

January 22, 2020

Paul Bezaire
Bezaire Partners
302-180 Eugenie St. West
Windsor, ON N8X 2X6
M: 519-816-6844
pbezaire@bezaire.ca

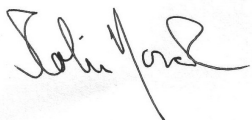
Re: Noise Assessment for the Proposed Hotel Development – 4100 Seventh Concession Road, City of Windsor.

Dear Mr. Bezaire,

Please find enclosed a noise assessment report for the proposed hotel at 4100 seventh concession road, in the City of Windsor. This assessment pertains to the noise impacts from the road and rail line which are located near to the proposed site. It also considers the impact from aircraft noise from the Windsor International Airport as given by the published NEF/NEP contours.

I trust that the enclosed information meets your requirements. Please do not hesitate to contact me if you have any questions.

Sincerely,



Colin Novak PhD, PEng

Noise Assessment for the Proposed Hotel Development 4100 Seventh Concession Road, City of Windsor



Paul Bezaire
Bezaire Partners
302-180 Eugenie St. West
Windsor, ON N8X 2X6
M: 519-816-6844
pbezaire@bezaire.ca

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Statement of Liability

Akoustik Engineering Limited prepared this report for Bezaire Partners. The material in it reflects Dr. Helen Ule's and Dr. Colin Novak's judgement considering the information available to them and Akoustik Engineering Limited at the time of the measurements and report preparation, under the stated test conditions. Any use that a Third Party makes of this report, or any reliance on decisions made based on it, is the responsibility of such Third Parties. Akoustik Engineering Limited accepts no responsibility for damages, if any, suffered by any Third Party resulting from decisions made or actions based on this report.

Introduction

This report is a noise assessment for the proposed hotel located at Concession Road 7 and Baseline Road, in the City of Windsor. The assessment pertains to the environmental noise impact from nearby road and rail traffic as well as aircraft noise. Associated with the operations at the Windsor International Airport. An illustration of the geographical area with the proposed development area identified, as well as the proposed development layout is given in Appendix A: Site Location. A zoning map of the area is provided in Appendix B. The expected noise impacts have been predicted using the Ministry of the Environment, Conservation and Parks (MECP) prediction software STAMSON and are based on available road and rail traffic volumes, which have been projected 10 years forward. Given that the road and rail traffic occurs during all periods of a 24-hour day, as defined by the applicable Noise Pollution Control documents (NPC-300), the assessment has been carried out for the entire 24-hour period. Appendix C includes the CN Rail Main Line Requirements. Aircraft noise impacts have been evaluated with reference to the published NEF/NEP contours. All assumptions used for the calculations in this report are detailed in Appendix D. Any recommended abatement to control noise are included in this report.

Identification of Noise Sources

The proposed development is surrounded by Windsor International Airport to the north, residential housing to the east and commercial property to the south and west of the property. A CN rail main line is located west of the property; Baseline Road is located to the north, Concession Road 7 is located to the west and County Road 42 is also located to the north. The Ministry of the Environment (MECP) specifications for the identification of existing or future major sources of noise impact on a development is whether they are within 500 metres of the site. The noise sources which could possibly produce an impact on the proposed development are County Road 42 (north), Concession Road 7 (west) and Baseline Road (north) and the CN railway located west of the development. The lands of the proposed development falls within the NEF/NEP 25 contour as shown in the development constraint areas map, which is included in Appendix E. There are no other significant sources of noise which are expected to have an impact on the proposed development.

Ministry of the Environment and Climate Change Noise Criteria

In accordance to the MECP Guideline NPC-300, the following sound level limits for residential developments of Class 1 have been set and are shown for both roadway and rail noise in Table 1 and 2 below respectively. Select pages from the NPC-300 guideline have been included in Appendix F: NPC-300 Reference Pages for reference. The proposed development is classified as a Class 2 area, given that the region exhibits features of both a Class 1 and a Class 3 area, based on the environmental noise characteristics. It is worth noting that when the sound level limits presented in Table 1 and 2 are exceeded, noise control abatement is required.

Table 1: Ministry of the Environment, Conservation and Parks Noise Criteria for Roadway Noise

Location	Daytime L_{eq} [dBA]	Nighttime L_{eq} [dBA]
Outdoor Living Area (OLA)	55	--
Plane of Window (Indoor)	55 (45)	50 (40)

Table 2: Ministry of the Environment, Conservation and Parks Noise Criteria for Rail Noise

Location	Daytime L_{eq} [dBA]	Nighttime L_{eq} [dBA]
Outdoor Living Area (OLA)	55	--
Plane of Window (Indoor)	55 (40)	50 (35)

From Table 1 and 2, daytime refers to the period from 07:00 to 23:00 and nighttime refers to the period from 23:00 to 07:00 hours. An outdoor living area (OLA) refers to a location such as a patio, yard, or barbeque area. In this case the OLA is an amenity area located at the north west corner of the property. Given that the proposed balconies for the residential units have a depth less than 4 m, they are considered as OLAs for assessment purposes.

The limits presented in Table 1 and 2 are the limits before noise control measures are required. The noise level limit in an OLA may be exceeded by up to 5 dBA if proper warning clauses are inserted in the titles, deeds, and any tenancy agreements relating to the property and only after barriers or other noise control measures have been found to be impractical or unfeasible. A noise attenuation barrier is required to protect and bring the sound level down to 55 dBA in the OLA if the noise level exceeds 60 dBA. Only in cases where the required noise control measures are not feasible for technical, economic or administrative reasons would an excess above the limit (55 dBA) be acceptable with the appropriate warning clause; in this situation, any excess above the noise limit will not be deemed acceptable if it exceeds 5 dB.

The guideline also recommends the provision for the installation of central air conditioning when the noise level outside the plane of a window exceeds 55 dBA for the daytime or 50 dBA for the nighttime. If the noise level exceeds 65 dBA for the daytime or 60 dBA for the nighttime, the installation of central air conditioning should be implemented. Further, building components including exterior walls, windows and doors should be designed to have sufficient Sound Transmission Class (STC) ratings to meet the indoor noise guidelines.

Noise Source Data

Prior to modelling the noise, road traffic volume data was obtained from the City of Windsor in the form of annual average daily traffic (AADT) volumes. The projected road traffic volumes along with the breakdown of vehicle types are given in Appendix G: Road Traffic Volume Data. Also, given in Appendix G are the distances used in the noise prediction model between the representative receptor locations and the roadways.

Based on the data provided, an annual growth rate of 2.5% per annum was assumed. Day and night traffic volumes were calculated using an assumed 85%-day and 15%-night split. In order to meet the minimum 40 vehicle/hr requirement of STAMSON the traffic volume information for the night on Baseline was increased to this minimum value while still maintaining the compliment of automobiles, medium and heavy trucks.

Rail traffic volume data was obtained from a rail schedule provided by CN Rail. The rail volume (taken from the year 2016) was projected 14 years, using a 2.5% increase per annum, as prescribed by CN Rail. As such, the predicted noise levels given in this report are for future traffic volumes for the year 2030. An email from CN rail detailing the rail volume information, along with the subsequent projected rail data and train schedules are included in Appendix H: Rail Traffic Volume Data. Also, given in Appendix H are the distances between the railway and the representative receptor locations used in the noise prediction model.

Identification of the Representative Receptor Locations

Upon examination of the layout for the proposed hotel, two units located on the highest floor of the hotel was evaluated for noise impacts as these represent the worst case. Additionally, a first floor unit was modelled. All of these are for what represents the worst case façades of the building due to their proximity and orientation to the road and railway.

Assessment Approach

The predicted sound levels from the nearby road and rail traffic has been determined through the application of the prediction noise modelling software STAMSON 5.0. All input data pertaining to the lot layout parameters was based on the layout plan provided at the time of the study, as shown in Appendix A: Site Location. The input data used to calculate the predicted sound level exposures for the selected lots impacted by the road and rail traffic noise, and the resulting outputs, are given in Appendix I: Noise Model Printout.

The acoustic propagation model used to predict the noise levels at the representative floor levels was developed to determine the noise impacts and extent of the noise control measures required (if any). The MECP requires the calculation of the noise impacts at the outdoor living area (OLA) and plane of window of the dwellings; in this case the hotel sleeping quarters. Since there are no balconies and no identified OLA shown in the site plan, there is no consideration of an OLA.

Results and Noise Control Requirements

The following section is a summary and assessment of the modeled results for the representative units.

Road and Rail Noise

As specified by the MECP Environmental Noise Guideline NPC-300, the outdoor and indoor sound level limits (based on one-hour LA_{eq} values) at a residence for road and rail traffic noise are categorized into three (3) limits, based on the type of space assessed. The document also specifies the recommended noise control measures, if required, that should be followed for the OLA, plane of a window (ventilation requirements) and the indoor living area (building components) noise assessments. Select pages from the NPC-300 guideline are given in Appendix F: NPC-300 Reference Pages, which includes the stated warning clauses and other requirements based on the predicted noise levels.

The predicted noise level impacts for the daytime and nighttime periods for the representative Points of Reception (POR)s with no control measures are given in Table 3. From these tables, it is seen that some of

the MECP noise limits are exceeded at all levels/facades studied. Warning clauses must be implemented in all development agreements, offers to Purchase, and agreements of Purchase or Sale or Lease of each dwelling unit as detailed below.

Table 3: Predicted Noise Levels – Plane of Window

POR (height in metres)	Daytime Period LAeq (dBA) – plane of window	Nighttime Period LAeq (dBA) – plane of window
1 (1.5 m)	55.2	51.5 (Note C)
2 (11 m)	59.0 (Note C)	55.3 (Note C)
3 (11 m)	60.6 (Note C)	56.6 (Note C)

Notes taken from NPC-300:

Note A: Noise control measures may be applied to reduce the sound level to 55 dBA. If measures are not provided, prospective purchasers or tenants should be informed of potential noise problems by a warning clause Type A.

Note B: Noise control measures should be implemented to reduce the level to 55 dBA. Only in cases where the required noise control measures are not feasible for technical, economic or administrative reasons would an excess above the limit (55 dBA) be acceptable with a warning clause Type B.

Note C: The dwelling should be designed with a provision for the installation of central air conditioning in the future, at the occupant’s discretion. Warning clause Type C is also recommended.

Note D: Installation of central air conditioning should be implemented with a warning clause Type D. In addition, building components including windows, walls and doors, where applicable, should be designed so that the indoor sound levels comply with the sound level limits in Table C-2.

