

ENVIRONMENTAL NOISE ASSESSMENT

PROPOSED RESIDENTIAL DEVELOPMENT VILLAGES OF CENTRAL PARK EAST COBOURG COMMUNITY (PHASE 1)

**PART OF LOTS 11, 12 AND 13
CONCESSIONS A AND 1 BLOCK D,
REGISTERED PLAN 277, FILE: 14T06001-R
TOWN OF COBOURG
(COUNTY OF NORTHUMBERLAND)**

**PREPARED FOR:
RONDEAU (COBOURG) LTD.**

May 6, 2019

Town of Cobourg
Planning Department
55 King Street West
Cobourg, ON
K9A 2M2

**Re: Environmental Noise Assessment
Villages of Central Park, Rondeau (Cobourg) Ltd.
Proposed Residential Development (Phase 1)
Part of Lots 11, 12 and 13, Concessions A and 1
Block D, Registered Plan 277, File: 14T-06001-R
Town of Cobourg (County of Northumberland)
Project No. Y1837**

We are pleased to submit this Environmental Noise Assessment for the above noted development based on the latest Phase 1 Lotting Plan dated April 2018 to achieve sound levels acceptable to the Ministry of Environment, Conservation and Parks and the Town of Cobourg.

The study addresses noise generated by Highway 401 to the north at approximately 700m, Elgin Street East to the south and Street 'A' through the development.

Prior to construction, it is recommended that the designated Outdoor Living Area location and house plan for Block 8 (South Unit) to be reviewed once the architectural plans become available to ensure that the sound level at the designated outdoor living area for Block 8 (South Unit) meets the sound level limit of 60 dBA..

Prior to the issuance of occupancy permit, it is recommended that a qualified engineer should submit a letter to the Town indicating that the recommended noise control measures or acceptable alternatives have been incorporated in the building which satisfy the M.E.C.P. noise criteria.

Should you have any questions regarding this report, please contact the undersigned.

Respectfully Submitted,

YCA ENGINEERING Limited



Hava Jouharchi, P.Eng.
Senior Project Engineer

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1.0 INTRODUCTION

PURPOSE

A residential development has been proposed by Fourteen Estates in the Town of Cobourg. This report is an analysis of future sound levels within the proposed development and describes the types and locations of noise mitigation measures which will be required.

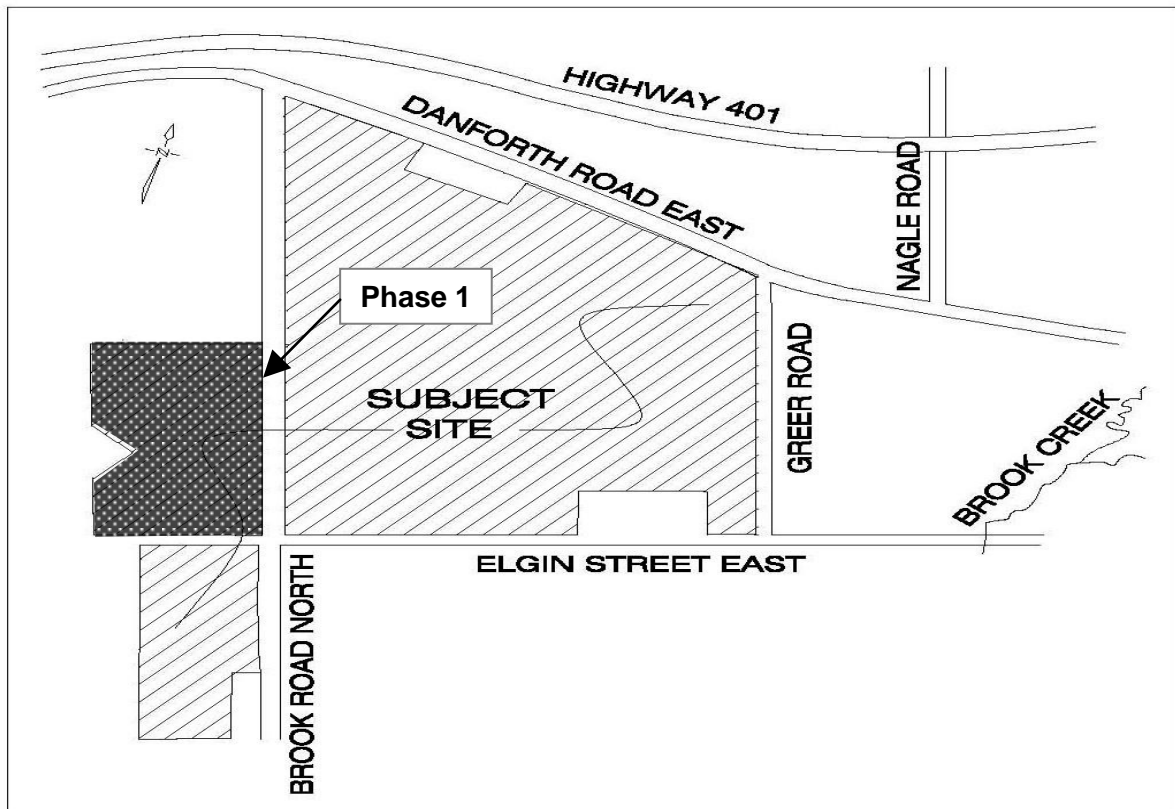
SITE DESCRIPTION AND LOCATION

The proposed Phase 1 of the development consists of detached/semi-detached residential units, townhouse blocks, a stormwater management pond, parks/ open spaces, Environmental Protection Blocks and local internal roads. Highway 401 is located to the north at approximately 700m, Elgin Street East to the south and Street 'A' through the development in the Town of Cobourg.

The surrounding land uses are existing residential developments to the west, proposed residential developments to the east and south, and an Environmental Protection land to the north.

KEY PLAN

The location of the proposed development is further indicated by the Key Plan below.



2.0 SOUND LEVEL CRITERIA

The sound level descriptor (L_{eq} in dBA) are for 16 hours (daytime) and 8 hours (night-time) based on MOECC Guideline NPC-300:

Outdoor Activity Areas (7 a.m. – 11 p.m.) – 16 Hr. Leq. = 55 dBA

If daytime outdoor sound levels at the backyards (outdoor activity areas) of residential areas exceed 60 dBA, physical noise attenuation measures such as acoustical fences, increased building setbacks or reorientation of dwellings and lots must be employed to reduce the sound levels. In some cases, outdoor sound levels may be allowed to exceed the above criteria by a maximum of 5 dBA. If such excesses occur, purchasers must be informed of the existence of potentially annoying sound levels by means of warning clauses registered on title.

Living and Dining Area and Bedroom (7 a.m.–11 p.m.) = 45 dBA Roads, 40 dBA Railways

Living and Dining Area (11 p.m.–7 a.m.) = 45 dBA Roads, 40 dBA Railways

Bedrooms (11 p.m. – 7 a.m.) = 40 dBA Roads, 35 dBA Railways

Appropriate building components such as walls, doors and windows are chosen with reference to the following. If daytime sound levels at the external dwelling walls are 65 dBA or less (roadways), and 60 dBA or less (railways), then the indoor sound level criteria described above will be achieved using standard (Ontario Building Code) construction methods and building components. If night-time sound levels are 60 dBA or less (roadways) and 55 dBA or less (railways), standard construction methods and building components can be utilized. If the external sound levels exceed the above criteria, then components having extra sound insulation properties may be required.

Ventilation requirements are determined with reference to the following. If night-time sound levels at the bedroom window of a dwelling unit are in the range of 50 to 60 dBA, the ventilation system must be designed to allow the optional installation of central air conditioning at the owner's discretion. If night-time sound levels are greater than 60 dBA, central air conditioning must be installed. If daytime sound levels at the living room/dining room windows are in the range of 55 to 65 dBA, the ventilation system must be designed to allow optional installation of central air conditioning. For daytime sound levels greater than 65 dBA, central air conditioning must be installed.

