SS WILSON ASSOCIATES
Consulting Engineers

REPORT NO. WA16-039
REVISION 1

NOISE CONTROL FEASIBILITY STUDY
PROPOSED RESIDENTIAL DEVELOPMENT
2256 MAYFIELD ROAD
TOWN OF CALEDON

SUBMITTED TO:

CALEDON TERRA INVESTMENTS INC.
145 REYNOLDS STREET, SUITE 400
OAKVILLE, ON
L6J 0A7

PREPARED BY:

AMIRA RAHAL, B.A.S.
ASSOCIATE PRINCIPAL

REVIEWED BY:

HAZEM GIDAMY, M.ENG., P.ENG.
PRINCIPAL

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SSWA INC. 15 Wertheim Court, Suite 211, Richmond Hill, Ontario, L4B 3H7
Tel: (905) 707-5800 e-mail: info@sswilsonassociates.com
www.sswilsonassociates.com & www.noisetraining.com

NOISE CONTROL FEASIBILITY STUDY-REVISION 1
PROPOSED RESIDENTIAL DEVELOPMENT
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TOWN OF CALEDON

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1.0 INTRODUCTION

1.1 The services of SS Wilson Associates (SSWA) were retained to prepare a Noise Control Feasibility Study for Caledon Terra Investments Inc., for the proposed residential development located at 2256 Mayfield Road in the Town of Caledon.

The objective of this report is to support an application for Draft Plan Approval of the proposed development.

1.2 The site is bounded by the following land uses:

- to the west by Greenland 'B' (Greenway Corridor)
- to the south by Mayfield Road
- to the east by a future residential development
- to the north by Greenland 'A' (Woodlot and Wetlands) and furthermore, by a future residential development

The location of the site is shown in Figure 1. Project north is illustrated in Figures 2, 3 and 4.

1.3 Major features of the development are defined by the Draft Plan of Subdivision drawing prepared by KLM Planning Partners Inc., Project No. P-2569, Drawing No. 16:1 dated September 9, 2016.

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. Mayfield Road
2. Street '1' (future roadway)

There are no nearby stationary noise sources of concern for the proposed development.

The proposed development is located outside the 25 NEF/NEP contour lines prepared by Transport Canada; therefore, aircraft noise is not considered a problem.

1.5 The scope of this report is to define the minimum noise attenuation requirements for the control of outdoor and indoor environmental sound levels.

1.6 This Revision 1 is based on comments received from the Region of Peel dated February 7, 2017 and from the Town of Caledon, comments dated April 20, 2017.

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 levels in the Outdoor Living Areas (OLAs)[1] of some of the residential dwellings will exceed the recommended objective sound level. For these dwellings, outdoor noise control measures are required along with relevant warning clauses. All other dwellings on the development will have acceptable outdoor sound levels in their OLAs and, therefore, no outdoor noise control measures need be considered.

2. The unattenuated sound levels at the outside walls of some of the dwellings will exceed the recommended objective sound levels. Indoor noise controls are required for these dwellings along with relevant warning clauses. All other dwellings on the development will have acceptable indoor sound levels. Therefore, noise control measures are not required.

3. 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.

2.2 RECOMMENDATIONS

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

1. Outdoor Noise Control Measures

Lots: 86 and 87

a. An acoustical barrier should be constructed to shield the Outdoor Living Area for the above noted lot with the following details:

   (i) The barrier should be constructed along the alignment shown schematically in Figure 3.
   (ii) The required barrier height as shown in Figure 3 could be as high as 2.6 m.
   (iii) As per the Town of Caledon's guidelines, the sound barriers are to be

[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 MOECC rules).

located 0.3 meters on the private side of the property line.

(iv) The barrier may consist of an earth berm, a fence or a combination thereof. The fence component to be constructed of a durable material having approximately 20 kg/m2 (Ξ 4 lb/ft2) of surface area and be in a continuous line without openings or gaps.

b. Since final grading plans are not available at this stage, the barrier height is based on the assumption that the ground elevations at the road, the base of the barrier and the receiver are all equal. The ground elevations are all assumed to be 0m in this case until such time as the grading plans become available.

Accordingly, a Detailed Noise Control Study should be undertaken prior to final approval of the specified locations requiring a barrier to define specific barrier alignments and heights based on the final grading plans.
It is also the responsibility of the developer/builder responsible for final design and construction of the sound barrier to ensure that the correct barrier elevation details are secured from the Acoustical Engineer prior to planning and construction of the specified barrier.

2. Air Conditioning

Lots: 85 to 96

The above noted properties should be equipped with central air conditioning systems with their condensing units to be located in noise insensitive locations. The sound levels of the outdoor condensing units should meet the MOECC's the maximum sound level, L_{AS} of 50 dBA[2] at the neighbour's closest point(s) of reception, i.e. at their ground-based outdoor areas as well as the closest window on any floor level as outlined in MOECC publication NPC-216 and other levels specified by the municipality. The following warning clause should be registered in all Development Agreements and Offers of Sale and Purchase or Lease of these properties:

"*This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment and Climate Change*".

It is also our recommendation that the necessary detailed technical analysis be performed prior to submitting an application for Building Permit to optimize the required air conditioning unit noise rating number/specification in order to meet the Provincial sound level

[2] Or the lowest hourly ambient Leq due to road traffic projected at the receptor location(s)

standards at the closest receptors (i.e., a maximum sound level $\mathbf{L_{AS}}$ of 50 dBA[3] at the neighbour's closest points of reception within their ground-based outdoor areas as well as at the closest window on any floor level) **after taking into consideration the specific property design and proposed A/C unit location. Other A/C noise control measures, where required to meet the sound level criteria at the point(s) of reception, should also be identified and shown on the applicable permit drawings/specifications.**

The Analysis Section in this study provides additional important details on the application of air conditioners.

3. Provision for Air Conditioning

Lots: 80 to 84 and 97

The above noted properties should be equipped with a ducted forced air heating system: furnace/fan, supply air plenum, and duct work. The components are to be appropriately situated and sized to accommodate future installation of central air conditioning systems. The provision for future air conditioning should also include the installation of the necessary rough-in work such as a floor drain for the condensate, appropriate electrical power supply, thermostat control wiring and a capped sleeve in the exterior wall for future refrigeration tubing in an approved location (Installation cost of the air conditioning system is an option to the developer/builder as they see fit).