Note E: Building components including windows, walls and doors, where applicable, need to be designed so that the indoor sound levels comply with the sound level limits in Table C-2. The acoustical performance of the building components (windows, doors and walls) needs to be specified. In addition, the exterior walls of the first row of dwellings next to railway tracks are to be built to a minimum of brick veneer or masonry equivalent construction, from the foundation to the rafters when the rail traffic Leq (24-hour), estimated at a location of a nighttime receptor, is greater than 60 dBA, and when the first row of dwellings is within 100 metres of the tracks.

It is required that the following warning clauses be implemented in all development agreements, offers to Purchase, and agreements of Purchase or Sale or Lease of each dwelling unit:

Warning Clause(s):

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, Conservation and Parks.”

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 and rail 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, Conservation and Parks."

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, Conservation and Parks.”

Type D: “This dwelling unit has been equipped with central air conditioning in order to 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, Conservation and Parks. Air conditioning units are to be installed in a noise insensitive area.”

Aircraft Noise

Given that a portion of the proposed development falls within the NEF/NEP 25 to 30 countour, building components including windows, walls and ceiling/roof must be designed to achieve the indoor sound level limit (given as a NEF/NEP) shown in Table 4. A warning clause and provision that ducting to accomadate the future installation (if not already installed) of air conditioning be installed is also required.

Table 4: Supplementary Indoor Aircraft Noise Limits

Type of Space	Indoor NEF/NEP*
General offices, reception areas, retail stores, etc.	15
Individual or semi-private offices, conference rooms, etc.	10
Living/dining areas of residences, sleeping quarters of hotels/motels, theatres, libraries, schools, daycare centres, places of worship, etc.	5
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc.	0

* The indoor NEF/NEP values listed in Table C-10 are not obtained from NEF/NEP contour maps. The values are representative of the indoor sound levels and are used as assessment criteria for the evaluation of acoustical insulation requirements.

Since the indoor aircraft noise limits are expressed as NEF countours, the equivelant indoor sound pressure level to the NEF 5 countour is estimated using the following equation:

$$NEF = Leq(24) - 31 \text{ dBA.}$$

From this, the target indoor sound level is taken to be 36 dBA. To achieve this indoor sound level, some building components including windows, walls and ceiling/roof should be designed to have specific Sound Transmission Class (STC) ratings so to provide sufficient sound attenuation. STC is a single numbered descriptor of the acoustical isolation effectiveness of a structural element. It is commonly used to describe the acoustical characteristic of the element regarding noise transmission within the commonly encountered frequency range. A structural element with high STC rating provides good sound attenuation.

For this study, the recommended STC values were calculated using software that uses both the outdoor sound level and target indoor sound level to specify the needed rating for each building component so that sufficient attenuation is realized. For the calculation, the outdoor level was taken to be a conservatively high 65 dBA and the indoor level was taken to be a conservatively low 36 dBA. As no specific building information was available, the typical hotel room was assumed to have a floor area of 325 ft² with a window area of 65 ft² and exterior wall area of 123.5 ft². The program inputs and results for the STC calculations and assumption are given in Appendix J: STC Output Results. The building component STC requirements are provided in Table 5.

Table 5: Required STC Rating for building component

Building Component	STC Rating
Exterior Wall	29
Window	26
Roof (top floor)	33

Results Summary



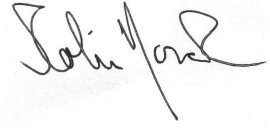
Table 6 summarizes the required warning clauses and building requirements, if any, for the proposed development. It is required that any necessary warning clauses be implemented in all development agreements, offers to Purchase, and agreements of Purchase or Sale or Lease for the development as identified in Table 6.

Table 6: Summary of Warning Clauses and Building Component Requirements

Lot(s)	Noise Barrier Requirement (Y/N)	Warning Clause(s)	Building Component Requirement(s)	Ventilation Requirement(s)
All hotel sleeping rooms on all floors	N/A	Type C	Minimum STC Rating for the following Building Components: Exterior Wall – 29 Window – 26 Roof - 33	Provision for the installation of central air conditioning

Conclusion

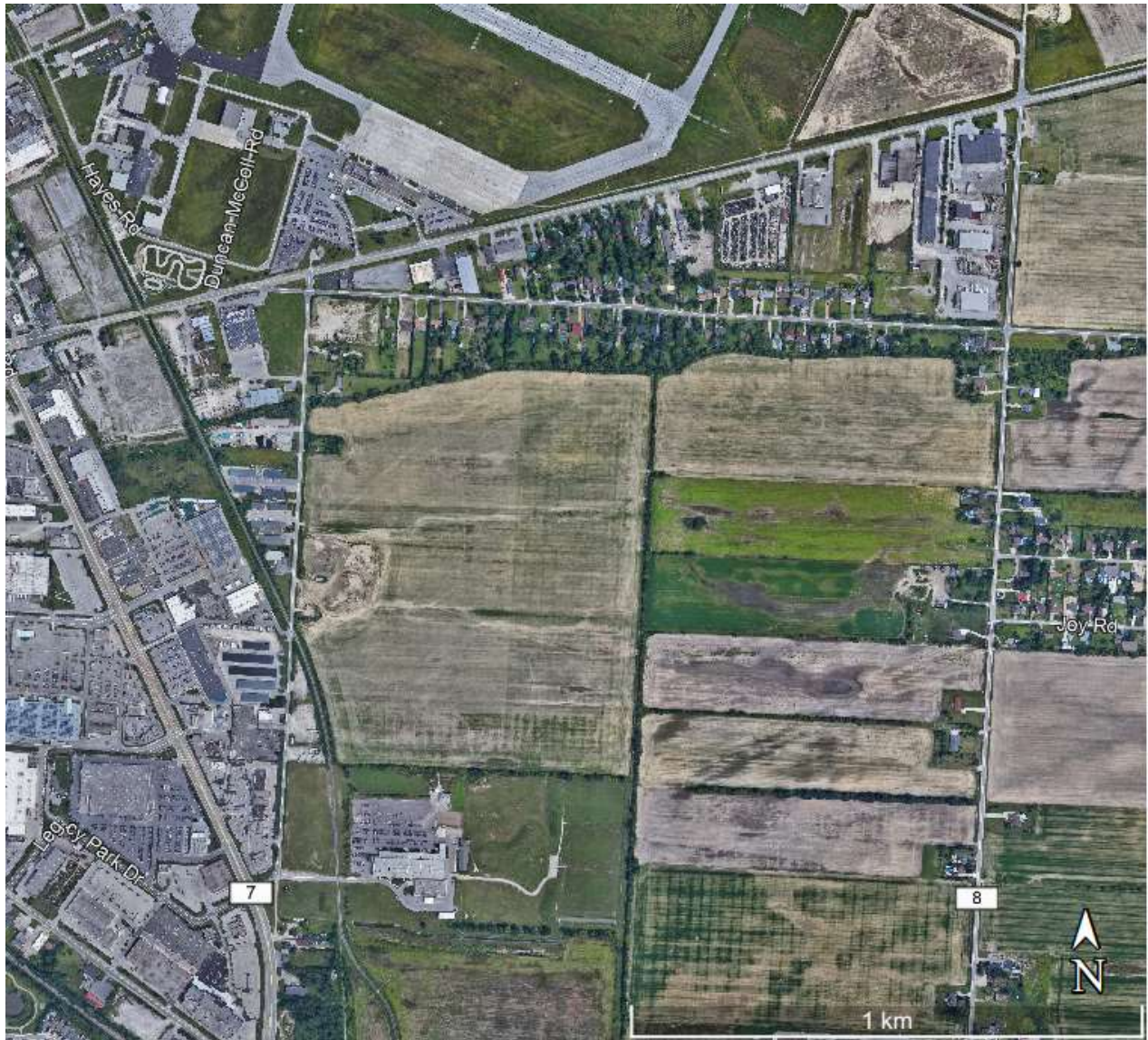
The noise impact on the proposed development has been shown in this report to exceed the limits set by the Ontario Ministry of the Environment, Conservation and Parks. However, given that the noise impacts can be addressed through the use of appropriate building material design (STC), the installation of heating components to accommodate air conditioning and warning clauses, it is recommended that the development be given approval with the understanding that the stated warning clauses and conditions will be implemented.

For 		
	Prepared by: Helen Ule, Ph.D., PEng	Reviewed by: Colin Novak, Ph.D., PEng

