00 | 1.50 | 1.59 | 1.59 |
| 0.50 | 1.50 | 1.47 | 1.47 |

LOCOMOTIVE (0.00 + 59.77 + 0.00) = 59.77 dBA

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

```
   -90     90   0.58  77.51 -12.18  -1.33   0.00  -2.65   0.00
61.35
   -90     90   0.48  77.51 -11.35  -1.13   0.00   0.00  -5.26
59.77
-------------------------------------------------------------------
---

WHEEL (0.00 + 51.01 + 0.00) = 51.01 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------
---
   -90     90   0.66  70.09 -12.76  -1.46   0.00  -2.65   0.00
53.22
   -90     90   0.58  70.09 -12.16  -1.32   0.00   0.00  -5.60
51.01
-------------------------------------------------------------------
---

Segment Leq : 60.31 dBA

Total Leq All Segments: 60.31 dBA


Results segment # 1: CNKingston (night)
---------------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !        1.50 !        1.59 !         1.59
       0.50 !        1.50 !        1.47 !         1.47

LOCOMOTIVE (0.00 + 57.77 + 0.00) = 57.77 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------
---
   -90     90   0.58  75.51 -12.18  -1.33   0.00  -2.65   0.00
59.35
   -90     90   0.48  75.51 -11.35  -1.13   0.00   0.00  -5.26
57.77
-------------------------------------------------------------------
---

WHEEL (0.00 + 49.99 + 0.00) = 49.99 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------
---
   -90     90   0.66  69.07 -12.76  -1.46   0.00  -2.65   0.00
52.21
```

```
   -90     90   0.58  69.07 -12.16  -1.32   0.00   0.00  -5.60
49.99
-------------------------------------------------------------------
---

Segment Leq : 58.44 dBA

Total Leq All Segments: 58.44 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 60.31
                           (NIGHT): 58.44
```

STAMSON 5.0 NORMAL REPORT Date: 22-01-2020 10:30:29
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rl_079.te Time Period: Day/Night 16/8 hours
Description: Road Traffic Noise Impact at Lots 77-84, 124

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

| Train Type | Trains | Speed (km/h) | # loc /Train | # Cars /Train | Eng type | Cont weld |
|---|---|---|---|---|---|---|
| 1. Freight | 11.0/6.0 | 105.0 | 4.0 | 140.0 | Diesel | Yes |
| 2. Passenger | 31.0/1.0 | 150.0 | 2.0 | 10.0 | Diesel | Yes |

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

| | | |
|---|---|---|
| Angle1 Angle2 | -90.00 deg | 90.00 deg |
| Wood depth | 0 | (No woods.) |
| No of house rows | 1 / 1 | |
| House density | 30 % | |
| Surface | 1 | (Absorptive ground surface) |
| Receiver source distance | 160.00 / 160.00 m | |
| Receiver height | 1.50 / 1.50 m | |
| Topography | 1 | (Flat/gentle slope; no barrier) |

No Whistle
Reference angle : 0.00

Results segment # 1: CNKingston (day)

LOCOMOTIVE (0.00 + 58.52 + 0.00) = 58.52 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.58 | 77.51 | -16.29 | -1.33 | 0.00 | -1.37 | 0.00 | 58.52 |

WHEEL (0.00 + 50.20 + 0.00) = 50.20 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 70.09 | -17.07 | -1.46 | 0.00 | -1.37 | 0.00 | 50.20 |

Segment Leq : 59.12 dBA

Total Leq All Segments: 59.12 dBA

Results segment # 1: CNKingston (night)
---

LOCOMOTIVE (0.00 + 56.52 + 0.00) = 56.52 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.58 | 75.51 | -16.29 | -1.33 | 0.00 | -1.37 | 0.00 | 56.52 |

WHEEL (0.00 + 49.18 + 0.00) = 49.18 dBA

| Angle1 | Angle2 | Alpha | RefLeq | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 69.07 | -17.07 | -1.46 | 0.00 | -1.37 | 0.00 | 49.18 |