If the purchaser/occupant does not take the central air conditioning option, the following clause should be registered in all Development Agreement(s) and Offers of Sale and Purchase or Lease of these properties:

"*This dwelling unit has been fitted with provisions, which include a fan forced heating system, suitably sized ducts, plenum, electrical power wiring, thermostatic control wiring, a nearby floor drain, etc. sized to accommodate the future addition of central air conditioning by the occupant at their expense and discretion. Installation of central air conditioning by the occupant will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment and Climate Change. Future installation of the air conditioning system should meet the Ministry of the Environment and Climate Change criteria in Publication NPC-216 (a maximum sound level* L_{AS} *of 50 dBA at the neighbour's closest point(s) of reception, i.e. at their ground-based outdoor areas as well as at the closest window on any floor level) and other applicable levels specified by the municipality.*"

[3] Or the lowest hourly ambient Leq due to road traffic projected at the receptor location(s)

4. Warning Clause *4

Lots: 80 to 97

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

"*Purchasers/tenants are advised that despite the inclusion of noise control features within this development area and within the dwellings, sound levels from increasing road traffic may continue to be of concern, occasionally interfering with some activities of the dwelling occupants as the sound level exceeds the Municipality's and the Ministry of the Environment and Climate Change noise criteria.*"

5. Building Acoustic Insulation

Lots: 85 to 96

All exterior building components (walls, windows and doors) should meet the minimum Acoustic Insulation Factors (AIF) shown in Tables 3 and 4. 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.

Typical Acoustic Insulation Factors (AIF) are shown in Tables 3 and 4. It should be noted that these sample lots included in the tables were selected to inclusively represent all other lots within the development. The conclusions drawn from these calculations provide sufficient information by which the recommendations within this study have been determined.

The Detailed Noise Control Study should provide complete and specific tabulations of AIF's for all properties affected.

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 dwelling(s).

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

6. Required Sections and Details

Typical cross sections should be prepared and submitted in due course by the Consulting Engineers responsible for preparation of the site grading and drainage plans based on the final approved elevations. The sections should typically include existing and proposed future building grade elevations, source, receiver and barrier/berm ground elevations, berm slopes, drainage provisions, etc.

7. Implementation Procedures

a) Prior to final approval of this development, a Detailed Noise Control Study, or an upgraded noise study should be required to take into consideration the following:
   - The proposed detailed grading plans
   - Final lot layout, lot/block numbers, etc.
   - Possible proposed building locations
   - The exact distances to all sources of concern
   - Final/approved sound barrier locations as well as barrier height-sound level alternatives

b) The necessary Development Agreement(s) should include the details of all the necessary noise control measures and procedures as outlined herein in this noise study to the satisfaction of all concerned parties.

c) Prior to the issuance of building permits, 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.

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 LEVEL CRITERIA

3.1 SURFACE TRANSPORTATION CRITERIA[5]

The surface transportation noise is based on the objective sound levels recommended by the Ministry of the Environment and Climate Change (Ref: MOECC 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(d), 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(d), 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(n), 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.

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 nighttime sound level at the outside wall of the sleeping quarters or bedrooms is equal to or exceeds $L_{Aeq(night)}$ 8hrs 60 dBA or when the daytime sound level at the outside wall of the Living/Dining/ Recreation space is equal to or exceeds $L_{Aeq(day)}$ 16 hrs 65 dBA.

If the nighttime sound level at the outside wall exceeds $L_{Aeq(night)}$ 50dBA but is less than 60dBA, or if the daytime sound level at the outside wall exceeds 55dBA but is less than $L_{Aeq(day)}$ 65dBA, then forced air heating with provision for future

installation of central air conditioning is required.

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 COND.	FORCED AIR VENTILATION WITH PROVISION FOR FUTURE AIR COND.	WARNING CLAUSE	ACOUSTIC INSULATION
ROAD	<=55	<=50	-	-	-	-
	>55 & <=65	>50 & <=60	-	Yes	Yes "Type C"	-
	>65	>60	Yes	-	Yes "Type D"	Yes
RAIL	<=55	<=50	-	-	-	-
	>55 & <=60	>50 & <=55	-	Yes	Yes "Type C"	-
	>60 & <=65	>55 & <=60	-	Yes	Yes "Type C"	Yes
	>65	>60	Yes	-	Yes "Type D"	Yes

4.0 ANALYSIS

4.1 TRANSPORTATION SOURCES OF NOISE

The relevant road and traffic data were obtained from the Region of Peel and are summarized below:

- Mayfield Road

Current No. of Lanes	4
Future No. of Lanes	6
Posted Speed Limit	60 km/hr.
Future Posted Speed Limit	60 km/hr.
AADT (Year 2016)	15,126vpd
Ultimate AADT	48,100vpd
Total Truck Percentage (Day) - Medium Truck Split - Heavy Truck Split	3.7% 1.8% 1.9%
Total Truck Percentage (Night) - Medium Truck Split - Heavy Truck Split	4.8% 2.9% 1.9%
Day(16 hrs.)/Night(8 hrs.) Split	73%/27%
Directional Traffic Split (assumed)	50%/50%
Road Gradient (assumed)	0%

- Street "1"[6]

Future No. of Lanes (assumed)	2
Future Posted Speed Limit (assumed)	50 km/hr.
Future Year 2031 (assumed)	3,646vpd
Total Truck Percentage (assumed) - Medium Truck Split (assumed) - Heavy Truck Split (assumed)	1% 1% 0%
Day(16 hrs.)/Night(8 hrs.) Split (assumed)	92%/8%
Directional Traffic Split (assumed)	50%/50%
Road Gradient (assumed)	0%

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

[6] As per Traffic data from SSWA file number WA16-033

At the present time, the predicted vehicular traffic data for the future internal road referred to as Street "1" is unavailable. Therefore, the assumed traffic data for this road was based on the traffic data for an internal road within a nearby development[7] and is summarized above.

Should the actual traffic data become available, adjustments to the sound levels predicted in this study can be adjusted. It should be noted that the typical adjustment may not be significant and could be within the range of +/- 1dB, which is not significant.

4.2 OUTDOOR NOISE ENVIRONMENT

Sound level predictions were carried out based on MOECC's ORNAMENT sound level prediction modeling procedures[8] (Ontario Road Noise Analysis Method for Environment and Transportation, Technical Document, 1989).

