

**REPORT NO. WA20-052
REVISION 5**

**DETAILED NOISE CONTROL STUDY
MIXED-USE RESIDENTIAL DEVELOPMENT
1041 LAKESHORE ROAD EAST
CITY OF MISSISSAUGA**

**SUBMITTED TO:
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C/O SKYBOURNE DEVELOPMENTS INC.
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MARCH 14, 2025



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	<u>INDEX</u>	<u>PAGE</u>
1.0	INTRODUCTION	1
2.0	SUMMARY AND RECOMMENDATIONS	3
3.0	SOUND AND VIBRATION LEVEL CRITERIA	11
4.0	ANALYSIS	15

TABLES

FIGURES

APPENDIX A: ROAD AND RAIL TRAFFIC DATA

APPENDIX B: SAMPLE SOUND LEVEL CALCULATIONS

1.0 INTRODUCTION

- 1.1** The services of SS Wilson Associates (SSWA) were retained by Skybourne Developments Inc. on behalf of 1407 Lakeshore Developments Inc. to prepare a Detailed Noise Control Study for the proposed development located at 1041 Lakeshore Road East in the City of Mississauga.

The objective of this Report is to support an application for OPA and ZBA Approval of the proposed development.

- 1.2** The site is bounded by the following land uses:
- to the north by residential dwellings and furthermore by a railway line which carries GO Transit, CN and VIA rail trains
 - to the south by Lakeshore Road East and light industrial uses
 - to the east by a residential development and low-rise commercial
 - to the west by an Auto Repair Shop, operating as “Krown Lakeshore”, as well as residential and low-rise commercial uses

The location of the site is shown in Figure 1. Project north is illustrated in Figures 2 and 3.

- 1.3** Major features of the development are defined by the set of architectural drawings prepared by RAW Design Inc., received on March 14, 2025.

Figure 2 illustrates the general layout of the proposed development.

- 1.4** Major surface transportation noise sources (current and future) of concern to the development are:
1. Lakeshore Road East
 2. GO Transit (Metrolinx) rail
 3. CN Rail
 4. VIA Rail

- 1.5** Major stationary noise sources (current and future) of concern to the development are:
1. Heating, Ventilation and Air Conditioning (HVAC) equipment serving the nearby buildings.
 2. Bay doors of the automotive repair shop directly west of the proposed development across Ogden Avenue.
 3. Process equipment (cyclone) for the furniture manufacturing facility on the south side of Lakeshore Road.

- 1.6** The proposed development is located outside the 25 NEF/NEP contour lines prepared by Transport Canada; therefore, aircraft noise is not considered a problem.
- 1.7** The scope of this report is to define the minimum noise attenuation requirements for the control of outdoor and indoor sound levels from environmental noise sources.
- 1.8** Revision 1 dated March 2nd was based on the updated set of architectural drawings prepared by RAW Design Inc., received on February 17, 2022.
- 1.9** Revision 2 dated September 28, 2022, was based on the following:
- The updated drawings prepared by RAW Design Inc., received on September 27th, 2022.
 - The calculations have been revised to include Metrolinx's updated rail data dated August 22, 2022.
- 1.10** Revision 3, dated February 17, 2023, was based on the following:
- The updated drawings prepared by RAW Design Inc. dated February 17, 2023
 - Rail traffic calculations and noise control recommendations were revised to reflect Metrolinx's updated rail data dated February 10, 2023, in response to City comments.
- 1.11** Revision 4 dated February 22, 2024 provided additional supporting information regarding the application of the MECP Class 4 Area concept for the subject site. The revision also incorporated the most recent drawings referenced in Section 1.3 above.
- 1.12** This Revision 5 updates the Metrolinx Warning Clause within this report, as per the City of Mississauga's comments dated July 2, 2024.

2.0 SUMMARY AND RECOMMENDATIONS

2.1 SUMMARY

Based on the analysis conducted in this investigation it is concluded that:

1. The unattenuated daytime sound level for the Common Outdoor Living Area (Common OLA)¹ located on the 10th floor, will exceed the MECP's recommended objective sound level. Therefore, for this area, outdoor noise control measures are required.
2. The private Outdoor Living Areas (OLAs)¹ located on the ground floor along the east and west sides of the building have not been assessed, given that the aforementioned Common OLA has been provided for the residents.

Furthermore, sound barriers will not be feasible to protect such areas without compromising the intended uses of the outdoor spaces and the aesthetics of the proposed building. Therefore, outdoor noise control measures are not recommended for this area.

3. Based on the MECP guidelines, all other terraces and the balconies for the proposed development are not considered as OLAs due to fact that the depth of the balconies/terraces are less than 4 m. Therefore, no physical mitigation measures are required, and a warning clause registered in the Development Agreement(s) will suffice.
4. The unattenuated sound levels at the outside walls of the proposed building will exceed the recommended objective sound levels. Indoor noise controls are required within the proposed building along with relevant warning clauses.
5. Although the projected sound levels are predicted to be above the sound level criteria outlined in Section 3, it is feasible to control sound levels within the outdoor and indoor areas of the proposed development to meet the stated criteria.
6. The results of the investigation of the stationary sources of noise (summary list: commercial HVAC units from neighbouring operations, industrial equipment and trucks to the west, the auto service shop immediately west of the proposed development, the proposed garage exhaust ventilation shaft, HVAC and electrical equipment associated with the development itself) indicate that the unattenuated sound levels at the Points of Reception of concern (particularly

¹ At times, it may also be referred to as Outdoor Amenity Areas. The size of an OLA is subject to municipal standards and other project requirements (except when classified as a balcony along with other applicable MECP rules).

residential receptors on the west and south sides of the building) are predicted to exceed the applicable sound level criteria for stationary sources. Accordingly, noise control measures are warranted for these Points of Reception. The following is a summary of the recommended mitigation measures/actions as per the procedures:

- a. Application of the Class 4 acoustical area planning classification and air conditioning systems to allow windows to remain closed;
 - b. Window sizes on the west side of the proposed building must be selected and sized to ensure the operable area of each window is small relative to the window area;
 - c. The use of an intake silencer for the fluid cooler in the mechanical penthouse;
 - d. The selection of mechanical and electrical equipment to have sound power levels equal to or less than as shown in this report.
 - e. The use of warning clauses advising purchasers/occupants of the potential for high sound levels due to the nearby automotive repair shop, and the fact that the site should be considered a Class 4 area.
7. The City of Mississauga is requested to undertake the necessary procedures, as detailed in this study, to designate the subject development site, 1041 Lakeshore Road E, as an MECP Class 4 area which will require formal approval by the City. Based on meeting with City staff, it is understood that this issue is being addressed at a Council meeting and staff are supportive of the application of the Class 4 Area concept to the subject site.

The Class 4 Area is a planning tool intended to be applied to noise-sensitive land uses being built in proximity to existing, lawfully established stationary sources. The application of the Class 4 Area requires special warning clause provisions, implementation of central air conditioning, and permits a 5-10 dB leeway in the Ministry sound level criteria to provide benefits to the proponent (reducing the requirements for noise controls within the development and/or at the source) and the surrounding industries (reduction or avoidance of noise mitigation measures, reduced impact to operations, higher permissible levels for future Ministry approvals, etc.). The application of the Class 4 concept for the subject site will avoid the need for a significantly taller rooftop parapet barrier and removes the requirement to mitigate noise sources at the surrounding industries. It should be noted that the subject site is exposed to very high levels of ambient transportation noise due to road traffic upon Lakeshore Road E.

8. An update to this noise control study must be undertaken prior to the submission of plans for building permit approval to assess the specific sound emission levels from the selected equipment to ensure compliance with the conclusions of this report and to update the required noise controls, if necessary.

With implementation of the above noted recommendations, we are satisfied that the applicable sound level criteria are met.

2.2 RECOMMENDATIONS

A summary of the minimum noise attenuation requirements is presented in Table 1. Detailed description is as follows:

1. Class 4 Area Designation

To be applied to the entire development site

The results of the investigation of the stationary sources of noise indicate that the unattenuated sound levels at the Points of Reception of concern are predicted to exceed the MECP's applicable sound level criteria for stationary sources. Accordingly, noise control measures are warranted for these Points of Reception.

Due to the presence of numerous sources of stationary noise in the surrounding area, there is no practical means of constructing sound barriers or other noise controls to shield the subject development (particularly the 10th floor terrace OLA) from sources of stationary noise that is technically or economically feasible. Therefore, SSWA is recommending that the subject area of concern to be classified as a **Class 4 Area** as an alternative that is consistent with the Provincial guidelines set out in the MECP Guideline, NPC-300.

In order for an area to be classified as a Class 4 area, the following conditions must be pursued, approved and implemented:

- 1) The subject dwelling units must be fitted with air conditioning as a means to allow the windows to stay closed;
- 2) That the subject area is intended for development with new noise-sensitive land use(s) that are not yet built;
- 3) That the subject area is in proximity to existing, lawfully-established stationary source(s) (in this case, the nearby commercial buildings, industrial land uses, and automotive service shop);
- 4) That the subject area has formal confirmation from the land use planning authority with the Class 4 Area classification, which is determined during the land use planning process under the Planning Act. It should be noted that the means or method of implementing the Class 4 area is entirely at the discretion of the municipality. Often, this is formally granted by way of a Council decision based on justification from a noise planning report such as this document;
- 5) Prospective purchasers must be informed that the dwelling is located within a Class 4 Area through the appropriate means and informed of the relevant Agreements of noise mitigation. In addition, the appropriate warning clause will be required to inform the purchaser that the applicable Class 4 Area

sound level limits are based on the assumption that windows are closed (MECP Warning Clause Type F).

- 6) Some of the noise controls can only apply to “high-rise multi-unit buildings” as defined by the MECP (not applicable in this development proposal).

It should be noted that sound levels in excess of the MECP criteria that would warrant the application of a Class 4 area are primarily predicted at the west building facades facing the Krown Automotive shop, and within the OLA due to the IMG Inc. cyclone. Due to reduced angles of exposure to the sources of noise, the other dwelling units are predicted to have lower sound levels. However, the Class 4 area designation cannot be applied “piecemeal” in that manner, and the entire site must be classified as a Class 4. Therefore, all dwellings within the proposed site will require air conditioning systems and warning clauses to suit.

2. Outdoor Noise Control Measures

Common OLA-10th Floor

An acoustical barrier should be constructed to shield the above-noted Common OLA with the following details:

- (i) The barrier should be constructed along the alignments shown schematically in Figure 3.
- (ii) The parapet and/or rooftop acoustical barrier may consist of a transparent material to OBC requirements. The added acoustic fence component to be constructed of a durable material having approximately 10 kg/m² (\approx 2 lb/ft²) of surface area and be in a continuous line without openings or gaps.
- (iii) The Builder/Contractor should be required to seek approval, including shop drawing approvals of the detailed construction of the proposed barriers prior to its installation and the approval of the Engineer shall cover: material/wood species, construction details, support details, arrangements of the panels and exact locations on a development/building plan.

3. Air Conditioning

All Units within Building

The above-noted properties should be equipped with central air conditioning. The air conditioning system may be central to the entire building or may be central to each dwelling unit (for example using packaged incremental units (PTAC), internal Heat Pump or Fan Coil Units (FCU) connected to a central

cooling/heating system with suitable duct work to all rooms²). The *Ministry of the Environment, Conservation and Parks* does not accept window-type air conditioning units in lieu of a central system. In all cases, serious attention should be given by the proponent, the Mechanical Engineer, and the Contractor to the noise potential of the air conditioning system as it may affect the outdoor and indoor receivers within or outside of the proposed development. It is important that the Builder, the Mechanical Engineer, and the Contractor achieve the MECP objectives (the maximum sound level L_{AS} of 50 dBA³ at the closest internal/external point(s) of reception, i.e. at their outdoor areas as well as at the closest window on any floor level) included in Publication NPC-300.

The following warning clause should be registered in all Development Agreement(s) and Offers of Sale and Purchase or Lease of these properties:

“Purchasers are advised that despite the inclusion of noise control features in this development area and within the building units, noise levels from increasing road and/or rail traffic will continue to be of concern, occasionally interfering with some activities of the dwelling occupants as the noise level exceeds the Municipality’s and the Ministry of the Environment’s noise criteria”.

“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 provincial policies”.

In accordance with the Region of Peel’s Guidelines, the location and installation of the outdoor air conditioning device should comply with sound level limits of provincial policies and with any other criteria specified by the municipality.

It is also our recommendation that the necessary detailed technical analysis be performed prior to the certification process for Building Permit to address the specific requirements for the control of the selected air conditioning system to meet the sound level criteria at the point(s) of reception and to include same in the applicable permit drawings/specifications.

4. Warning Clause^{*4}

In accordance with the Region of Peel’s Guidelines, the following Warning

² The use of split system A/C units in apartment buildings is seldom used .

³ Or the lowest hourly ambient L_{eq} due to road traffic projected at the receptor location(s).). It should be noted that L_{AS} of 55 dBA is acceptable only for cases where the A/C unit is placed in a high ambient location (i.e. with a direct line of sight to a major roadway).

^{*4} Reference should be made to Bulletin No. 91003, Environmental Warnings/Restrictions, Ontario Ministry of Consumer and Commercial Relations.

Clause should be registered in all Development Agreements and Offers of Sale and Purchase or Lease of these properties:

All Units within Building:

Notification of Class 4 Area (Type F):

“Purchasers/tenants are advised that sound levels due to the adjacent commercial automotive facility 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, thereby ensuring that the indoor sound levels are within the sound level limits of the municipality and provincial policies.”

Notification of Noise Controls (Type B):

“Purchasers are advised that despite the inclusion of noise control features in this development area and within the building units, noise levels from increasing road and rail traffic will continue to be of concern, occasionally interfering with some activities of the dwelling occupants as the noise level exceeds the Municipality’s and the Ministry of the Environment’s noise criteria”.

Notification of Rail Noise (Metrolinx):

Warning: The Applicant is advised that the subject land is located within Metrolinx’s 300 metres railway corridor zone of influence and as such is advised that Metrolinx and its assigns and successors in interest has or have a right-of-way within 300 metres from the subject land. The Applicant is further advised that there may be alterations to or expansions of the rail or other transit facilities on such right-of-way in the future including the possibility that Metrolinx or any railway entering into an agreement with Metrolinx to use the right-of-way or their assigns or successors as aforesaid may expand or alter their operations, which expansion or alteration may affect the environment of the occupants in the vicinity, notwithstanding the inclusion of any noise and vibration attenuating measures in the design of the development and individual lots, blocks or units.

Notification of Rail Noise (FCM/RAC Guideline):

“Warning: The applicant is advised that the subject land is located within the 300 metres railway corridor zone of influence, and as such is advised that CN, VIA Rail, and their assigns and successors in interest have right-of-way within 300 m from the subject land hereof. There may be alterations to or expansions of the rail or other facilities on such right-of-way in the future, including the possibility that they or any railway company entering into an agreement with this railway company to use the right-of-way or their assigns or successors as aforesaid may expand their operations. The 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). CN and VIA Rail 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 right-of-way.

“All persons intending to acquire an interest in the real property by purchase or lease are advised of the proximity of the lands, which could operate on a 24-hour basis. It is possible that the marshalling/shunting yard operations may cause disturbance and may be altered or expanded, which could affect the living environment of the residents despite the inclusion of any noise and vibration attenuating measures in the design of the outdoor amenity areas and individual dwellings. Residents are advised that further mitigation cannot be expected and the railway company will not be responsible for any complaints or claims arising from use of such facilities and/or operations.”

All Units on West Side of Building:

The following Warning Clause should be registered in all Development Agreements and Offers of Sale and Purchase or Lease of the properties on the west side of the building, which are exposed to noise from the nearby automotive shop (Krown Lakeshore):

“Purchasers are advised that despite the inclusion of noise control features in this development area and within the building units, noise levels from the nearby automotive repair facility may continue to be of concern at times, occasionally interfering with some activities of the dwelling occupants as the noise level exceeds the Municipality’s and the Ministry of the Environment’s noise criteria”.

All Units with a Balcony:

The following Warning Clause should be registered in all Development Agreements and Offers of Sale and Purchase or Lease of these properties having a balcony:

“Purchasers/tenants are advised that despite the inclusion of noise control features within this development and within the dwellings, sound levels from increasing road and rail traffic will continue to be of concern as the levels in the balcony exceed the Ministry of the Environment, Conservation and Parks criteria” and that a protected Common Outdoor Living Area meeting the Ministry sound level criteria has been provided within the development”.

5. Building Acoustic Insulation

All Units within Building

All exterior building components (walls, windows and doors) should meet the minimum Acoustic Insulation Factors (AIF) shown in Tables 4 and 5. All windows should be well fitted and weather-stripped.