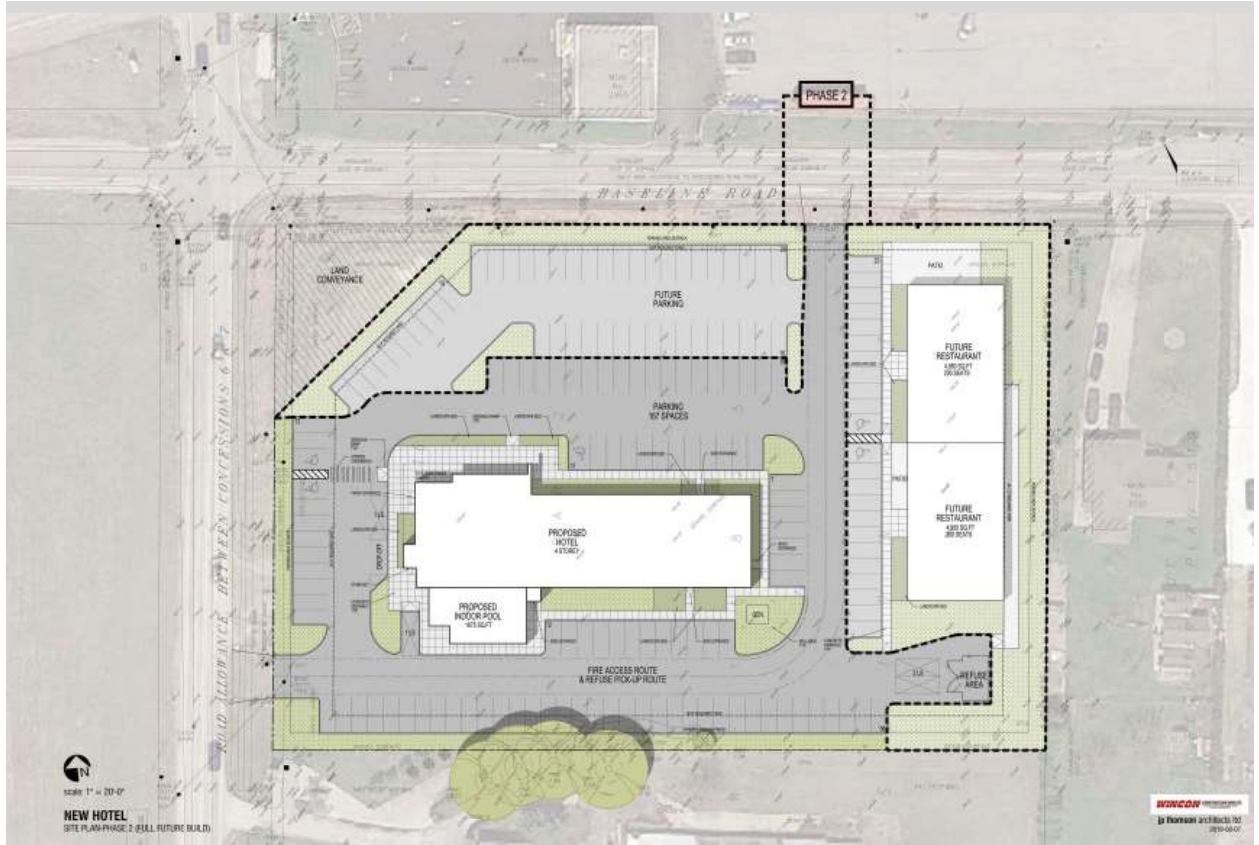
Appendix A: Site Location



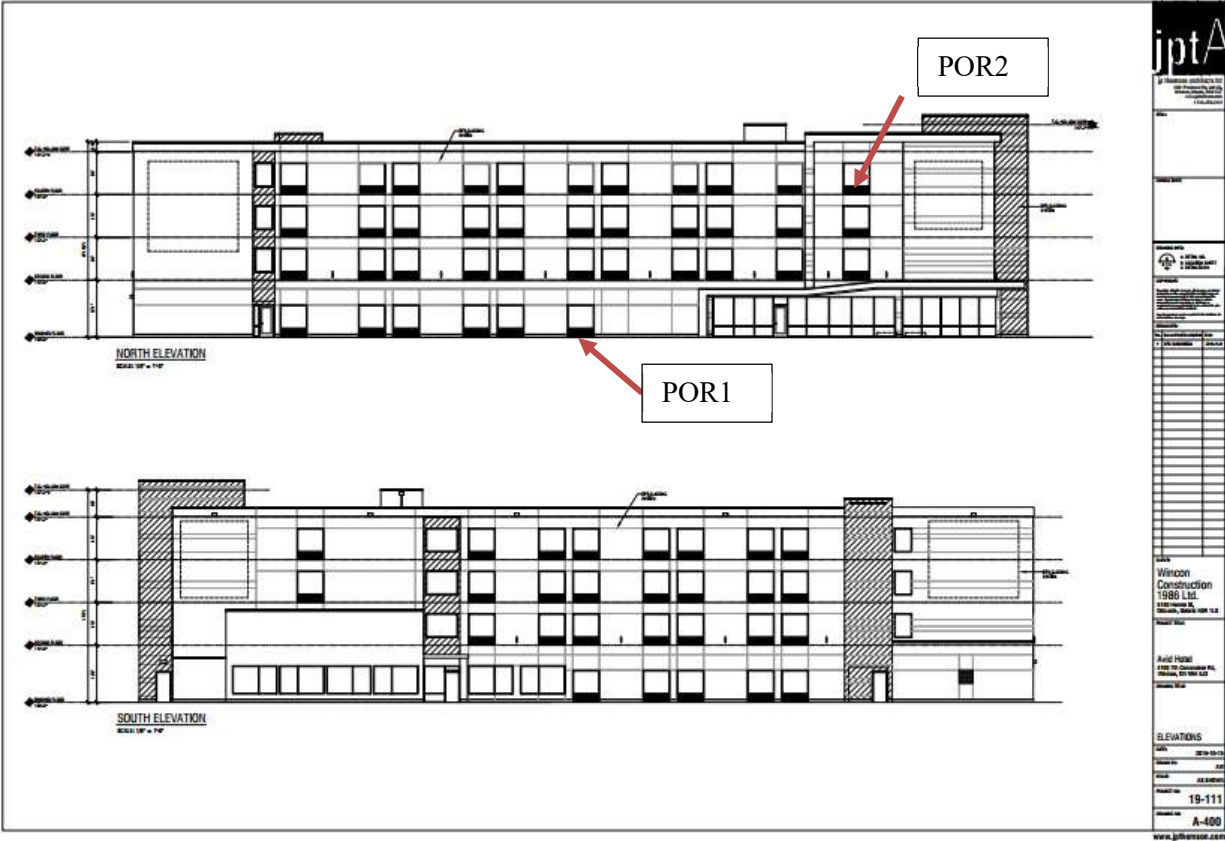
A 1: General Location of Proposed Development and Surrounding Area



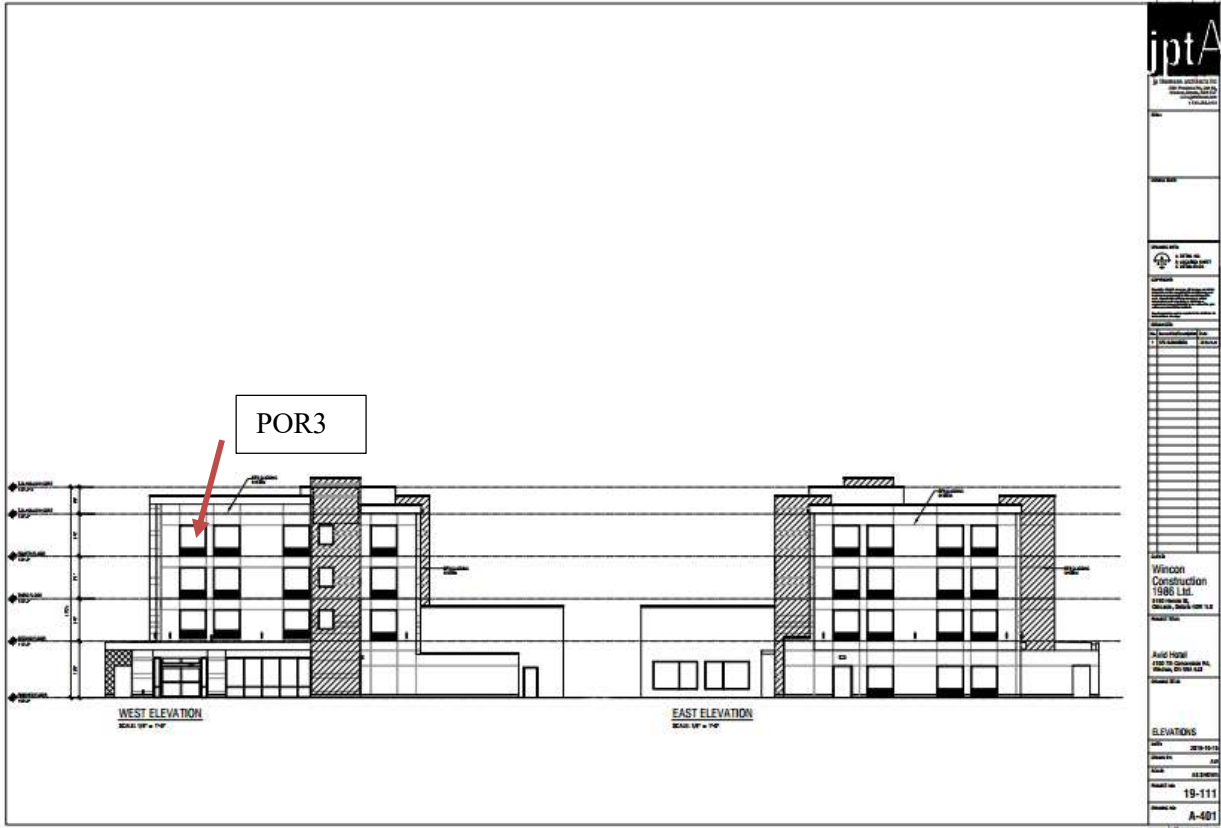
A 2: Proposed Development Site Plan showing Surrounding Area Features