Overall sound levels at the OLAs of the selected representative 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 Lot 87, the unattenuated daytime sound level in the designated OLA will exceed 60 dBA, the maximum criteria levels allowed. Therefore, outdoor noise control measures are required for this lot.

For Lot 86, the unattenuated daytime sound level in the designated OLA is predicted to be in the range of L_{Aeq} 55dBA to 60dBA, therefore, outdoor noise control measures are recommended.

In consideration of the calculations, it is concluded that for all other receptor locations, the unattenuated daytime sound levels in the designated OLAs will not exceed the objective level of L_{Aeq} 55dBA, therefore outdoor noise control measures are not required for these properties.

The conventional approach by which excess noise in the rear yard OLAs may be mitigated is through construction of acoustical barriers.

Barrier height calculations for the receptors of concern are included in Appendix B. The barrier alignment is as shown in Figure 3. At this time, as house footprints are not yet available, OLA locations are approximate and as such,

[7] (File: WA16-033)

[8] The MOECC'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 that 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 x log "factor" from the results (in this case, 10 x log 10=10).

cannot be indicated on the figures.

If the sound level at the OLA is attenuated to 55 dBA as per the Ministry Guidelines, barrier heights of up to 2.6m will be required, which are not technically, economically, or administratively feasible. In addition, the recommended barrier height will preserve consistency with the nearby neighboring developments.

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 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) the following is concluded:

- The sound levels at the outside walls of the following receptors (within any habitable room on any floor) is predicted to exceed $L_{Aeq(day)}$ 65 and/or $L_{Aeq(night)}$ 60 dBA respectively:

  Lots: 85 to 96

  Therefore, central air conditioning is required.

- The daytime/nighttime noise environment at the outside walls of the following receptors (within any habitable room on any floor) is predicted to be in the range of $L_{Aeq\ day}$ 56-65 dBA and/or $L_{Aeq\ night}$ 51-60 dBA:

  Lots: 80 to 84 and 97

  Forced-air heating system with provision for central air conditioning is therefore required.

- All other receptor(s) will have a sound level equal to or less than $L_{Aeq(day)}$ 55 dBA and/or $L_{Aeq(night)}$ 50 dBA and therefore no noise control measures need be considered.

Typical Acoustic Insulation Factors (A.I.F.) are summarized in Tables 3 and 4.

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 3 and 4. 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 MOECC and the municipality prior to submission for building permits as part of their Certification process.

Wall construction using concrete block, brick veneer, precast concrete panels or acoustically equivalent light frame construction will be adequate to meet the indoor sound level criteria.

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

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 67 dBA, the AIF value for the Living Room will be 29 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 (13mm) 3mm; 4mm (6mm) 4mm

As an example, for a typical unit with nighttime outdoor sound level of 66 dBA, the AIF value for the bedrooms will be 33 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 (6mm) 6mm laminated; 6mm (6mm) 4mm laminated

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 the Acoustical Engineer in order to advise the design consultant on the ***specific*** building components for noise control to suite the actual window construction details.

4.5 CONTROL OF AIR CONDITIONING UNITS NOISE

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

1. Control of air conditioning noise is governed by Provincial and/or municipal standards which specify acceptable sound emission levels for the air conditioning devices and/or acceptable sound levels at the point(s) of reception.

   The Ministry of the Environment and Climate Change criteria for control of air conditioning noise is outlined in several technical publications including publications NPC-300 and NPC-216 (a maximum sound level of 50 dBA[9] at the neighbour's closest point(s) of reception, i.e. at their outdoor areas as well as at the closest window on any floor level). The applicable sound level criteria for new residential development where air conditioning is a mandatory requirement for noise control inside habitable rooms are: 1) a maximum ARI[*] Sound Rating to suit the site specific installation for the air conditioning device, and 2) hourly L_{Aeq} sound level limits of 50 dBA at the point(s) of reception (or the prevailing hourly L_{Aeq} due to vehicular traffic ambient noise if higher than 50 dBA).

   Municipal standards for air conditioning noise may also include specific or maximum Sound Rating numbers (in bels) and/or point-of-reception sound level limits in reference to specific municipal By-Laws and/or standards as applicable.

   Therefore, it is essential that the final selection, location, design, and specifications of the air conditioning devices ensure compliance with the applicable sound level criteria prior to making any commitment.

   The following are examples of the preferred approach when dealing with the issue of air conditioning noise.

   a) If the A/C condensing unit is to be installed in backyards in urban areas, then units having lower bels rating may be required. The use of units with

[9] Or the lowest hourly ambient Leq due to road traffic projected at the receptor location(s)
[*] When tested in accordance with ARI Standard 270-84

lower sound rating of 6.8bel or lower may give the builder the flexibility of locating the unit as close as 3 metres from the joint property lines without exceeding the MOECC 50 dBA standard for houses in urban areas.

b) If the unit is to be located in the front or in the side yard areas (closer to the front and provided that there are no windows to habitable rooms on the side walls), then units having less stringent sound level rating requirements may result in complying with sound criteria.
c) Through the building permit process of the specific properties, additional calculations should be performed to optimize the unit sound ratings depending on the house model and the installation location.

2. The resulting sound levels due to residential air conditioners at the nearest points-of-reception should not exceed the levels in MOECC Publication NPC-216 (a maximum sound level of 50 dBA[10] at the neighbour's closest point(s) of reception, i.e. at their outdoor areas as well as at the closest window on any floor level).

3. The siting of the split-system central air conditioning units and other systems should follow good planning principles.

4. Should location of the outdoor air conditioner unit be in the back or side yard areas where noise is likely to interfere with the outdoor and indoor activities of any occupant and/or neighbor, 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.

   It is also our recommendation that the necessary detailed technical analysis be performed prior to submitting an application for Building Permit to optimize the required air conditioning unit Sound Rating number in order to meet the Provincial sound level standards at the closest receptors after taking into consideration the specific property design and proposed A/C unit location. Other A/C noise control measures, where required to meet the sound level criteria at the point(s) of reception, should also be identified and shown on the applicable permit drawings/specifications.

Indoor Sound Levels

While the control of the indoor noise created by the air conditioning equipment is

[10] Or the lowest hourly ambient Leq due to road traffic projected at the receptor location(s)

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 and Climate Change recommended indoor sound level criteria included in Section 3.0 of this study.