It is also the responsibility of the developer/builder responsible for final design and construction of the subject dwellings to ensure that the correct windows, walls and doors acoustic specifications are secured from the Acoustical Engineer prior to planning and construction of the noted dwellings.

6. Implementation Procedures

The following is a summary of the generally recommended procedures for implementation as per the MECP requirements:

- a) The Development Agreement(s) should include the details of all the necessary noise control measures and procedures as outlined herein this noise study to the satisfaction of all concerned parties.
- b) Upon availability of updated rail data from Metrolinx and Via Rail, an update will be required to the noise study.
- c) Prior to submission of the project plans for Building Permit, the Builder's plans, with respect to the units requiring noise control measures as referred to earlier, should be certified by an Acoustical Engineer as being in conformance with the recommendations of the Detailed Noise Control Study as approved and/or amended by the authorities having jurisdiction.

The barrier certification should include approval of the sound barrier shop drawings (showing the barrier material/wood species, construction details, support details, arrangements of the panels and exact locations on a development plan, height, and material composition) if applicable.

- d) Prior to their final inspection and release for occupancy, these dwellings should be certified by an Acoustical Engineer as being in compliance with the recommendations of the Detailed Noise Control Study.

In view of the fact that municipal implementation procedures of the noise control measures recommended herein may differ, it is the responsibility of the developer/builder responsible for final design and construction of the subject structures/dwellings to ensure that the correct details related to the noise control measures referred in this report, such as sound barriers, building shell component specifications (windows, walls, doors, and others), air conditioning noise control technical requirements, etc. are secured from the Acoustical Engineer prior to planning and construction of the noted buildings.

3.0 SOUND AND VIBRATION LEVEL CRITERIA

3.1 SURFACE TRANSPORTATION CRITERIA⁵

The surface transportation noise is based on the objective sound levels recommended by the Ministry of the Environment, Conservation and Parks (Ref: MECP Publication NPC-300 “Environmental Noise Guideline, Noise Assessment Criteria for Stationary Sources and for Land Use Planning, 2013”) and applicable Regional/Municipal sound level standards and procedures for different land uses and spaces.

The following is a summary of the applicable sound level criteria for surface transportation sources for the shown time periods (day=d & night=n):

Sound Level Limits for Outdoor Living Areas (OLAs)

AREA & TIME PERIOD	L _{Aeq(day)} ROAD AND RAIL (dBA)
Designated (Individual or common) Outdoor Living Areas (16 hr day, 07:00 - 23:00)	L _{Aeq(day)} 55

Indoor Sound Level Limits

Type of Space	L _{Aeq} (Time Period) (dBA)	
	Road	Rail
Living/dining, den areas of residences, hospitals, nursing homes, schools, daycare centres, etc. (Time period-day: 16 hr, 07:00 - 23:00)	L _{Aeq(day)} 45	L _{Aeq(day)} 40
Living/dining, den areas of residences, hospitals, nursing homes, etc. (except schools or daycare centres) (Time period-night: 8 hr, 23:00 - 07:00)	L _{Aeq(night)} 45	L _{Aeq(night)} 40
Sleeping quarters (Time period-day: 16 hr, 07:00 - 23:00)	L _{Aeq(day)} 45	L _{Aeq(day)} 40
Sleeping quarters (Time period-night: 8 hr, 23:00 - 07:00)	L _{Aeq(night)} 40	L _{Aeq(night)} 35

⁵ Road, rail and rolling stock traffic.
SS Wilson Associates

**Additional Supplementary (Best Management Practices) Sound Level
Criteria Recommended for Other Uses**

Type of Space	L _{Aeq} (Time Period) (dBA)	
	Road	Rail
General offices, reception areas, retail stores, etc. (Time period-day: 16 hr, 07:00 - 23:00)	L _{Aeq(day)} 50	L _{Aeq(day)} 45
Living/dining areas of residences, hospitals, schools, nursing/retirement homes, daycare centres, theatres, places of worship, libraries, individual or semiprivate offices, conference rooms, reading rooms, etc. (Time period-day: 16 hr, 23:00 - 07:00)	L _{Aeq(day)} 45	L _{Aeq(day)} 40
Sleeping quarters of hotels/motels (Time period-night: 8 hr, 23:00 - 07:00)	L _{Aeq(night)} 45	L _{Aeq(night)} 40
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc. (Time period-night: 8 hr, 23:00 - 07:00)	L _{Aeq(night)} 40	L _{Aeq(night)} 35

The criteria for acceptable outdoor and indoor sound levels are based on “free-field” predicted and/or measured sound levels at the applicable receiver locations, thus the effects of sound reflections and reverberant sound fields are not considered.

If the sound level is less than or equal to the sound level criteria, no control measures will be required.

The outdoor sound levels **may** exceed the outdoor sound level criterion by up to 5 decibels, provided that it can be demonstrated that it is not technically, economically or administratively feasible to achieve the criterion and that the occupants are informed of a potential disturbance due to the excess noise by means of a warning clause or cautionary note to be registered in all Development Agreement(s) and Offers of Sale and Purchase or Lease.

Central air conditioning is required when the daytime sound level at the outside wall of any habitable room containing windows exceeds an L_{Aeq(day)} 16 hrs of 65 dBA or when the nighttime sound level at the outside wall of any habitable room containing windows exceeds an L_{Aeq(night)} 8hrs of 60 dBA.

Forced air ventilation (with provision for future installation of a central air conditioning system) is required when the daytime sound level at the outside wall of any habitable room containing windows an exceeds L_{Aeq(day)} 16 hrs of 55 dBA

but is less than or equal to 65 dBA or when the nighttime sound level at the outside wall of any habitable room containing windows exceeds an $L_{Aeq(night)}$ 8hrs of 50 dBA but is less than or equal to 60 dBA.

Notwithstanding the above, the Region of Peel requires that for those dwellings with a nighttime building façade sound level of 60dBA, air conditioning be installed, as opposed to the MECP’s requirement for provision for air conditioning for these dwellings.

Application of Criteria

The following table summarizes the requirements for noise control measures for the various sound level ranges:

SOURCE OF NOISE	DAYTIME SOUND LEVEL $L_{Aeq(day)}$	NIGHTTIME SOUND LEVEL $L_{Aeq(night)}$	AIR CONDITIONING	FORCED AIR VENTILATION WITH PROVISION FOR FUTURE AIR COND.	WARNING CLAUSE	ACOUSTIC INSULATION
ROAD	<=55	<=50	-	-	-	-
	>55 & <=65	>50 & <=59	-	Yes	Yes "Type C"	
	>65	>59	Yes	-	Yes "Type D"	Yes
RAIL	<=55	<=50	-	-	-	-
	>55 & <=60	>50 & <=55	-	Yes	Yes "Type C"	-
	>60 & <=65	>55 & <=59	-	Yes	Yes "Type C"	Yes
	>65	>59	Yes	-	Yes "Type D"	Yes

3.2 CRITERIA FOR STATIONARY NOISE SOURCES

The following criteria apply to the impact of Stationary Sources of noise as defined by the MECP to include industrial and commercial facilities. The criteria apply to the impact of Stationary Sources external to the development on the proposed development or to the impact of any proposed Stationary Sources internal to the development on the development itself.

The criteria used in this study are based on the objective sound levels recommended by the Ministry of the Environment, Conservation and Parks (Ref.: MECP Publication NPC-300 “Environmental Noise Guideline, Noise Assessment Criteria for Stationary Sources and for Land Use Planning, 2013) and other relevant publications.

For sound from a stationary source, including Quasi-Steady Impulsive Sound but not including other impulsive sound, the predicted and/or measured “predictable worst case” 1-hour equivalent sound levels (L_{Aeq1hr}) of the stationary source(s) at a point of reception is the higher of the applicable exclusion limit value (given in the following tables) or the background sound level for that point of reception. The outdoor sound level limits for stationary sources apply only to daytime and evening (07:00 – 23:00 hours).

**Exclusion⁶ Limit Values of One-Hour Equivalent
Sound Level (L_{Aeq} , dBA) Outdoor Points of Reception**

Time of Day	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00 – 19:00	50	50	45	55
19:00 – 23:00	50	45	40	55

**Exclusion Limit Values of One-Hour Equivalent Sound Level (L_{Aeq} , dBA)
Plane of Window of Noise Sensitive Spaces**

Time of Day	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00 – 19:00	50	50	45	60
19:00 – 23:00	50	50	40	60
23:00 – 07:00	45	45	40	55

⁶ or the minimum hourly background (ambient) sound level L_{Aeq1hr} , whichever is higher

4.0 ANALYSIS

4.1 TRANSPORTATION SOURCES OF NOISE

The relevant road and traffic data were obtained from the City of Mississauga and are summarized below:

- Lakeshore Road

Current No. of Lanes	4
Future No. of Lanes	4
Posted Speed Limit	50 km/hr.
Future Speed Limit	50 km/hr.
Present AADT for Ambient Calculations (2022)	19,817 vpd
Ultimate AADT	38,500 vpd
Ultimate Total Truck Percentage	6%
- Medium Truck Split	3.3% (3.7% 2022)
- Heavy Truck Split	2.7% (1.7% 2022)
Day (16 hrs.) / Night (8 hrs.) Split	90%/10%
Directional Traffic Split (assumed)	50%/50%
Road Gradient	<2%
Future R.O.W.	30 m

Appendix A contains the relevant road traffic data used in this study.

RAIL TRAFFIC DATA (GO LINE KNOWN AS THE “OAKVILLE SUBDIVISION”)

DAYTIME (0700-2300)

TYPE OF TRAIN	MAX. NO. OF TRAINS	MAX. NO. OF CARS	MAX. OPER SPEED (KM/H)	MAX. NO. OF LOCOMOTIVES
1-Diesel Passenger	354	12	153	1
2-Diesel Passenger	0	N/A	N/A	N/A

NIGHTTIME (2300-0700)

TYPE OF TRAIN	MAX. NO. OF TRAINS	MAX. NO. OF CARS	MAX. OPER SPEED (KM/H)	MAX. NO. OF LOCOMOTIVES
1-Diesel Passenger	54	12	153	1
2-Diesel Passenger	0	N/A	N/A	N/A

RAIL TRAFFIC DATA (CN LINE KNOWN AS THE “OAKVILLE SUBDIVISION”)

DAYTIME (0700-2300)

TYPE OF TRAIN	MAX. NO. OF TRAINS	MAX. NO. OF CARS	MAX. OPER SPEED (KM/H)	MAX. NO. OF LOCOMOTIVES
Way Freight	1	25	60	4
Passenger	14	10	95	2

NIGHTTIME (2300-0700)

TYPE OF TRAIN	MAX. NO. OF TRAINS	MAX. NO. OF CARS	MAX. OPER SPEED (KM/H)	MAX. NO. OF LOCOMOTIVES
Way Freight	4	25	60	4
Passenger	1	10	95	2

RAIL TRAFFIC DATA (VIA RAIL LINE KNOWN AS THE “OAKVILLE SUBDIVISION”)

DAYTIME (0700-2300)

TYPE OF TRAIN	MAX. NO. OF TRAINS	MAX. NO. OF CARS	MAX. OPER SPEED (KM/H)	MAX. NO. OF LOCOMOTIVES
Passenger	2	12	153	1

ADDITIONAL COMMENTS

1. The above traffic is for present day conditions. To allow for future increases in rail traffic volumes we have increased the above data by 2.5% per year to forecast to the year 2032.
2. The measures recommended in this report are strictly related to environmental noise due to train pass-bys. Reference to other measures for safety including distance setbacks, berming, and specific warning clauses can be found in the relevant policies published by the railway company.
3. Due to the current global pandemic, SSWA was advised by VIA Rail Canada to expect delays in receiving the requested rail data (Correspondences to this regard with VIA Rail are included in Appendix A). In the interim, VIA advised to extract volumes from their schedules for the Toronto Union Station to Windsor Train Station line known as the “Oakville Subdivision” which are available on line. Once the updated data becomes available from VIA Rail, an

update will be required to the noise study.

Appendix A contains the relevant rail traffic data used in this study.

4.2 OUTDOOR NOISE ENVIRONMENT

Sound level predictions were carried out based on MECP's ORNAMENT and STEAM sound level prediction modeling procedures⁷ (Ontario Road Noise Analysis Method for Environment and Transportation, Technical Document, 1989 and STEAM, Sound from Trains Environmental Analysis Method, 1990).

Overall sound levels at selected receptor locations are shown in Table 2. Sample sound level calculations at representative receptor locations are presented in Appendix B.

In consideration of the calculations, it is concluded that for the Common Outdoor Living Area on the 10th floor, the unattenuated daytime sound levels will exceed 60 dBA, the maximum criteria levels allowed. Therefore, outdoor noise control measures are required for this area. With the recommended 1.2m high sound barrier, a sound level below the MECP's maximum allowable sound level criteria will be achieved.

The private Outdoor Living Areas located on the ground floor along the east and west sides of the building have not been assessed, as a Common OLA has been provided for the residents. Furthermore, sound barriers will not be feasible to protect such areas without compromising the intended uses of the outdoor spaces and the aesthetics of the proposed building. Therefore, outdoor noise control measures are not recommended for this area.

Based on the MECP guidelines, the balconies for the proposed development are not considered as OLAs due to fact that the depth of the balconies/terraces are less than 4m. Therefore, no physical mitigation measures are required, and a warning clause registered in the Development Agreement(s) will suffice.

The conventional approach by which excess noise may be mitigated is through construction of acoustical barriers. Barrier height calculations for the Common OLA are included in Appendix B. The barrier alignment is as shown in Figure 3.

4.3 INDOOR NOISE ENVIRONMENT

The criteria for indoor L_{Aeq} sound levels are based on projected L_{Aeq} levels at the outside face of the dwellings with appropriate assumptions for the differences

⁷ The MECP's noise prediction models ORNAMENT and STEAM have a limitation as to the minimum AADT value for 24 hour traffic volume (calculated for the daytime and nighttime hourly volume). When the AADT value is less than 40 vph, there is a neutral mathematical manipulation that can be used as long as the hourly traffic volume is not very low. The manipulation is implemented by multiplying the traffic volume by any reasonable factor (for example a factor of 10) and then by deducting $10 \times \log$ "factor" from the results (in this case, $10 \times \log 10=10$).

between the outdoor and indoor sound levels. If the outside L_{Aeq} levels do not exceed the recommended objective sound levels, then the indoor L_{Aeq} levels will not be exceeded, assuming standard building construction and operable windows.

Overall daytime sound levels at the building facades are shown in Table 3 and the overall nighttime sound levels at the building facades are shown in Table 4.

In consideration of the estimated sound levels and by comparison to the acceptable indoor sound level criteria (Section 3) it is concluded that for all units within the proposed building, the sound levels at the outside walls (within any habitable room on any floor) is predicted to exceed $L_{Aeq}(\text{day})$ 65 and/or $L_{Aeq}(\text{night})$ 59 dBA respectively. Therefore, central air conditioning is required.

Typical Acoustic Insulation Factors (A.I.F.) are summarized in Tables 4 and 5.

Additional Notes Regarding Air Conditioning Systems in Apartment Buildings

Based on the Sound Level Criteria and the established future sound levels, it was concluded that the dwelling units within the proposed building will require air conditioning.

There are several techniques available to air condition apartment units using either a system central to the entire building or alternatively each apartment unit would have its own central system including the indoor fan and the outdoor condensing unit.

As it is not the subject of this report to discuss the specifics of all systems that may be used, the following comments are offered, to assist the proponent, the Mechanical Engineer and the Contractor in appreciating the acoustical problems and concerns associated with some of the commonly available commercial air conditioning systems:

1. The location and the design of the central system (cooling tower, condensing unit, openings in mechanical rooms, etc.) are important elements that must be checked by the Mechanical Engineer in order to achieve the stated outdoor and indoor sound level criteria.
2. Air conditioning units central to each individual apartment unit must also be designed by the Mechanical Engineer to meet the objective sound levels. If split-systems are used, then the sound power level of the outdoor units should be selected to avoid impacting the outdoor living areas and the windows of habitable spaces. Other noise control measures available include quieter makes, the use of other forms of sound barriers, etc. If through the wall incremental units are used, then the selected incremental units should have the following features in order to reduce the transmission of high outside noise levels into the suites:
 - a) The partition in the heating/cooling chassis should be of the acoustically sealed type (this partition separates the outdoor and indoor components).
 - b) The unit should preferably be of the insulated "double casing design".

- c) The interior of the unit should be acoustically lined.
- d) The perimeter of the sleeve should be caulked all around with acoustical sealant.
- e) The unit may be placed through the living room wall and acoustically lined ducts extended to the adjoining bedroom or dining room in accordance with manufacturers recommendations.