Segment Leq : 57.26 dBA

Total Leq All Segments: 57.26 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.12
(NIGHT): 57.26

STAMSON 5.0 NORMAL REPORT Date: 14-11-2019 10:55:39
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: pr_149.te Time Period: Day/Night 16/8 hours
Description: Road Traffic Noise Impact at Lots 149, 150

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

| | | |
|---|---|---|
| Car traffic volume | : 3323/369 | veh/TimePeriod * |
| Medium truck volume | : 69/8 | veh/TimePeriod * |
| Heavy truck volume | : 69/8 | 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) | : 3333 |
| Percentage of Annual Growth | : 1.20 |
| Number of Years of Growth | : 12.00 |
| Medium Truck % of Total Volume | : 2.00 |
| Heavy Truck % of Total Volume | : 2.00 |
| Day (16 hrs) % of Total Volume | : 90.00 |

Data for Segment # 1: PrinceSt (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 | : 30.00 / 30.00 | m |
| Receiver height | : 10.50 / 10.50 | m |
| Topography | : 1 | (Flat/gentle slope; no barrier) |
| Reference angle | : 0.00 | |

Results segment # 1: PrinceSt (day)
---

Source height = 1.19 m

ROAD (0.00 + 54.24 + 0.00) = 54.24 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.40 | 59.43 | 0.00 | -4.21 | -0.98 | 0.00 | 0.00 | 0.00 | 54.24 |

Segment Leq : 54.24 dBA

Total Leq All Segments: 54.24 dBA

Results segment # 1: PrinceSt (night)
---

Source height = 1.20 m

ROAD (0.00 + 47.82 + 0.00) = 47.82 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.40 | 53.01 | 0.00 | -4.21 | -0.98 | 0.00 | 0.00 | 0.00 | 47.82 |

Segment Leq : 47.82 dBA

Total Leq All Segments: 47.82 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 54.24
(NIGHT): 47.82

STAMSON 5.0 NORMAL REPORT Date: 14-11-2019 11:00:01
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: pr_31.te Time Period: Day/Night 16/8 hours
Description: Road Traffic Noise Impact at Lot 31

Road data, segment # 1: PrinceSt (day/night)
---
Car traffic volume : 3323/369 veh/TimePeriod *
Medium truck volume : 69/8 veh/TimePeriod *
Heavy truck volume : 69/8 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): 3333
Percentage of Annual Growth : 1.20
Number of Years of Growth : 12.00
Medium Truck % of Total Volume : 2.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: PrinceSt (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 : 20.00 / 20.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: PrinceSt (day)
---

Source height = 1.19 m

ROAD (0.00 + 55.90 + 0.00) = 55.90 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 59.43 | 0.00 | -2.07 | -1.46 | 0.00 | 0.00 | 0.00 | 55.90 |

Segment Leq : 55.90 dBA

Total Leq All Segments: 55.90 dBA

Results segment # 1: PrinceSt (night)
---

Source height = 1.20 m

ROAD (0.00 + 49.48 + 0.00) = 49.48 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 53.01 | 0.00 | -2.07 | -1.46 | 0.00 | 0.00 | 0.00 | 49.48 |

Segment Leq : 49.48 dBA

Total Leq All Segments: 49.48 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.90
(NIGHT): 49.48

STAMSON 5.0 NORMAL REPORT Date: 14-11-2019 11:12:09
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r2_reti.te Time Period: Day/Night 16/8 hours
Description: Road Traffic Noise Impact at Retirement/Nursing Home

Road data, segment # 1: County2 (day/night)
---
Car traffic volume : 1436/359 veh/TimePeriod *
Medium truck volume : 30/7 veh/TimePeriod *
Heavy truck volume : 30/7 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): 1452
Percentage of Annual Growth : 2.13
Number of Years of Growth : 12.00
Medium Truck % of Total Volume : 2.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: County2 (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 : 130.00 / 130.00 m
Receiver height : 10.50 / 10.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: County2 (day)
---