3.0 NOISE SOURCES

ROAD TRAFFIC

The proposed residential development is located south of Highway 401 at approximately 700m, north of Elgin Street East with Street 'A' through the development as indicated on Drawing Y1837.

Noise generated by Highway 401, East, Elgin Street East and Street 'A' have the potential to affect the future residential development. All other roads within this site are local roadways.

Traffic volume information for Elgin Street East and Street 'A' were based on a Traffic Impact Study prepared by R.J. Burnside & Associates Limited dated October 2017. The truck percentages were assumed to be 50% medium and 50% heavy trucks for the arterial and collector roads. The forecasted traffic information was projected to the year 2037 at a growth rate of 2% per year.

Therefore, for noise analysis purposes, the following traffic information for Elgin Street East and Street 'A' are summarized in the Tables 1 and 2 below:

TABLE 1: STREET 'A' TRAFFIC DATA	
Projected Annual Average Daily Traffic*	4,200
Percent Trucks	3%
Heavy and Medium trucks ratio	10:90
Speed (km/hr)	50
Number of Lanes	2

TABLE 2: ELGIN STREET EAST TRAFFIC DATA	
Projected Annual Average Daily Traffic*	18,000
Percent Trucks	8%
Heavy and Medium trucks ratio	50:50
Speed (km/hr)	60
Number of Lanes	2

* Projected future traffic based on Traffic Impact Study prepared by R. J. Burnside & Associates Ltd..

Traffic volume information for Highway 401 has been provided by the Ministry of Transportation dated November 2018.

TABLE 3: HIGHWAY 401 TRAFFIC DATA	
Projected Annual Average Daily Traffic **	70,000
Percent Trucks	30%
Heavy and Medium trucks ratio	50:50
Speed (km/hr)	100
Number of Lanes	6

** Projected future traffic provided by Ministry of Transportation.

RAIL TRAFFIC

The proposed development is located at more than 500m from the CP and CN railways to the south. Therefore, the railway noise is considered acoustically insignificant.

STATIONARY NOISE SOURCES

A Place of Worship (Block 105) is expected to be at the northeast corner of the Phase 1 development. The details of this Block are unknown at this time. Further investigation is recommended once the details of this Block become available to ensure the sound levels from the Place of Worship at met at the adjacent receptors.

An Elementary School (Block 103) is expected to be at east of the Phase 1 development. The details of this Block are unknown at this time. Further investigation is recommended once the details of this Block become available to ensure the sound levels from the School at met at the adjacent receptors.

4.0 NOISE ASSESSMENT

Drawing Y1837 is based on the latest Plan dated December 2018 and the Phase 1 Lotting Plan showing various noise analysis locations and noise mitigation measures within the proposed development. Sound levels were calculated using the Ministry of Environment's Stamson 5.04 computer based noise prediction model. The noise criteria and warning clauses are listed in Appendix 3. Table 4 lists the unattenuated sound levels at various locations.

TABLE 4: UNATTENUATED SOUND LEVELS					
LOCATIONS		DISTANCE TO CENTRELINE OF ROAD (m)	DAYTIME (16 Hr. Leq (dBA))		NIGHT-TIME (8 Hr. Leq (dBA))
			OUTDOOR AMENITY	DWELLING WALL	DWELLING WALL
PHASE 1					
Block 1 (West Unit)	Side Wall	15.0 ¹	-	53.38	46.72
		100 ²		57.93 (59.76)	51.40 (54.68)
		1000 ³		50.36	50.36
	Rear Yard	30 ¹			
		96 ²	48.27		
		1000 ³	54.88 (56.54)	-	-
			48.83		
Block 2 (West Unit)	Rear Wall	100.0 ¹	-	40.26	33.58
		70 ²		57.89 (57.96)	51.36 (51.36)
	Rear Yard	102 ¹		-	-
		67 ²	39.45		
			57.48 (57.55)		
Block 3 (North Unit)	Side Wall	15.0 ¹	-	56.39	49.73
		150 ²		50.11 (58.40)	43.58 (54.32)
		1000 ³		51.86	51.86
	Rear Yard	17 ¹			
		150 ²	54.84		
		1000 ³	49.09 (56.94)	-	-
			50.33		
Block 8 (South Unit)	Side Wall	15.0 ¹	-	53.11	46.42
		20.0 ²		66.45 (66.65)	48.93 (50.86)
	Rear Yard*	30.0 ¹		-	-
		22.0 ²	40.17		
			56.91 (57.00)		
Block 11	Side Wall	745 ³	-	57.64	57.64
	Rear Yard	740 ³	56.28	-	-

- 1 Street 'A'
 2 Elgin Street East
 3 Highway 401
 () Combined sound level from multiple sources

* Designated Outdoor Living Area to be located on the north side of the house or within a courtyard. House Plan and OLA location to be reviewed once the architectural plans become available

5.0 RECOMMENDED NOISE MITIGATION MEASURES

5.1 OUTDOOR MEASURES

Based on the sound level results in Table 4, the daytime outdoor amenity area sound levels at the following locations are expected to be between 55dBA and 60dBA due to road traffic in the absence of mitigative measures.

Therefore, noise mitigation measures are not required. However, a Warning Clause Type A is recommended. See Section 5.4.

- Blocks 1 and 2 (All Units), Blocks 3, 4, 5, 6, 7 (North Unit)
- Block 8 (2nd and 3rd southerly units), Block 11 (All Units)

Please note that the designated Outdoor Living Area for Block 8 (South Unit) is expected to be located on the north side of the house or within a courtyard.

House Plan and OLA location should be reviewed once the architectural plans becomes available to ensure that the sound level at the designated outdoor space for Block 8 (South Unit) meets the sound level limit of 60 dBA.

5.2 VENTILATION REQUIREMENTS

Ventilation requirements were determined using the sound levels at the building facades listed in Table 4.

MANDATORY CENTRAL AIR CONDITIONERS

Based on the information in Table 4, the following locations are expected to be above 65dBA during the daytime and/or above 60dBA during the nighttime. Therefore, mandatory air conditioning is required for the following locations:

- Block 8 (South Unit)

The following warning clause Type D must be incorporated into the Subdivision Agreement, which will be registered on title and should be included in all offers of purchase, sale and lease of the above locations:

Warning Clause Type D:

“This unit was fitted with an air conditioner to allow the windows and exterior doors to remain closed, thereby achieving indoor sound levels within the limits recommended by the Ministry of Environment. (Note: care should be taken to ensure that the condenser unit is located in an area that is not sensitive to noise. The sound rating of air conditioning units must not exceed the sound emission standards established by the Ministry of Environment).”

PROVISION FOR CENTRAL AIR CONDITIONERS

The following dwelling units must be constructed with a forced air heating system with ducting sized to accommodate a central air conditioning unit, in order to allow the homeowner the option of installing central air conditioning should he or she wish to do so in the future.

- Blocks 1 to 7, 9 to 16 (All Units) and Block 8 (Remaining Units)
- Part Lots Blocks 93/94 and 95/96

In addition, the following warning clauses must be incorporated into the Subdivision Agreement, which will be registered on title and should be included in all offers of purchase, sale and lease of the above dwelling units:

Warning Clause Type C:

“This dwelling unit was fitted with ducting sized to accommodate a central air conditioning unit. The installation of central air conditioning by the homeowner will allow windows and exterior doors to be kept closed, thereby achieving indoor sound levels within the limits recommended by the Ministry of Environment. (Note: care should be taken to ensure that the condenser unit is located in an area that is not sensitive to noise. The sound rating of central air conditioning units must not exceed the sound emission standards established by the Ministry of Environment).”