4.4 TYPICAL WINDOW / WALL CONSTRUCTION

As the detailed architectural plans for Building Permit submission are not available at this time, it is not possible to specify the window and wall details to meet the AIF requirements presented in Tables 4 and 5. Further detailed analysis should be undertaken based on the data presented in this Report to take into consideration the final room location, floor area, window type (operable or fixed), window size and orientation, etc. Such analysis is required by the MECP and the municipality prior to submission for building permits as part of their Certification process.

It must be pointed out that there are several factors affecting the final glass selection including:

1. Size of window.
2. Room dimensions.
3. Floor level and direction room faces.
4. Fixed or operable glass.
5. The number of building components.
6. Type of wall to be used.
7. Projected sound levels outside the window
8. The choice of "laminated" window glazing in one or two of the window panes.

For the calculation of type of windows required for each dwelling, a detailed description of each unit is required.

As an example, for a typical unit with daytime outdoor sound level of 69 dBA, the AIF value for the Living Room will be 31 assuming 3 components. If the window to floor ratio is 32%, then the window requirements in terms of glass thickness, mm (air space thickness, mm) glass thickness, mm are any of the following:

Double Glazed: 3mm (20mm) 3mm; 4mm (16mm) 4mm

As an example, for a typical unit with nighttime outdoor sound level of 63 dBA, the AIF value for the bedrooms will be 30 assuming 3 components. If the window to floor ratio is 20%, then the window requirements in terms of glass thickness, mm (air space thickness, mm) glass thickness, mm are any of the following:

Double Glazed: 3mm (13mm) 3mm; 4mm (6mm) 4mm

The above window glazing construction is typical examples only. It is

recommended that prior to the submission of the building plans for Building Permit that the detailed architectural drawings of the units requiring noise control measures, as referred to earlier, be examined by an Acoustical Engineer in order to advise the design consultant on the **specific** building components for noise control to suite the actual window construction details.

IMPORTANT NOTES TO THE WINDOW SUPPLIER/CONTRACTOR:

The Contractor should use the window glazing dimensions specified in this report. If the Contractor chooses to use, instead the minimum specified STC values herein in this report, then the Contractor MUST observe the following rules:

- (1) The **specific** windows MUST be tested by an “accredited” acoustic laboratory that is “NVLAP” accredited, and
- (2) The full STC test results shall be submitted to SS Wilson Associates for prior approval before installation.

The resulting sound levels due to large central air conditioners associated with apartment and other buildings should not exceed the Ministry of the Environment, Conservation and Parks sound level criteria included in their Publications NPC-300 and NPC-233. Noise control measures for large central air conditioning systems include any or a combination of the following:

- a. Directing the air intake and discharge openings away from the noise-sensitive receptors.
- b. The use of partial and/or full enclosures.
- c. Using parts of the building as sound barrier.
- d. The use of silencers and/or acoustic louvers on air discharge and intake openings.
- e. Distance setback.

It is also important that the necessary detailed technical analysis be performed prior to submission of the Building Permit plans or the certification process for Building Permit to address the specific requirements for the control of the selected air conditioning system to meet the sound level criteria at the point(s) of reception and to include same in the applicable permit drawings/ specifications.

4.5 CONTROL OF AIR CONDITIONING UNITS NOISE FOR THE CITY OF MISSISSAUGA

To control the environmental noise emitted by air conditioning or heat pump units it is essential that the following procedures and specifications be adhered to by the parties responsible for the selection, design and installation of the air conditioning systems:

1. Although the Ministry of the Environment, Conservation and Parks guidelines refer to residential air conditioners not exceeding 7.6 bels and that some municipalities specify other standards for residential air conditioner noise, we

recommend that the sound emission level of residential air conditioners (power level) not exceed 6.8 bels when tested in accordance with ARI Standard 270-84 (Using the minimum sound rating specified by the MECP may result in sound levels exceeding the MECP NPC-216 criteria at the points of reception in some cases).

The following is the City of Mississauga's views when dealing with the issue of air conditioning noise.

- a) The City will not accept placement of air conditioning condenser units in the front yards. They are permitted in the side yard under certain conditions. The building Division has indicated that the Zoning By-law was amended in 1991 (B/L 356-89) to the extent of allowing condenser units in side yards provided they are no closer than 0.61 metres from the side lot line.
 - b) The MECP's Technical Publication NPC-216 criteria section 6 related to a sound emission standard for the condenser unit will be enforced by the City.
 - c) The criteria for air conditioning noise impact, i.e. L_{Aeq} 55 dBA, apply to the impact on both the property itself and the adjoining properties. However, the City's view considers this criterion as a guideline only.
 - d) To ensure these requirements are met, Schedule 'C' clauses in the Servicing Agreement will require builders plan certification and final certification by the Acoustic Engineer to ensure the air conditioning condenser units and locations are in compliance with the noise report.
2. The resulting sound levels due to residential air conditioners at the nearest points-of-reception should not exceed the levels in MECP Publication NPC-216.
 3. The siting of the split-system central air conditioning units and other systems should follow good planning principles.
 4. When placing the air condenser unit in the backyard or side yard areas the noise is likely to interfere with the outdoor and indoor activities of any occupant and/or neighbour then it is necessary to design and install noise control measures.

Noise control measures include any or a combination of the following:

- a) Distance setback away from the receptor(s).
- b) Sound barrier wall(s) or ultimately an acoustic enclosure.
- c) Sealing selected windows, i.e., installation of non-operable windows.
- d) Deleting selected windows.

Indoor Sound Levels

While the control of the indoor noise created by the air conditioning equipment is not the direct subject of this study, it is important that the selected and designed air conditioning systems achieve indoor sound levels that meet the OBC/ASHRAE

criteria and be at least 5dB lower than the Ministry of the Environment, Conservation and Parks recommended indoor sound level criteria included in Section 3.0 of this study.

4.6 STATIONARY SOURCES OF NOISE EXTERNAL TO THE PROPOSED DEVELOPMENT

1. Introduction

The subject site is neighboured on the west and south sides by existing commercial and industrial developments which may cause noise impacts on the proposed development.

2. Description of the Sources of Stationary Noise

Oasis Convention Centre

The building located directly south of the proposed development across Lakeshore Road E is the Oasis Convention Centre which contains the largest number of rooftop HVAC equipment sources. From aerial photography, it was determined that the sources of concern include two (2) 5-ton units, six (6) 10-ton units, and one (1) 20-ton unit. The further HVAC equipment present on the rooftop (make-up air and ventilation equipment) was assumed to be located too far from the proposed development to create a noticeable impact.

ILSCO of Canada (ILSCO)

This commercial/manufacturing operation is located south of the proposed development, across Lakeshore Road E, and has three (3) HVAC units which may affect the proposed development. From aerial photography, it was determined that the sources of concern include three (3) 5-ton units. The further HVAC equipment present on the rooftop was assumed to be located too far from the proposed development to create a noticeable impact.

Krown Lakeshore (Krown Rust Control)

Krown Lakeshore is an automotive service/repair shop located immediately west of the proposed site, across Ogden Avenue. The shop includes three (3) auto service bays which face the proposed development for which the noise impact was considered. The sound level emission data for the auto service bays was assumed based on reasonably accurate data from SSWA's internal database from a similar automotive service shop.

Interior Manufacturing Group Inc. (IMG Inc.)

IMG Inc. is a furniture manufacturing facility located to the west of the proposed development, on the south side of Lakeshore Road E. The noise impact of the industrial cyclone equipment on the east side of the facility has been

considered, along with the impact of commercial truck deliveries. The sound level emission data for the cyclone was obtained by on-site measurements, and truck emissions were assumed based on reasonably accurate data from SSWA's internal database for similar commercial trucks.

Figure 4 shows the location of the subject sources of stationary noise.

3. Points of Reception

One location of the subject building is exposed to all external sources of stationary noise and is located at the southwest corner façade of the proposed building. The west and south building facades are also exposed to one or more of the sources of stationary noise mentioned above. Lastly, the 10th floor common outdoor living areas are considered as Points of Reception:

- POR 1 – Southwest corner building facade
- POR 2 –10th floor terrace Common OLA, west side facing Ogden Ave

Figure 5 shows the location of the subject receptors.

4. Description of the Sources of Ambient / Background Noise and Operational Data

Lakeshore Road E is the primary source of ambient transportation noise which impacts the proposed development. The impact of ambient noise has been calculated for each Point of Reception and is tabulated below (the sound levels have been calculated at the 10th storey receptor to eliminate the effects of ground attenuation and adjusted for the minimum hourly traffic during each time period). The minimum hourly ambient sound level at each point of reception from road noise sources are as follows:

POR	Daytime	Evening	Nighttime
POR 1	64 dBA	60 dBA	51 dBA
POR 2	45 dBA	41 dBA	N/A

Figure 5 shows the relative location of the receptors with respect to the sources of ambient noise. Appendix C contains the relevant traffic data of the roads and other sources of noise which establish the ambient noise in the subject area.

5. Applicable Criteria

The applicable stationary noise criteria are determined based on the above-calculated ambient sound levels, or the MECF exclusion limits, whichever is higher. The proposed development is in a Class 1 Urban area; therefore, the exclusion limits are: 50 dBA (Day), 50 dBA (Evening), and 45 dBA (Night); there is no nighttime criteria for the OLAs. Therefore, based on the calculated

ambient sound levels, the applicable criteria are tabulated below:

POR	Daytime	Evening	Nighttime
POR 1	64 dBA	60 dBA	51 dBA
POR 2	50 dBA	50 dBA	N/A

6. Measurement Equipment

The attended sound level measurements were performed using a Rion NA-28, Type 1 Precision Integrating Sound Level Meter and Real Time Frequency Analyzer fitted with 1/1 & 1/3 Octave Bands filters and a 1/2" condenser microphone c/w windscreen.

No unattended sound level measurements were performed.

The sound level measurement procedures were primarily based on the Ministry of Environment procedures in their Publication NPC-103 "Procedures" included in the Model Municipal Noise Control By-Law, the recommendations of the instrument manufactures and the best engineering practices to suit site-specific conditions. The sound level meters were checked and calibrated before, during and following completion of the measurement sessions without any appreciable change in the sound levels.

The weather conditions during the measurement sessions were favourable for measurements as the local wind speed did not exceed 30 km/hr and there was no precipitation.

7. Established Stationary Source Sound Levels & Operational Details

Oasis Convention Centre HVAC Units:

- Two (2) 5-ton HVAC units, assumed to be 8.4 bels (56 dBA @ 10m)
- Six (6) 10-ton HVAC units, assumed to be 8.6 bels (58 dBA @ 10m)
- One (1) 20-ton HVAC unit, assumed to be 8.8 bels (60 dBA @ 10m)
- All HVAC units were assumed to operate for 60 minutes during the day, 45 minutes during the evening, and 30 minutes at night.

ILSCO HVAC Units:

- Three (3) 5-ton HVAC units, assumed to be 8.4 bels (56 dBA @ 10m)
- All HVAC units were assumed to operate for 60 minutes during the day, 45 minutes during the evening, and 30 minutes at night.

Krown Automotive Bay Doors:

- SSWA has assumed, based on prior measurements of similar automotive service bays, that each service bay will emit 88 dBA from a reference distance of 2m, largely due to the use of pneumatic tools.
- Each bay was assumed to be open and producing noise for one (1) ten-minute period per hour, during the daytime only.

- The bay doors being closed are assumed to provide 20 dB of attenuation based on prior experience.

IMG Cyclone:

- SSWA conducted a site visit to measure the actual sound levels produced by the cyclone during operation.
- The cyclone was measured to be Leq 61 dBA at a reference distance of 96m (taken from the sidewalk at the border of the IMG facility property).
- A tonal character was observed while on site and also when analyzing the data; therefore, a 5 dB tonal penalty was applied in accordance with MECP guidelines.
- The cyclone was assumed to operate for 45 minutes during each daytime hour.
- Additionally, it was assumed that two (2) trucks per hour will idle for 10 minutes at the driveway of the IMG property while entering/leaving the facility. The sound emission data for such trucks were taken from prior measurements by SSWA for commercial delivery trucks idling.

8. Sound Level Calculations Model

A 3-D computer program⁸ for multiple point and line sources and multiple receivers developed by SS Wilson Associates was used to calculate the sound levels. The program takes into account:

- Reference sound levels and reference distances for the equipment working in each area of the subject development, i.e. sound emission levels.
- The Cartesian co-ordinates (x, y & z) of all sources and receivers.
- The number of events or occurrences of the noise in a given time period and the time period of each event.
- Spherical divergence factor.
- Additional attenuation due to sound barriers; natural or man-made types.
- Additional attenuation due to ground (as modified by sources/receiver elevations, the presence of intervening barriers and the type of ground).
- Atmospheric attenuation due to air molecular absorption.

For the purposes of this study, a sound level adjustment was applied to the measured sound emission level of the IMG cyclone. In accordance with the MECP procedures, +5 dB tonal adjustment was incorporated into the overall analysis of the Leq from the operation of the cyclone.

⁸ The model used by SSWA to predict the sound levels due to Stationary Sources in this report is a proprietary prediction spreadsheet program developed by SSWA and is primarily based on the ISO 9613-2 publication recognized by the MECP as an acceptable method for sound level predictions.
SS Wilson Associates

9. Impact Assessment and Findings

The table below summarizes the results of the unmitigated stationary noise calculations at the receptors identified above. The only mitigation features which are considered in this analysis is a standard parapet height of 1.1m around the terrace in accordance with OBC safety standards.

POR	Daytime	Evening	Nighttime	Criteria	Compliance?
POR 1	66 dBA	48 dBA	46 dBA	64/60/51	No (daytime)
POR 2	54 dBA	39 dBA	N/A	50/50	No (daytime)

From the table above, it can be seen that the unmitigated sound levels will noticeably exceed the applicable criteria during the daytime period.

At POR1, the sound level excesses are almost entirely due to the Krown automotive shop directly across Ogden Avenue, on the assumption that all three service bays will be in operation with the doors fully open. In the absence of automotive shop noise, the building façade sound level is predicted to be 60 dBA, which is well below the applicable criteria based on hourly traffic sound levels (64 dBA). In addition, the assumption used for the analysis of the automotive shop is conservative – it assumes that all three automotive bays will emit 10 minutes of continuous noise due to pneumatic and grinding tools, which are typically used intermittently and would in practice be much less disruptive to residents. In spite of this, it is recommended to use sealed windows (or keep operable areas small), and to maintain small window areas relative to room sizes particularly in bedrooms and sleeping quarters facing west.

The sound level excess in the OLA (POR2) is due to the cyclone at IMG Inc., which is a very loud and very tall source. The use of an acoustic parapet barrier around the perimeter of the OLA could be implemented to offer noise mitigation. The table below summarizes the mitigated sound levels in the OLA. All other sources of stationary noise are at or below the applicable criteria for acceptable noise levels at all receptors.

POR	Barrier	Daytime	Evening	Criteria	Compliance?
POR 2	2.7m	50 dBA	39 dBA	50/50	Yes

In order to meet the 50 dBA Class 1 exclusion limit criteria in the OLA on the west side of the 10th floor terrace, a sound barrier of up to 2.7m high would be required around the OLA. This is not considered practical, as such a high barrier would compromise the appearance of the building, and inhibit the enjoyment of the space by residents. Moreover, stationary noise controls are generally applied at the source of noise, not the receptor. Therefore, it is not considered technically or administratively feasible to implement noise control measures to meet the limits of a Class 1 area at the OLA. Instead, SSWA recommends the use of a Class 4 acoustic area in this case.

10. Impact Assessment and Findings – Class 4 Acoustic Area

The use of the Class 4 acoustic area as a land use planning tool increases the sound level criteria for assessment, raising the daytime/nighttime building façade criteria to 60/55 dBA, and the daytime OLA criteria to 55 dBA. It is recommended that the proposed land development area be re-designated as an MECP “Class 4 Area”, subject to approvals by the authority having jurisdiction (in this case, it is only the City of Mississauga, as later explained). This is an alternative approach that is consistent with the Provincial guidelines set out in the MECP Policy Guideline NPC-300. With a Class 4 designation, it is possible to mitigate the excess stationary noise levels to within the limits of Class 4 criteria. It should be noted that while some receptors can meet the limits of a Class 1 acoustic area (essentially all units with no direct exposures to the above-noted sources of noise), sites cannot be comprised of two different acoustic classifications; if Class 4 is implemented for some dwellings on the site, it must be implemented for all dwellings.