Source height = 1.19 m

ROAD (0.00 + 43.38 + 0.00) = 43.38 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.40 | 57.49 | 0.00 | -13.12 | -0.98 | 0.00 | 0.00 | 0.00 | 43.38 |

Segment Leq : 43.38 dBA

Total Leq All Segments: 43.38 dBA

Results segment # 1: County2 (night)
---

Source height = 1.17 m

ROAD (0.00 + 40.20 + 0.00) = 40.20 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.40 | 54.31 | 0.00 | -13.13 | -0.98 | 0.00 | 0.00 | 0.00 | 40.20 |

Segment Leq : 40.20 dBA

Total Leq All Segments: 40.20 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 43.38
(NIGHT): 40.20

**APPENDIX D**

**Building Component Construction Requirements**

**(2 Pages)**

**Table D1: Predicted Noise Levels and Control Measures**

| | |
|---|---|
| Room/Facade Reference Number | Lots 117-123 |
| Room Location | Two-Storeys, Northeast Corner of the Site |
| Room Type | Bedroom |
| Floor Area, m2 | n/a |

| | Windows - Day | Windows - Night | Wall - Day | Wall - Night | Notes |
|---|---|---|---|---|---|
| Predicted Outdoor Sound Level, dBA | 63.2 | 61.3 | 62.7 | 62.7 | RL_122.te |
| Calculation Adjustment, dBA | 1.1 | 1.1 | 0.7 | 0.7 | - Whistle Noise |
| Indoor Room Level, dBA | 40 | 35 | 40 | 35 | NPC-300 Table C-9, Road Traffic [1] |
| CMHC Room Target, dBA | 35 | 35 | 35 | 35 | CMHC Table 1, 24-Hour Criteria [2] |
| Criteria Adjustment, dBA | -5 | 0 | -5 | 0 | CMHC-MOE |
| Adjusted Outdoor Sound Level, dBA | 59 | 62 | 58 | 63 | Used in Determining AIF |
| (Window, Wall) Area, m2 | n/a | n/a | n/a | n/a | |
| (Window, Wall)/Floor Ratio, % | 30% | 30% | 80% | 80% | Assumed Window/Floor Area Ratio |
| Number of Components | 3 | 3 | 3 | 3 | Windows, Wall, Door |
| Acoustic Insulation Factor (AIF) | 31 | 34 | 30 | 35 | CMHC: Table 6.1 |
| Approximate Sound Transmission Class (STC) | 32 | 35 | - | 40 | CMHC: Tables D2, 6.3 |
| Examples of Control Measures | 3 - 40 - 3 | 3 - 40 - 3 | Brick Veneer/Masonry | Brick Veneer/Masonry | The Worst Case Requirement Is Displayed |
| Air Conditioning | Central AC | Central AC | Central AC | Central AC | Central AC Required |
| Warning Clause | Type D | Type D | Type D | Type D | |

**Table D2: Predicted Noise Levels and Control Measures**

| | |
|---|---|
| Room/Facade Reference Number | Lots 77-84, 124 |
| Room Location | 1-Storey Homes, Facing CN Railway |
| Room Type | Bedroom |
| Floor Area, m2 | n/a |

| | Windows - Day | Windows - Night | Wall - Day | Wall - Night | Notes |
|---|---|---|---|---|---|
| Predicted Outdoor Sound Level, dBA | 59.1 | 57.3 | 58.6 | 58.6 | RL_079.te |
| Calculation Adjustment, dBA | 1.1 | 1.1 | 0.7 | 0.7 | - Whistle Noise |
| Indoor Room Level, dBA | 40 | 35 | 40 | 35 | NPC-300 Table C-9, Road Traffic [1] |
| CMHC Room Target, dBA | 35 | 35 | 35 | 35 | CMHC Table 1, 24-Hour Criteria [2] |
| Criteria Adjustment, dBA | -5 | 0 | -5 | 0 | CMHC-MOE |
| Adjusted Outdoor Sound Level, dBA | 55 | 58 | 54 | 59 | Used in Determining AIF |
| (Window, Wall) Area, m2 | n/a | n/a | n/a | n/a | |
| (Window, Wall)/Floor Ratio, % | 30% | 30% | 80% | 80% | Assumed Window/Floor Area Ratio |
| Number of Components | 3 | 3 | 3 | 3 | Windows, Wall, Door |
| Acoustic Insulation Factor (AIF) | 27 | 30 | 26 | 31 | CMHC: Table 6.1 |
| Approximate Sound Transmission Class (STC) | 28 | 31 | - | - | CMHC: Tables D2, 6.3 |
| Examples of Control Measures | OBC | 3 - 16 - 3 | OBC | OBC | The Worst Case Requirement Is Displayed |
| Air Conditioning | Provision | Provision | Provision | Provision | Installed at Occupant's Discretion |
| Warning Clause | Type C | Type C | Type C | Type C | |