5.3 BUILDING COMPONENTS

Building components within the proposed development were analyzed using the STC (Sound Transmission Class) method recommended by the M.E.C.P. Detailed floor plans of the proposed buildings are not available at this time in order to best determine the required building components. Although this information is not yet available for the proposed development, the result is based on the assumption that a living, dining or recreation room is located at the side of the house closest to the roadway and contains three components (two exterior walls and a set of windows). The windows are assumed to be 25% of the floor area and the same side exterior walls are assumed to be 80% of the floor area.

DAYTIME SOUND LEVELS

In order to ensure acceptable daytime indoor sound levels at the most noise sensitive location (Block 8, South Unit), the various building components must provide a STC rating of 30 for windows and a STC rating of 37 for exterior walls (using a daytime dwelling wall sound level of 67 dBA).

NIGHT-TIME SOUND LEVELS

In order to ensure acceptable night-time second storey sound levels at the most noise sensitive location (Block 1, Wes Unit), the various building components must provide a STC rating of 24 for windows and a STC rating of 31 for exterior walls (using a night-time bedroom sound level of 58 dBA).

BUILDING COMPONENT REQUIREMENTS

The minimum standard window and exterior wall construction of the Ontario Building Code meets STC 30 and STC 38, respectively. Therefore, Standard window and exterior wall components are acceptable to meet the indoor sound levels.

EXTERIOR WALLS

The following exterior wall construction EW1 meets the STC 36 rating, assuming a ratio of wall area to room floor area of 80%:

12.7mm gypsum board, vapour barrier and 38 x 89mm studs with 50mm (or thicker) mineral wool or fiberglass batts in interstud cavities, plus sheathing, 25mm air space and 20mm siding or stucco

WINDOWS

The following are some window configurations meeting an STC rating of 29, assuming the ratio of window area to room floor area is 25%:

- double glazing 3mm x 3mm thickness with 13mm air space (Sliders/Casement) or
- double glazing 4mm x 4mm thickness with 6mm air space (Sliders/Casement) or
- any other window type yielding a similar or greater STC rating

Sample window and exterior wall configurations are included in Appendix 4 for additional options.

Please note that the final building components should be determined once final building floor plans become available and once dwelling locations and orientations are finalized.

5.4 WARNING CLAUSES

Warning clause Type A must be incorporated into the Subdivision Agreement for the following units, which will be registered on title and included in all offers of purchase and sale or lease.

- Blocks 1 to 14 (All Units)
- Part Lots Blocks 93/94 and 95/96

Warning Clause Type A

"Occupants are advised that sound levels due to increasing road traffic may occasionally interfere with some activities of the occupants as the sound level will exceed the Ministry of Environment's noise criteria."

Warning Clause Type E

"Purchasers/tenants are advised that due to the proximity of the Elementary School and the Place of Worship, noise from the activities may at times be audible"

6.0 SUMMARY OF NOISE MITIGATION MEASURES

The summary of noise abatement measures are listed in the following Table 5 identifying ventilation requirements, noise barrier requirements, building components and warning clauses.

TABLE 5: SUMMARY OF NOISE MITIGATION MEASURES				
LOCATIONS	VENTILATION REQUIREMENTS	BUILDING COMPONENTS	NOISE BARRIERS	WARNING CLAUSES
Block 8 (South Unit)	Mandatory central air conditioning	Wall: OBC ¹ Window: OBC	No ²	Type A, D
Blocks 3,11, 16 (All Units) Part Lots Block 93/94 Part Lots Block 95/96	Provision for air conditioning	Wall: OBC Window: OBC	No	Type A, C and E
Blocks 1, 2, 4 to 7, 9, 10, 12, 13, 14 (All Units) Block 8 (Remaining Units)	Provision for air conditioning	Wall: OBC Window: OBC	No	Type A, C

¹ Ontario Building Code Standard requirement.

² Designated Outdoor Living Area to be located on the north side of the house or within a courtyard. House Plan and OLA location to be reviewed once the architectural plans become available.

7.0 RECOMMENDATIONS AND CONCLUSION

RECOMMENDATIONS

1. Mandatory air conditioning is required for Block 8 (South Unit).
2. Provision for air conditioning is required for Blocks 1 to 7, 9 to 14 (All Units) and Block 8 (Remaining Units) and Part Lots Blocks 93/94 and 95/96.
3. The designated Outdoor Living Area for Block 8 (South Unit) should be located on the north side of the house or within a courtyard. House Plan and OLA location should be reviewed once the architectural plans become available to ensure that the sound level at the designated outdoor space for Block 8 (South Unit) meets the sound level limit of 60 dBA.
4. Standard window and exterior wall components are acceptable to meet the indoor sound levels.
5. Further investigation is recommended once the details of the Place of Worship Block and Elementary School Blocks become available to ensure the sound levels are met at the adjacent receptors.
6. All applicable warning clauses shall be listed in the Town of Cobourg's Subdivision Agreement and also be inserted in the Agreements of Purchase and Sale or Lease and registered on title.
7. Prior to construction of the dwelling units, it is recommended that the architectural plans be reviewed to ensure all building components meet the acoustical requirements.
8. Prior to the issuance of occupancy permit for any unit for which noise barriers, ventilation and building components have been specified in the Noise Study, it is recommended that a qualified engineer should submit a letter to the Town indicating that the recommended measures or acceptable alternatives have been incorporated in the building which satisfy the M..E.C.P. criteria.