A 3: Proposed Development Site Plan

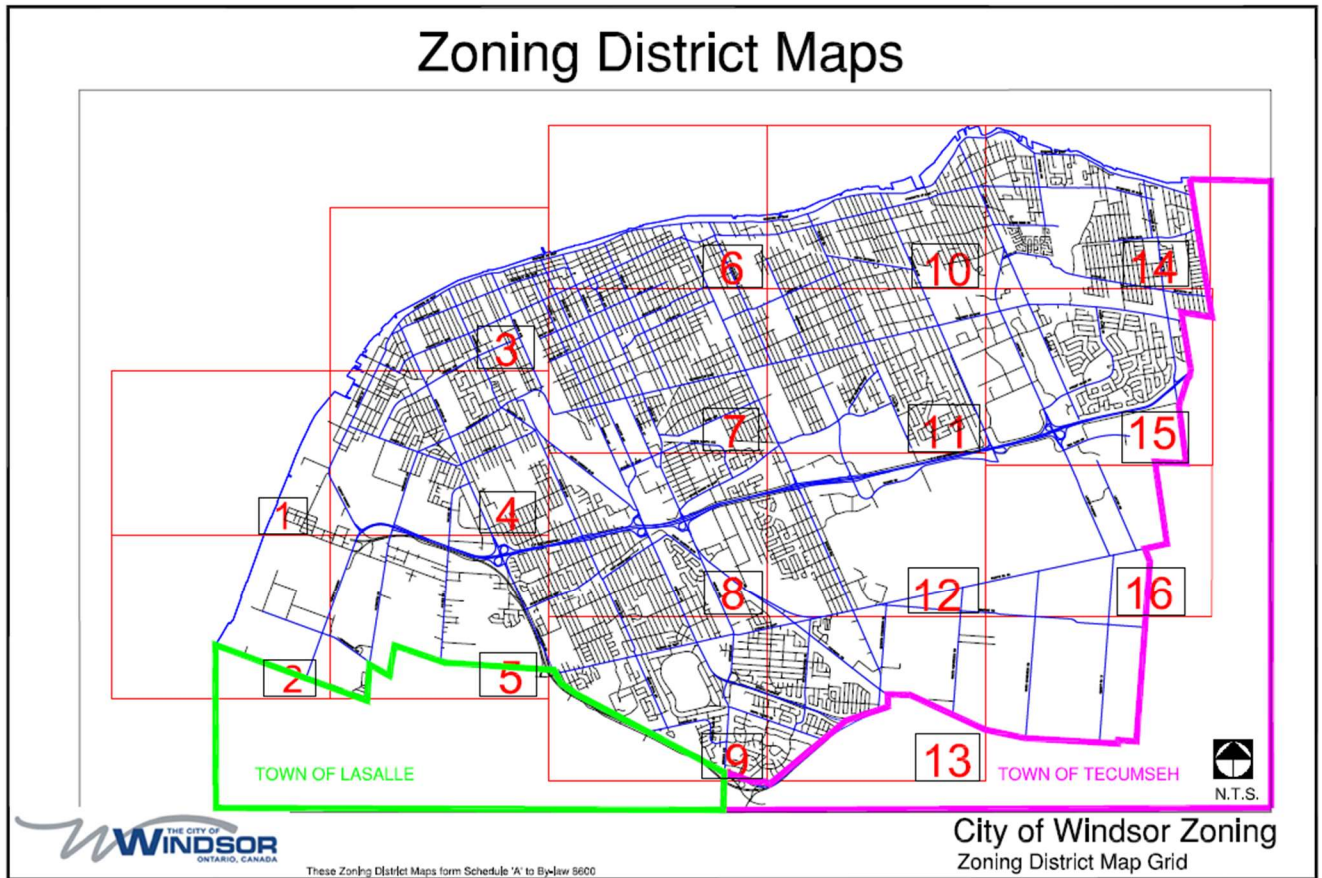


A 4:Proposed Development North and South Elevations

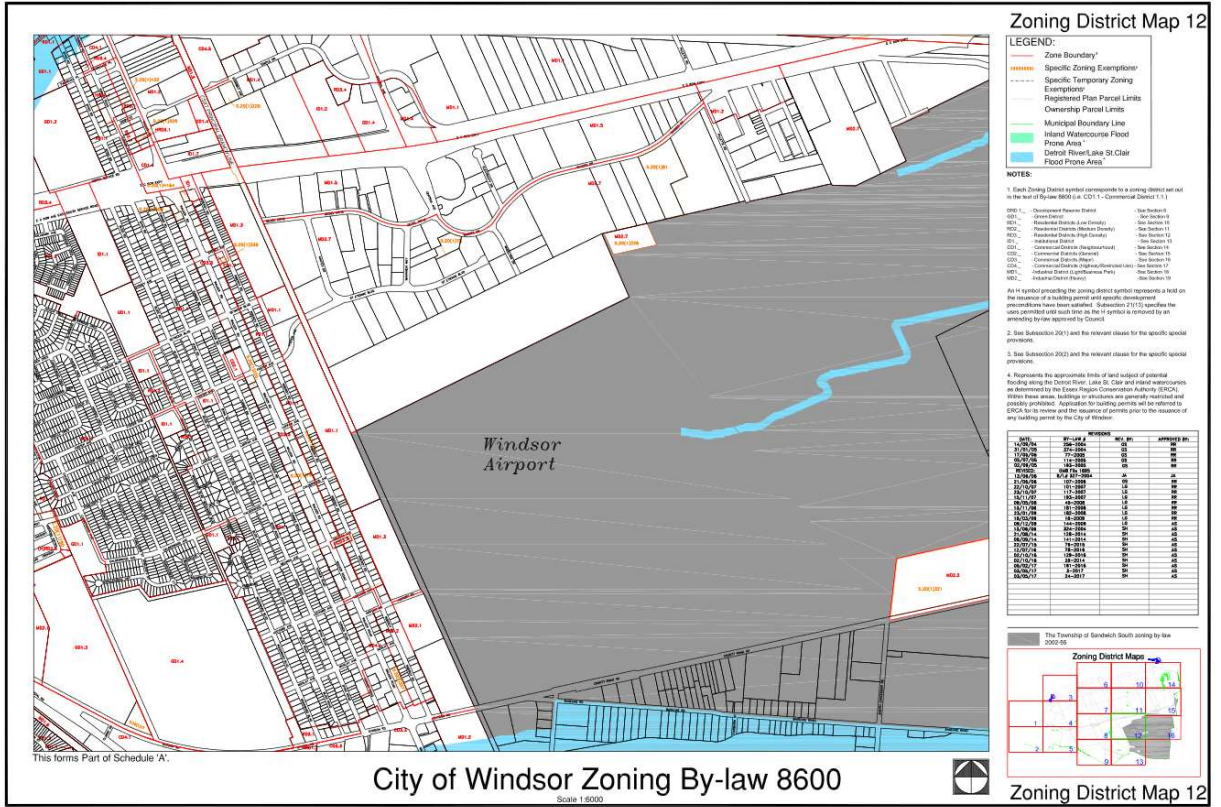


A 5:Proposed Development West and East Elevations

Appendix B: Land-use Zoning Map of Area



B 1: City of Windsor Zoning – Zoning District Map Grid



B 2: City of Windsor Zoning Map 12

Appendix C: CN Rail Main Line Requirements

Railway Classification for Application of Standard Impact Mitigation Measures

Railway lines in Ontario are classified by the railway companies into five classes for the purpose of applying the Standard Impact Mitigation Measures, to be Incorporated in New Residential Developments Adjacent to Railways. The classification is based on the present and potential traffic using the lines, and other operating characteristics, and is described below.

Maps showing the classification of the various railway lines are available for reference.

1. Principal Main Line

Traffic: Includes heavy trains with 3 or 4 power units per train.
High speeds, frequently exceeding 80 k.p.h. (50 m.p.h.)
Volume generally exceeds 10 trains per day

Crossings, gradients etc. may increase normal railway noise and vibration.

2. Secondary Main Line

Traffic: Trains generally light or moderate weight, with 1 or 2 power units per train.
High speeds, frequently exceeding 80 k.p.h. (50 m.p.h.)
Volume generally exceeds 5 trains per day

Crossings, gradients etc. may increase normal railway noise and vibration.

3. Principal Branch Line

Traffic: Trains generally light or moderate weight, with 1 or 2 power units per train, but may include heavier trains with more units
Low speeds, generally limited to 50 k.p.h. (30 m.p.h.)
Regular scheduled traffic, usually less than 5 trains per day

4. Secondary Branch Line

Traffic: Intermittent, unscheduled traffic, usually less than 1 trains per day
Low speeds, generally limited to 50 k.p.h. (30 m.p.h.)
Trains generally of light to moderate weight with 1 power unit per train

5. Spur Line

Traffic: Unscheduled traffic on a demand basis
Low speeds, generally limited to 50 k.p.h. (30 m.p.h.)
Trains of light weight, with 1 power unit per train

Standard Impact Mitigation Measures, to be Incorporated in New Residential Developments Adjacent to Railways

The measures are graduated in accordance with the operating characteristics of the rail lines the dwellings are to be built close to. Five categories are established for the "normal" situation of a fairly flat tract of land with houses at roughly the same elevation as the railway tracks. Variations would then apply for the cases where the tracks were in cut or on embankment, with the houses at a higher or lower level.

All of the railway lines in Ontario will be classified by the railway companies into the five classes described in "Railway Classifications for Application of Standard Impact Mitigation Measures". Where the Standard Measures call for site testing and evaluation this will be scrutinized by the Ministry of the Environment to ensure that the appropriate measures are provided.

Standard Impact Mitigation Measures

Appropriate measures for residential development adjacent to railway corridors are outlined in the following Standard Impact Mitigation Measures for a Principal Main Line, a Secondary Main Line, a Principal Branch Line, a Secondary Branch Line and a Spur Line.



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.

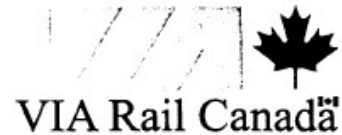
C 3: CN Rail Canada – Principal Main Line Requirements

PRINCIPAL MAIN LINE REQUIREMENTS



- A. Safety setback of dwellings 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. 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 300 metres of the railway right-of-way: “Warning: VIA Rail Canada Inc. 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). VIA will not be responsible for any complaints or claims arising from the 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 of 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 VIA.
- H. The Owner enter into an Agreement stipulating how VIA’s concerns will be resolved and will pay VIA’s reasonable costs in preparing and negotiating the agreement.

SECONDARY MAIN LINE REQUIREMENTS



- A. Safety setback of dwellings 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, 2.0 metres above grade at the property line, with side slopes not steeper than 2.5 to 1.
- B. 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 4.5 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 300 metres of the railway right-of-way: "Warning: VIA Rail Canada Inc. 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). VIA will not be responsible for any complaints or claims arising from the 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 of 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 VIA.
- H. The Owner enter into an Agreement stipulating how VIA's concerns will be resolved and will pay VIA's reasonable costs in preparing and negotiating the agreement.

C 5: CN Rail Canada – Secondary Main Line Requirements

PRINCIPAL BRANCH LINE REQUIREMENTS



- A. Safety setback of dwellings from the railway rights-of-way to be a minimum of 15 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, 2.0 metres above grade at the property line, with side slopes not steeper than 2.5 to 1.
- B. 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 4.0 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 300 metres of the railway right-of-way: “Warning: VIA Rail Canada Inc. 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). VIA will not be responsible for any complaints or claims arising from the 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 of 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 VIA.
- H. The Owner enter into an Agreement stipulating how VIA’s concerns will be resolved and will pay VIA’s reasonable costs in preparing and negotiating the agreement.

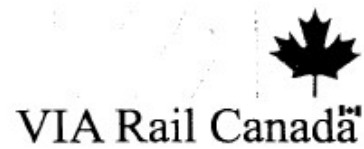
SECONDARY BRANCH LINE REQUIREMENTS



- A. Safety setback of dwellings from the railway rights-of-way to be a minimum of 15 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, 2.0 metres above grade at the property line, with side slopes not steeper than 2.5 to 1.
- B. 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.
- C. The Owner shall install and maintain a chain link fence of minimum 1.83 metre height along the mutual property line.
- D. 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 300 metres of the railway right-of-way: "Warning: VIA Rail Canada Inc. 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). VIA will not be responsible for any complaints or claims arising from the use of such facilities and/or operations on, over or under the aforesaid rights-of-way."
- E. 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.
- F. The Owner shall through restrictive covenants to be registered on title and all agreements of purchase and sale of 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 VIA.
- G. The Owner enter into an Agreement stipulating how VIA's concerns will be resolved and will pay VIA's reasonable costs in preparing and negotiating the agreement.

C 7: CN Rail Canada – Secondary Branch Line Requirements

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 300 metres of the railway right-of-way: “Warning: VIA Rail Canada Inc. 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). VIA will not be responsible for any complaints or claims arising from the 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.