In order for an area to be classified as a Class 4 area, the following conditions must be pursued, approved and implemented:

- 1) The subject dwelling units must be fitted with air conditioning as a means to allow the windows to stay closed;
- 2) That the subject area is intended for development with new noise-sensitive land uses that are not yet built;
- 3) That the subject area is in proximity to existing, lawfully-established stationary sources;
- 4) That the subject area has formal confirmation from the land use planning authority with the Class 4 Area classification, which is determined during the land use planning process under the Planning Act (i.e., as determined and recommended within this report);
- 5) Prospective purchasers must be informed that the dwelling is located within a Class 4 Area through the appropriate means and informed of the relevant Agreements of noise mitigation. In addition, the appropriate warning clause will be required to inform the purchaser that the applicable Class 4 Area sound level limits are based on the assumption that windows are closed (MECP Warning Clause Type F).
- 6) Some of the noise controls can only apply to “high-rise multi-unit buildings”, as defined by the MECP.
- 7) One of the neighbouring commercial uses, ILSCO of Canada, bears an Environmental Compliance Approval (ECA), Approval Number 3357-9HXK73, dated May 9, 2014, for the HVAC equipment and welding booth on site. The ECA is registered to ILSCO of Canada Company. Therefore, the City must obtain formal approval from this operation and they should be advised by the City of Mississauga that the subject development site will be redesignated as a Class 4 Area. In keeping with the MECP practices, the responsibility for the cost of provision and installation of any necessary noise controls will be the responsibility of the developer, if required;

however, as indicated by the stationary analysis, the ILSCO site is not expected to produce any adverse noise impacts.

Should this approach be accepted, the following warning clause should be registered in all Development Agreements and Offers of Sale and Purchase or Lease for all properties within the development site (MECP Type F):

“Purchasers/tenants are advised that sound levels due to the adjacent commercial operations 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.”

As determined via the transportation noise assessment, it is recognized that a parapet acoustic barrier at least 1.2m in height will be required around the OLA due to traffic noise sources. The required 1.2m parapet barrier for transportation noise will also provide a mitigating effect for the nearby stationary sources of noise, as will the standard minimum parapet height per OBC requirements.

The following is a summary of the predicted sound level impact, including the necessary transportation noise mitigation, at each of the selected receptors with respect to the Class 4 Area criteria:

POR	Daytime	Evening	Nighttime	Criteria	Compliance?
POR 1	66 dBA	48 dBA	46 dBA	64/60/51	No (daytime)
POR 2	54 dBA	34 dBA	N/A	55/55	Yes

The sound levels in the OLA due to stationary noise are predicted to be in compliance with the Class 4 Area sound level criteria without the need for additional noise control measures. The building façade sound levels are not affected by the rooftop barrier, and will continue to have a minor excess of 2 dB at the west building façade facing Krown Lakeshore.

11. Noise Control Measures and Impact Assessment

Since the operable portions of the windows facing the west are considerably small relative to the room sizes, as well as relative to the sealed sections of the windows, it is expected that the sound levels projected indoors into the corresponding rooms will be at or below the applicable sound level criteria. As mentioned above, the sound levels in absence of the automotive facility are 60 dBA or less, well within the acceptable criteria, and the predicted condition of all three bays emitting the equivalent of 10 minutes of continuous noise with the doors open is unlikely to occur. Sound levels within the indoor noise-sensitive spaces on the west side of the building are expected to be consistent with the MECP’s recommended indoor sound level limits, provided the windows are sealed or have very small operable sections, and the window

sizes are small relative to the floor area.

In view of the potential for audibility of the noise from the automotive repair shop immediately to the west, the following section contains the study report recommendations for a warning clause to be included in the relevant development agreements for all residential units facing west.

12. Recommendations

- Implement the Class 4 Acoustic Area to the development site to permit higher sound level criteria in recognition of the fact that the site is surrounded by existing sources of stationary noise.
- The sizes of windows facing west shall be maintained to the dimensions shown on the plans provided, i.e., the operable portion to be maintained as shown on the figures included in this noise study.
- All residential units with windows facing west shall have the following warning clause included in all development agreements :

“Purchasers are advised that despite the inclusion of noise control features in this development area and within the building units, noise levels from the nearby automotive repair facility may continue to be of concern at times, occasionally interfering with some activities of the dwelling occupants as the noise level exceeds the Municipality’s and the Ministry of the Environment’s noise criteria.”

4.7 STATIONARY SOURCES OF NOISE INTERNAL TO THE PROPOSED DEVELOPMENT

1. Introduction

This section deals with the potential noise impact of the proposed high density residential building, in which the cumulative noise due to stationary sources within the proposed development may impact external receptors and also receptors within the development itself.

2. Description of the Sources of Stationary Noise

Based on the preliminary M&E coordination drawings, there are several sources of stationary noise shown to be included as part of the proposed development, summarized as follows:

1. Two (2) rooftop makeup air units for corridor ventilation
2. Fluid cooler located in the mechanical penthouse with external intake and exhaust openings
3. Garage exhaust ventilation shaft located in the north-west corner of the site
4. Electrical transformer located in the north-east corner of the site
5. Emergency generator room next to mechanical penthouse, with external discharge (assessed separately)

3. Point of Reception

Noise-sensitive points of reception were selected to represent the areas most exposed to the above-noted sources of stationary noise, as follows:

- POR 1 – Unit 833, north-facing bedroom window
- POR 2 – 10th Floor Outdoor Amenity (west side)
- POR 3 – Unit 110, north-facing bedroom window
- POR 4 – Existing residential dwelling north of proposed site, west side
- POR 5 – Existing residential dwelling north of proposed site, east side

Figure 6 shows the location of the subject Points of Reception. All other noise sensitive receptors, including other windows, outdoor terraces and rooftop amenity spaces will all be located at further setbacks. Compliance with the stationary criteria at the selected receptors will ensure compliance at all other noise-sensitive receptors.

4. Description of the Sources of Ambient / Background Noise and Operational Data

Lakeshore Road E is the primary source of ambient transportation noise which impacts the proposed development. However, the selected receptors are generally located on the rear side of the building and entirely shielded from sources of ambient noise. Only the 10th floor amenity area is exposed to ambient noise from Lakeshore Road E. Figure 6 shows the relative location of the receptors with respect to the sources of stationary noise.

5. Applicable Criteria

The applicable stationary noise criteria are determined based on the above-calculated ambient sound levels, or the MECF exclusion limits, whichever is higher. Since the selected windows/building facades are located on the rear side of the building, it is shielded from all sources of road noise; therefore, the exclusion limit values will be used.

The proposed development is located in a Class 1 Urban area; however, as determined in the previous stationary analysis of external sources, due to the significant impacts from external sources of noise, it is recommended that receptors within this site be considered for a Class 4 area. The Class 4 area criteria are as follows:

POR	Daytime	Evening	Nighttime
POR 1	60 dBA	60 dBA	55 dBA
POR 2	55 dBA	55 dBA	N/A
POR 3	60 dBA	60 dBA	55 dBA
POR 4	50 dBA	50 dBA	45 dBA
POR 5	50 dBA	50 dBA	45 dBA

6. Established Stationary Source Sound Levels & Operational Details

As the details of the equipment specifications have not yet been finalized at this stage of the project, assumptions were made to characterize the sound power level and noise impacts of the stationary sources of noise, based on proxy data for similar equipment from prior projects. Prior to submission of the building plans for building permit, an update shall be made to the noise assessment using the specific equipment sound power levels to confirm the conclusions and recommendations of this report.

Rooftop Makeup Air Units (2)

- Sound Power Level: 87 dBA sound power
- Operational assumptions: Assumed to operate continuously (60 minutes per hour) during all time periods

Fluid Cooler (Mechanical Penthouse)

- The preliminary M&E drawings indicate that the fluid cooler will incorporate an intake silencer to be provided by the manufacturer of the fluid cooler. Sound power levels for the intake and exhaust openings were assumed under this assumption to specify the necessary exterior sound power emission ratings to ensure compliance with MECF limits.
- Intake Sound Power Level (north side): 74 dBA sound power
- Exhaust Sound Power Level (top discharge): 83 dBA sound power
- Operational assumptions: Assumed to operate continuously (60 minutes per hour) during daytime hours, 45 minutes in evening hourly periods, and 30 minutes during nighttime hours.

Garage Exhaust Ventilation Fans

- The drawings include two levels of underground parking, each with two fans at the garage exhaust shaft (4 total).
- Sound Power Level: 74 dBA Combined Sound Power (66 dBA per fan)
- Operational assumptions: Assumed to operate for 60 minutes in a given hour during daytime and evening periods, and 30 minutes in a given nighttime period.

Electrical Transformer

- The electrical transformer will be located at the north-east corner of the site close to POR 5.
- Sound Power Level: 68 dBA Sound Power Level
- Operational assumptions: Assumed to operate continuously at all times.

Emergency Power Generator (Open Roof at Mechanical Penthouse)

- While emergency power generators are exempted from assessment when in operation during emergency conditions, maintenance testing of emergency power equipment is not exempt, and must be considered separately from other sources of stationary noise.

- Sound Power Level: 74 dBA at a distance of 7.5m
- Operational assumptions: Assumed to operate for 30 minutes in a given hour for testing, during daytime hours ONLY.

7. **Sound Level Calculations Model**

A 3-D computer program for multiple point and line sources and multiple receivers developed by SS Wilson Associates was used to calculate the sound levels. The program takes into account:

- Reference sound levels and reference distances for the equipment working in each area of the subject development, i.e., sound emission levels.
- The Cartesian co-ordinates (x, y & z) of all sources and receivers.
- The number of events or occurrences of the noise in a given time period and the time period of each event.
- Spherical divergence factor.
- Additional attenuation due to sound barriers; natural or man-made types.
- Additional attenuation due to ground (as modified by sources/receiver elevations, the presence of intervening barriers and the type of ground).
- Atmospheric attenuation due to air molecular absorption.

A sample calculation is included in Appendix B at the end of this report.

8. **Impact Assessment and Findings**

The table below summarizes the results of the stationary noise calculations at the receptors identified above from all internal sources of stationary noise, with the exception of the emergency power generator.

POR	Daytime	Evening	Nighttime	Criteria	Compliance?
POR 1	55 dBA	54 dBA	52 dBA	60/60/55	Yes
POR 2	46 dBA	46 dBA	N/A	55/55	Yes
POR 3	48 dBA	48 dBA	45 dBA	60/60/55	Yes
POR 4	46 dBA	46 dBA	44 dBA	50/50/45	Yes
POR 5	43 dBA	43 dBA	42 dBA	50/50/45	Yes

From the table above, it can be seen that sound levels at the building façades of the noise-sensitive uses within the development itself and the surrounding receptors will be in compliance with the applicable criteria, provided the assumed sound power levels and operation details are maintained. Therefore, sound levels at all noise-sensitive points of reception will be within acceptable limits per MECP guidelines.

Figure 6 identifies the daytime and nighttime sound levels at the critical point of reception.

9. Impact Assessment – Emergency Power Generator

The table below summarizes the results of the stationary noise calculations at the receptors identified above from the emergency power generator.

POR	Daytime	Criteria	Compliance?
POR 1	55 dBA	55 dBA	Yes
POR 2	47 dBA	55 dBA	Yes
POR 3	38 dBA	55 dBA	Yes
POR 4	52 dBA	55 dBA	Yes
POR 5	55 dBA	55 dBA	Yes

From the table above, it can be seen that sound levels from the emergency power generator at the building façades of the noise-sensitive uses within the development itself and the surrounding receptors will be in compliance with the applicable criteria, provided the assumed sound power levels and operation details are maintained. Therefore, sound levels at all noise-sensitive points of reception will be within acceptable limits per MECP guidelines.

Figure 7 identifies the daytime and nighttime sound levels due to operation of the emergency power generator at the critical points of reception.

10. Noise Control Measures and Impact Assessment

In order to maintain the predicted stationary sound levels in compliance with the MECP criteria as predicted above, the following noise controls or system design criteria must be implemented:

- The use of silencers will be required on the intake, and possible the discharge, opening(s) of the rooftop fluid cooler;
- Garage exhaust ventilation equipment should be selected based on the sound power levels assumed previously. Alternatively, the garage shaft will need to be treated with acoustic linings, to later detail prior to the building permit stage;
- The emergency power generator must be supplied with an acoustic enclosure rated to provide the assumed sound pressure level of 74 dBA at a distance of 7.5m. In addition, it is recommended to locate the generator at least 4m from the edge of the rooftop to reduce impacts on the rear side of the proposed development.

11. Recommendations

It should be noted that the foregoing assessment has been performed with the use of assumed sound power level and operational details of the equipment, which will be finalized at a later stage. Therefore, it is recommended that prior to submission of the detailed building drawings that the mechanical details of all the necessary HVAC equipment serving the individual units, and the

common areas, be made available to the Acoustical Consultant for determination of the required noise control measures.

The noise control measures may include one or more of the following:

- Mechanical and electrical equipment should be selected to provide the necessary performance for their selected purpose, and to be at or below the sound power levels assumed in Section 4.7.6 above.
- Re-orientation of the components of the HVAC equipment emitting noise
- The intake opening of the fluid cooler must incorporate a silencer (to be provided by the equipment supplier) to achieve an external noise emission sound power level of 74 dBA. Top discharge sound levels must also comply with the assumed sound power level, otherwise a silencer will be required.
- In consideration of the fact that ambient sound levels will be low at the nearby residential dwellings offsite (due to increased setback from Lakeshore Road and shielding from the proposed development itself), the noise impact from the garage shaft may be significant and require substantial noise control measures (lining, baffles, etc.). If possible, it is recommended to relocate the garage exhaust shaft to be on the side facing Lakeshore Road, as the high ambient sound levels from the road noise will mask any noise impacts from the garage shaft.
- Where the garage shaft is presently shown, application of noise controls will be required, including selection of low fan sound emission levels, acoustical insulation of the garage shaft, the use of acoustical silencers/baffles, etc.
- The emergency power generator must be supplied with an acoustic enclosure to provide the assumed sound pressure level of 74 dBA at 7.5m.

Potential Impact of the Commercial Space On the Ground Floor

The project plans and drawings show the ground floor being planned for commercial land use, which is in close proximity to the proposed residential component of the project. The commercial space will require separate heating, ventilation and air conditioning equipment to serve the area on the ground floor.

Such equipment will have the potential for creating additional environmental and interior noise impact on the residential component of the project and since the detailed mechanical drawings for the project are not available at this stage, it is important that this issue be addressed during the detailed design stage and in particular during the building permit submission stage.

Noise control measures may include one or a combination of measures with the intent of meeting the MECP and the OBC/ASHRAE requirements for noise as outlined in MECP Publication NPC-205 and the ASHRAE Guidelines. The guidelines in question deal with the transfer of the outdoor noise to the outside into the residential units as well as the potential for transfer of the indoor equipment vibration and sound levels through the structure itself.

Operating parameters of the commercial component may also require assessment of their potential impact on the residential component of the development and/or on to neighboring sensitive land uses.

4.8 **Important Notes for the Residential Builder Regarding Windows**

The results in this report provide information on the calculated Acoustic Insulation Factors (AIF) for windows based on typical assumed window and room dimensions.

To assist the Builder in appreciating the fact of whether the results presented herein require typical commercially available residential type windows, or special type windows, the following table⁹ provides reasonably accurate information on whether such window(s) are standard industry window or not:

Acoustic Insulation Factor (AIF) in this report	35	34	33	32	31	30	29	28	27	26
Window to room floor area percentage NOT to be exceeded	10%	13%	16%	20%	25%	32%	40%	50%	63%	80%

If the above ratios are exceeded, several options are available to the builder including one or more of: reducing the size of the window, increasing the inter-pane air spacing, the use of thicker glazing, the use of “laminated” glazing (1 or 2 panes), etc.

WORKED EXAMPLE 1:

- AIF shown in this study: 31
- Actual room floor area: 250 sq.ft.
- You selected a window area of: 45 sq.ft
- Your window/floor ratio: (45 divided by 250, then times 100) =18%
- Your result is less than above table value 25%; i.e. standard glazing unit

WORKED EXAMPLE 2:

- AIF shown in this study: 34
- Actual room floor area: 200 sq.ft.
- You selected a window area of: 50 sq.ft
- Your window/floor ratio: (50 divided by 200, then times 100) =25%
- Your result is more than above table value 13%; i.e. Non-standard (special) glazing unit

⁹ Based on a typical commercially available glazing: 3mm inside pane, 16mm inter-pane air space & 3mm exterior pane.