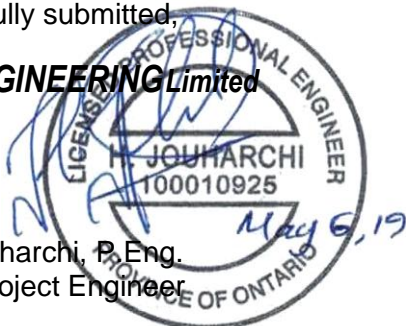
CONCLUSION

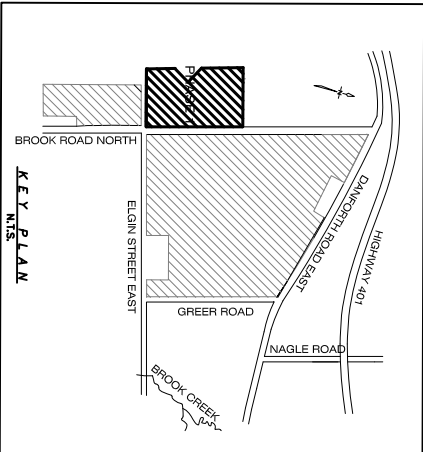
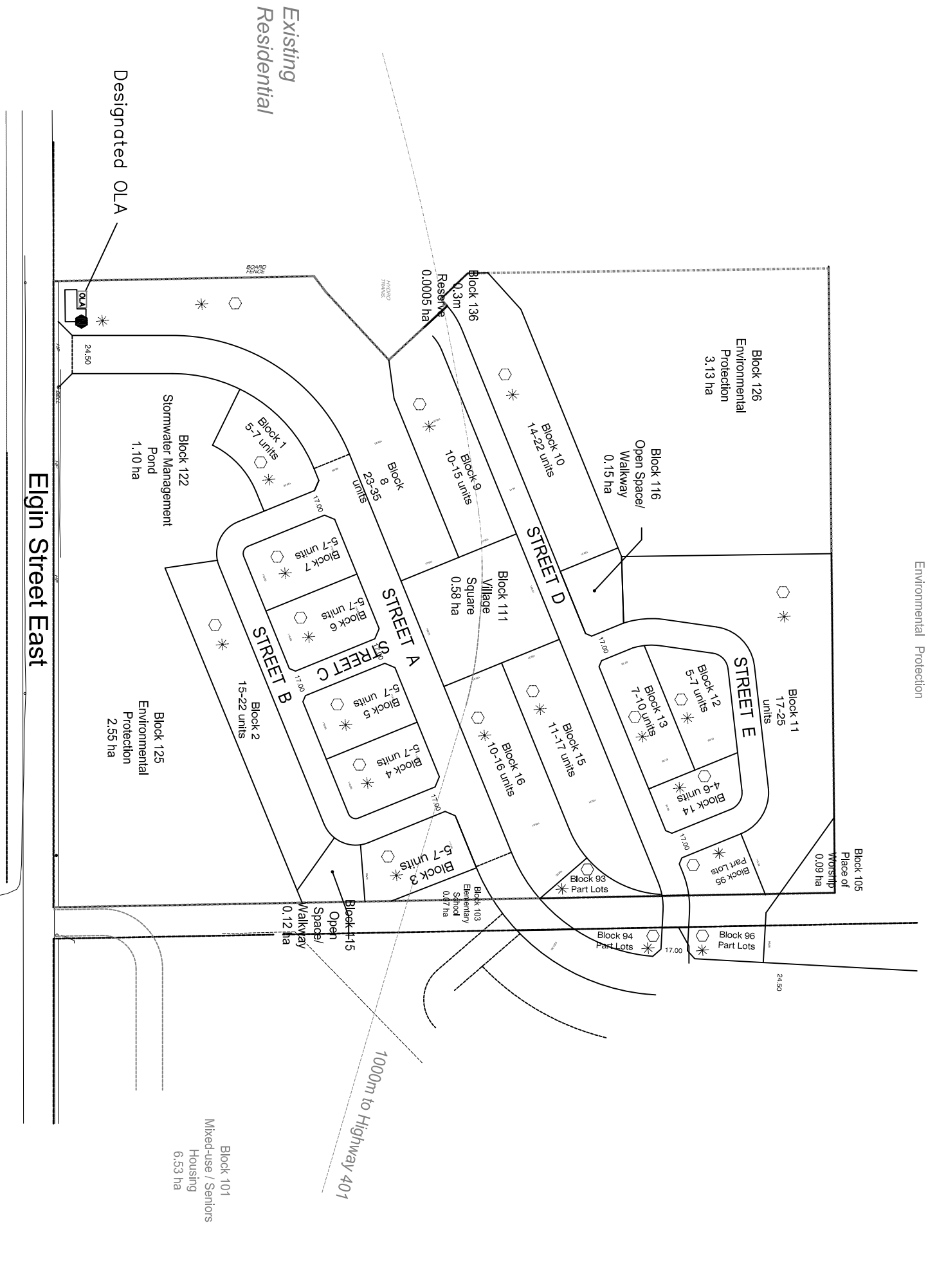
This report has determined that sound levels acceptable to the Ministry of Environment, Conservation and Parks and Town of Cobourg are expected to be achieved using the abatement measures in this report and as shown on the attached Drawing Y1837.

Respectfully submitted,

YCA ENGINEERING Limited

Hava Jouharchi, P.Eng.
Senior Project Engineer





- LEGEND:
- MANDATORY CENTRAL AIR CONDITIONING AND WARNING CLAUSE D
 - OPTIONAL CENTRAL AIR CONDITIONING AND WARNING CLAUSE C
 - WARNING CLAUSE A

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PLAN OF SUBDIVISION
NOISE
MITIGATION MEASURES

VILLAGES OF CENTRAL PARK
EAST COBOURG
(PHASE 1)
Part of Lots 11,12 and 13
Concessions A and 1, Block D
Registered Plan 277
File: 14T06001-R
TOWN OF COBOURG

DRAWING: Y1837

Scale: NTS DATE: May 2019

APPENDIX 1

TRAFFIC DATA

Good Afternoon Hava,

In response to your request please find below the information available from this office for Highway 401 (Between Baltimore Road and Nagle Road) in Cobourg:

2016 AADT = 42,500
2016 SADT = 52,000
Estimated AADT (2035) = 54,000
Estimated SADT (2035) = 70,000
Number of Through Lanes = 6
Posted Speed = 100 km/hr
% Trucks (Estimated) = 30%

Please note that the above information is estimated based upon our current knowledge of the area, which may be subject to change in the future. Other information related to ROW, gradient, day/night split and heavy/medium truck split will be available from Eastern Region Traffic Office.

If you require further information, please don't hesitate to contact me.

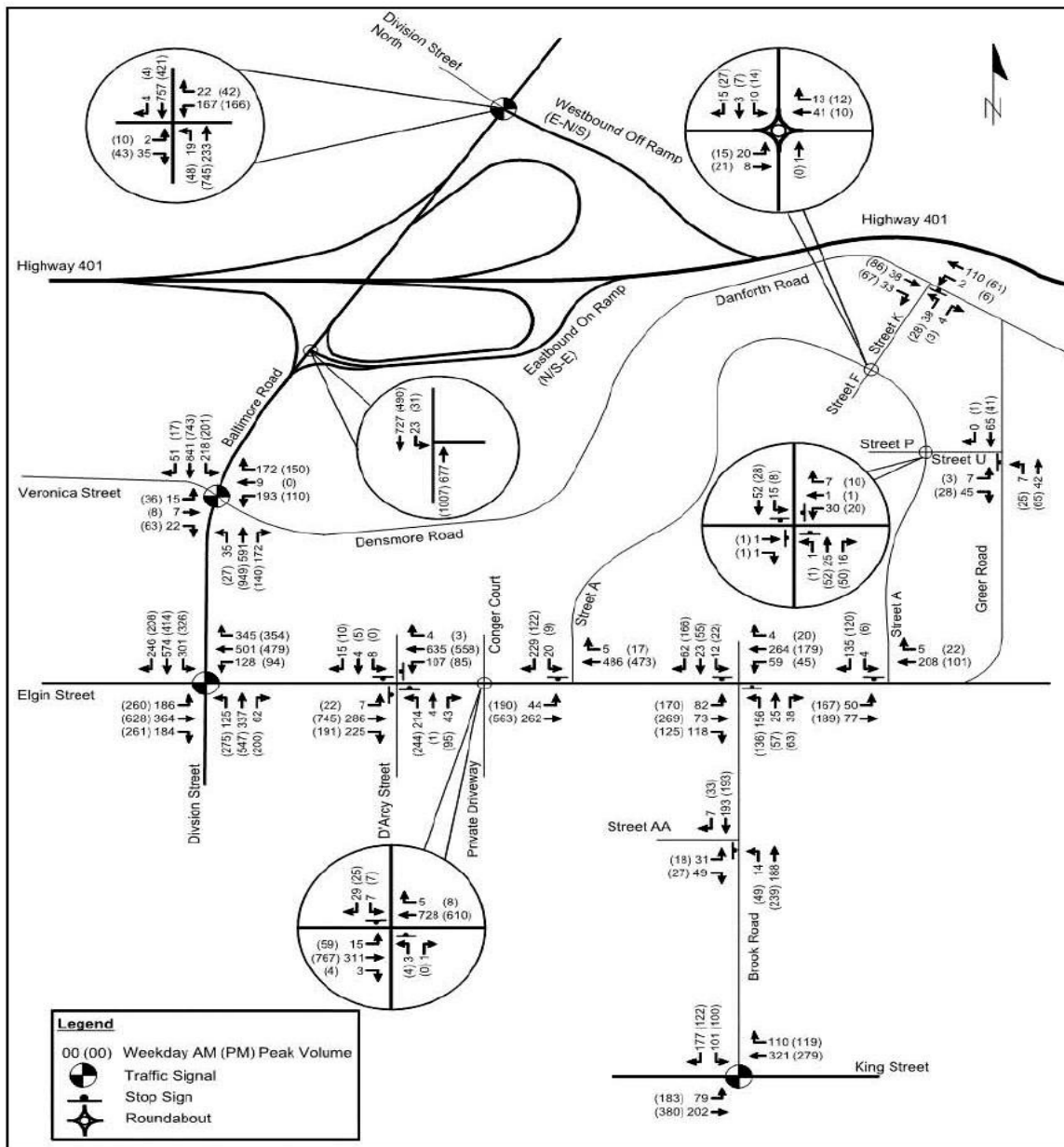
Ahsan Alam, PhD, Planner
Systems Analysis and Forecasting Office
Transportation Planning Branch, MTO
Suite 700, 7th Floor, 777 Bay Street
Toronto, ON M7A 2J8, Tel: 416-585-6237



5.5 2027 Total Traffic Operations

The 2027 total traffic volumes consists of 2027 background volumes shown in Figure 12 plus total subdivision trips shown in Figure 15. The resulting traffic volumes are shown in Figure 16.