4.6 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 table[11] 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

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

TABLES

TABLE 1

SUMMARY OF MINIMUM REQUIRED NOISE CONTROL MEASURES

LOT(S)	SOUND BARRIER	CENTRAL AIR CONDITIONING	PROVISION FOR CENTRAL AIR CONDITIONING	WARNING CLAUSE
80 to 84	No	No	Yes	Yes
85	No	Yes	--	Yes
86	Yes	Yes	--	Yes
87	Yes	Yes	--	Yes
88 to 96	No	Yes	--	Yes
97	No	No	Yes	Yes
All Other Lots	No	No	No	No

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SS WILSON ASSOCIATES

8/8/2017 12:47

Leq- AIF CALCULATIONS AND TYPICAL WINDOW GLAZING REQUIREMENTS

(Using NRC/MOE Pocedures)

File Number :

Project Name :

OUTDOORS

Table 2

WA16-039

2256 Mayfield Rd W, Caledon

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

Record Number	1	2	3	4	5	6	7	8	9	10	11	12
Consider Record	Y	Y	Y	Y	Y	N	N	N	N	N	N	N
LOT NO.	25	86	86	87	93							
FACE/DIRECTION	North	West	West	West	North							
LOCATION	Outdoor Living Area	Outdoor Living Area	Outdoor Living Area	Outdoor Living Area	Outdoor Living Area							
Source 1: Mayfield Road	**Road Traffic**		**OUTDOOR DAYTIME LEVELS**			OUTDOOR DAYTIME LEVELS			OUTDOOR DAYTIME LEVELS			
Leq Outdoors	46.00	52.00	57.00	63.00	54.00							
Partial angle of exposure, degrees	180	180	180	180	180							
Partial exposure adjust., dB												
Additional Adjustment, dB			-5.00	-8.00								
Additional Adjustment, dB												
Sub-Total Leq, dBA	**46.00**	**52.00**	**52.00**	**55.00**	**54.00**							
Source 2: O.R.D.C.	**Rail Traffic**		**OUTDOOR DAYTIME LEVELS**			OUTDOOR DAYTIME LEVELS			OUTDOOR DAYTIME LEVELS			
Leq Daytime												
Partial angle of exposure, degrees	180	180	180	180	180							
Partial exposure adjust., dB												
Additional Adjustment, dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA												
Source 3:	**Road Traffic**		**OUTDOOR DAYTIME LEVELS**			OUTDOOR DAYTIME LEVELS			OUTDOOR DAYTIME LEVELS			
Leq Daytime												
Partial angle of exposure, degrees	180	180	180	180	180							
Partial exposure adjust., dB												
Additional Adjustment, 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	180	180	180	180							
Partial exposure adjust., dB												
Additional Adjustment, dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA												
Sub-Tot. 4 Sources Leq, dBA	**46.00**	**52.00**	**52.00**	**55.00**	**54.00**							
Aircraft noise NEF/NEP												
Adjust.1												
Adjust.2												
Adjusted NEF/NEP												
Approx. Overall Combined Leq	*46*	*52*	*52*	*55*	*54*							
Overall Road and/or Rail and/or Stationary Sources, Leq (dBA)	***46***	***52***	***52***	***55***	***54***							
Aircraft Noise Only, NEF												
NOTES		No Barrier Requirement	2.2m High Sound Barrier	2.4m & 2.6 m High Sound Barriers	No Barrier Requirement							

N6 Leq-AIF Master-January 2007 Proceed

SS WILSON ASSOCIATES

8/8/2017 12:47

Leq- AIF CALCULATIONS AND TYPICAL WINDOW GLAZING REQUIREMENTS

File Number :

Project Name :

WA16-039

DAYTIME

Table 3

(Using NRC/MOE Pocedures)

2256 Mayfield Rd, Caledon

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	Y	Y	Y	Y	N	N	N	N	N	N	N
LOT NO.	25	80	84	86	93							
FACE/DIRECTION	South	East	East	East	South							
LOCATION	Building Façade	Building Façade	Building Façade	Building Façade	Building Façade							
ROOM CLASSIFICATION	Living /Dining	Living /Dining	Living /Dining	Living /Dining	Living /Dining							
Adjustm. to Criterion, dBA												
MOE Transportation Sources Daytime Leq Indoor Criteria, dBA	45	45	45	45	45							
Aircraft Indoor Criteria, NEF	5	5	5	5	5							
Source 1: Mayfield Road	**Road Traffic**		**DAYTIME LEVELS**			DAYTIME LEVELS			DAYTIME LEVELS			
Leq Daytime	53.00	51.00	55.00	63.00	67.00							
Partial angle of exposure, degrees	180	180	180	180	180							
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA	**53.00**	**51.00**	**55.00**	**63.00**	**67.00**							
Angular range of incidence (0,1,2,3)												
Adjusted AIF	15	13	17	25	29	-38	-38	-38	-38	-38	-38	-38
Source 2: O.R.D.C.	**Rail Traffic**		**DAYTIME LEVELS**			DAYTIME LEVELS			DAYTIME LEVELS			
Leq Daytime												
Partial angle of exposure, degrees	180	180	180	180	180							
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA												
Angular range of incidence (0,1,2,3)												
Adjusted AIF	-28	-28	-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	180	180	180	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
Source 4:	**Road Traffic**		**DAYTIME LEVELS**			DAYTIME LEVELS			DAYTIME LEVELS			
Leq Daytime												
Partial angle of exposure, degrees	180	180	180	180	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
Sub-Tot. 4 Sources Leq, dBA	**53.00**	**51.00**	**55.00**	**63.00**	**67.00**							
Aircraft noise NEF/NEP												
Adjust.1												
Adjust.2												
Adjusted NEF/NEP												
Approx. Overall Combined Leq	*53*	*51*	*55*	*63*	*67*							
Assumed Window/Floor Area %	32.0	32.0	32.0	32.0	32.0							
Assumed Total # of Components (Road, Rail, and Other Sources)	3	3	3	3	3							
Assumed Total # of Components Aircraft ONLY	3	3	3	3	3							
AIF of 4 Sources	*15*	*13*	*17*	*25*	*29*							
Aircraft AIF												
Combined AIF	15	13	17	25	29							
Openable or Fixed windows ?	Openable	Openable	Openable	Openable	Openable							
Regular or Laminated Glass	Regular	Regular	Regular	Regular	Regular							
Other Adjustment												
Final Adjusted AIF	15	13	17	25	29							
Minimum STC (Approx)	*16*	*14*	*18*	*26*	*30*							
Typical Minimum Double Glazing Alternatives	3(6)3	3(6)3	3(6)3	3(6)3	3(13)3 4(6)4							
NOTES	.....	.....	.....	.....	.....							