4.9 Abbreviations

Basic Descriptor	Measurement Weighting	Time Weighting Characteristics
L_p Sound pressure level	A-Weighted sound pressure level C-Weighted sound pressure level Z-Weighted sound pressure level(Flat)	F(Fast). S(Slow). I(Impulse). L _{AF} , L _{AS} , L _{AI} L _{CF} , L _{CS} , L _{CI} L _{ZF} , L _{ZS} , L _{ZI}
L_{eq} Equivalent continuous sound level	Equivalent continuous A-weighted sound level Equivalent continuous C-weighted sound level Equivalent continuous Z-weighted(Flat) sound level	L _{Aeq} , L _{Aleq} L _{Ceq} , L _{Cleq} L _{Zeq} , L _{Zleq}
L_E Sound Exposure Level	A-Weighted sound exposure Level C-Weighted sound exposure Level Z-Weighted sound exposure Level(Flat)	L _{AE} , L _{AIE} L _{CE} , L _{CIE} L _{ZE} , L _{ZIE}
L_{max}, L_{min} Maximum Sound Level	Maximum A-weighted sound level Maximum C-weighted sound level Maximum Z- weighted sound level(Flat)	L _{AFmax} , L _{ASmax} , L _{AImax} L _{CFmax} , L _{CSmax} , L _{CImax} L _{ZFmax} , L _{ZSmax} , L _{ZImax}
L_N Percentile Sound Level	Percentile A-weighted sound level Percentile C-weighted sound level Percentile Z-weighted sound level(Flat)	L _{AFNn} , L _{ASNn} , L _{AINn} L _{CFNn} , L _{CSNn} , L _{CINn} L _{ZFNn} , L _{ZSNn} , L _{ZINn}
L_{peak} Peak Sound Level	A-Weighted peak sound level C-Weighted peak sound level Z-Weighted peak sound level(Flat)	L _{Apeak} L _{Cpeak} L _{Zpeak}

TABLES

**TABLE 1
SUMMARY OF MINIMUM REQUIRED NOISE CONTROL MEASURES**

RECEPTOR	SOUND BARRIER	CENTRAL AIR CONDITIONING	PROVISION FOR CENTRAL AIR CONDITIONING	WARNING CLAUSE(S)
All Units within Building	No	Yes	--	Yes
Common OLA- 10 th Floor	Yes	--	--	--
All other Terraces/Balconies	No	--	--	Yes

**TABLE 2
BARRIER HEIGHT REQUIRED TO ACHIEVE L_{Aeq} 55 dBA IN OLAs**

RECEPTOR	OLA Sound Level Without Barrier, $L_{Aeq(day)}$, dBA	BARRIER HEIGHT, m TO ACHIEVE THE FOLLOWING, $L_{Aeq(day)}$, dBA					
		60	59	58	57	56	55
Common OLA 10 th Floor	61	--	--	1.2	1.6	2.2	2.6

File Number : WA20-52 R3
 Project Name : 1041 Lakeshore Rd E
 Description : Mississauga

OUTDOORS
Table 3

Any Heavy Rail Line ?	Yes
Appropriate adjustment will be applied to the Acoustic Insulation Factor to account for their	

Record Number	1	2	3	4	5	6	7	8	9	10	11	12
Consider Record	Y	N	N	N	N	N	N	N	N	N	N	N
RECEPTOR	Common OLA 10th Floor West											
FACE/DIRECTION												
LOCATION	Common OLA											
Source 1: Lakshore Road	Road Traffic	OUTDOOR DAYTIME LEVELS			OUTDOOR DAYTIME LEVELS			OUTDOOR DAYTIME LEVELS				
Leq Outdoors	50.00											
Partial angle of exposure, degrees	180											
Partial exposure adjust., dB												
Barrier Adjustment, dB	-1.00											
Additional Adjustment, dB												
Sub-Total Leq, dBA	49.00											
Source 2: Rail Lines	Rail Traffic	OUTDOOR DAYTIME LEVELS			OUTDOOR DAYTIME LEVELS			OUTDOOR DAYTIME LEVELS				
Leq Daytime	61.00											
Partial angle of exposure, degrees	180											
Partial exposure adjust., dB												
Barrier Adjustment, dB	-4.00											
Additional Adjustment, dB												
Sub-Total Leq, dBA	57.00											
Source 3:	Road Traffic	OUTDOOR DAYTIME LEVELS			OUTDOOR DAYTIME LEVELS			OUTDOOR DAYTIME LEVELS				
Leq Daytime												
Partial angle of exposure, degrees	180											
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA												
Source 4:	Road Traffic	OUTDOOR DAYTIME LEVELS			OUTDOOR DAYTIME LEVELS			OUTDOOR DAYTIME LEVELS				
Leq Daytime												
Partial angle of exposure, degrees	180											
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA												
Sub-Tot. 4 Sources Leq, dBA	57.64											
Aircraft noise NEF/NEP												
Adjust. 1												
Adjust. 2												
Adjusted NEF/NEP												
Approx. Overall Combined Leq	58											
Overall Road and/or Rail and/or Stationary Sources, Leq (dBA)	58											
Aircraft Noise Only, NEF												
NOTES	1.2m High Barrier Required											

N6 Leq-AIF Master-January 2007
 2022-02-23 13:45
 File Number : WA20-052
 Project Name : 1041 Lakeshore Road East
 Description : Mississauga

Proceed **SS WILSON ASSOCIATES**
 Leq- AIF CALCULATIONS AND TYPICAL WINDOW GLAZING REQUIREMENTS

DAYTIME
Table 4

(Using NRC/MOE Procedures)

Description :		Condo Building											
Record Number		1	2	3	4	5	6	7	8	9	10	11	12
Consider Record		Y	N	N	N	N	N	N	N	N	N	N	N
RECEPTOR	Building Facade												
FACE/DIRECTION	South												
LOCATION	BUILDING FACADE												
ROOM CLASSIFICATION	Living / Dining												
Adjustm. to Criterion, dBA													
MOE Transportation Sources													
Daytime Leq Indoor Criteria, dBA	45												
Aircraft Indoor Criteria, NEF	5												
Source 1: Lakshore Road	Road Traffic	DAYTIME LEVELS				DAYTIME LEVELS				DAYTIME LEVELS			
Leq Daytime	69.00												
Partial angle of exposure, degrees	180												
Partial exposure adjust., dB													
Additional Adjustment, dB													
Sub-Total Leq, dBA	69.00												
Angular range of incidence (0,1,2,3)													
Adjusted AIF	31	-38	-38	-38	-38	-38	-38	29	18	9	-38	-38	-38
Source 2: Rail Lines	Rail Traffic	DAYTIME LEVELS				DAYTIME LEVELS				DAYTIME LEVELS			
Leq Daytime													
Partial angle of exposure, degrees	180												
Partial exposure adjust., dB													
Additional Adjustment, dB													
Sub-Total Leq, dBA													
Angular range of incidence (0,1,2,3)													
Adjusted AIF	-28	30	34	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28
Source 3:	Road Traffic	DAYTIME LEVELS				DAYTIME LEVELS				DAYTIME LEVELS			
Leq Daytime													
Partial angle of exposure, degrees	180												
Partial exposure adjust., dB													
Additional Adjustment, dB													
Sub-Total Leq, dBA													
Angular range of incidence (0,1,2,3)													
Adjusted AIF	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38
Source 4:	Road Traffic	DAYTIME LEVELS				DAYTIME LEVELS				DAYTIME LEVELS			
Leq Daytime													
Partial angle of exposure, degrees	180												
Partial exposure adjust., dB													
Additional Adjustment, dB													
Sub-Total Leq, dBA													
Angular range of incidence (0,1,2,3)													
Adjusted AIF	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38
Sub-Tot. 4 Sources Leq, dBA	69.00												
Aircraft noise NEF/NEP													
Adjust.1													
Adjust.2													
Adjusted NEF/NEP													
Approx. Overall Combined Leq	69												
Assumed Window Floor Area %	32.0												
Assumed Total # of Components (Road, Rail, and Other Sources)	3												
Assumed Total # of Components Aircraft ONLY	3												
AIF of 4 Sources	31												
Aircraft AIF													
Combined AIF	31												
Openable or Fixed windows ?	Openable												
Regular or Laminated Glass	Regular												
Other Adjustment													
Final Adjusted AIF	31												
Minimum STC (Approx)	32												
Typical Minimum Double Glazing Alternatives	3/20/3 4/16/4 3/13/6 6/13/6												
NOTES	A/C Required												

N6 Leq-AIF Master-January 2007
 2022-02-23 13:45
 File Number :
 Project Name :
 Description :

Proceed

SS WILSON ASSOCIATES

Leq- AIF CALCULATIONS AND TYPICAL WINDOW GLAZING REQUIREMENTS

(Using NRC/MOE Po

WA20-052
 1041 Lakeshore Road
 Mississauga

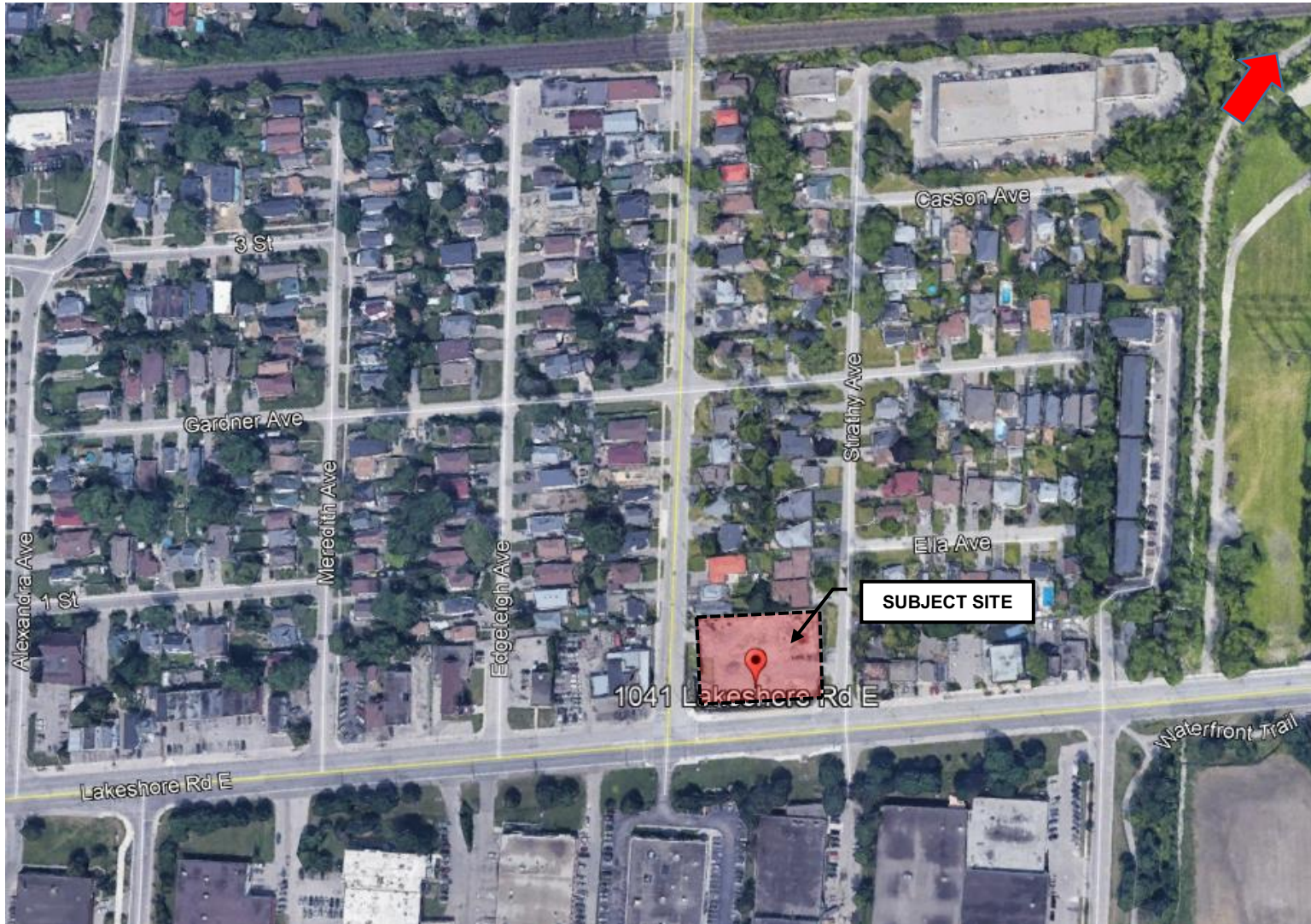
NIGHT TIME
Table 5

Description : Condo Building

Caution: , the AIF Reported for heavy Rail Noise is the Higher of day and night

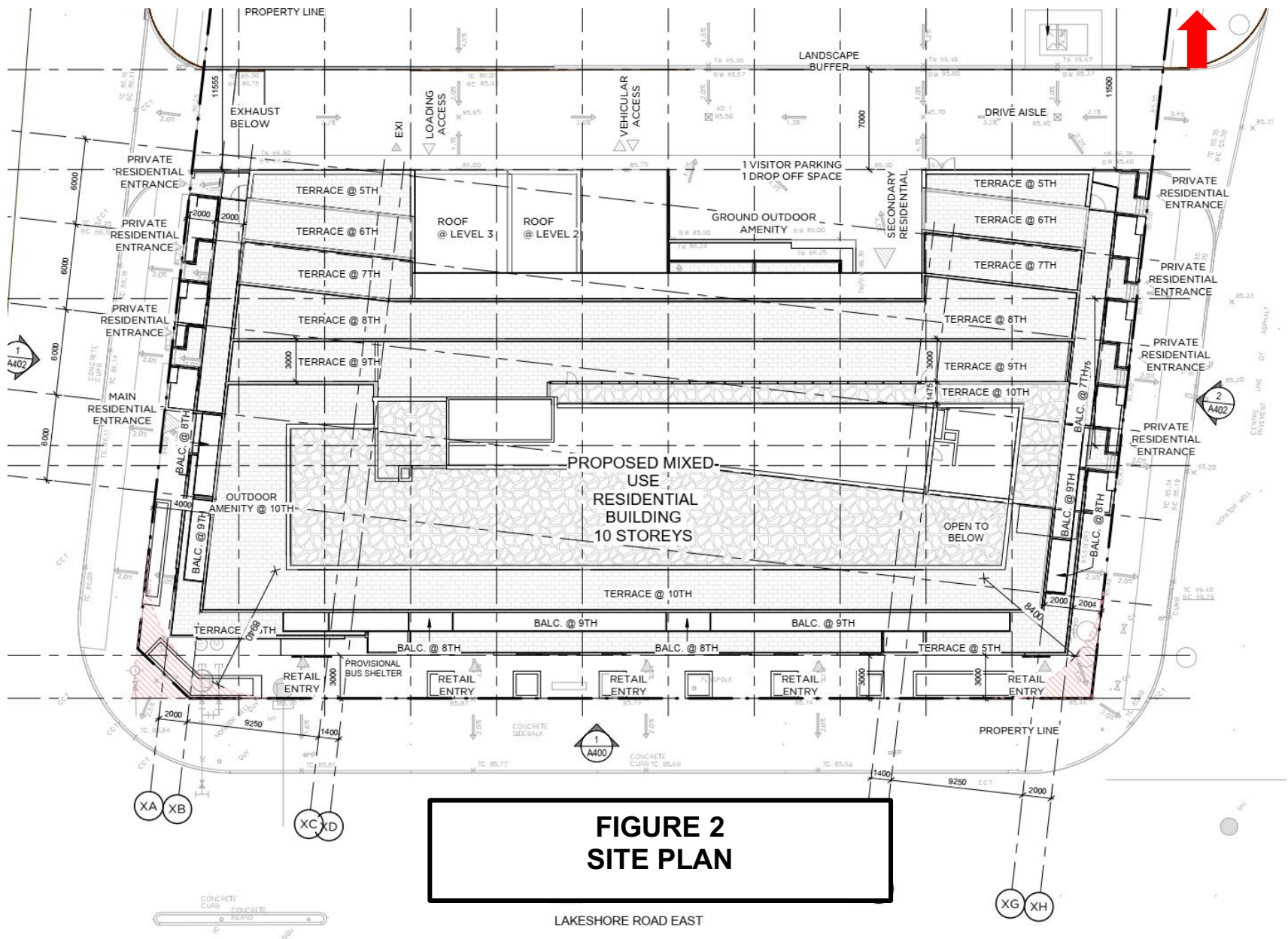
Record Number	1	2	3	4	5	6	7	8	9	10	11	12
Consider Record	Y	N	N	N	N	N	N	N	N	N	N	N
TOWNHOUSE/UNIT NO.	Building Facade											
FACE/DIRECTION	South											
LOCATION	BUILDING FACADE											
ROOM CLASSIFICATION	Bedroom											
Adjustm. to Criterion, dBA												
MOE Transportation Sources Night												
Leq Indoor Criteria, dBA	40											
Aircraft Indoor Criteria, NEF												
Source 1: Lakeshore Road	Road Traffic	NIGHT TIME LEVELS			NIGHT TIME LEVELS			NIGHT TIME LEVELS				
Leq Night Time	63.00											
Partial angle of exposure, degrees	180											
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA	63.00											
Angular range of incidence (0,1,2,3)												
Adjusted AIF	30	-33	25	19	25	13	26	15	6	-33	-33	-33
Source 2: Rail Lines	Rail Traffic	NIGHT TIME LEVELS			NIGHT TIME LEVELS			NIGHT TIME LEVELS				
Leq Night Time												
Partial angle of exposure, degrees	180											
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA												
Angular range of incidence (0,1,2,3)												
Adjusted AIF	-28	30	34	-28	-28	-28	-28	-28	-28	-28	-28	-28
Source 3:	Road Traffic	NIGHT TIME LEVELS			NIGHT TIME LEVELS			NIGHT TIME LEVELS				
Leq Night Time												
Partial angle of exposure, degrees	180											
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA												
Angular range of incidence (0,1,2,3)												
Adjusted AIF	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33
Source 4:	Road Traffic	NIGHT TIME LEVELS			NIGHT TIME LEVELS			NIGHT TIME LEVELS				
Leq Night Time												
Partial angle of exposure, degrees	180											
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA												
Angular range of incidence (0,1,2,3)												
Adjusted AIF	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33
Sub-Tot. 4 Sources Leq, dBA	63.00											
Aircraft noise NEF/NEP												
Adjust. 1												
Adjust. 2												
Adjusted NEF/NEP												
Approx. Overall Combined Leq	63											
Assumed Window/ Floor Area %	20.0											
Assumed Total # of Components (Road, Rail, and Other Sources)	3											
Assumed Total # of Components Aircraft ONLY	3											
AIF of 4 Sources	30											
Aircraft AIF												
Combined AIF	30											
Openable or Fixed windows ?	Openable											
Regular or Laminated Glass	Regular											
Other Adjustment												
Final Adjusted AIF	30											
Minimum STC (Approx)	29											
Typical Minimum Double Glazing Alternatives	3(6 13											
NOTES	A/C Required											