C 8: CN Rail Canada – Spur Line Requirements



PRINCIPAL MAIN LINE

- A. Noise berm, or combination berm and acoustic fence, adjoining and parallel to the railway right-of-way and having returns at the ends:
- (i) Minimum total height 5.5 metres above top-of-rail.
 - (ii) Acoustic fence to be constructed without openings and of a durable material weighing not less than 20 kg. per square metre (4 lb./sq. ft.) of surface area.
- Note: The Railway may consider other measures recommended by an approved Noise Consultant satisfactory to the Railway.
- B. Safety setback of dwellings from the railway right-of-way to be a minimum of 30 metres in conjunction with the safety berm noted below. In the absence of a safety berm, we require a dwelling setback of 120 metres.
- C. Ground-borne vibration transmission to be estimated through site testing and evaluation to determine if dwellings within 75 metres of the Railway right-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. Safety berm adjoining and parallel to the railway right-of-way with returns at the ends, 2.5 metres above grade is required despite none being required to address the Railway's noise concerns.
- E. The following clause should be inserted in all offers to purchase, agreements of sale and purchase or lease and in the title deed or lease of each dwelling: "Warning: Canadian National Railway Company or its assigns or successors in interest has or have a right-of-way within 300 metres from the land the subject hereof. There may be alterations to or expansions of the rail facilities on such right-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 right-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 Developer shall install and maintain at his own expense, a chain link fence of minimum 1.83 metre (6 feet) height along the mutual property line, which shall be maintained by the Owner.
- H. 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 the sole responsibility for and shall maintain these measures to the satisfaction of CN Rail.
- I. Pursuant to the Planning Act, the Municipality shall provide this office of the Railway with written notice of the public meeting, by-law and passing of the by-law appropriately zoning the lands hereby proposed for subdivision.
- J. The Owner enter into an Agreement stipulating how CN Rail's concerns will be resolved and will pay CN Rail's reasonable costs in preparing and negotiating the agreement.

Appendix D: Report and Model Assumptions

ROAD:

- Traffic counts (AADT) provided by Mike Spagnuolo at the City of Windsor
- Project to 2030 with 2.5% growth rate per annum
- 85% of traffic during day period and 15% during night period
- 90% cars, 6% medium trucks, 4% heavy trucks
- Distances:
 - POR 1
 - Baseline – 61 m
 - Cty Rd 42 – 114 m
 - 7th Concession – 55 m
 - POR 2
 - Baseline – 55 m
 - Cty Rd 42 – 105 m
 - 7th Concession – 37 m
 - POR 3
 - Baseline – 61 m
 - Cty Rd 42 – 108 m
 - 7th Concession – 30.5 m
- Angles:
 - POR 1
 - Baseline – -90 to 90
 - Cty Rd 42 – -90 to 90
 - 7th Concession – 0 to 90
 - POR 2
 - Baseline – -90 to 90
 - Cty Rd 42 – -90 to 90
 - 7th Concession – 0 to 90
 - POR 3
 - Baseline – -20 to 10
 - Cty Rd 42 – -90 to 10
 - 7th Concession – -90 to 90
- Historical Volume:
 - Cty. Rd 42
 - 2015 – 13,600
 - Baseline
 - 2015 – 700
 - 7th Concession
 - 2016 – 5,600
- 2030 Volume
 - Cty Rd. 42
 - Cars – 15,068 day, 2,659 night
 - Commercial –
 - Medium – 1,004 day, 177 night

- Heavy – 670 day, 118 night
 - Baseline
 - Cars – 776 day, 288 night
 - Commercial –
 - Medium – 52 day, 19 night
 - Heavy – 34 day, 13 night
 - 7th Concession
 - Cars – 6,053 day, 1,068 night
 - Commercial –
 - Medium – 404 day, 71 night
 - Heavy – 269 day, 47 night
- Speeds:
 - Baseline – 50 km/h
 - Cty Rd 42 – 50 km/h
 - 7th Concession – 50 km/h

RAIL:

- Continuously welded
- Speed 16 km/h
- Data provided by Derek Basso (CN); December 2016
- Project to 2030 with 2.5% growth rate per annum
- No whistle
- View angles:
 - POR 1 – 0 to 50
 - POR 2 – 0 to 50
 - POR 3 - -90 to 50
- Distances:
 - POR 1 – 340 m
 - POR 2 – 322 m
 - POR 3 – 315 m
- 2016 Volume
 - Day – 3
 - Night – 3
 - Max cars – 140 day; 140 night
 - Locomotives – 4 max
- 2030 Volume
 - Day – 4.24
 - Night – 4.24

PROPERTY:

- Assume:
 - Total of 4 floors

- No balconies or identified OLA assumed with this development
- POR 1 on ground floor and POR 2 and 3 on 4th floor

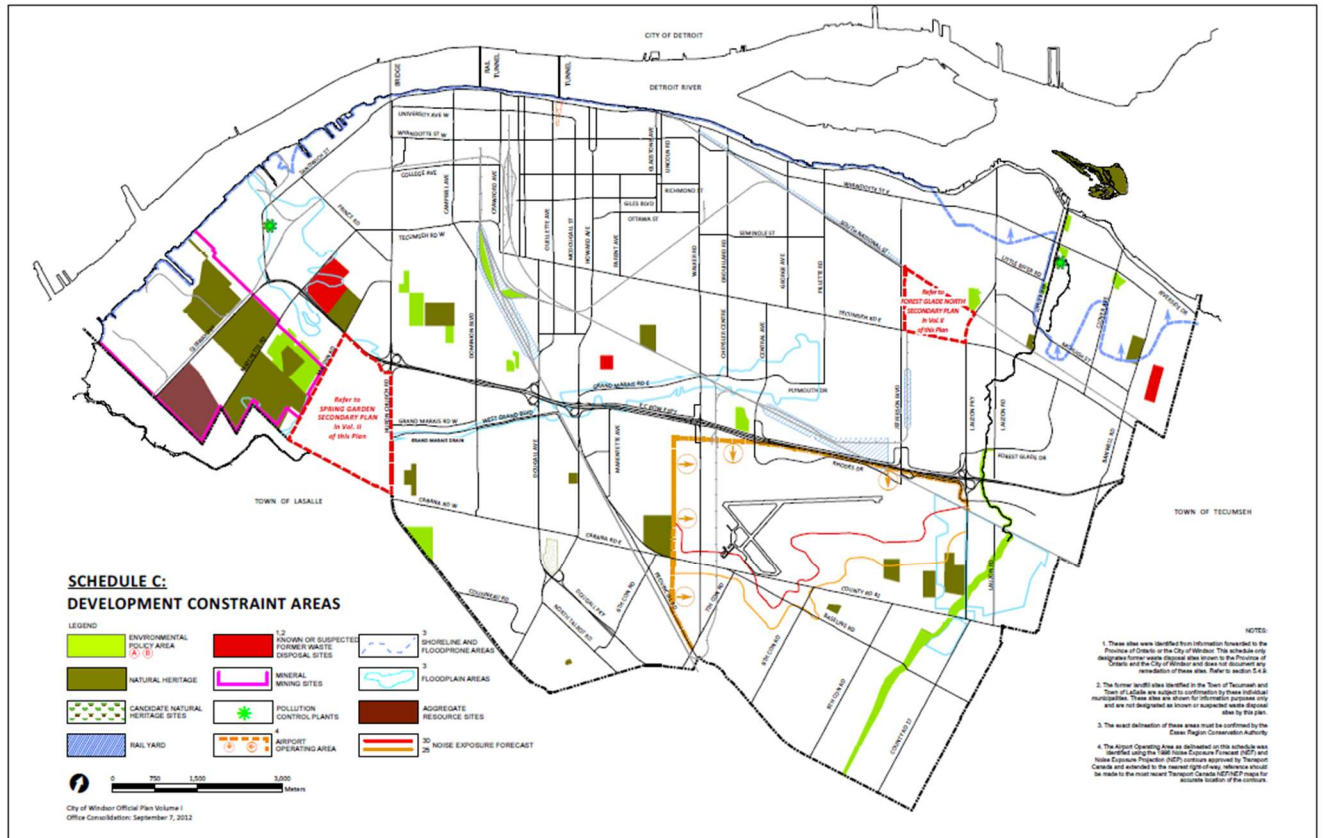
General:

- Model is 16 hour day, 8 hour night

STC Calculation:

- Bedroom – floor area 325 sq ft, window area 65 sq ft, wall area 123.5 sq ft, very absorptive furnishings
- Outdoor level 65 dBA
- Indoor level 40 dBA – bedroom
- Sound arrives 0-90 degrees
- Window is sealed thick

Appendix E: Schedule C: Development Constraints Areas



Appendix F: NPC-300 Reference Pages

ENVIRONMENTAL NOISE GUIDELINE Stationary and Transportation Sources - Approval and Planning		NPC-300	
<p>L_{eq} (8). For complete description on assessing road traffic impacts, refer to ORNAMENT. Other traffic noise prediction models have been and are being developed by various authorities and may be adopted from time to time for use in Ontario by the MOE.</p> <p>In order to be consistent with MOE guidelines, the sound level should be assessed in an OLA, such as a rear yard or a patio, and in indoor living areas, such as bedrooms and living rooms. Where the noise impact exceeds the applicable sound level limits, mitigation measures such as site planning, architectural design, noise barriers, building envelope elements (windows, exterior walls, doors) with upgraded sound isolation performance and/or central air conditioning may be required. Noise control measures are not required if the sound level estimated in the OLA is 55 dBA or less during the daytime and 50 dBA or less in the plane of bedroom windows during either daytime or nighttime.</p>			
C3.2.2 Daytime Outdoor Sound Level Limit			
Table C-1 gives the equivalent sound level (L_{eq}) limit for designated OLAs. The limit applies to the entire daytime period from 07:00 to 23:00.			
Table C-1 Sound Level Limit for Outdoor Living Areas Road and Rail			
Time Period		L_{eq} (16) (dBA)	
16-hour, 07:00 – 23:00		55	
C3.2.3 Indoor Sound Level Limits			
Table C-2 gives the equivalent sound level (L_{eq}) limits and the applicable time periods for the indicated types of indoor spaces. The specified indoor sound level limits are maxima and apply to the indicated indoor spaces with windows and doors closed.			
Table C-2 Indoor Sound Level Limits Road and Rail			
Type of Space	Time Period	L_{eq} (dBA)	
		Road	Rail
Living/dining, den areas of residences, hospitals, nursing homes, schools, daycare centres, etc.	07:00 – 23:00	45	40
Living/dining, den areas of residences, hospitals, nursing homes, etc. (except schools or daycare centres)	23:00 – 07:00	45	40
Sleeping quarters	07:00 – 23:00	45	40
Ministry of the Environment, August 2013		38	

F 1: Daytime Outdoor and Daytime/Nighttime Indoor Sound Level Limits

Type of Space	Time Period	L _{eq} (dBA)	
	23:00 – 07:00	40	35

C3.3 Rail Traffic Noise

C3.3.1 Method

The assessment of rail traffic noise impact should be conducted using a prediction method entitled STEAM, Sound from Trains Environmental Analysis Method, published in 1990 by MOE, Reference [34]. The descriptors used in the assessment are the 16-hour daytime and the 8-hour nighttime equivalent sound levels, L_{eq} (16) and L_{eq} (8). Other traffic noise prediction models have been and are being developed by various authorities and may be adopted from time to time for use in Ontario by the MOE.