SS WILSON ASSOCIATES

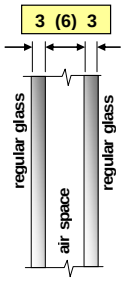
SUMMARY TABLE OF **Leq- AIF CALCULATIONS AND TYPICAL WINDOW GLAZING REQUIREMENTS**

DAYTIME
Table 3

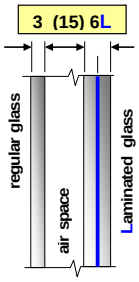
- Windows must be well-fitted weatherstripped units. - The interpane spacing shown in the tables are the minimum acceptable.
- Larger spacing for a given glazing thickness normally improves the performance.

LOT NO.	FACE/DIRECTION	ROOM CLASSIFICATION	LOCATION	Openable or Fixed Window	Regular Strength or Laminated Glass	Combined AIF	Approx. Overall Combined Leq	Double Glazing Alternatives , mm	Triple Glazing Alternatives , mm	*Minimum STC (Approx)*
25	South	Living /Dining	Building Façade	Openable	Regular	15	53	3(6)3		*16*
80	East	Living /Dining	Building Façade	Openable	Regular	13	51	3(6)3		*14*
84	East	Living /Dining	Building Façade	Openable	Regular	17	55	3(6)3		*18*
86	East	Living /Dining	Building Façade	Openable	Regular	25	63	3(6)3		*26*
93	South	Living /Dining	Building Façade	Openable	Regular	29	67	3(13)3 4(6)4		*30*

ABBREVIATIONS SPECIFIC TO THIS PROJECT : FF(Front Face), RF(Rear Face), RS(Right Side face), LS(Left Side face)

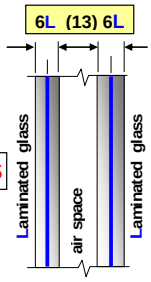


Double Glazing- regular glass

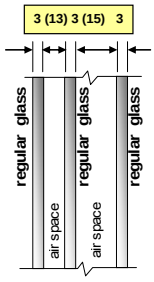


Double Glazing- *single laminated glass*

EXAMPLES



Double Glazing- *double laminated glass*



Triple Glazing- regular glass

N6 Leq-AIF Master-January 2007 Proceed

SS WILSON ASSOCIATES

8/8/2017 12:47

Leq- AIF CALCULATIONS AND TYPICAL WINDOW GLAZING REQUIREMENTS

(Using NRC/MOE Pocedures)

File Number :

Project Name :

WA16-039

NIGHT TIME
Table 4

2256 Mayfield Road, Caledon

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	Y	Y	Y	Y	N	N	N	N	N	N	N
LOT NO.	25	80	84	86	93							
FACE/DIRECTION	South	East	East	East	South							
LOCATION	Building Façade	Building Façade	Building Façade	Building Façade	Building Façade							
ROOM CLASSIFICATION	Bedroom	Bedroom	Bedroom	Bedroom	Bedroom							
Adjustm. to Criterion, dBA												
MOE Transportation Sources Night Leq Indoor Criteria, dBA	40	40	40	40	40							
Aircraft Indoor Criteria, NEF												
Source 1: Mayfield Road	**Road Traffic**		NIGHT TIME LEVELS			NIGHT TIME LEVELS		NIGHT TIME LEVELS				
Leq Night Time	46.00	51.00	55.00	63.00	66.00							
Partial angle of exposure, degrees	180	180	180	180	180							
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA	**46.00**	**51.00**	**55.00**	**63.00**	**66.00**							
Angular range of incidence (0,1,2,3)												
Adjusted AIF	13	18	22	30	33	-33	-33	-33	-33	-33	-33	-33
Source 2: O.R.D.C.	**Rail Traffic**		NIGHT TIME LEVELS			NIGHT TIME LEVELS		NIGHT TIME LEVELS				
Leq Night Time												
Partial angle of exposure, degrees	180	180	180	180	180							
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA												
Angular range of incidence (0,1,2,3)												
Adjusted AIF	-28	-28	-28	-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	180	180	180	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	180	180	180	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	**46.00**	**51.00**	**55.00**	**63.00**	**66.00**							
Aircraft noise NEF/NEP												
Adjust.1												
Adjust.2												
Adjusted NEF/NEP												
Approx. Overall Combined Leq	*46*	*51*	*55*	*63*	*66*							
Assumed Window/Floor Area %	20.0	20.0	20.0	20.0	20.0							
Assumed Total # of Components (Road, Rail, and Other Sources)	3	3	3	3	3							
Assumed Total # of Components Aircraft ONLY	3	3	3	3	3							
AIF of 4 Sources	*13*	*18*	*22*	*30*	*33*							
Aircraft AIF												
Combined AIF	13	18	22	30	33							
Openable or Fixed windows ?	Openable	Openable	Openable	Openable	Openable							
Regular or Laminated Glass	Regular	Regular	Regular	Regular	Laminated							
Other Adjustment												
Final Adjusted AIF	13	18	22	30	30							
Minimum STC (Approx)	*12*	*17*	*21*	*29*	*29*							
Typical Minimum Double Glazing Alternatives	3(6)3	3(6)3	3(6)3	3(6)3	3(6)6 6(6)4							
NOTES	.....	.....	.....	.....	.....							

SS WILSON ASSOCIATES

SUMMARY TABLE OF **Leq- AIF CALCULATIONS AND TYPICAL WINDOW GLAZING REQUIREMENTS**

NIGHT TIME

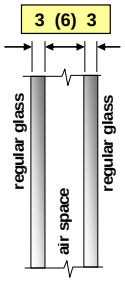
Table 4

- Windows must be well-fitted weatherstripped units. - The interpane spacing shown in the tables are the minimum acceptable.
- Larger spacing for a given glazing thickness normally improves the performance.