FIGURES



**FIGURE 1
KEY PLAN**

PROJECT NORTH



**FIGURE 2
SITE PLAN**

LAKESHORE ROAD EAST

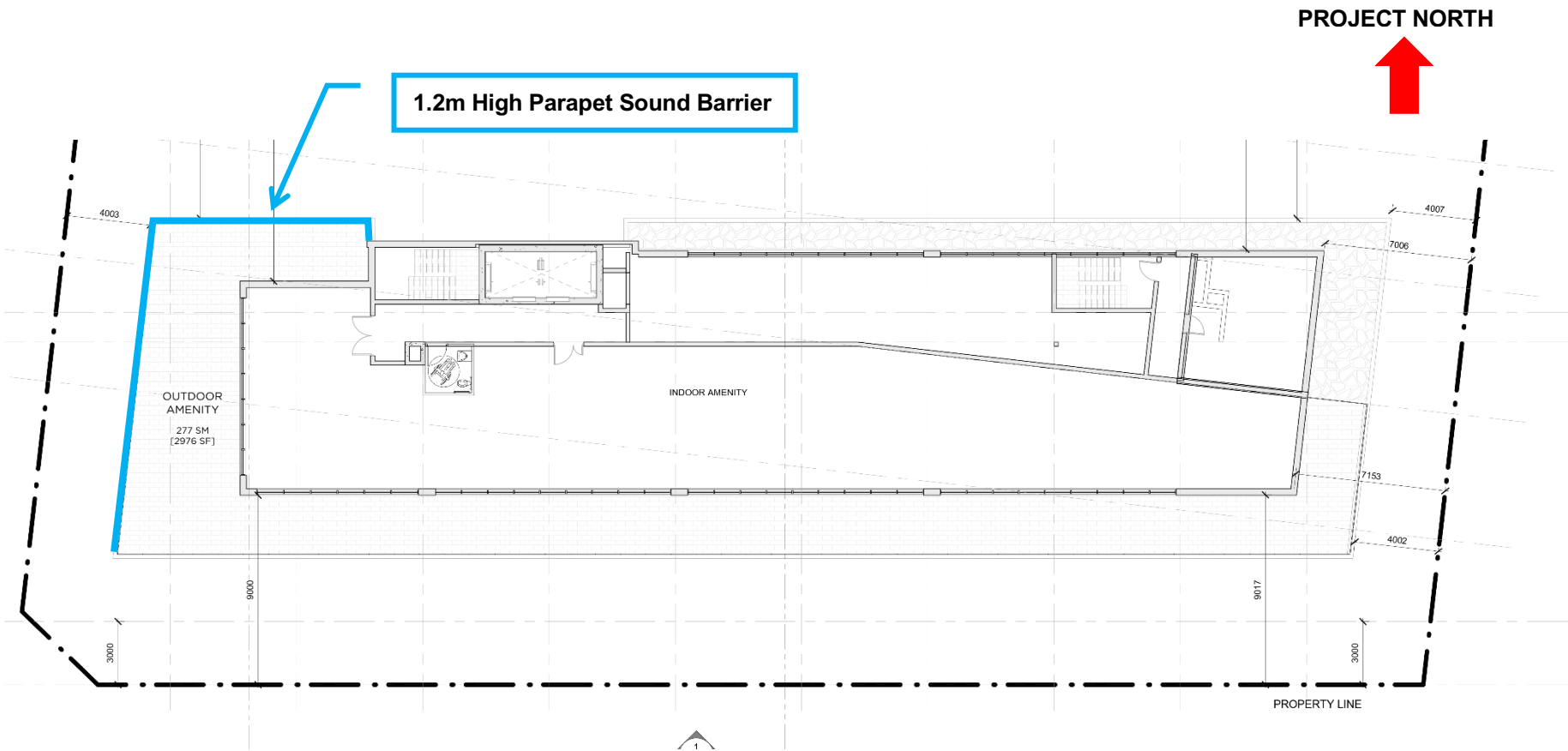


FIGURE 3
SCHEMATIC BARRIER ALIGNMENT- 10TH FLOOR TERRACE



FIGURE 4
EXTERNAL SOURCES OF STATIONARY NOISE OF CONCERN

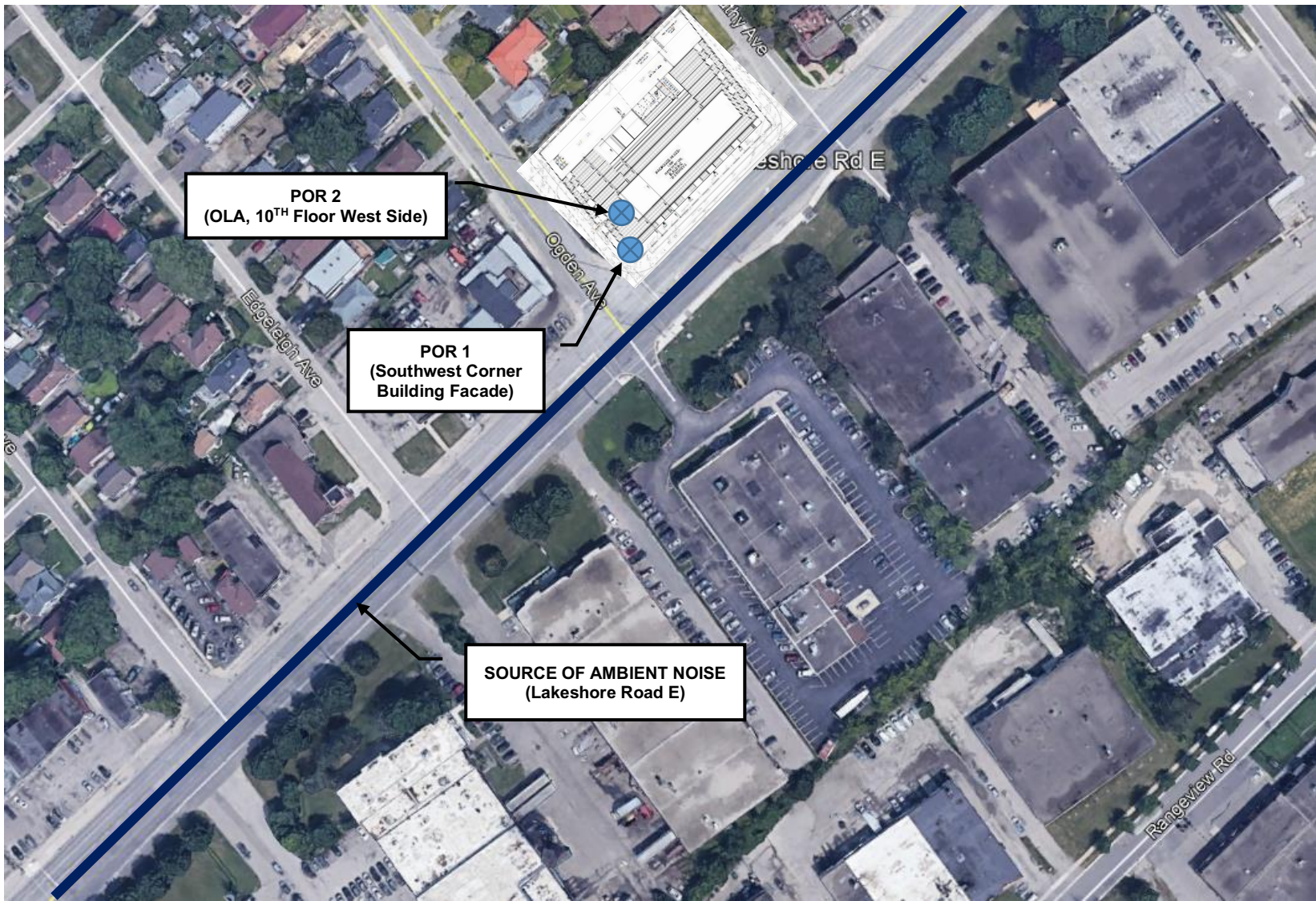


FIGURE 5
POINTS OF RECEPTION OF EXTERNAL SOURCES OF STATIONARY NOISE



FIGURE 6
IMPACT ASSESSMENT OF INTERNAL SOURCES OF STATIONARY NOISE



FIGURE 7
IMPACT ASSESSMENT OF EMERGENCY POWER GENERATOR NOISE

APPENDIX A
ROAD AND RAIL TRAFFIC DATA

Date: 06-Nov-20

NOISE REPORT FOR PROPOSED DEVELOPMENT

REQUESTED BY:

Name: Cheryl McMurter

Company: SS Wilson Associates



PREPARED BY:

Name: Bertuen Mickle

Tel#: (905) 615-3200

Location: Lakeshore Road East : Ogden Avenue to Hydro Road

ID#: 488

ON SITE TRAFFIC DATA

Specific	Street Names			
	Lakeshore Road			
AADT:	38,500			
# of Lanes:	4 lanes			
% Trucks:	6%			
Medium/Heavy Trucks Ratio:	55/45			
Day/Night Traffic Split:	90/10			
Posted Speed Limit:	50 km/h			
Gradient of Road:	<2%			
Ultimate R O W:	30m			

Comments: Ultimate Traffic data Only (2041)



Classification Details Report

Location: LAKESHORE RD E btwn ORCHARD RD & UNNAMED UEDU

Municipality: Mississauga

Eastbound

	1	2	3	4	5	6	7	8	Grand Total
StartTime	0-4.8	4.9-9	9.1-10	10.1-13	13.1-15.8	15.9-18.8	18.9-22.5	22.6-40	
10/1/2020 12:00 AM	18	41	0	3	2	0	0	0	64
10/1/2020 1:00 AM	9	25	0	2	1	0	0	0	37
10/1/2020 2:00 AM	10	12	0	1	1	0	0	0	24
10/1/2020 3:00 AM	8	13	0	1	0	0	0	0	22
10/1/2020 4:00 AM	13	22	0	3	2	0	1	0	41
10/1/2020 5:00 AM	39	69	4	8	2	1	3	0	126
10/1/2020 6:00 AM	102	163	2	12	2	2	2	0	285
10/1/2020 7:00 AM	133	222	3	16	8	5	5	1	393
10/1/2020 8:00 AM	195	317	8	20	6	2	1	1	550
10/1/2020 9:00 AM	170	245	13	31	6	2	5	2	474
10/1/2020 10:00 AM	207	263	8	25	8	4	1	3	519
10/1/2020 11:00 AM	222	361	13	29	5	3	1	1	635
10/1/2020 12:00 PM	213	341	11	21	4	2	4	1	597
10/1/2020 1:00 PM	245	314	12	25	5	2	3	1	607
10/1/2020 2:00 PM	243	328	8	25	5	2	5	0	616



Classification Details Report

Location: LAKESHORE RD E btwn ORCHARD RD & UNNAMED UEDU

Municipality: Mississauga

Eastbound

10/1/2020 3:00 PM	332	393	5	29	5	2	5	0	771
10/1/2020 4:00 PM	307	366	2	12	4	1	4	0	696
10/1/2020 5:00 PM	308	398	2	8	3	4	4	2	729
10/1/2020 6:00 PM	258	339	2	8	6	1	5	0	619
10/1/2020 7:00 PM	186	220	5	4	1	3	1	0	420
10/1/2020 8:00 PM	154	179	2	3	5	1	4	0	348
10/1/2020 9:00 PM	116	156	0	4	3	0	0	0	279
10/1/2020 10:00 PM	70	99	0	2	2	0	0	0	173
10/1/2020 11:00 PM	58	85	1	2	2	0	0	0	148
Grand Total	3616	4971	101	294	88	37	54	12	9173
	1	2	3	4	5	6	7	8	Grand Total
Total %	39.42%	54.19%	1.10%	3.21%	0.96%	0.40%	0.59%	0.13%	100.00%

Date: 2020/02/24

Project Number: OAK-16.60-Southdown Road, Mississauga ON.

Dear Cheryl:

Re: Train Traffic Data – CN Oakville Subdivision near Southdown Road, Mississauga ON

The following is provided in response to Cheryl's 2020/02/19 request for information regarding rail traffic in the Southdown Road, Mississauga ON at approximately Mile 16.60 on CN's Oakville 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	0	140	60	4
Way Freight	1	25	60	4
Passenger	14	10	95	2

	2300-0700			
Type of Train	Volumes	Max.Consist	Max. Speed	Max. Power
Freight	0	140	60	4
Way Freight	4	25	60	4
Passenger	1	10	95	2

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

Except where anti-whistling bylaws are in effect, engine-warning whistles and bells are normally sounded at all at-grade crossings. There are two (2) at-grade crossing in the immediate vicinity of the study area at Mile 16.09 Clarkson Rd Xing and Mile 16.45 Lakeshore Rd Xing. Anti-whistling by laws are in effect at Mile 16.09 Clarkson Rd Xing only

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.

SS Wilson Associates

From: Rail Data Requests <RailDataRequests@metrolinx.com>
Sent: February 10, 2023 2:44 PM
To: SS Wilson Associates
Subject: RE: Rail Traffic Request - WA20-052, 1041 Lake Shore East, Mississauga

Good afternoon,

Please consider the following data as these are our latest train trip data.

The subject lands (1041 Lake Shore Road East in Mississauga) are located within 300 metres of the Metrolinx Oakville Subdivision (which carries Lakeshore West GO rail service).

It's anticipated that GO rail service on this Subdivision will be comprised of diesel and electric trains. The GO rail fleet combination on this Subdivision will consist of up to 2 locomotives and 12 passenger cars. The typical GO rail weekday train volume forecast near the subject lands, including both revenue and equipment trips is in the order of 408 trains. The planned detailed trip breakdown is listed below:

	1 Diesel Locomotive	2 Diesel Locomotives	1 Electric Locomotive	2 Electric Locomotives		1 Diesel Locomotive	2 Diesel Locomotives	1 Electric Locomotive	2 Electric Locomotives
Day (0700-2300)	132	0	222	0	Night (2300-0700)	20	0	34	0

The current track design speed near the subject lands is 95 mph (153 km/h).

There are *anti-whistling by-laws* in affect near the subject lands at Lorne Park Rd.

With respect to future electrified rail service, Metrolinx is committed to finding the most sustainable solution for electrifying the GO rail network and we are currently working towards the next phase.

Options have been studied as part of the Transit Project Assessment Process (TPAP) for the GO Expansion program, currently in the procurement phase. The successful proponent team will be responsible for selecting and delivering the right trains and infrastructure to unlock the benefits of GO Expansion. The contract is in a multi-year procurement process and teams have submitted their bids to Infrastructure Ontario and Metrolinx for evaluation and contract award. GO Expansion construction will get underway in late 2022 or 2023. However, we can advise that train noise is dominated by the powertrain at lower speeds and by the wheel-track interaction at higher speeds. Hence, the noise level and spectrum of electric trains is expected to be very similar at higher speeds, if not identical, to those of equivalent diesel trains.

Given the above considerations, it would be prudent at this time, for the purposes of acoustical analyses for development in proximity to Metrolinx corridors, to assume that the acoustical characteristics of electrified and diesel trains are equivalent. In light of the aforementioned information, acoustical models should employ diesel train parameters as the basis for analyses. We anticipate that additional information regarding specific operational parameters for electrified trains will become available in the future once the proponent team is selected.