Figure 16: 2027 Total Traffic Volumes



APPENDIX 2

STAMSON 5.04 SOUND LEVEL CALCULATIONS

STAMSON 5.04 SUMMARY REPORT Date: 10-01-2019 1:44:35
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: bklrw.te Time Period: Day/Night 16/8 hours
Description: Block 1, Side Wall

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

Car traffic volume : 3667/407 veh/TimePeriod *
Medium truck volume : 102/11 veh/TimePeriod *
Heavy truck volume : 11/1 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): 4200
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 2.70
Heavy Truck % of Total Volume : 0.30
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Street A (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 15.00 / 15.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)

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

Car traffic volume : 14904/1656 veh/TimePeriod *
Medium truck volume : 648/72 veh/TimePeriod *
Heavy truck volume : 648/72 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): 18000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 4.00
Heavy Truck % of Total Volume : 4.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Elgin Street (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 100.00 / 100.00 m
Receiver height : 4.50 / 4.50 m
Topography : 0 (Define your own alpha.)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 0.00 m
Barrier receiver distance : 10.00 / 10.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Alpha : 0.33

Road data, segment # 3: Hwy 401 (day/night)

Car traffic volume : 32668/16332 veh/TimePeriod *
Medium truck volume : 7000/3500 veh/TimePeriod *
Heavy truck volume : 7000/3500 veh/TimePeriod *
Posted speed limit : 100 km/h
Road gradient : 2 %

Road pavement : 1 (Typical asphalt or concrete)
 * Refers to calculated road volumes based on the following input:
 24 hr Traffic Volume (AADT or SADT): 70000
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 15.00
 Heavy Truck % of Total Volume : 15.00
 Day (16 hrs) % of Total Volume : 66.67

Data for Segment # 3: Hwy 401 (day/night)

 Angle1 Angle2 : -90.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 2 / 2
 House density : 70 %
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 500.00 / 500.00 m
 Receiver height : 4.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)

Result summary (day)

	! source !	Road !	Total
	! height !	Leq !	Leq
	! (m) !	(dBA) !	(dBA)
1.Street A	! 0.73 !	53.38 !	53.38
2.Elgin Street	! 1.41 !	57.93 !	57.93
3.Hwy 401	! 1.97 !	53.36 !	53.36 - 3= 50.36
Total			59.76 dBA

Result summary (night)

	! source !	Road !	Total
	! height !	Leq !	Leq
	! (m) !	(dBA) !	(dBA)
1.Street A	! 0.70 !	46.72 !	46.72
2.Elgin Street	! 1.41 !	51.40 !	51.40
3.Hwy 401	! 1.97 !	53.36 !	53.36 - 3= 50.36
Total			54.68 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.76
 (NIGHT): 54.58

STAMSON 5.04 SUMMARY REPORT Date: 10-01-2019 1:51:10
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
 Filename: bklry.te Time Period: Day/Night 16/8 hours
 Description: Block 1, Rear Yard

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

 Car traffic volume : 3667/407 veh/TimePeriod *
 Medium truck volume : 102/11 veh/TimePeriod *
 Heavy truck volume : 11/1 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): 4200
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 2.70
 Heavy Truck % of Total Volume : 0.30
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Street A (day/night)

 Angle1 Angle2 : -90.00 deg 0.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 30.00 m
 Receiver height : 1.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : -90.00 deg Angle2 : 0.00 deg
 Barrier height : 0.00 m
 Barrier receiver distance : 4.50 m
 Source elevation : 100.00 m
 Receiver elevation : 105.35 m
 Barrier elevation : 105.05 m

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

 Car traffic volume : 14904/1656 veh/TimePeriod *
 Medium truck volume : 648/72 veh/TimePeriod *
 Heavy truck volume : 648/72 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): 18000
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 4.00
 Heavy Truck % of Total Volume : 4.00
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Elgin Street (day/night)

 Angle1 Angle2 : -90.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 96.00 m
 Receiver height : 1.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
 Barrier height : 0.00 m
 Barrier receiver distance : 4.50 m
 Source elevation : 101.50 m
 Receiver elevation : 105.35 m
 Barrier elevation : 105.05 m

Road data, segment # 3: Hwy 401 (day/night)

Car traffic volume : 32668/16332 veh/TimePeriod *
Medium truck volume : 7000/3500 veh/TimePeriod *
Heavy truck volume : 7000/3500 veh/TimePeriod *
Posted speed limit : 100 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 70000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 15.00
Heavy Truck % of Total Volume : 15.00
Day (16 hrs) % of Total Volume : 66.67

Data for Segment # 3: Hwy 401 (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 2 / 2
House density : 70 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 500.00 m
Receiver height : 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 0.00 m
Barrier receiver distance : 4.50 m
Source elevation : 110.50 m
Receiver elevation : 105.35 m
Barrier elevation : 105.05 m

Result summary (day)

! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----+-----
1.Street A ! 0.73 ! 48.27 ! 48.27 *
2.Elgin Street ! 1.41 ! 54.88 ! 54.88 *
3.Hwy 401 ! 1.97 ! 51.83 ! 51.83 * -3 = 48.83
-----+-----+-----+-----
Total 56.54 dBA

STAMSON 5.04 SUMMARY REPORT Date: 10-01-2019 1:51:26
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
 Filename: bk2ry.te Time Period: Day/Night 16/8 hours
 Description: Block 2, Rear Yard

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

 Car traffic volume : 3667/407 veh/TimePeriod *
 Medium truck volume : 102/11 veh/TimePeriod *
 Heavy truck volume : 11/1 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): 4200
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 2.70
 Heavy Truck % of Total Volume : 0.30
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Street A (day/night)

 Angle1 Angle2 : -90.00 deg 0.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 102.00 m
 Receiver height : 1.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : -90.00 deg Angle2 : 0.00 deg
 Barrier height : 0.00 m
 Barrier receiver distance : 4.50 m
 Source elevation : 100.00 m
 Receiver elevation : 105.80 m
 Barrier elevation : 103.30

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

 Car traffic volume : 14904/1656 veh/TimePeriod *
 Medium truck volume : 648/72 veh/TimePeriod *
 Heavy truck volume : 648/72 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): 18000
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 4.00
 Heavy Truck % of Total Volume : 4.00
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Elgin Street (day/night)

 Angle1 Angle2 : -90.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 67.00 m
 Receiver height : 1.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
 Barrier height : 0.00 m
 Barrier receiver distance : 10.00 m
 Source elevation : 102.00 m
 Receiver elevation : 105.80 m
 Barrier elevation : 103.30 m

Result summary (day)

	! source !	Road !	Total
	! height !	Leq !	Leq
	! (m) !	(dBA) !	(dBA)
1.Street A	! 0.73 !	39.45 !	39.45 *
2.Elgin Street	! 1.41 !	57.48 !	57.48 *
Total			57.55 dBA

STAMSON 5.04 SUMMARY REPORT Date: 10-01-2019 1:44:57
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: bk3sw.te Time Period: Day/Night 16/8 hours
Description: Block 3, Side Wall

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

Car traffic volume : 3667/407 veh/TimePeriod *
Medium truck volume : 102/11 veh/TimePeriod *
Heavy truck volume : 11/1 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): 4200
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 2.70
Heavy Truck % of Total Volume : 0.30
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Street A (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 15.00 / 15.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)