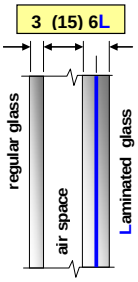
LOT NO.	FACE/DIRECTION	ROOM CLASSIFICATION	LOCATION	Openable or Fixed Window	Regular Strength or Laminated Glass	Combined AIF	Approx. Overall Combined Leq	Double Glazing Alternatives , mm	Triple Glazing Alternatives , mm	*Minimum STC (Approx)*
25	South	Bedroom	Building Façade	Openable	Regular	13	46	3(6)3		*12*
80	East	Bedroom	Building Façade	Openable	Regular	18	51	3(6)3		*17*
84	East	Bedroom	Building Façade	Openable	Regular	22	55	3(6)3		*21*
86	East	Bedroom	Building Façade	Openable	Regular	30	63	3(6)3		*29*
93	South	Bedroom	Building Façade	Openable	Laminated	33	66	3(6)6	6(6)4	*29*

ABBREVIATIONS SPECIFIC TO THIS PROJECT : FF(Front Face), RF(Rear Face), RS(Right Side face), LS(Left Side face)

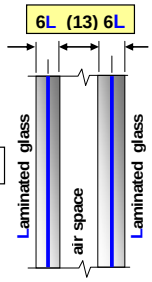
EXAMPLES