**APPENDIX E**

**Measurement Weather Information**

**(4 Pages)**

Government of Canada / Gouvernement du Canada



## Hourly Data Report for October 29, 2019

All times are specified in Local Standard Time (LST). Add 1 hour to adjust for Daylight Saving Time where and when it is observed.

**KINGSTON A**

**ONTARIO**

**Current Station Operator: NAVCAN**

| | |
|---|---|
| **Latitude:** | 44°13'33.000" N |
| **Longitude:** | 76°35'48.000" W |
| **Elevation:** | 92.40 m |
| **Climate ID:** | 6104149 |
| **WMO ID:** | |
| **TC ID:** | YGK |

| TIME | Temp °C | Dew Point °C | Rel Hum % | Wind Dir 10's deg | Wind Spd km/h | Visibility km | Stn Press kPa | Hmdx | Wind Chill | Weather |
|---|---|---|---|---|---|---|---|---|---|---|
| 00:00 | | | | | | | | | | |
| 01:00 | | | | | | | | | | |
| 02:00 | | | | | | | | | | |
| 03:00 | | | | | | | | | | |
| 04:00 | | | | | | | | | | |
| 05:00 | 11.9 | 9.8 | 87 | 16 | 33 | 24.1 | 100.86 | | | NA |

| TIME | Temp °C | Dew Point °C | Rel Hum % | Wind Dir 10's deg | Wind Spd km/h | Visibility km | Stn Press kPa | Hmdx | Wind Chill | Weather |
|---|---|---|---|---|---|---|---|---|---|---|
| **06:00** | 12.0 | 9.7 | 85 | 16 | 35 | 24.1 | 100.85 | | | **NA** |
| **07:00** | 11.9 | 9.4 | 85 | 17 | 31 | 24.1 | 100.94 | | | **Mostly Cloudy** |
| **08:00** | 12.4 | 9.6 | 83 | 16 | 33 | 24.1 | 100.95 | | | **NA** |
| **09:00** | 13.0 | 9.9 | 82 | 16 | 27 | 24.1 | 100.96 | | | **NA** |
| **10:00** | 13.7 | 10.0 | 78 | 17 | 30 | 24.1 | 100.95 | | | **Mainly Clear** |
| **11:00** | 14.2 | 10.5 | 78 | 17 | 26 | 24.1 | 100.93 | | | **NA** |
| **12:00** | 14.9 | 11.0 | 77 | 18 | 23 | 24.1 | 100.86 | | | **NA** |
| **13:00** | 15.6 | 11.5 | 76 | 18 | 18 | 24.1 | 100.84 | | | **Mainly Clear** |
| **14:00** | 15.7 | 11.5 | 76 | 20 | 17 | 24.1 | 100.86 | | | **NA** |
| **15:00** | 14.3 | 11.4 | 82 | 18 | 14 | 24.1 | 100.86 | | | **NA** |
| **16:00** | 14.5 | 11.4 | 82 | 19 | 15 | 24.1 | 100.81 | | | **Mostly Cloudy** |
| **17:00** | 14.6 | 11.4 | 81 | 19 | 21 | 24.1 | 100.83 | | | **NA** |
| **18:00** | 15.2 | 11.3 | 78 | 24 | 18 | 24.1 | 100.91 | | | **NA** |
| **19:00** | 15.1 | 11.0 | 76 | 21 | 24 | 24.1 | 100.96 | | | **Mostly Cloudy** |
| **20:00** | 15.2 | 11.2 | 77 | 21 | 26 | 24.1 | 101.00 | | | **NA** |
| **21:00** | 13.3 | 11.6 | 89 | 19 | 13 | 24.1 | 101.03 | | | **NA** |
| **22:00** | 12.9 | 11.7 | 92 | 20 | 11 | 24.1 | 101.08 | | | **Cloudy** |
| **23:00** | | | | | | | | | | |