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

Car traffic volume : 14904/1656 veh/TimePeriod *
Medium truck volume : 648/72 veh/TimePeriod *
Heavy truck volume : 648/72 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): 18000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 4.00
Heavy Truck % of Total Volume : 4.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Elgin Street (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 50 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 150.00 / 150.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)

Road data, segment # 3: Hwy 401 (day/night)

Car traffic volume : 32668/16332 veh/TimePeriod *
Medium truck volume : 7000/3500 veh/TimePeriod *
Heavy truck volume : 7000/3500 veh/TimePeriod *
Posted speed limit : 100 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
24 hr Traffic Volume (AADT or SADT): 70000
Percentage of Annual Growth : 0.00

Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 15.00
 Heavy Truck % of Total Volume : 15.00
 Day (16 hrs) % of Total Volume : 66.67
 Data for Segment # 3: Hwy 401 (day/night)

 Angle1 Angle2 : -90.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 1 / 1
 House density : 70 %
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 500.00 / 500.00 m
 Receiver height : 4.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)

Result summary (day)

	!	source	!	Road	!	Total	
	!	height	!	Leq	!	Leq	
	!	(m)	!	(dBA)	!	(dBA)	
1.Street A	!	0.73	!	56.39	!	56.39	
2.Elgin Street	!	1.41	!	50.11	!	50.11	
3.Hwy 401	!	1.97	!	54.86	!	54.86	-3 = 51.86
	+		+		+		
		Total				58.40 dBA	

Result summary (night)

	!	source	!	Road	!	Total	
	!	height	!	Leq	!	Leq	
	!	(m)	!	(dBA)	!	(dBA)	
1.Street A	!	0.70	!	49.73	!	49.73	
2.Elgin Street	!	1.41	!	43.58	!	43.58	
3.Hwy 401	!	1.97	!	54.86	!	54.86	-3 = 51.86
	+		+		+		
		Total				54.32 dBA	

TOTAL Leq FROM ALL SOURCES (DAY): 58.40
 (NIGHT): 54.32

STAMSON 5.04 SUMMARY REPORT Date: 10-01-2019 1:51:43
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
 Filename: bk3ry.te Time Period: Day/Night 16/8 hours
 Description: Block 3, Rear Yard

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

```
-----
Car traffic volume : 3667/407   veh/TimePeriod *
Medium truck volume : 102/11    veh/TimePeriod *
Heavy truck volume  : 11/1      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): 4200
  Percentage of Annual Growth         : 0.00
  Number of Years of Growth           : 0.00
  Medium Truck % of Total Volume      : 2.70
  Heavy Truck % of Total Volume       : 0.30
  Day (16 hrs) % of Total Volume      : 90.00
-----
```

Data for Segment # 1: Street A (day/night)

```
-----
Angle1 Angle2      : -55.00 deg  90.00 deg
Wood depth          : 0          (No woods.)
No of house rows    : 0 / 0
Surface             : 1          (Absorptive ground surface)
Receiver source distance : 17.00 m
Receiver height     : 1.50 m
Topography          : 2          (Flat/gentle slope; with barrier)
Barrier angle1      : -55.00 deg  Angle2 : 90.00 deg
Barrier height       : 0.00 m
Barrier receiver distance : 4.50 m
Source elevation     : 116.50 m
Receiver elevation   : 113.20 m
Barrier elevation    : 112.35 m
-----
```

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

```
-----
Car traffic volume : 14904/1656 veh/TimePeriod *
Medium truck volume : 648/72    veh/TimePeriod *
Heavy truck volume  : 648/72    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): 18000
  Percentage of Annual Growth         : 0.00
  Number of Years of Growth           : 0.00
  Medium Truck % of Total Volume      : 4.00
  Heavy Truck % of Total Volume       : 4.00
  Day (16 hrs) % of Total Volume      : 90.00
-----
```

Data for Segment # 2: Elgin Street (day/night)

```
-----
Angle1 Angle2      : -90.00 deg  90.00 deg
Wood depth          : 0          (No woods.)
No of house rows    : 1 / 1
House density       : 50 %
Surface            : 1          (Absorptive ground surface)
Receiver source distance : 150.00 m
Receiver height     : 1.50 m
Topography          : 2          (Flat/gentle slope; with barrier)
Barrier angle1      : -90.00 deg  Angle2 : 90.00 deg
Barrier height       : 0.00 m
Barrier receiver distance : 4.50 m
Source elevation     : 104.00 m
Receiver elevation   : 113.20 m
Barrier elevation    : 112.35 m
-----
```

Road data, segment # 3: Hwy 401 (day/night)

```

-----
Car traffic volume : 32668/16332 veh/TimePeriod *
Medium truck volume : 7000/3500 veh/TimePeriod *
Heavy truck volume : 7000/3500 veh/TimePeriod *
Posted speed limit : 100 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
  24 hr Traffic Volume (AADT or SADT): 70000
  Percentage of Annual Growth : 0.00
  Number of Years of Growth : 0.00
  Medium Truck % of Total Volume : 15.00
  Heavy Truck % of Total Volume : 15.00
  Day (16 hrs) % of Total Volume : 66.67
Data for Segment # 3: Hwy 401 (day/night)
-----

```

```

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 70 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 500.00 m
Receiver height : 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 0.00 m
Barrier receiver distance : 4.50 m
Source elevation : 110.00 m
Receiver elevation : 113.20 m
Barrier elevation : 112.35 m

```

Result summary (day)

```

-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----+-----
1.Street A ! 0.73 ! 54.84 ! 54.84 *
2.Elgin Street ! 1.41 ! 49.09 ! 49.09 *
3.Hwy 401 ! 1.97 ! 53.33 ! 53.33 * -3 = 50.33
-----+-----+-----+-----
Total 56.94 dBA

```

STAMSON 5.04 SUMMARY REPORT Date: 10-01-2019 1:45:16
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
 Filename: bk8sws.te Time Period: Day/Night 16/8 hours
 Description: Block 8, Side Wall

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

```
-----
Car traffic volume : 3693/410 veh/TimePeriod *
Medium truck volume : 76/8 veh/TimePeriod *
Heavy truck volume : 11/1 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): 4200
  Percentage of Annual Growth : 0.00
  Number of Years of Growth : 0.00
  Medium Truck % of Total Volume : 2.00
  Heavy Truck % of Total Volume : 0.30
  Day (16 hrs) % of Total Volume : 90.00
-----
```

Data for Segment # 1: Street A (day/night)

```
-----
Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 15.00 / 15.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
-----
```

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

```
-----
Car traffic volume : 14904/1656 veh/TimePeriod *
Medium truck volume : 648/72 veh/TimePeriod *
Heavy truck volume : 648/72 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): 18000
  Percentage of Annual Growth : 0.00
  Number of Years of Growth : 0.00
  Medium Truck % of Total Volume : 4.00
  Heavy Truck % of Total Volume : 4.00
  Day (16 hrs) % of Total Volume : 90.00
-----
```

Data for Segment # 2: Elgin Street (day/night)

```
-----
Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 20.00 / 100.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
-----
```

Result summary (day)

```
-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----+-----
1.Street A ! 0.73 ! 53.11 ! 53.11
2.Elgin Street ! 1.41 ! 66.45 ! 66.45
-----+-----+-----+-----
Total 66.65 dBA
-----
```

Result summary (night)

```
-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----+-----
1.Street A ! 0.70 ! 46.42 ! 46.42
2.Elgin Street ! 1.41 ! 48.93 ! 48.93
-----+-----+-----+-----
Total 50.86 dBA
-----
```

TOTAL Leq FROM ALL SOURCES (DAY): 66.65
 (NIGHT): 50.86

STAMSON 5.04 SUMMARY REPORT Date: 06-05-2019 10:02:29
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
 Filename: bk8rya.te Time Period: Day/Night 16/8 hours
 Description: Block 8, OLA *(OLA location assumed north of the house/within a Courtyard)