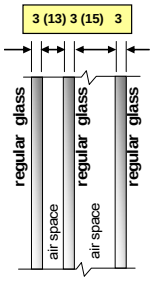
Double Glazing- regular glass



Double Glazing- *single laminated glass*



Double Glazing- *double laminated glass*



Triple Glazing- regular glass

FIGURES

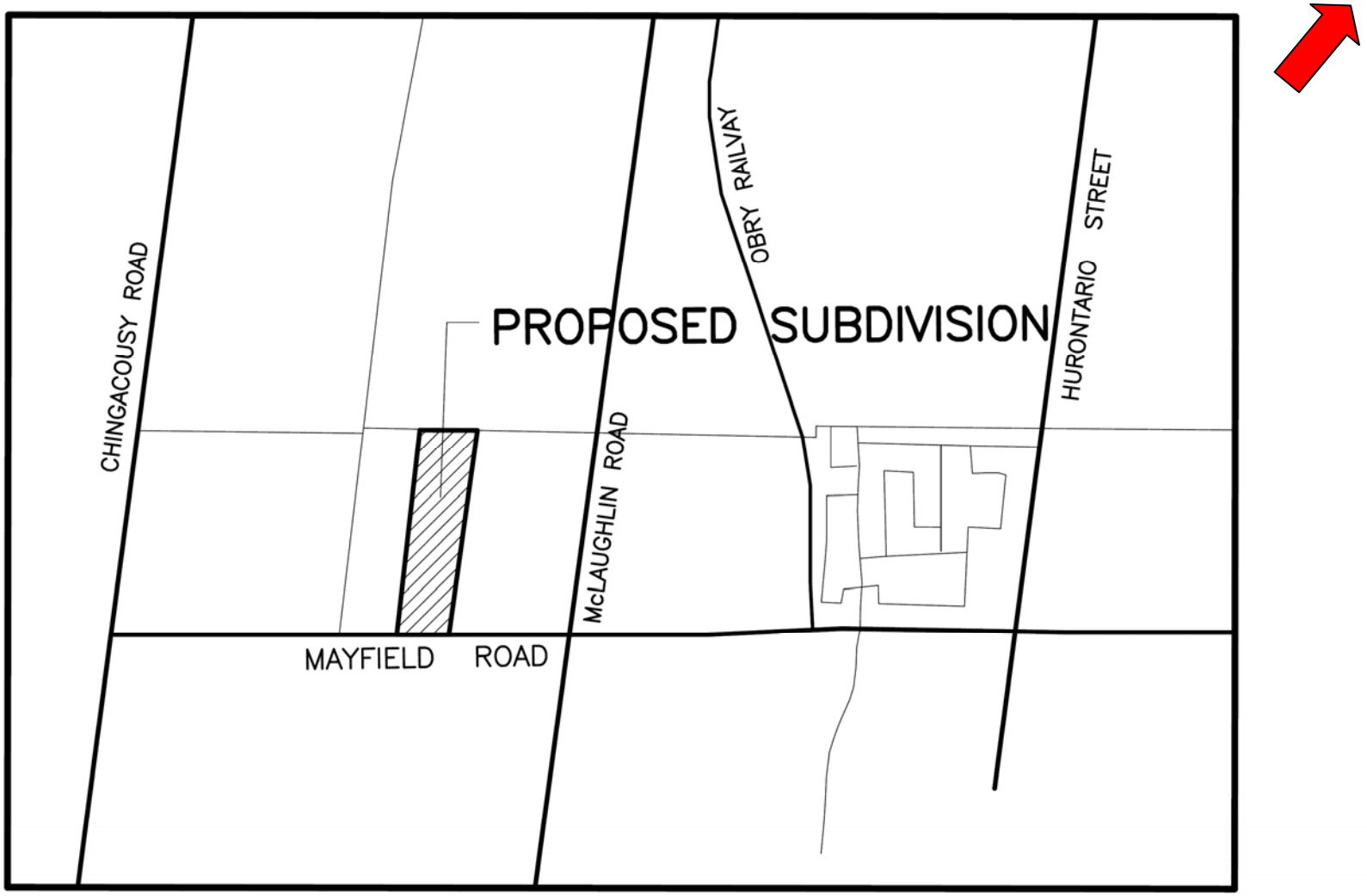


FIGURE 1
KEY PLAN

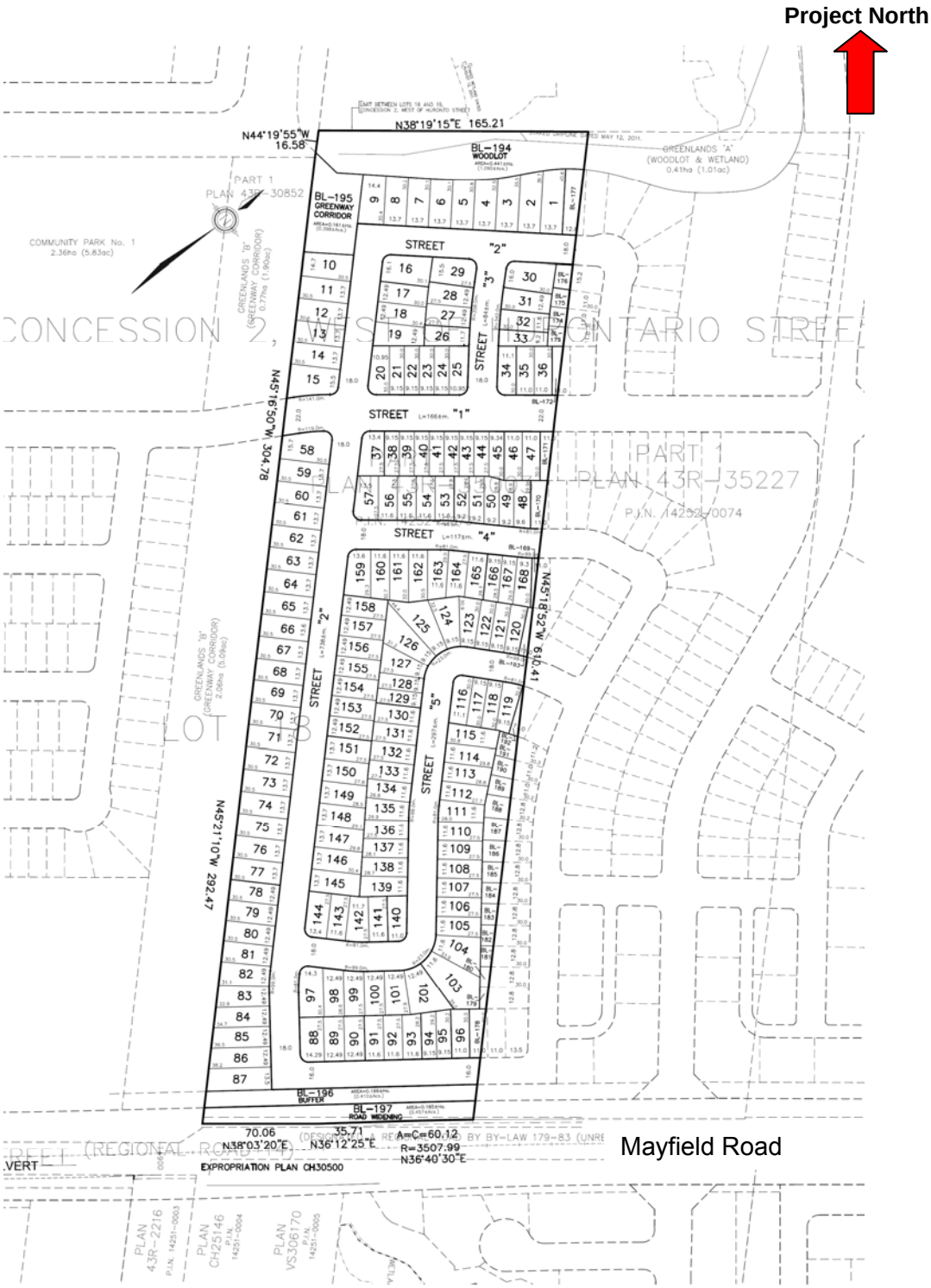


FIGURE 2
DRAFT PLAN OF SUBDIVISION

FIGURE 3
SCHEMATIC BARRIER ALIGNMENTS

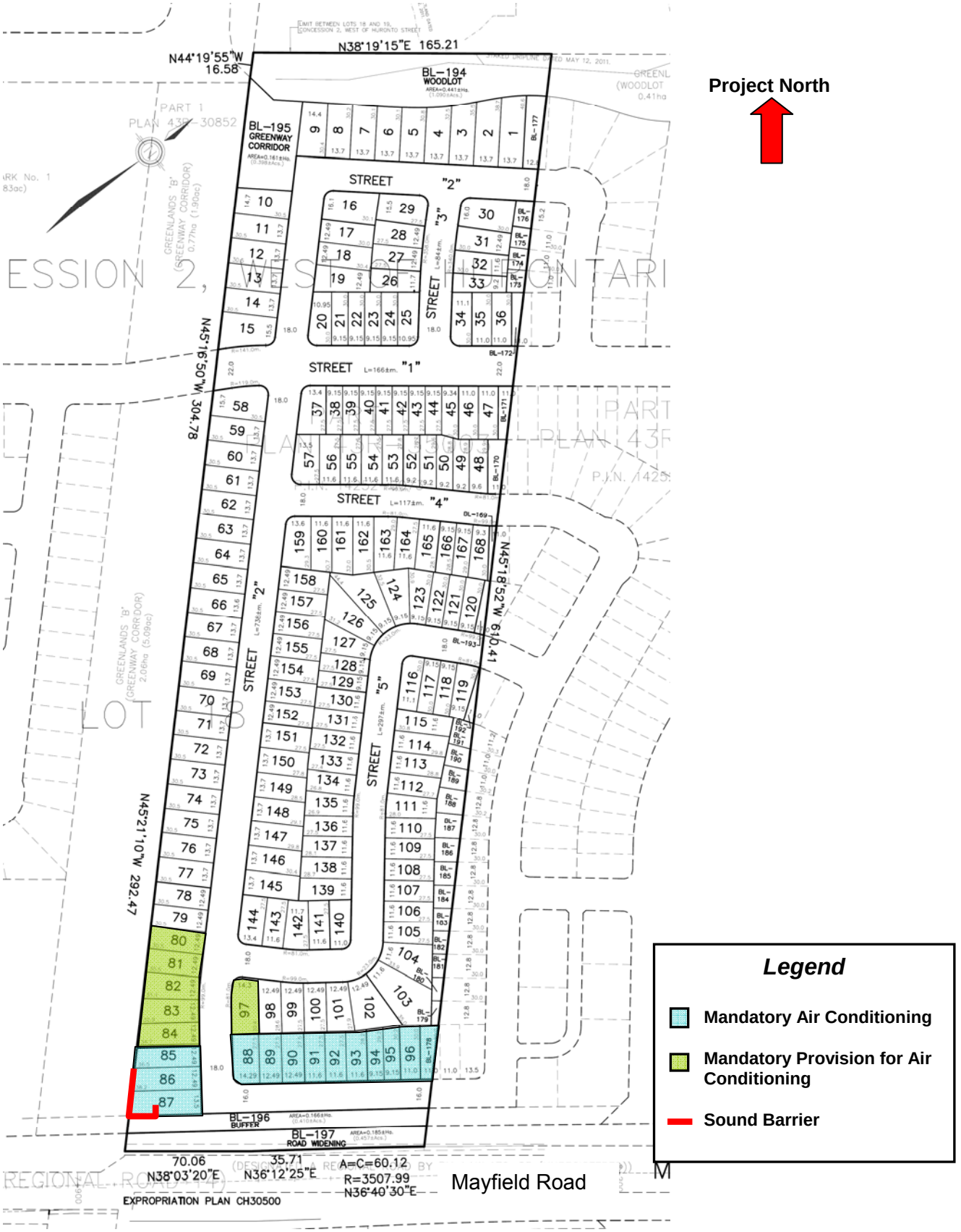


FIGURE 4
SUMMARY OF MINIMUM INDOOR AND OUTDOOR NOISE REQUIREMENTS

APPENDIX A

ROAD TRAFFIC DATA

Region of Peel
Working for you

The Region of Peel is the proud recipient of the National Quality Institute Order of Excellence, Quality; the National Quality Institute Canada Award of Excellence Gold Award, Healthy Workplace; and a 2008 IPAC/Deloitte Public Sector Leadership Gold Award.