**Legend**

- E = Estimated
- M = Missing
- NA = Not Available

Government of Canada / Gouvernement du Canada



## Hourly Data Report for October 30, 2019

All times are specified in Local Standard Time (LST). Add 1 hour to adjust for Daylight Saving Time where and when it is observed.

**KINGSTON A**

**ONTARIO**

**Current Station Operator: NAVCAN**

| | |
|---|---|
| **Latitude:** | 44°13'33.000" N |
| **Longitude:** | 76°35'48.000" W |
| **Elevation:** | 92.40 m |
| **Climate ID:** | 6104149 |
| **WMO ID:** | |
| **TC ID:** | YGK |

| TIME | Temp °C | Dew Point °C | Rel Hum % | Wind Dir 10's deg | Wind Spd km/h | Visibility km | Stn Press kPa | Hmdx | Wind Chill | Weather |
|---|---|---|---|---|---|---|---|---|---|---|
| 00:00 | | | | | | | | | | |
| 01:00 | | | | | | | | | | |
| 02:00 | | | | | | | | | | |
| 03:00 | | | | | | | | | | |
| 04:00 | | | | | | | | | | |
| 05:00 | 12.3 | 11.5 | 95 | 26 | 4 | 24.1 | 101.23 | | | NA |

| TIME | Temp °C | Dew Point °C | Rel Hum % | Wind Dir 10's deg | Wind Spd km/h | Visibility km | Stn Press kPa | Hmdx | Wind Chill | Weather |
|---|---|---|---|---|---|---|---|---|---|---|
| **06:00** | 11.9 | 10.4 | 91 | 30 | 10 | 24.1 | 101.32 | | | **NA** |
| **07:00** | 11.5 | 9.6 | 88 | 34 | 6 | 19.3 | 101.36 | | | **Cloudy** |
| **08:00** | 11.5 | 8.7 | 83 | 34 | 13 | 19.3 | 101.43 | | | **NA** |
| **09:00** | 12.9 | 8.9 | 76 | 1 | 18 | 24.1 | 101.36 | | | **NA** |
| **10:00** | 13.4 | 9.4 | 77 | 6 | 13 | 24.1 | 101.38 | | | **Cloudy** |
| **11:00** | 13.4 | 9.1 | 75 | 5 | 13 | 24.1 | 101.39 | | | **NA** |
| **12:00** | 13.6 | 9.3 | 75 | 11 | 10 | 24.1 | 101.28 | | | **NA** |
| **13:00** | 13.9 | 9.0 | 72 | 2 | 5 | 24.1 | 101.22 | | | **Mostly Cloudy** |
| **14:00** | 13.9 | 9.5 | 75 | 1 | 5 | 24.1 | 101.16 | | | **NA** |
| **15:00** | 13.2 | 8.6 | 73 | 5 | 14 | 24.1 | 101.09 | | | **NA** |
| **16:00** | 11.3 | 5.8 | 69 | 6 | 21 | 24.1 | 101.03 | | | **Cloudy** |
| **17:00** | 10.1 | 5.0 | 70 | 2 | 18 | 24.1 | 100.99 | | | **NA** |
| **18:00** | 9.4 | 4.2 | 70 | 4 | 20 | 24.1 | 100.94 | | | **NA** |
| **19:00** | 9.2 | 4.3 | 72 | 4 | 20 | 24.1 | 100.86 | | | **Cloudy** |
| **20:00** | 8.8 | 5.0 | 77 | 4 | 28 | 24.1 | 100.74 | | | **NA** |
| **21:00** | 8.7 | 5.8 | 82 | 5 | 26 | 24.1 | 100.64 | | | **NA** |
| **22:00** | 8.6 | 6.2 | 85 | 5 | 17 | 24.1 | 100.57 | | | **Rain** |
| **23:00** | | | | | | | | | | |