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

 Car traffic volume : 3667/407 veh/TimePeriod *
 Medium truck volume : 102/11 veh/TimePeriod *
 Heavy truck volume : 11/1 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): 4200
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 2.70
 Heavy Truck % of Total Volume : 0.30
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Street A (day/night)

 Angle1 Angle2 : -90.00 deg 0.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 30.00 / 30.00 m
 Receiver height : 1.50 / 4.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : -90.00 deg Angle2 : 0.00 deg
 Barrier height : 4.00 m
 Barrier receiver distance : 3.00 / 3.00 m
 Source elevation : 100.85 m
 Receiver elevation : 103.60 m
 Barrier elevation : 101.85 m

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

 Car traffic volume : 14904/1656 veh/TimePeriod *
 Medium truck volume : 648/72 veh/TimePeriod *
 Heavy truck volume : 648/72 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): 18000
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 4.00
 Heavy Truck % of Total Volume : 4.00
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Elgin Street (day/night)

 Angle1 Angle2 : -90.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 22.00 / 22.00 m
 Receiver height : 1.50 / 4.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
 Barrier height : 4.00 m
 Barrier receiver distance : 3.00 / 6.00 m
 Source elevation : 100.82 m
 Receiver elevation : 103.60 m
 Barrier elevation : 101.85 m

Result summary (day)

	!	source	!	Road	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.Street A	!	0.73	!	40.17	!	40.17
2.Elgin Street	!	1.41	!	56.91	!	56.91
Total						57.00 dBA

STAMSON 5.04 SUMMARY REPORT Date: 10-01-2019 1:45:55
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
 Filename: blk11rw.te Time Period: Day/Night 16/8 hours
 Description: Block 11, Rear Wall

Road data, segment # 1: Hwy 401 (day/night)

```
-----
Car traffic volume : 32668/16332 veh/TimePeriod *
Medium truck volume : 7000/3500 veh/TimePeriod *
Heavy truck volume : 7000/3500 veh/TimePeriod *
Posted speed limit : 100 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
  24 hr Traffic Volume (AADT or SADT): 70000
  Percentage of Annual Growth : 0.00
  Number of Years of Growth : 0.00
  Medium Truck % of Total Volume : 15.00
  Heavy Truck % of Total Volume : 15.00
  Day (16 hrs) % of Total Volume : 66.67
```

Data for Segment # 1: Hwy 401 (day/night)

```
-----
Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 372.50 / 372.50 m
Receiver height : 4.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 0.00 m
Barrier receiver distance : 10.00 / 10.00 m
Source elevation : 110.50 m
Receiver elevation : 115.50 m
Barrier elevation : 115.50 m
```

Result summary (day)

```
-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----+
1.Hwy 401 ! 1.97 ! 60.64 ! 60.64 * - 3= 57.64
-----+-----+-----+
Total 57.64 dBA
```

* Bright Zone !

Result summary (night)

```
-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----+
1.Hwy 401 ! 1.97 ! 60.64 ! 60.64 * - 3= 57.64
-----+-----+-----+
Total 57.64 dBA
```

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 57.64
 (NIGHT): 57.64

STAMSON 5.04 SUMMARY REPORT Date: 10-01-2019 1:50:54
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
 Filename: blk11ry.te Time Period: Day/Night 16/8 hours
 Description: Block 11, Rear Yard

Road data, segment # 1: Hwy 401 (day/night)

```
-----
Car traffic volume   : 32668/16332 veh/TimePeriod *
Medium truck volume : 7000/3500 veh/TimePeriod *
Heavy truck volume  : 7000/3500 veh/TimePeriod *
Posted speed limit  : 100 km/h
Road gradient       : 2 %
Road pavement      : 1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
  24 hr Traffic Volume (AADT or SADT): 70000
  Percentage of Annual Growth         : 0.00
  Number of Years of Growth           : 0.00
  Medium Truck % of Total Volume      : 15.00
  Heavy Truck % of Total Volume       : 15.00
  Day (16 hrs) % of Total Volume      : 66.67
-----
```

Data for Segment # 1: Hwy 401 (day/night)

```
-----
Angle1  Angle2      : -90.00 deg  90.00 deg
Wood depth          : 0 (No woods.)
No of house rows    : 0 / 0
Surface            : 1 (Absorptive ground surface)
Receiver source distance : 370.00 / 372.50 m
Receiver height     : 1.50 / 4.50 m
Topography          : 2 (Flat/gentle slope; with barrier)
Barrier angle1      : -90.00 deg  Angle2 : 90.00 deg
Barrier height      : 0.00 m
Barrier receiver distance : 10.00 / 10.00 m
Source elevation    : 110.50 m
Receiver elevation   : 114.20 m
Barrier elevation    : 113.00 m
-----
```

Result summary (day)

```
-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----+-----
1.Hwy 401 ! 1.97 ! 59.28 ! 59.28 * -3+ 56.28
-----+-----+-----+-----
Total 56.28 dBA
```

APPENDIX 3

SOUND LEVEL CRITERIA

MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS

ENVIRONMENTAL NOISE GUIDELINE

Stationary and Transportation Sources - Approval and Planning Publication NPC-300

August 2013

Day-time Outdoor Sound Level Limit

Table C-1 gives the equivalent sound level (L_{eq}) limit for designated Outdoor Living Areas. The limit applies to the entire day-time period from 07:00 to 23:00.

TABLE C-1
Sound Level Limit for Outdoor Living Areas
Road and Rail

<i>Time Period</i>	<i>$L_{eq}(16)$ (dBA)</i>
16 hr, 07:00 - 23:00	55

Indoor Sound Level Limit

Table C-2 gives the equivalent sound level (L_{eq}) limits and the applicable time periods for the indicated types of indoor space. The specified sound level criteria are minimum requirements and apply to the indicated indoor spaces with the windows and doors closed.

TABLE C- 2
Indoor Sound Level Limits (Road and Rail)

<i>Type of Space</i>	<i>Time Period</i>	<i>L_{eq} (Time Period) (dBA)</i>	
		<i>Road</i>	<i>Rail</i>
<i>Living/dining, den areas of residences, nursing/retirement homes, hospitals, schools, day-care centers, etc.</i>	<i>07:00-23:00</i>	45	40
<i>Living/dining areas of residences, nursing/retirement homes, hospitals, etc. (except schools or daycare centres)</i>	<i>23:00 - 07:00</i>	45	40
<i>Sleeping quarters</i>	<i>07:00-23:00</i>	45	40
<i>Sleeping quarters</i>	<i>23:00 - 07:00</i>	40	35

SUPPLEMENTARY NOISE LIMITS

Indoor limits for transportation sources applicable to noise sensitive land uses are specified in Table C-2 and Table C-9.