Operational information is subject to change and may be influenced by, among other factors, service planning priorities, operational considerations, funding availability and passenger demand.

It should be noted that this information only pertains to Metrolinx rail service. It would be prudent to contact other rail operators in the area directly for rail traffic information pertaining to non-Metrolinx rail service.

I trust this information is useful. Should you have any questions or concerns, please do not hesitate to contact me.

Regards,
Tara

Tara Kamal Ahmadi

Junior Analyst
Third Party Projects Review, Capital Projects Group
Metrolinx | 20 Bay Street | Suite 600 | Toronto | Ontario | M5J 2W3

SS Wilson Associates

From: Service <service@viarail.ca>
Sent: Wednesday, November 11, 2020 2:21 PM
To: SS Wilson Associates
Subject: Automatic reply: -VIA Rail Line "Oakville Subdivision", SSWA File No. WA20-052

Nous avons un volume de courriels plus élevé que d'habitude en raison de la situation liée au COVID-19.

VIA Rail prend aussi les mesures nécessaires afin de diminuer le risque de propagation.

Par conséquent, notre délai de réponse risque d'être plus long que d'habitude.

Merci de votre compréhension,

We are experiencing a higher volume of emails than usual due to the situation linked to COVID-19.

VIA Rail is also taking appropriate steps to decrease the risk of spreading the infection.

As such, our response time might be longer than usual.

Thank you for your understanding,,

Customer Support Desk
Bureau de Soutien à la Clientèle
VIA Rail Canada Inc.
Moncton / Moncton

////////////////////////////////////
VIA Rail Canada Inc.
77 Canada Street, Moncton, New Brunswick, E1C 0V3



Thursday Nov 05, 2020

Toronto Union Station — Windsor train station

Scheduled hours are not showing possible delays. Please consult your train status before you travel

TRAIN 71	Scheduled hours 08:40 — 12:57	Travel time 4h 17m	Train status
TRAIN 75	Scheduled hours 17:30 — 21:58	Travel time 4h 28m	Train status

APPENDIX B

SAMPLE SOUND LEVEL CALCULATIONS

Filename: nwl0terr.te Time Period: Day/Night 16/8 hours
Description: Sound Level at 10th Floor Common OLA- West Side

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

```
-----
Car traffic volume   : 32571/3619   veh/TimePeriod *
Medium truck volume :   1143/127   veh/TimePeriod *
Heavy truck volume  :    936/104   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): 38500
Percentage of Annual Growth       : 0.00
Number of Years of Growth         : 0.00
Medium Truck % of Total Volume    : 3.30
Heavy Truck % of Total Volume     : 2.70
Day (16 hrs) % of Total Volume    : 90.00
```

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

```
-----
Angle1  Angle2      : -30.00 deg   90.00 deg
Wood depth      :      0      (No woods.)
No of house rows :      0 / 0
Surface         :      2      (Reflective ground surface)
Receiver source distance : 30.00 / 30.00 m
Receiver height  :   1.50 / 4.50 m
Topography      :      2      (Flat/gentle slope; with barrier)
Barrier angle1  : -30.00 deg   Angle2 : 90.00 deg
Barrier height   :   0.00 m
Barrier receiver distance : 8.00 / 8.00 m
Source elevation :   0.00 m
Receiver elevation : 28.50 m
Barrier elevation : 28.50 m
Reference angle  :   0.00
```

Result summary (day)

```
-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----+
1.Lakeshore Rd ! 1.28 ! 49.71 ! 49.71
-----+-----+-----+
Total 49.71 dBA
```

Result summary (night)

	! source	! Road	! Total
	! height	! Leq	! Leq
	! (m)	! (dBA)	! (dBA)
1.Lakeshore Rd	1.28	47.00	47.00
	Total		47.00 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 49.71
(NIGHT): 47.00

SS WILSON ASSOCIATES -Consulting Engineers, Richmond Hill, Ontario
 RAIL TRAFFIC NOISE PREDICTION MODEL
 BASED ON MOE STEAM/ORNAMENT
 1041 Lakeshore Rd East
 Mississauga- Oakville Subdivision
 Name(s) of Rail Lines:
 Receptor Name:
 SSWA Project Number: **WA20-052 R3** Comments **10th Floor-West Side**

Revised June 8 2015

This area is free to insert any text

Purpose of Calculation	Bldg.Facade	Whistle Noise??								
DO NOT COPY AND PASTE CELLS UNLESS YOU PASTE "VALUES" ONLY										
Include the following Segments ? (No=0 or Yes=1)	0	1	1	1	1	1	1	1	1	1
Rail Name & Direction		CN RAIL	CN RAIL	CN RAIL	VIA RAIL	METROLINX GO (1 DIESEL LOCOMOTIVE)	METROLINX GO (2 DIESEL LOCOMOTIVE)			
Rail/Segment Number or Other Data	Passenger	WAY FREIGHT	PASSENGER	PASSENGER	PASSENGER	PASSENGER	PASSENGER			
Segment Source of Noise	Locomo Whistle Wheels	Locomo Whistle Wheels	Locomo Whistle Wheels	Locomo Whistle Wheels	Locomo Whistle Wheels	Locomo Whistle Wheels	Locomo Whistle Wheels			
Whistle Noise??	Yes No Yes	Yes No Yes	Yes No Yes	Yes No Yes	Yes No Yes	Yes No Yes	Yes No Yes			
MOE Topographic Case (1-11)-See Instructions										
	S and R on flat ground but with constant ground slope + Barrier	S and R on flat ground but with constant ground slope + Barrier	S and R on flat ground but with constant ground slope + Barrier	S and R on flat ground but with constant ground slope + Barrier	S and R on flat ground but with constant ground slope + Barrier	S and R on flat ground but with constant ground slope + Barrier	S and R on flat ground but with constant ground slope + Barrier			
Traffic Data Calculation Period (24Hrs or 16.8 d/n or 1 H)	Day/Night	Day/Night	Day/Night	Day/Night	Day/Night	Day/Night	Day/Night			
Intermediate Surface: Absorptive or Reflective	Absorptive	Absorptive	Absorptive	Absorptive	Absorptive	Absorptive	Absorptive			
Absorptive Alpha Override: Manual or Auto	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic			
Manual Alpha (if Cell is Blank, do not change, otherwise, input your choice for α)										
Measured Angle Case Number	1	1	1	1	1	1	1			
Angle description	-01 Left & +02 Right	-01 Left & +02 Right	-01 Left & +02 Right	-01 Left & +02 Right	-01 Left & +02 Right	-01 Left & +02 Right	-01 Left & +02 Right			
Angle Theta θ1		-90	-90	-90	-90	-90	-90			
Angle Theta θ2		30	30	30	30	30	30			
Angle Theta Error Detection Flag	Angle Error									
Subtended Angle (Angle of Exposure), °	0	120	120	120	120	120	120			
Number of Locomotives per train	4	2	2	1	1	1	2			
Number of cars per train	25	10	10	12	12	12	12			
Number of Trains in 24 Hrs.										
Hourly Number of Trains in 1 Hour										
Number of Daytime Trains 07:00 to 23:00.		1	14	2	2	354	0			
Number of Night Trains 23:00 to 07:00		4	1	0	0	54	0			
% Increase / year		2.50%	2.50%	2.50%	2.50%	2.50%	2.50%			
Number of years		14	14	14	14	11	11			
Future Number of Trains in 24 Hrs.										
Future Hourly Number of Trains in 1 Hour										
Future Number of Daytime Trains 07:00 to 23:00	0	1	20	3	3	464	0			
Future Number of Nighttime Trains 23:00 to 07:00	0	6	1	0	0	71	0			
Posted Speed (Km/Hr) [S]		96.5	96.5	153	153	153	153			
Wood Depth (m)		0	0	0	0	0	0			
Day time Receiver Height,m [RH] (For 24 Hrs. & Hourly also)		1.5	1.5	1.5	1.5	1.5	1.5			
Nighttime Receiver Height (m) [NRH]		1.5	1.5	1.5	1.5	1.5	1.5			
Source-Receiver Distance [SRD]		330	330	330	330	330	330			
Nighttime Source-Receiver Distance [NSRD]		330	330	330	330	330	330			
Barrier Height (m) [BH]		0	0	0	0	0	0			
Barrier-Receiver Distance (m)	8	8	8	8	8	8	8			
Barrier Receiver Distance Error Flag										
Ground Elevation Difference (m) [e]		0	0	0	0	0	0			
Source Ground Elevation (m)		0	0	0	0	0	0			
Receiver Ground Elevation (m)		28.5	28.5	28.5	28.5	28.5	28.5			
Barrier Ground Elevation (m)		28.5	28.5	28.5	28.5	28.5	28.5			
Include Effect of Dense Woods?		No	No	No	No	No	No			
Number of Rows of Houses		0	0	0	0	0	0			
Nighttime Number of Rows of Houses		0	0	0	0	0	0			
Percentage of Row Occupied by Houses (??%)		20%	20%	20%	20%	20%	80%			
Height of Row of House [HH]		0	0	0	0	0	7			
Do you want to change the model frequency?		N	N	N	N	N	N			
Input your Choice of frequency										
Dominant Octave Frequency Band (Hz) [F]	250 2000 500	500 500 500	500 500 500	500 500 500	500 500 500	500 500 500	500 500 500			
For Wheel noise ONLY: Enter a factor of -5 dB for Continuously Welded Rail (CWR) and +5 dB for Trestles as applicable										
Day Time [16 hours] Additional dBA Correction Factor Specify	0 0 0	0 0 5	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0			
Night Time [8 hours] Additional dBA Correction Factor- Specify	0 0 0	0 5 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0			
N/A	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0			
N/A	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0			
RESULTS FOR SEGMENTS										
Daytime [16 hours] Segment Leq ₁₆	0.0	39.2	46.1	38.9	61.1	0.0				
Nighttime [8 hours] Segment Leq ₈	0.0	48.3	37.7	0.0	55.9	0.0				
24 Hour Daily Segment Leq ₂₄										
1 Hour Segment Leq ₁										
Note: The predicted values may slightly differ than the MOE values										
Day Time Leq (16 Hrs.)	61									
Night Time Leq (8 Hrs.)	57									
24 Hour Daily Leq										
1 Hour Leq										

Filename: nwterrb.te Time Period: Day/Night 16/8 hours
Description: Sound Level at W Common OLA with Barrier

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

```
-----
Car traffic volume   : 32571/3619   veh/TimePeriod *
Medium truck volume :   1143/127   veh/TimePeriod *
Heavy truck volume  :    936/104   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): 38500
Percentage of Annual Growth       : 0.00
Number of Years of Growth         : 0.00
Medium Truck % of Total Volume    : 3.30
Heavy Truck % of Total Volume     : 2.70
Day (16 hrs) % of Total Volume    : 90.00
```

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

```
-----
Angle1  Angle2      : -30.00 deg   90.00 deg
Wood depth      :      0      (No woods.)
No of house rows :      0 / 0
Surface        :      2      (Reflective ground surface)
Receiver source distance : 30.00 / 30.00 m
Receiver height :    1.50 / 4.50 m
Topography     :      2      (Flat/gentle slope; with barrier)
Barrier angle1 : -30.00 deg   Angle2 : 90.00 deg
Barrier height  :    1.20 m
Barrier receiver distance : 8.00 / 8.00 m
Source elevation :    0.00 m
Receiver elevation : 28.50 m
Barrier elevation : 28.50 m
Reference angle :    0.00
```

Result summary (day)

```
-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----+
1.Lakeshore Rd ! 1.28 ! 48.62 ! 48.62
-----+-----+-----+
Total 48.62 dBA
```

Result summary (night)

	! source !	Road	! Total
	! height !	Leq	! Leq
	! (m) !	(dBA)	! (dBA)
1.Lakeshore Rd	! 1.28 !	45.07	! 45.07
	Total		45.07 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 48.62
(NIGHT): 45.07

Filename: nsdn.te Time Period: Day/Night 16/8 hours
Description: Sound Levels at South Building Facade

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

```
-----
Car traffic volume : 32571/3619 veh/TimePeriod *
Medium truck volume : 1143/127 veh/TimePeriod *
Heavy truck volume : 936/104 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): 38500
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 3.30
Heavy Truck % of Total Volume : 2.70
Day (16 hrs) % of Total Volume : 90.00
```

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

```
-----
Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 19.00 / 19.00 m
Receiver height : 30.00 / 30.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

Result summary (day)

```
-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----+-----
1.Lakeshore Rd ! 1.28 ! 69.36 ! 69.36
-----+-----+-----+-----
Total 69.36 dBA
```

Result summary (night)