The impact of railway traffic noise and the requirement for noise control measures should be assessed similarly to road traffic noise. The sound level should be assessed in an OLA, such as a rear yard or a patio, and in indoor living areas, such as bedrooms and living rooms, and compared with MOE guidelines. Noise control measures are not required if the sound level estimated in the OLA is 55 dBA or less during the daytime and 50 dBA or less in the plane of bedroom windows during daytime or nighttime.

C3.3.2 Daytime Outdoor Sound Level Limit

The outdoor noise impact should be assessed in the OLA during daytime hours, 07:00 to 23:00, considering a combination of only two sources of rail traffic noise, namely the locomotive and the wheel-rail interaction. Whistle noise is not included in the outdoor noise impact assessment. Table C-1 gives the equivalent sound level (L_{eq}) limit for OLAs.

C3.3.3 Indoor Sound Level Limits

The indoor assessment should consider the combination of all three railway noise sources, i.e., locomotive, wheel-rail and whistle. Table C-2 gives the equivalent sound level (L_{eq}) limits for the indicated types of indoor space. The specified indoor sound level limits are maxima and apply to the indicated indoor spaces with windows and doors closed.

A major characteristic of railway noise is its high pass-by sound level for short periods and a major low frequency component produced by the operation of the diesel locomotive. This special character of the sound should be taken into account, particularly when assessing the indoor sound levels. Consequently, in order to account for the special character of railway sound, the indoor sound level limits for rail noise, Table C-2, are 5 dBA lower than the indoor sound level limits for road traffic noise.

This difference results in a requirement for acoustically superior architectural components such as windows and walls, for railway noise.

C3.4 Air Traffic Noise

C3.4.1 Method

Aircraft noise impact assessment is based on Noise Exposure Forecast/Noise Exposure Projection (NEF/NEP) contours determined by methods approved by Transport Canada.

Where the noise impact exceeds the applicable limits, warning clauses and mitigation measures for indoor spaces such as architectural design, special building components and/or central air conditioning may be required. The indoor NEF/NEP values, specified in Table C-4 and Table C-10, are related to the outdoor values and the acoustical insulation provided by the building. The indoor NEF values can be calculated by converting the indoor sound levels, expressed as $L_{eq}(24)$ (dBA), using the expression $NEF = L_{eq}(24) - 31$ dBA.

Section 1.6.7.2 of the 2005 Provincial Policy Statement, Reference [26], establishes the applicable development criterion. With the exception of redevelopment or infilling, Section 1.6.7.2 of the 2005 Provincial Policy Statement, Reference [26], prohibits new residential development and other sensitive land uses in aircraft noise zones above the NEF/NEP 30 contour. The noise impact on the proposed noise sensitive land use is determined based on the location of the noise sensitive land use with respect to the official NEF/NEP contours. NEF/NEP contours are usually available for major civil aviation airports from the airport authority. The more restrictive of the NEF and NEP contours would apply.

C3.4.2 Outdoor Limit

Table C-3 gives the aircraft noise limit in terms of an NEF/NEP value in any outdoor area, including the OLA. The limit applies to the entire 24-hour period. The distance separation from the airport and, consequently, the location of the noise sensitive land use with respect to the NEF/NEP contours, is the only measure that controls the outdoor noise impact.

Table C-3
 Outdoor Aircraft Noise Limit

Time Period	NEF/NEP
24-hour	30

the emissions are not required to be included with the overall noise assessment of a stationary source facility.

In addition, sound level limits do not apply to emergency equipment operating in emergency situations.

C4.5.4 Sound Level Limits for Layover Sites

The sound level limit for noise from a layover site in any hour, expressed in terms of the One-Hour Equivalent Sound Level (L_{eq}) is the higher of either 55 dBA or the background sound level.

C5 Noise Impact Assessment – Multiple Sources

Impulse sources, non-impulse sources and emergency equipment are to be analyzed separately. Where there are multiple, non-impulse sources at a stationary source, the noise assessment should be based on the combined effect of all sources comprising the stationary source, added together on an energy basis.

C6 Noise Impact Assessment – Supplementary Noise Limits

Indoor limits for transportation sources applicable to noise sensitive land uses are specified in Table C-2 and Table C-4. Table C-9 and Table C-10 are expanded versions of Table C-2 and Table C-4, and present guidelines for acceptable indoor sound levels that are extended to land uses and developments which are not normally considered noise sensitive. The specified values are maximum sound levels and apply to the indicated indoor spaces with the windows and doors closed. The sound level limits in Table C-9 and Table C-10 are presented as information, for good-practice design objectives.

Table C-9
Supplementary Indoor Sound Level Limits
Road and Rail

Type of Space	Time Period	L_{eq} (Time Period) (dBA)	
		Road	Rail
General offices, reception areas, retail stores, etc.	16 hours between 07:00 – 23:00	50	45
Living/dining areas of residences, hospitals, schools, nursing/retirement homes, daycare centres, theatres, places of worship, libraries, individual or semi-private offices, conference rooms, reading rooms, etc.	16 hours between 07:00 – 23:00	45	40
Sleeping quarters of hotels/motels	8 hours between 23:00 – 07:00	45	40
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc.	8 hours between 23:00 – 07:00	40	35

Table C-10
Supplementary Indoor Aircraft Noise Limits
(Applicable over 24-hour period)

Type of Space	Indoor NEF/NEP*
General offices, reception areas, retail stores, etc.	15
Individual or semi-private offices, conference rooms, etc.	10
Living/dining areas of residences, sleeping quarters of hotels/motels, theatres, libraries, schools, daycare centres, places of worship, etc.	5
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc.	0

* The indoor NEF/NEP values listed in Table C-10 are not obtained from NEF/NEP contour maps. The values are representative of the indoor sound levels and are used as assessment criteria for the evaluation of acoustical insulation requirements.

C7 Noise Control Measures

The following sections provide MOE guidance for appropriate noise control measures. These sections constitute requirements that are applied to MOE approvals for stationary sources. This information is also provided as guidance which land use planning authorities may consider adopting.

The definition in Part A describes the various types and application of noise control measures. All the noise control measures described in the definition are appropriate to address the impact of noise of transportation sources (road, rail and aircraft) on planned sensitive land uses. Only some of the noise control measures described in the definition are appropriate to address the noise impact of stationary sources on planned sensitive land uses.

C7.1 Road Noise Control Measures

C7.1.1 Outdoor Living Areas

If the 16-Hour Equivalent Sound Level, $L_{eq}(16)$ in the OLA is greater than 55 dBA and less than or equal to 60 dBA, noise control measures may be applied to reduce the sound level to 55 dBA. If measures are not provided, prospective purchasers or tenants should be informed of potential noise problems by a warning clause Type A.

If the 16-Hour Equivalent Sound Level, $L_{eq}(16)$ in the OLA is greater than 60 dBA, noise control measures should be implemented to reduce the level to 55 dBA. Only in cases where the required noise control measures are not feasible for technical, economic or administrative reasons would an excess above the limit (55 dBA) be acceptable with a warning clause Type B. In the above situations, any excess above the limit will not be acceptable if it exceeds 5 dBA.

C7.1.2 Plane of a Window – Ventilation Requirements

C7.1.2.1 Daytime Period, 07:00 – 23:00 Hours

Noise control measures may not be required if the L_{eq} (16) daytime sound level in the plane of a bedroom or living/dining room window is less than or equal to 55 dBA. If the sound level in the plane of a bedroom or living/dining room window is greater than 55 dBA and less than or equal to 65 dBA, the dwelling should be designed with a provision for the installation of central air conditioning in the future, at the occupant's discretion. Warning clause Type C is also recommended.

If the daytime sound level in the plane of a bedroom or living/dining room window is greater than 65 dBA, installation of central air conditioning should be implemented with a warning clause Type D. In addition, building components including windows, walls and doors, where applicable, should be designed so that the indoor sound levels comply with the sound level limits in Table C-2. The location and installation of the outdoor air conditioning device should comply with sound level limits of Publication NPC-216, Reference [32], and guidelines contained in Environmental Noise Guidelines for Installation of Residential Air Conditioning Devices, Reference [6], or should comply with other criteria specified by the municipality.

C7.1.2.2 Nighttime Period, 23:00 – 07:00 Hours

Noise control measures may not be required if the L_{eq} (8) nighttime sound level in the plane of a bedroom or living/dining room window is less than or equal to 50 dBA. If the sound level in the plane of a bedroom or living/dining room window is greater than 50 dBA and less than or equal to 60 dBA, the dwelling should be designed with a provision for the installation of central air conditioning in the future, at the occupant's discretion. Warning clause Type C is also recommended.

If the nighttime sound level in the plane of a bedroom or living/dining room window is greater than 60 dBA, installation of central air conditioning should be implemented, with a warning clause Type D. In addition, building components including windows, walls and doors, where applicable, should be designed so that the indoor sound levels comply with the sound level limits in Table C-2. The location and installation of the outdoor air conditioning device should comply with sound level limits of Publication NPC-216, Reference [32], and guidelines contained in Environmental Noise Guidelines for Installation of Residential Air Conditioning Devices, Reference [6], or should comply with other criteria specified by the municipality.

C7.1.3 Indoor Living Areas – Building Components

If the nighttime sound level outside the bedroom or living/dining room windows exceeds 60 dBA or the daytime sound level outside the bedroom or living/dining area windows exceeds 65 dBA, building components including windows, walls and doors, where applicable, should be designed so that the indoor sound levels comply with the

sound level limits in Table C-2. The acoustical performance of the building components (windows, doors and walls) should be specified.

C7.2 Rail Noise Control Measures

C7.2.1 Outdoor Living Areas

Whistle noise is not included in the determination of the outdoor daytime sound level due to railway trains. All the provisions of Section C7.1.1 apply also to noise control requirements for rail noise.

C7.2.2 Plane of a Window – Ventilation Requirements

Whistle noise is not included in the determination of the sound level in the plane of a window. All the provisions of Section C7.1.2 apply also to noise control requirements for rail noise.

C7.2.3 Indoor Living Areas – Building Components

The sound level, L_{eq} , during the daytime (16-hour) and nighttime (8-hour) periods is determined using the prediction method STEAM, Reference [34], immediately outside the dwelling envelope. Whistle noise is included in the determination of the sound level.

If the nighttime sound level outside the bedroom or living/dining room windows exceeds 55 dBA or the daytime sound level outside the bedroom or living/dining area windows exceeds 60 dBA, building components including windows, walls and doors, where applicable, need to be designed so that the indoor sound levels comply with the sound level limits in Table C-2. The acoustical performance of the building components (windows, doors and walls) needs to be specified.

In addition, the exterior walls of the first row of dwellings next to railway tracks are to be built to a minimum of brick veneer or masonry equivalent construction, from the foundation to the rafters when the rail traffic L_{eq} (24-hour), estimated at a location of a nighttime receptor, is greater than 60 dBA, and when the first row of dwellings is within 100 metres of the tracks.