September 8, 2016

Cheryl McMurter
SS Wilson Associates
Re: Ultimate Traffic Request – WA16-039- 2256 Mayfield Road West
2256 Mayfield Road West
City of Brampton

Cheryl:

Per your request, we are providing the following traffic data.

Mayfield Road, 0.2 km west of Highway 10.

	Existing	Planned
24 Hour Traffic Volume	15,126	48,100
# of Lanes	4	6
Day/Night Split	73/27	73/27
Day Trucks (% of Total Volume)	1.8% Medium 1.9% Heavy	1.8% Medium 1.9% Heavy
Night Trucks (% of Total Volume)	2.9% Medium 1.9% Heavy	2.9% Medium 1.9% Heavy
Right-of-Way Width	50 metres	
Posted Speed Limit	60 km/h	

Public Works
10 Peel Centre Dr., Suite B, Brampton, ON L6T 4B9
Tel: 905-791-7800 www.peelregion.ca

APPENDIX B

SAMPLE SOUND LEVEL CALCULATIONS

STAMSON 5.0 SUMMARY REPORT Date: 05-07-2017 15:25:49
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: n87ola.te Time Period: Day/Night 16/8 hours
Description: Lot 87-Sound Level at Outdoor Living Area

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

Car traffic volume : 33814/12506 veh/TimePeriod *
Medium truck volume : 632/234 veh/TimePeriod *
Heavy truck volume : 667/247 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 48100
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.80
Heavy Truck % of Total Volume : 1.90
Day (16 hrs) % of Total Volume : 73.00

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

Angle1 Angle2 : -30.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 40.00 / 40.00 m
Receiver height : 1.50 / 4.50 m
Topography : 0 (Define your own alpha.)
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 : 0.00 m
Barrier elevation : 0.00 m
Alpha : 0.33
Reference angle : 0.00

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Mayfield Rd	1.17	62.98	62.98
Total			62.98 dBA

Result summary (night)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Mayfield Rd	1.17	61.68	61.68
Total			61.68 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.98
(NIGHT): 61.68

STAMSON 5.0 SUMMARY REPORT Date: 05-07-2017 15:26:18
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: n87b55.te Time Period: Day/Night 16/8 hours
Description: Lot 87-Sound Level at OLA with Barrier

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

Car traffic volume : 33814/12506 veh/TimePeriod *
Medium truck volume : 632/234 veh/TimePeriod *
Heavy truck volume : 667/247 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 48100
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.80
Heavy Truck % of Total Volume : 1.90
Day (16 hrs) % of Total Volume : 73.00

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

Angle1 Angle2 : -30.00 deg 60.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 40.00 / 40.00 m
Receiver height : 1.50 / 4.50 m
Topography : 0 (Define your own alpha.)
Barrier angle1 : -30.00 deg Angle2 : 60.00 deg
Barrier height : 2.60 m
Barrier receiver distance : 8.00 / 8.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Alpha : 0.33
Reference angle : 0.00

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

Car traffic volume : 33814/12506 veh/TimePeriod *
Medium truck volume : 632/234 veh/TimePeriod *
Heavy truck volume : 667/247 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 48100
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00

Medium Truck % of Total Volume : 1.80
Heavy Truck % of Total Volume : 1.90
Day (16 hrs) % of Total Volume : 73.00

Data for Segment # 2: Mayfield Rd (day/night)

Angle1 Angle2 : 60.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 40.00 / 40.00 m
Receiver height : 1.50 / 4.50 m
Topography : 0 (Define your own alpha.)
Barrier angle1 : 60.00 deg Angle2 : 90.00 deg
Barrier height : 2.40 m
Barrier receiver distance : 8.00 / 8.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Alpha : 0.33
Reference angle : 0.00

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Mayfield Rd	1.17	53.63	53.63
2.Mayfield Rd	1.17	49.53	49.53
Total			55.06 dBA

Result summary (night)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Mayfield Rd	1.17	60.84	60.84 *
2.Mayfield Rd	1.17	54.09	54.09 *
Total			61.67 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 55.06
(NIGHT): 61.67

STAMSON 5.0 SUMMARY REPORT Date: 30-09-2016 13:44:18
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 87day.te Time Period: Day/Night 16/8 hours
Description: Lot 87-Sound Level at Building Facade-Day

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

Car traffic volume : 33814/12506 veh/TimePeriod *
Medium truck volume : 632/234 veh/TimePeriod *
Heavy truck volume : 667/247 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 48100
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.80
Heavy Truck % of Total Volume : 1.90
Day (16 hrs) % of Total Volume : 73.00

Data for Segment # 1: Mayfield 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 : 35.00 / 35.00 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Result summary (day)
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	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Mayfield Rd	1.17	67.36	67.36
Total			67.36 dBA

Result summary (night)
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	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Mayfield Rd	1.17	66.05	66.05
Total			66.05 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.36
(NIGHT): 66.05

STAMSON 5.0 SUMMARY REPORT Date: 30-09-2016 13:45:31
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 87night.te Time Period: Day/Night 16/8 hours
Description: Lot 87-Sound Level at Building Facade-Night

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

Car traffic volume : 33428/12364 veh/TimePeriod *
Medium truck volume : 1018/377 veh/TimePeriod *
Heavy truck volume : 667/247 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 48100
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 2.90
Heavy Truck % of Total Volume : 1.90
Day (16 hrs) % of Total Volume : 73.00

Data for Segment # 1: Mayfield 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 : 35.00 / 35.00 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Result summary (day)
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	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Mayfield Rd	1.17	67.63	67.63
Total			67.63 dBA

Result summary (night)
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	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Mayfield Rd	1.17	66.32	66.32
Total			66.32 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.63
(NIGHT): 66.32