```
-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----+-----
```

1.Lakeshore Rd	!	1.28	!	62.83	!	62.83
-----+-----+-----+-----						
		Total				62.83 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 69.36
(NIGHT): 62.83

DATE PREPARED :.....

SS WILSON ASSOCIATES
PRELIMINARY NOISE ASSESMENT

Modified N23-APRIL 9 2009

File Number : WA20-052 General (non-impulsive) Source
 Project Name : 1041 Lakeshore Road E, Mississauga
 Receptor Name : South Building Façade - DAY
 Source Name : **Cyclone IMG** Y do not calc
 Cyclone 0 N calc

Show Emission Data	Yes	Source Unattenuated Leq dBA 60					Source Attenuated Leq dBA 60				dBL	dBA
Octave Band Centre Frequency, Hz	31.5	63	125	250	500	1000	2000	4000	8000			
Use Cartesian Co-Ordinates ?	No	No	No	No	No	No	No	No	No			
Ground Elevation at Receptor,m	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Receptor Height above ground, m	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0			
Ground Elevation at source, m	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Source Height above ground, m	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0			
Point or Line Source (P or L) ?	P	P	P	P	P	P	P	P	P			
Spectrum, dBL	71.0	68.0	65.0	67.0	57.0	58.0	53.0	43.0	31.0	74.5	62.9	
Adj. Name	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Adj. Name	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Reference Dist. for Lp, m	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0			
Adjusted Spectrum, dBL	71.0	68.0	65.0	67.0	57.0	58.0	53.0	43.0	31.0	74.5	62.9	
Scaled Source-Receptor Distance ,m	190.0	190	190	190	190	190	190	190	190			
Geometrical Spreading	.....										
Consider Distance atten.?	Y	Y	Y	Y	Y	Y	Y	Y	Y			
Distance Reduction Factor	20	20	20	20	20	20	20	20	20			
Reference Dist. for Lp, m	96	96	96	96	96	96	96	96	96			
Source-Receptor Distance,m	190	190	190	190	190	190	190	190	190			
Distance Error Flag	Ok											
Geometrical Spreading, dB	-5.9	-5.9	-5.9	-5.9	-5.9	-5.9	-5.9	-5.9	-5.9			
Lp With Geometric Spreading	65.1	62.1	59.1	61.1	51.1	52.1	47.1	37.1	25.1	68.6	57.0	
ISO Ground Attenuation	.....										
Model (1=none,2=CMHC,3=ISO)	3	3	3	3	3	3	3	3	3			
Use a Different Distance For Ground Atten.?	N	N	N	N	N	N	N	N	N			
Distance used for calculation												
Selected Distance For Calculation	190	190	190	190	190	190	190	190	190			
Source Height above ground, m	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0			
Receptor Height above ground, m	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0			
Barrier Height Factor(2xbh) (CMHC)	0	0	0	0	0	0	0	0	0			
P+T Factors (CMHC only)	0	0	0	0	0	0	0	0	0			
Calculated Ground Attenuation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Considered Ground Attenuation, dB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			

Lp With Geometric Spreading & Gnd.Atten.	65.1	62.1	59.1	61.1	51.1	52.1	47.1	37.1	25.1	68.6	57.0
Yes Atmospheric Attenuation	.....									
Consider atm.atten.of a Standard Day(Y or N)	Y	Y	Y	Y	Y	Y	Y	Y	Y		
Atmospheric Attenuation, dB	0.0	0.0	-0.1	-0.1	-0.2	-0.5	-0.9	-2.3	-4.2		
Sub-Total Propagation Attenuation,dB	-5.9	-6.0	-6.0	-6.1	-6.1	-6.4	-6.9	-8.3	-10.2		
Lp with Geom.Spreading,Gnd.&Atrn.Atten.	65.1	62.0	59.0	60.9	50.9	51.6	46.1	34.7	20.8	68.6	56.6
Additional Adjustments (Watch +/- Signs)	.....									
Tonal Penalty	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		
.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Adj. 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Adj. 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Adj. 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Adj. 4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Sub-Total Adjustments, dB	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		
Adjusted Lp @ Receptor, dBL	70.1	67.0	64.0	65.9	55.9	56.6	51.1	39.7	25.8	73.6	61.6
Leq Time Base , Minutes	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0		
Point Source Data :	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
- No. of Events in Time Base	1	1	1	1	1	1	1	1	1		
- Each Event Duration, min.	45	45	45	45	45	45	45	45	45		
- Duration Of All Events, min.	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0		
Linear Unattenuated Leq dBL	68.8	65.8	62.8	64.7	54.6	55.4	49.9	38.5	24.6	72.3	60.3
A-Weighted Unattenuated Leq dBA	29.4	39.6	46.7	56.1	51.4	55.4	51.1	39.5	23.5		
Noise Control Measures	.....									
Sound Barrier(s) Case	Receptor	Receptor	Receptor	Receptor	Receptor	Receptor	Receptor	Receptor	Receptor	Receptor	
Is there a sound Barrier (Y or N) ?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Ignore ISO Barrier Rule for gnd Atten? ?	N	N	N	N	N	N	N	N	N	N	
Decision	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	

Source Sound Barrier 1.....	Barrier 1													
Consider Barrier Attenuation	N	N	N	N	N	N	N	N	N	N				
Ground Elevation At Source, M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Source-Barrier Distance	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0				
Barrier Height	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Barrier Gnd. Elev.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Barrier Thickness	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Ground Elevation At Receptor, M	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5				
Receiver-Barrier Dist.	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0				
Calc. Line Source Barrier Attenuation, dB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Barrier Acoustic Zone	bright	bright	bright	bright	bright	bright	bright	bright	bright	bright				
Barrier Top Elevation	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Line-To-Point Source Barrier Adjust.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Source Barrier Attenuation, dB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Sub-Result Sound Level (Barrier 1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Barrier 1 Reduction (IL)	0.0 dBL		0.0 dBA											
Receptor Sound Barrier 2.....	Barrier a													
Consider Barrier Attenuation	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y				
Ground Elevation At Source, M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Source-Barrier Distance	182.0	182.0	182.0	182.0	182.0	182.0	182.0	182.0	182.0	182.0				
Ground Elevation At Receptor, M	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5				
Receiver-Barrier Dist.	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0				
Barrier Height	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1				
Barrier Gnd. Elev.	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5				
Barrier Thickness	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Calc. Line Source Barrier Attenuation, dB	-5.0	-5.1	-5.1	-5.3	-5.6	-6.2	-7.1	-8.5	-10.3					
Barrier Acoustic Zone	shadow	shadow	shadow	shadow	shadow	shadow	shadow	shadow	shadow	shadow				
Barrier Top Elevation	29.6	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1				
Line-To-Point Source Barrier Adjust.	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5				
Receiver Barrier Attenuation, dB	-6.5	-6.6	-6.6	-6.8	-7.1	-7.7	-8.6	-10.0	-11.8					
Sub-Result Sound Level (Barrier 2)	62.3	59.2	56.1	57.9	47.5	47.7	41.3	28.5	12.8		65.7	53.0		
Barrier 2 Reduction (IL)	6.6 dBL		7.3 dBA											
Barrier(s) Results														
Source Barrier Attenuation, dB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Receiver Barrier Attenuation, dB	-6.5	-6.6	-6.6	-6.8	-7.1	-7.7	-8.6	-10.0	-11.8					
Additional Attenuation Of Double Barrier	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Calculated Overall Double Barrier Attenuation	-6.5	-6.6	-6.6	-6.8	-7.1	-7.7	-8.6	-10.0	-11.8					
Do You Want to Limit The Barrier Reduction ?	N	N	N	N	N	N	N	N	N	N				
Maximum Allowed Barrier Reduction	-25.0	-25.0	-25.0	-25.0	-25.0	-25.0	-25.0	-25.0	-25.0	-25.0				
Selected Reduction(s) Due to Barrier(s)	-6.5	-6.6	-6.6	-6.8	-7.1	-7.7	-8.6	-10.0	-11.8					
Resultant Sound Level With Barrier(s)	62.3	59.2	56.1	57.9	47.5	47.7	41.3	28.5	12.8		65.7	53.0		
Barrier(s) Reduction (IL)	6.6 dBL		7.3 dBA											

Sound Level Adjust.(Watch +/- Signs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Note Re Removal of Tonal Penalty	Consider?	Consider	Consider	Consider	Consider	Consider	Consider	Consider	Consider	Consider?
Removal of Tonal Penalty	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ComAdj.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ComAdj.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Adjust 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Adjust 4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Adjust 5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Adjust 6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Reduction, dB	-6.5	-6.6	-6.6	-6.8	-7.1	-7.7	-8.6	-10.0	-11.8	
Linear Attenuated Leq dBL	62.3	59.2	56.1	57.9	47.5	47.7	41.3	28.5	12.8	65.7
A-Weighted Attenuated Leq dBA	22.9	33.0	40.0	49.3	44.3	47.7	42.5	29.5	11.7	53.0
Source Unattenuated Leq dBA	60.3	dBA	Source Attenuated Leq dBA				53.0	dBA		

ADDITIONAL DOUBLE BARRIER DETAILS

Consider Barrier Attenuation (Y or N)	N	N	N	N	N	N	N	N	N
Foss's First Wall is The Barrier Near The	Receiver	Receiver	Receiver	Receiver	Receiver	Receiver	Receiver	Receiver	Receiver
First Source Height	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
First Source Ground Elevation	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5
Calculated Receiver Height	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Calculated Receiver Ground Elevation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calculated Barrier Height	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Calculated Barrier Ground Elevation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Distance Between Double Barriers	152.0	152.0	152.0	152.0	152.0	152.0	152.0	152.0	152.0
Ratio of Double Barriers Dist. To S-R Dist.	80%								
Source-Receiver Distance	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0
Foss's Source-Barrier Distance	152.0	152.0	152.0	152.0	152.0	152.0	152.0	152.0	152.0
Foss's Receiver-Barrier Distance	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
BARRIER THICKNESS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calc. Line Source Barrier Attenuation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Barrier Acoustic Zone	bright	bright	bright	bright	bright	bright	bright	bright	bright
Barrier Top Elevation	33.5	33.5	33.5	33.5	33.5	33.5	33.5	33.5	33.5
Line-to-Point Source Barrier Adjust.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Additional Attenuation Of Double Barrier	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Overall Double Barrier Attenuation									

Configuration	
Parameter	Value
General	
Country	(user defined)
Max. Error (dB)	0.00
Max. Search Radius (m)	2000.00
Min. Dist Src to Rcvr	0.00
Partition	
Raster Factor	0.50
Max. Length of Section (m)	1000.00
Min. Length of Section (m)	1.00
Min. Length of Section (%)	0.00
Proj. Line Sources	On
Proj. Area Sources	On
Ref. Time	
Reference Time Day (min)	960.00
Reference Time Night (min)	480.00
Daytime Penalty (dB)	0.00
Recr. Time Penalty (dB)	6.00
Night-time Penalty (dB)	10.00
DTM	
Standard Height (m)	0.00
Model of Terrain	Triangulation
Reflection	
max. Order of Reflection	2
Search Radius Src	100.00
Search Radius Rcvr	100.00
Max. Distance Source - Rcvr	1000.00 1000.00
Min. Distance Rcvr - Reflector	1.00 1.00
Min. Distance Source - Reflector	0.10
Industrial (ISO 9613)	
Lateral Diffraction	some Obj
Obst. within Area Src do not shield	On
Screening	Excl. Ground Att. over Barrier Dz with limit (20/25)
Barrier Coefficients C1,2,3	3.0 20.0 0.0
Temperature (°C)	10
rel. Humidity (%)	70
Ground Absorption G	0.00
Wind Speed for Dir. (m/s)	3.0
Roads (TNM)	
Railways (Schall 03 (1990))	
Strictly acc. to Schall 03 / Schall-Transrapid	
Aircraft (???)	
Strictly acc. to AzB	

Receiver
 Name: POR-1
 ID: POR_1
 X: 17616383.31
 Y: 4825970.22
 Z: 27.00

vert. Area Source, ISO 9613, Name: "Fluid Cooler Intake", ID: "Intake_CT"																			
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	K0	Dc	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1	17616384.12	4825971.26	32.50	0	D	A	64.7	4.1	0.0	0.0	26.1	0.2	-3.0	0.0	0.0	0.0	0.0	0.0	45.5
2	17616382.96	4825969.62	32.50	0	D	A	64.7	1.7	0.0	0.0	25.9	0.2	-3.0	0.0	0.0	0.0	0.0	0.0	43.3
4	17616382.11	4825968.41	32.50	0	D	A	64.7	1.7	0.0	0.0	26.4	0.2	-3.0	0.0	0.0	0.0	0.0	0.0	42.7
9	17616384.48	4825971.78	31.50	0	D	A	64.7	1.0	0.0	0.0	24.8	0.2	-3.0	0.0	0.0	0.0	0.0	0.0	43.7
13	17616383.75	4825970.74	31.50	0	D	A	64.7	1.0	0.0	0.0	24.2	0.1	-3.0	0.0	0.0	0.0	0.0	0.0	44.4
17	17616382.96	4825969.62	31.50	0	D	A	64.7	1.7	0.0	0.0	24.2	0.1	-3.0	0.0	0.0	0.0	0.0	0.0	45.1
19	17616382.11	4825968.41	31.50	0	D	A	64.7	1.7	0.0	0.0	25.0	0.2	-3.0	0.0	0.0	0.0	0.0	0.0	44.2
30	17616384.48	4825971.78	30.60	0	D	A	64.7	0.1	0.0	0.0	23.2	0.1	-3.0	0.0	0.0	0.0	0.0	0.0	44.4
34	17616383.75	4825970.74	30.60	0	D	A	64.7	0.1	0.0	0.0	22.3	0.1	-3.0	0.0	0.0	0.0	0.0	0.0	45.3
39	17616382.96	4825969.62	30.60	0	D	A	64.7	0.7	0.0	0.0	22.3	0.1	-3.0	0.0	0.0	0.0	0.0	0.0	46.0
45	17616382.11	4825968.41	30.60	0	D	A	64.7	0.7	0.0	0.0	23.5	0.1	-3.0	0.0	0.0	0.0	0.0	0.0	44.8

Area Source, ISO 9613, Name: "Fluid Cooler Discharge", ID: "CT_Discharge"																			
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	K0	Dc	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
49	17616385.71	4825970.75	34.60	0	D	A	73.4	-10.9	0.0	0.0	29.0	0.3	-3.0	0.0	0.0	16.8	0.0	0.0	19.4
51	17616385.59	4825970.43	34.60	0	D	A	73.4	-9.9	0.0	0.0	29.0	0.3	-3.0	0.0	0.0	17.1	0.0	0.0	20.2
53	17616385.54	4825970.30	34.60	0	D	A	73.4	-23.7	0.0	0.0	29.0	0.3	-3.0	0.0	0.0	17.2	0.0	0.0	6.3
58	17616385.10	4825968.64	34.60	0	D	A	73.4	4.8	0.0	0.0	29.0	0.3	-3.0	0.0	0.0	18.7	0.0	0.0	33.2
60	17616384.37	4825967.62	34.60	0	D	A	73.4	0.8	0.0	0.0	29.2	0.3	-3.0	0.0	0.0	17.9	0.0	0.0	29.8
63	17616386.04	4825970.80	34.60	0	D	A	73.4	-7.7	0.0	0.0	29.2	0.3	-3.0	0.0	0.0	17.2	0.0	0.0	22.1
67	17616386.29	4825970.48	34.60	0	D	A	73.4	-5.0	0.0	0.0	29.2	0.3	-3.0	0.0	0.0	17.7	0.0	0.0	24.2
72	17616386.42	4825970.33	34.60	0	D	A	73.4	-18.1	0.0	0.0	29.3	0.3	-3.0	0.0	0.0	17.9	0.0	0.0	10.8
74	17616386.61	4825970.14	34.60	0	D	A	73.4	-2.8	0.0	0.0	29.4	0.3	-3.0	0.0	0.0	18.2	0.0	0.0	25.8
81	17616386.25	4825968.82	34.60	0	D	A	73.4	5.3	0.0	0.0	29.3	0.3	-3.0	0.0	0.0	19.0	0.0	0.0	33.1

Point Source, ISO 9613, Name: "MAU-2", ID: "MAU_2"																			
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	K0	Dc	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
87	17616391.94	4825971.27	36.40	0	DEN	A	86.7	0.0	0.0	0.0	33.1	0.1	-3.0	0.0	0.0	17.4	0.0	0.0	39.1

Point Source, ISO 9613, Name: "MAU-1", ID: "MAU_1"																			
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	K0	Dc	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
89	17616370.04	4825942.15	36.40	0	DEN	A	86.7	0.0	0.0	0.0	41.2	0.3	-3.0	0.0	0.0	14.7	0.0	0.0	33.5

Area Source, ISO 9613, Name: "Transformer", ID: "Transformer"																			
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	K0	Dc	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
111	17616371.52	4825998.93	2.00	0	DEN	500	63.1	-1.7	0.0	0.0	43.0	0.1	-3.0	0.0	0.0	13.1	0.0	0.0	8.2
115	17616371.67	4825999.43	2.00	0	DEN	500	63.1	-4.0	0.0	0.0	43.1	0.1	-3.0	0.0	0.0	12.9	0.0	0.0	6.1
117	17616371.84	4825999.40	2.00	0	DEN	500	63.1	-11.2	0.0	0.0	43.1	0.1	-3.0	0.0	0.0	13.1	0.0	0.0	-1.3
130	17616372.05	4825999.36	2.00	0	DEN	500	63.1	-4.5	0.0	0.0	43.0	0.1	-3.0	0.0	0.0	13.3	0.0	0.0	5.1
133	17616372.38	4825999.30	2.00	0	DEN	500	63.1	-13.3	0.0	0.0	43.0	0.1	-3.0	0.0	0.0	14.2	0.0	0.0	-4.5
135	17616371.82	4825999.08	2.00	1	DEN	500	63.1	-12.4	0.0	0.0	43.8	0.1	-3.0	0.0	0.0	8.0	0.0	1.0	0.8
138	17616371.70	4825998.67	2.00	1	DEN	500	63.1	-2.3	0.0	0.0	43.8	0.1	-3.0	0.0	0.0	7.9	0.0	1.0	11.0
140	17616371.11	4825999.46	2.00	0	DEN	500	63.1	-2.5	0.0	0.0	43.1	0.1	-3.0	0.0	0.0	12.3	0.0	0.0	8.1
143	17616371.08	4825998.91	2.00	0	DEN	500	63.1	-8.3	0.0	0.0	43.0	0.1	-3.0	0.0	0.0	12.7	0.0	0.0	2.0
148	17616370.77	4825998.86	2.00	0	DEN	500	63.1	-0.9	0.0	0.0	43.0	0.1	-3.0	0.0	0.0	12.4	0.0	0.0	9.7
151	17616371.40	4825997.99	2.00	1	DEN	500	63.1	-18.6	0.0	0.0	43.8	0.1	-3.0	0.0	0.0	6.1	0.0	1.0	-3.4
152	17616370.98	4825998.56	2.00	1	DEN	500	63.1	-2.7	0.0	0.0	43.7	0.1	-3.0	0.0	0.0	8.3	0.0	1.0	10.3
153	17616370.80	4825999.05	2.00	1	DEN	500	63.1	-4.0	0.0	0.0	43.6	0.1	-3.0	0.0	0.0	8.7	0.0	1.0	8.7

Area Source, ISO 9613, Name: "Exhaust Shaft", ID: "Ex_Shaft"																			
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	K0	Dc	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
91	17616342.70	4825951.50	0.20	0	D	500	61.1	-0.7	0.0	0.0	45.3	0.1	-3.0	0.0	0.0	10.7	0.0	0.0	7.2
96	17616343.05	4825951.02	0.20	0	D	500	61.1	-13.8	0.0	0.0	45.3	0.1	-3.0	0.0	0.0	11.0	0.0	0.0	-6.2
101	17616343.89	4825949.85	0.20	0	D	500	61.1	6.3	0.0	0.0	45.3	0.1	-3.0	0.0	0.0	16.4	0.0	0.0	8.6
103	17616344.31	4825948.37	0.20	0	D	500	61.1	2.1	0.0	0.0	45.3	0.1	-3.0	0.0	0.0	17.4	0.0	0.0	3.3
155	17616342.50	4825949.31	0.20	0	D	500	61.1	5.3	0.0	0.0	45.5	0.1	-3.0	0.0	0.0	15.8	0.0	0.0	8.0
157	17616341.79	4825950.42	0.20	0	D	500	61.1	-11.2	0.0	0.0	45.5	0.1	-3.0	0.0	0.0	10.6	0.0	0.0	-3.3
160	17616341.64	4825950.64	0.20	0	D	500	61.1	-0.4	0.0	0.0	45.5	0.1	-3.0	0.0	0.0	10.4	0.0	0.0	7.6
163	17616341.69	4825951.37	0.20	0	D	500	61.1	1.0	0.0	0.0	45.5	0.1	-3.0	0.0	0.0	10.2	0.0	0.0	9.2