C7.3 Combination of Road and Rail Noise

The noise impact in the OLA and in the plane of a window, and the requirements for outdoor measures, ventilation measures and warning clauses, should be determined by combining road and rail traffic sound levels.

The assessment of the indoor sound levels and the resultant requirement for the acoustical descriptors of the building components should be done separately for road

In Class 4 areas, where windows for noise sensitive spaces are assumed to be closed, the use of central air conditioning may be acceptable if it forms an essential part of the overall building designs.

C7.9 Verification of Noise Control Measures

It is recommended that the implementation of noise control measures be verified by qualified individuals with experience in environmental acoustics.

C8 Warning Clauses

The use of warning clauses or easements in respect of noise are recommended when circumstances warrant. Noise warning clauses may be used to warn of potential annoyance due to an existing source of noise and/or to warn of excesses above the sound level limits. Direction on the use of warning clauses should be included in agreements that are registered on title to the lands in question. The warning clauses would be included in agreements of Offers of Purchase and Sale, lease/rental agreements and condominium declarations. Alternatively, the use of easements in respect of noise may be appropriate in some circumstances. Additional guidance on the use of noise warning clauses is provided in Section C7.1.1, Section C7.1.2.1, Section C7.1.2.2, Section C7.3 and Section C7.4.

C8.1 Transportation Sources

The following warning clauses may be used individually or in combination:

TYPE A: (see Section C7.1.1)

“Purchasers/tenants are advised that sound levels due to increasing road traffic (rail traffic) (air 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.”

TYPE B: (see Section C7.1.1 and Section C7.4)

“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: (see Section C7.1.2.1, Section C7.1.2.2 and Section C7.4)

“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: (see Section C7.1.2.1, Section C7.1.2.2 and Section C7.4)

“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.”

C8.2 Stationary Sources

It is not acceptable to use warning clauses in place of physical noise control measures to identify an excess over the MOE sound level limits. Warning clause (Type E) for stationary sources may identify a potential concern due to the proximity of the facility but it is not acceptable to justify exceeding the sound level limits.

TYPE E: (see Section C7.6)

“Purchasers/tenants are advised that due to the proximity of the adjacent industry (facility) (utility), noise from the industry (facility) (utility) may at times be audible.”

C8.3 Class 4 Area Notification

TYPE F: (see Section B9.2 and Section C4.4.2)

“Purchasers/tenants are advised that sound levels due to the adjacent industry (facility) (utility) are required to comply with sound level limits that are protective of indoor areas and are based on the assumption that windows and exterior doors are closed. This dwelling unit has been supplied with a ventilation/air conditioning system which will allow windows and exterior doors to remain closed.”

Appendix G: Road Traffic Volume Data

G 1: Predicted Oxford Street West (2.5% growth rate per annum)

Year	Road	Location	AADT
2015	County Road 42	East of Walker	13,600
2015	Baseline	East of 8 th Concession	700
2016	Concession Road 7	South of Baseline	5,600
2030	County Road 42	East of Walker	19,697 (predicted)
2030	Baseline	East of 8 th Concession	1,014 (predicted)
2030	Concession Road 7	South of Baseline	7,913 (predicted)

G 2: Predicted Hourly Traffic Volumes per Period and Breakdown of Cars, Medium Trucks and Heavy Trucks – County Road 42

Period	Hourly Traffic Volume (Vehicles/hr)	Auto Traffic Volume (Vehicles/hr)	Medium Truck Traffic Volume (Vehicles/hr)	Heavy Truck Traffic Volume (Vehicles/hr)
Day	1,047	942	63	42
Night	370	333	22	15

G 3: Predicted Hourly Traffic Volumes per Period and Breakdown of Cars, Medium Trucks and Heavy Trucks – Baseline

Period	Hourly Traffic Volume (Vehicles/hr)	Auto Traffic Volume (Vehicles/hr)	Medium Truck Traffic Volume (Vehicles/hr)	Heavy Truck Traffic Volume (Vehicles/hr)
Day	54	49	3	2
Night	40	36	2	2

G 4: Predicted Hourly Traffic Volumes per Period and Breakdown of Cars, Medium Trucks and Heavy Trucks – Concession Road 7

Period	Hourly Traffic Volume (Vehicles/hr)	Auto Traffic Volume (Vehicles/hr)	Medium Truck Traffic Volume (Vehicles/hr)	Heavy Truck Traffic Volume (Vehicles/hr)
Day	420	378	25	17
Night	148	133	9	6

G 4: Distance from Roadways to PORs

Facade	Distance from County Road 42 to Plane of Window (m)	Distance from Baseline to Plane of Window (m)	Distance from Concession Road 7 to Plane of Window (m)
POR1	114	61	55
POR2	105	55	37
POR3	108	61	30.5

Appendix H: Rail Traffic Volume Data

H 1: E-mail Correspondance from CN Rial regarding Train Count Data



Ahmed Atia <ahmed@akoustik.ca>

RE: Noise Study - Concession 7 / 8

1 message

Derek Basso <Derek.Basso@cn.ca>
To: Ahmed Atia <ahmed@akoustik.ca>

Tue, Dec 13, 2016 at 10:49 AM

Number of Trains	Max Speed	Number of Locomotive per Train	Number of Cars per Train	Engine Type
6	10	4	140	NA

These trains vary on a day to day schedule you can put 3 trains from 0700-2300 and 3 trains from 2300-0700.

Thanks

D



Derek Basso

Engineering Technician | Eastern Canada Division of Engineering
Design and Construction

1 Administration Road, Concord, ON, L4K 2R8

O - 905-669-3184

F - 905-760-3406

E - Derek.Basso@cn.ca

H 2: Predicted CN/VIA Rail Traffic Volumes (2.5% growth rate per annum)

Year	Railway	Day	Night
2016	CN Rail Line	3	3
2030	CN Rail Line	4.24 (predicted)	4.24 (predicted)

H 3: Train Volume Data Modelled for 2030

	Train Type	Number of Trains	Max Speed (km/h)	Number of Locomotive per Train	Number of Cars per Train	Engine Type
Day	Freight	4.24	16	4	140	Diesel
Night	Freight	4.24	16	4	140	Diesel

H 4: Distance from Via Rail Line to Selected Representative Lots

Façade	Distance to Railway to Plane of Window (m)
POR1	340
POR2	322
POR3	315

Appendix I: Noise Model Printouts

POR1

STAMSON 5.0 NORMAL REPORT Date: 15-01-2020 14:45:10

MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: POR1.te Time Period: Day/Night 16/8 hours

Description:

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

```
-----  
Train        ! Trains    ! Speed !# loc !# Cars! Eng !Cont  
Type        !            !(km/h) !/Train!/Train! type !weld  
-----+-----+-----+-----+-----+-----  
1.            ! 4.2/4.2 ! 16.0 ! 4.0 !140.0 !Diesel! Yes
```

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

```
-----  
Angle1 Angle2        : 0.00 deg 50.00 deg  
Wood depth            :    0    (No woods.)  
No of house rows      :    0 / 0  
Surface                :    1    (Absorptive ground surface)  
Receiver source distance : 340.00 / 340.00 m  
Receiver height        : 1.50 / 1.50 m  
Topography            :    1    (Flat/gentle slope; no barrier)  
No Whistle  
Reference angle        : 0.00
```

Results segment # 1: CN (day)

LOCOMOTIVE (0.00 + 38.74 + 0.00) = 38.74 dBA

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

0 50 0.58 66.12 -21.48 -5.90 0.00 0.00 0.00 38.74

WHEEL (0.00 + 23.14 + 0.00) = 23.14 dBA

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

0 50 0.66 51.58 -22.50 -5.94 0.00 0.00 0.00 23.14

Segment Leq : 38.86 dBA

Total Leq All Segments: 38.86 dBA

Results segment # 1: CN (night)

LOCOMOTIVE (0.00 + 41.75 + 0.00) = 41.75 dBA

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

0 50 0.58 69.13 -21.48 -5.90 0.00 0.00 0.00 41.75

WHEEL (0.00 + 26.15 + 0.00) = 26.15 dBA

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

0 50 0.66 54.59 -22.50 -5.94 0.00 0.00 0.00 26.15

Segment Leq : 41.87 dBA

Total Leq All Segments: 41.87 dBA

Road data, segment # 1: Cty Rd 42 (day/night)

Car traffic volume : 15068/2659 veh/TimePeriod

Medium truck volume : 1004/177 veh/TimePeriod

Heavy truck volume : 670/118 veh/TimePeriod

Posted speed limit : 50 km/h

Road gradient : 0 %

Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Cty Rd 42 (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 : 114.00 / 114.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Baseline (day/night)

Car traffic volume : 776/288 veh/TimePeriod
Medium truck volume : 52/19 veh/TimePeriod
Heavy truck volume : 34/13 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Baseline (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 : 61.00 / 61.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 3: 7th Conc (day/night)

Car traffic volume : 6053/1068 veh/TimePeriod
Medium truck volume : 404/71 veh/TimePeriod
Heavy truck volume : 269/48 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %

Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 3: 7th Conc (day/night)

Angle1 Angle2 : 0.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 1 (Absorptive ground surface)

Receiver source distance : 55.00 / 55.00 m

Receiver height : 1.50 / 1.50 m

Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

Results segment # 1: Cty Rd 42 (day)

Source height = 1.41 m

ROAD (0.00 + 52.54 + 0.00) = 52.54 dBA

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

-90 90 0.66 68.62 0.00 -14.62 -1.46 0.00 0.00 0.00 52.54

Segment Leq : 52.54 dBA

Results segment # 2: Baseline (day)

Source height = 1.41 m

ROAD (0.00 + 44.13 + 0.00) = 44.13 dBA

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

-90 90 0.66 55.70 0.00 -10.11 -1.46 0.00 0.00 0.00 44.13

Segment Leq : 44.13 dBA

Results segment # 3: 7th Conc (day)

Source height = 1.41 m

ROAD (0.00 + 50.82 + 0.00) = 50.82 dBA

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

0 90 0.66 64.66 0.00 -9.37 -4.47 0.00 0.00 0.00 50.82

Segment Leq : 50.82 dBA

Total Leq All Segments: 55.13 dBA

Results segment # 1: Cty Rd 42 (night)

Source height = 1.41 m

ROAD (0.00 + 48.01 + 0.00) = 48.01 dBA

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

-90 90 0.66 64.09 0.00 -14.62 -1.46 0.00 0.00 0.00 48.01

Segment Leq : 48.01 dBA

Results segment # 2: Baseline (night)

Source height = 1.42 m

ROAD (0.00 + 42.90 + 0.00) = 42.90 dBA

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

-90 90 0.66 54.47 0.00 -10.11 -1.46 0.00 0.00 0.00 42.90

Segment Leq : 42.90 dBA

Results segment # 3: 7th Conc (night)