**Legend**

- E = Estimated
- M = Missing
- NA = Not Available

**Date modified:**
2019-10-22

**APPENDIX F**

**Measurement Equipment Information**

**(1 Page)**

## MEASUREMENT EQUIPMENT INFORMATION

The following instruments were used in the acoustic and vibration measurements:

| | |
|---|---|
| **Sound Level Meter** | Hand-held Analyzer<br>Type: 2270<br>Serial No: 3008653 |
| **Pre-amplifier** | Type: ZC0032<br>Serial No: 23105 |
| **Microphone** | B&K Prepolarized Free-field 1/2” Microphone<br>Type: 4189<br>Serial No: 2985587 |
| **Calibrator** | B&K Sound Calibrator<br>Type: 4231<br>Serial No: 3014389 |

| | |
|---|---|
| Analyzer | 01dB-Metravib 2-channel Analyzer<br>Type: Symphonie<br>Serial No: 1924 |
| Velocity Sensor | Model: IMI VO626A01<br>Serial No. 8564 |

**APPENDIX G**

**Warning Clauses and CN Requirements**

**(2 Pages)**

**Type B**

“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 (rail traffic) (air traffic) may on occasions 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.”

**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 level limits of the Municipality and the Ministry of the Environment.”

**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 Municipality's and the Ministry of the Environment's noise criteria."

**CN Requirement “E”**

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.”

**Canadian National**
1 Administration Road
Concord, Ontario
L4K 1B9

# PRINCIPAL MAIN LINE REQUIREMENTS

**A.** Safety setback of habitable buildings from the railway rights-of-way to be a minimum of 30 metres in conjunction with a safety berm. The safety berm shall be adjoining and parallel to the railway rights-of-way with returns at the ends, 2.5 metres above grade at the property line, with side slopes not steeper than 2.5 to 1.

**B.** The Owner shall engage a consultant to undertake an analysis of noise. At a minimum, a noise attenuation barrier shall be adjoining and parallel to the railway rights-of-way, having returns at the ends, and a minimum total height of 5.5 metres above top-of-rail. Acoustic fence to be constructed without openings and of a durable material weighing not less than 20 kg. per square metre of surface area. Subject to the review of the noise report, the Railway may consider other measures recommended by an approved Noise Consultant.

**C.** Ground-borne vibration transmission to be evaluated in a report through site testing to determine if dwellings within 75 metres of the railway rights-of-way will be impacted by vibration conditions in excess of 0.14 mm/sec RMS between 4 Hz and 200 Hz. The monitoring system should be capable of measuring frequencies between 4 Hz and 200 Hz, ±3 dB with an RMS averaging time constant of 1 second. If in excess, isolation measures will be required to ensure living areas do not exceed 0.14 mm/sec RMS on and above the first floor of the dwelling.

**D.** The Owner shall install and maintain a chain link fence of minimum 1.83 metre height along the mutual property line.

**E.** 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."

**F.** 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.

**G.** The Owner shall through restrictive covenants to be registered on title and all agreements of purchase and sale or lease provide notice to the public that the safety berm, fencing and vibration isolation measures implemented are not to be tampered with or altered and further that the Owner shall have sole responsibility for and shall maintain these measures to the satisfaction of CN.

**H.** The Owner shall enter into an Agreement with CN stipulating how CN's concerns will be resolved and will pay CN's reasonable costs in preparing and negotiating the agreement.

**I.** The Owner shall be required to grant CN an environmental easement for operational noise and vibration emissions, registered against the subject property in favour of CN.