TABLE C-9
Indoor Sound Level Limits (Road and Rail)

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

SUMMARY OF MINIMUM NOISE CONTROL AND VENTILATION REQUIREMENTS FOR ROAD AND RAIL NOISE

TABLE 1
COMBINATION OF ROAD AND RAIL NOISE, DAY-TIME (0700 - 2300)
OUTDOOR, VENTILATION AND WARNING CLAUSE REQUIREMENTS

ASSESSMENT LOCATION	L _{eq} (16 hr) (dBA)	VENTILATION REQUIREMENTS	OUTDOOR CONTROL MEASURES	WARNING CLAUSE
OUTDOOR LIVING AREA (OLA)	Less than or equal to 55 dBA	N/A	None required	Not required
	Greater than 55 dBA to less than or equal to 60 dBA	N/A	Control measures (barriers) not required but should be considered	Required if resultant L _{eq} exceeds 55 dBA Type A
	Greater than 60 dBA	N/A	Control measures (barriers) required to reduce the L _{eq} below 60 dBA and as close to 55 dBA as technically, economically and administratively feasible	Required if resultant L _{eq} exceeds 55 dBA Type B
PLANE OF LIVING ROOM WINDOW	Greater than 50 dBA to less than or equal to 55 dBA	None required	N/A	Not required
	Greater than 55 dBA to less than or equal to 65 dBA	Forced air heating with provision for central air conditioning	N/A	Required Type C
	Greater than 65 dBA	Central air conditioning	N/A	Required Type D

TABLE 2
COMBINATION OF ROAD AND RAIL NOISE, NIGHT-TIME (2300 - 0700)
VENTILATION AND WARNING CLAUSE REQUIREMENTS

ASSESSMENT LOCATION	L _{eq} (8hr) (dBA)	VENTILATION REQUIREMENTS	WARNING CLAUSE
PLANE OF BEDROOM WINDOW	Greater than 50 dBA to less or equal to 60 dBA	Forced air heating with provision for central air conditioning	Required Type C

	Greater than 60 dBA	Central air conditioning	Required Type D
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TABLE 3
ROAD AND RAIL NOISE, DAY-TIME (0700 - 2300)
BUILDING COMPONENT REQUIREMENTS

ASSESSMENT LOCATION		L_{eq} (16 hr)	BUILDING COMPONENT REQUIREMENTS
PLANE OF LIVING ROOM WINDOW	R	Less than or equal to 65 dBA	Building compliant with the Ontario Building Code
	O		
	A	Greater than 65 dBA	Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria
	D		
	R	Less than or equal to 60 dBA	Building compliant with the Ontario Building Code
	A		
	I	Greater than 60 dBA	Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria
	L		

TABLE 4
ROAD AND RAIL NOISE, NIGHT-TIME (2300-0700)
BUILDING COMPONENT REQUIREMENTS

ASSESSMENT LOCATION		L_{eq} (8 hr)	BUILDING COMPONENT REQUIREMENTS
PLANE OF BEDROOM WINDOW	R	Less than or equal to 60 dBA	Building compliant with the Ontario Building Code
	O		
	A	Greater than 65 dBA	Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria
	D		
	R	Less than or equal to 60 dBA	Building compliant with the Ontario Building Code
	A		
	I	Greater than 60 dBA	Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria
	L		

TABLE 5
FACADE REQUIREMENT FOR RAIL NOISE ONLY - 24 HOURS

ASSESSMENT LOCATION	DISTANCE TO RAILWAY (m)	L_{eq} (24 hr) (dBA)	NOISE CONTROL REQUIREMENT
PLANE OF BEDROOM WINDOW	Less than 100 m	Less than or equal to 60 dBA	No additional requirement
		Greater than 60 dBA	Brick veneer or acoustically equivalent
	Greater than 100 m	Less than or equal to 60 dBA	No additional requirement
		Greater than 60 dBA	No additional requirement

TABLE B- 1
Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq 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

TABLE B- 2
Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq 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

WARNING CLAUSES

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

TYPE A:

"Occupants are advised that sound levels due to increasing road traffic may occasionally interfere with some activities of the occupants and the outdoor sound level may exceed the Municipality and the Ministry of Environment's noise criteria."

TYPE B:

"Purchasers are advised that despite the inclusion of noise abatement features within the development area, sound levels from road traffic may be of concern, occasionally interfering with some activities of the dwelling occupants as the sound level will exceed the Ministry of Environment's noise criteria."

TYPE C:

"This unit has been fitted with a forced air heating system and the ducting, etc. was sized to accommodate air conditioning. Installation of air conditioning by the occupant will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the Municipality's and the Ministry of the Environment's noise criteria. (Note: care should be taken to ensure that the condenser unit is located in an area that is not sensitive to noise. The sound rating of air conditioning units must not exceed the sound emission standards established by the Ministry of Environment.)"

TYPE D:

"This unit has been supplied with an air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the Municipality's and the Ministry of the Environment's noise criteria. (Note: care should be taken to ensure that the condenser unit is located in an area that is not sensitive to noise. The sound rating of air conditioning units must not exceed the sound emission standards established by the Ministry of Environment.)"

TYPE E:

"Purchasers/tenants are advised that due to the proximity of the Elementary School and the Place of Worship, noise from the activities may at times be audible"

APPENDIX 4

SAMPLE WINDOW AND EXTERIOR WALL CONFIGURATIONS

WINDOW STC RATINGS

STC	Double Glazing of indicated glass thickness					Triple Glazing	
	2mm and 2mm glass	3mm and 3mm glass	4mm and 4mm glass	3mm and 6mm glass	6mm and 6mm glass	3mm 3mm and 3mm glass	3mm 3mm and 6mm glass
	Interpane Spacing (mm)					Interpane Spacing (mm)	
27	6						
28	13						
29	15	6					
30	18	13	6				
31	22	16	13	6	6	6,6	
32	28	20	16	13	13	6,10	6,6
33	35	25	20	16	16	6,15	6,10
34	42	32	25	20	20	6,20	6,15
35	50	40	32	25	24	6,30	6,20
36	63	50	40	32	30	6,40	6,30
37	80	63	50	40	37	6,50	6,40
38	100	80	63	55	50	6,65	6,50
39	125	100	80	75	70	6,80	6,65
40	150	125	100	95	90	6,100	6,80
41		150	125	110	100		6,100
42			150	135	125		

Source: National Research Council, Division of Building Research

EXPLANATORY NOTES:

1. STC data listed in the table are for the well-fitted weather-stripped units that can be opened. The STC values apply only when the windows are closed. For windows fixed and sealed to the frame, add three to the STC given in the table.
2. If the interpane spacing or glass thickness for a specific double-glazed window is not listed in the table, the nearest listed values should be used.
3. If the interpane spacing for a specific triple-glazed window are not listed in the table, use the listed case whose combined spacing are nearest the actual combined spacing.
4. The STC data listed in the table are for typical windows, but details of glass mounting, window seals, etc., may result in slightly different performance for some manufacturer's products. If the laboratory sound transmission loss data (conforming to ASTM test method E-90) are available, these should be used.

EXTERIOR WALL STC RATINGS

Wall Configuration	EW1	EW2	EW3	EW4	EW1R	EW2R	EW3R	EW5	EW4R	EW6	EW7 EW5R	EW8
STC Rating	38	40	43	46	47	48	49	54	55	57	58	62

Source: National Research Council, Division of Building Research

NOTES:

- 1 The common structure of walls EW1 to EW5 is composed of 12.7mm gypsum board, vapour barrier and 38x89 mm studs with 50 mm (or thicker) mineral wool or glass fibre batts in inter-stud cavities.
 - EW1 denotes the common structure, plus sheathing, plus wood siding or metal siding and fibre backer board
 - EW2 denotes the common structure, plus rigid insulation (25 to 30 mm), and wood siding or metal siding and fibre backer board.
 - EW3 denotes simulated mansard with the common structure, plus sheathing, 28 X89 mm framing, sheathing and asphalt roofing material
 - EW4 denotes the common structure, plus sheathing and 20 mm stucco.
 - EW5 denotes the common structure, plus sheathing, 25 mm air space, 100mm brick veneer.
 - EW6 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25 to 50 mm), 100 mm back-up block 100 mm face brick.
 - EW7 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25 to 50 mm), 140mm back-up block, 100 mm face brick.
 - EW8 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25 to 50 mm), 200 mm concrete.
- 2 R signifies the mounting of the interior gypsum board on resilient clips.
- 3 An exterior wall conforming to rainscreen design principles and composed of 12.7 mm gypsum board, 100 mm concrete block, rigid insulation (25 to 50 mm), 25 mm air space, and 100 mm brick veneer has the same STC as EW6.
- 4 An exterior wall described in EW1 with the addition of rigid insulation (25 to 50 mm) between the sheathing and the external finish has the same STC as EW2.