Source height = 1.42 m

ROAD (0.00 + 46.32 + 0.00) = 46.32 dBA

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

0 90 0.66 60.16 0.00 -9.37 -4.47 0.00 0.00 0.00 46.32

Segment Leq : 46.32 dBA

Total Leq All Segments: 50.99 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.24

(NIGHT): 51.49

POR2

STAMSON 5.0 NORMAL REPORT Date: 15-01-2020 14:45:37

MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: POR2.te Time Period: Day/Night 16/8 hours

Description:

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

Train	! Trains	! Speed	!# loc	!# Cars	! Eng	!Cont
Type	!	!(km/h)	!/Train!	/Train!	type	!weld
1.	!	4.2/4.2	!	16.0	!	4.0
						!140.0
						!Diesel!
						! Yes

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

Angle1 Angle2 : 0.00 deg 50.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 1 (Absorptive ground surface)

Receiver source distance : 322.00 / 322.00 m

Receiver height : 11.00 / 11.00 m

Topography : 1 (Flat/gentle slope; no barrier)

No Whistle

Reference angle : 0.00

Results segment # 1: CN (day)

LOCOMOTIVE (0.00 + 43.07 + 0.00) = 43.07 dBA

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

0 50 0.30 66.12 -17.31 -5.74 0.00 0.00 0.00 43.07

WHEEL (0.00 + 27.07 + 0.00) = 27.07 dBA

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

0 50 0.41 51.58 -18.71 -5.80 0.00 0.00 0.00 27.07

Segment Leq : 43.18 dBA

Total Leq All Segments: 43.18 dBA

Results segment # 1: CN (night)

LOCOMOTIVE (0.00 + 46.08 + 0.00) = 46.08 dBA

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

0 50 0.30 69.13 -17.31 -5.74 0.00 0.00 0.00 46.08

WHEEL (0.00 + 30.08 + 0.00) = 30.08 dBA

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

0 50 0.41 54.59 -18.71 -5.80 0.00 0.00 0.00 30.08

Segment Leq : 46.19 dBA

Total Leq All Segments: 46.19 dBA

Road data, segment # 1: Cty Rd 42 (day/night)

Car traffic volume : 15068/2659 veh/TimePeriod

Medium truck volume : 1004/177 veh/TimePeriod

Heavy truck volume : 670/118 veh/TimePeriod

Posted speed limit : 50 km/h

Road gradient : 0 %

Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Cty Rd 42 (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 : 105.00 / 105.00 m
Receiver height : 11.00 / 11.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Baseline (day/night)

Car traffic volume : 776/288 veh/TimePeriod
Medium truck volume : 52/19 veh/TimePeriod
Heavy truck volume : 34/13 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Baseline (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 : 55.00 / 55.00 m
Receiver height : 11.00 / 11.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 3: 7th Conc (day/night)

Car traffic volume : 6053/1068 veh/TimePeriod
Medium truck volume : 404/71 veh/TimePeriod
Heavy truck volume : 269/48 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %

Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 3: 7th Conc (day/night)

Angle1 Angle2 : 0.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 1 (Absorptive ground surface)

Receiver source distance : 37.00 / 37.00 m

Receiver height : 11.00 / 11.00 m

Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

Results segment # 1: Cty Rd 42 (day)

Source height = 1.41 m

ROAD (0.00 + 56.04 + 0.00) = 56.04 dBA

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

-90 90 0.38 68.62 0.00 -11.64 -0.93 0.00 0.00 0.00 56.04

Segment Leq : 56.04 dBA

Results segment # 2: Baseline (day)

Source height = 1.41 m

ROAD (0.00 + 46.99 + 0.00) = 46.99 dBA

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

-90 90 0.38 55.70 0.00 -7.77 -0.93 0.00 0.00 0.00 46.99

Segment Leq : 46.99 dBA

Results segment # 3: 7th Conc (day)

Source height = 1.41 m

ROAD (0.00 + 55.31 + 0.00) = 55.31 dBA

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

0 90 0.38 64.66 0.00 -5.40 -3.95 0.00 0.00 0.00 55.31

Segment Leq : 55.31 dBA

Total Leq All Segments: 58.98 dBA

Results segment # 1: Cty Rd 42 (night)

Source height = 1.41 m

ROAD (0.00 + 51.51 + 0.00) = 51.51 dBA

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

-90 90 0.38 64.09 0.00 -11.64 -0.93 0.00 0.00 0.00 51.51

Segment Leq : 51.51 dBA

Results segment # 2: Baseline (night)

Source height = 1.42 m

ROAD (0.00 + 45.76 + 0.00) = 45.76 dBA

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

-90 90 0.38 54.47 0.00 -7.77 -0.93 0.00 0.00 0.00 45.76

Segment Leq : 45.76 dBA

Results segment # 3: 7th Conc (night)

Source height = 1.42 m

ROAD (0.00 + 50.81 + 0.00) = 50.81 dBA

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

0 90 0.38 60.16 0.00 -5.40 -3.95 0.00 0.00 0.00 50.81

Segment Leq : 50.81 dBA

Total Leq All Segments: 54.77 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.10

(NIGHT): 55.33

POR3

STAMSON 5.0 NORMAL REPORT Date: 15-01-2020 14:46:24
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: POR3.te Time Period: Day/Night 16/8 hours

Description:

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

Train	! Trains	! Speed	!# loc	!# Cars	! Eng	!Cont
Type	!	!(km/h)	!/Train!	/Train!	type	!weld
-----+-----+-----+-----+-----+-----+-----						
1.	!	4.2/4.2	!	16.0	!	4.0 !140.0 !Diesel! Yes

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

Angle1 Angle2 : -90.00 deg 50.00 deg

Wood depth : 0 (No woods.)

No of house rows : 1 / 1

House density : 50 %

Surface : 1 (Absorptive ground surface)

Receiver source distance : 315.00 / 315.00 m

Receiver height : 11.00 / 11.00 m

Topography : 1 (Flat/gentle slope; no barrier)

No Whistle

Reference angle : 0.00

Results segment # 1: CN (day)

LOCOMOTIVE (0.00 + 44.83 + 0.00) = 44.83 dBA

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

-90 50 0.30 66.12 -17.19 -1.64 0.00 -2.47 0.00 44.83

WHEEL (0.00 + 28.74 + 0.00) = 28.74 dBA

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

-90 50 0.41 51.58 -18.58 -1.80 0.00 -2.47 0.00 28.74

Segment Leq : 44.94 dBA

Total Leq All Segments: 44.94 dBA

Results segment # 1: CN (night)

LOCOMOTIVE (0.00 + 47.84 + 0.00) = 47.84 dBA

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

-90 50 0.30 69.13 -17.19 -1.64 0.00 -2.47 0.00 47.84

WHEEL (0.00 + 31.75 + 0.00) = 31.75 dBA

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

-90 50 0.41 54.59 -18.58 -1.80 0.00 -2.47 0.00 31.75

Segment Leq : 47.95 dBA

Total Leq All Segments: 47.95 dBA

Road data, segment # 1: Cty Rd 42 (day/night)

Car traffic volume : 15068/2659 veh/TimePeriod

Medium truck volume : 1004/177 veh/TimePeriod

Heavy truck volume : 670/118 veh/TimePeriod

Posted speed limit : 50 km/h

Road gradient : 0 %

Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Cty Rd 42 (day/night)

Angle1 Angle2 : -90.00 deg 10.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 108.00 / 108.00 m
Receiver height : 11.00 / 11.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Baseline (day/night)

Car traffic volume : 776/288 veh/TimePeriod
Medium truck volume : 52/19 veh/TimePeriod
Heavy truck volume : 34/13 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Baseline (day/night)

Angle1 Angle2 : -20.00 deg 10.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 61.00 / 61.00 m
Receiver height : 11.00 / 11.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 3: 7th Conc (day/night)

Car traffic volume : 6053/1068 veh/TimePeriod
Medium truck volume : 404/71 veh/TimePeriod
Heavy truck volume : 269/48 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %

Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 3: 7th Conc (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 : 30.50 / 30.50 m

Receiver height : 11.00 / 11.00 m

Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

Results segment # 1: Cty Rd 42 (day)

Source height = 1.41 m

ROAD (0.00 + 53.42 + 0.00) = 53.42 dBA

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

-90 10 0.38 68.62 0.00 -11.81 -3.39 0.00 0.00 0.00 53.42

Segment Leq : 53.42 dBA

Results segment # 2: Baseline (day)

Source height = 1.41 m

ROAD (0.00 + 39.50 + 0.00) = 39.50 dBA

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

-20 10 0.38 55.70 0.00 -8.39 -7.81 0.00 0.00 0.00 39.50

Segment Leq : 39.50 dBA

Results segment # 3: 7th Conc (day)

Source height = 1.41 m

ROAD (0.00 + 59.48 + 0.00) = 59.48 dBA

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

-90 90 0.38 64.66 0.00 -4.25 -0.93 0.00 0.00 0.00 59.48

Segment Leq : 59.48 dBA

Total Leq All Segments: 60.48 dBA

Results segment # 1: Cty Rd 42 (night)

Source height = 1.41 m

ROAD (0.00 + 48.89 + 0.00) = 48.89 dBA

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

-90 10 0.38 64.09 0.00 -11.81 -3.39 0.00 0.00 0.00 48.89

Segment Leq : 48.89 dBA

Results segment # 2: Baseline (night)

Source height = 1.42 m

ROAD (0.00 + 38.27 + 0.00) = 38.27 dBA

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

-20 10 0.38 54.47 0.00 -8.39 -7.81 0.00 0.00 0.00 38.27

Segment Leq : 38.27 dBA

Results segment # 3: 7th Conc (night)

Source height = 1.42 m

ROAD (0.00 + 54.98 + 0.00) = 54.98 dBA

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

-90 90 0.38 60.16 0.00 -4.25 -0.93 0.00 0.00 0.00 54.98

Segment Leq : 54.98 dBA

Total Leq All Segments: 56.01 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.60

(NIGHT): 56.64

Appendix J: STC Output Results

```

Indoor sound level in dB(A) is 36
Room absorption category is: high absorption
Outdoor sound level is 65 dB(A) (plus 0 dB from Table 2)

```

Components:	After Step 2	From Table 3 (% energy)	From Table 4 (% floor area)	From Table 5 (spectrum)	STC
1. Exterior wall	29	+5 dB (33 %)	-5 dB (38 %)	+0 dB	29
2. Window, sealed thick dou	29	+5 dB (33 %)	-8 dB (20 %)	+0 dB	26
3. Roof / ceiling	29	+5 dB (33 %)	-1 dB (100 %)	+0 dB	33

Calculation is for: hotel

J 1: STC Results for Assumed Hotel Room