YCA engineering Limited

Phone: 416-894-3213
hava@ycaengineering.com

9251 Yonge Street, Suite 8557
Richmond Hill, ON L4C 9T3

ENVIRONMENTAL NOISE ASSESSMENT

WHITEVALE (TFPM PHASE 2 LANDS)
DRAFT PLAN OF SUBDIVISION
NEIGHBOURHOOD 19

PART OF LOTS 21 AND 22, CONCESSION 5
CITY OF PICKERING

PREPARED FOR:

SEATON TFPM INC.

February 2023
Y1241D

YCA engineering Limited

Phone: 416-894-3213
hava@ycaengineering.com

9251 Yonge Street, Suite 8557
Richmond Hill, ON L4C 9T3

February 10, 2023

City of Pickering
Planning and Development
1 The Esplanade
Pickering, Ontario L1V 6K7

Re: Environmental Noise Assessment
Whitevale Draft Plan of Subdivision (TFPM Phase 2 Lands)
Neighbourhood 19
Part of Lots 20 and 21, Concession 5
City of Pickering
Project No. Y1241D

We are pleased to submit this Environmental Noise Assessment for the TFPM Phase 2 Lands of the development based on the latest draft plan dated February 2023 to achieve sound levels acceptable to the Ministry of Environment, Regional Municipality of Durham and the City of Pickering.

It is recommended that the sound barrier heights be reviewed once the detailed grading information is available.

It is recommended that the Medium Density Block 25 noise mitigation measures to be further reviewed once more details become available.

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

Respectfully Submitted,

YCA ENGINEERING Limited

Hava Jouharchi, P.Eng.
Senior Project Engineer

TABLE OF CONTENTS

1.0 INTRODUCTION

PURPOSE

A residential development (TFPM Phase 2 Lands) has been proposed by Seaton TFPM Inc. in the City of Pickering. This report is an analysis of future sound levels within the proposed residential development and describes the types and locations of noise mitigation measures which will be required based on the February 2023.

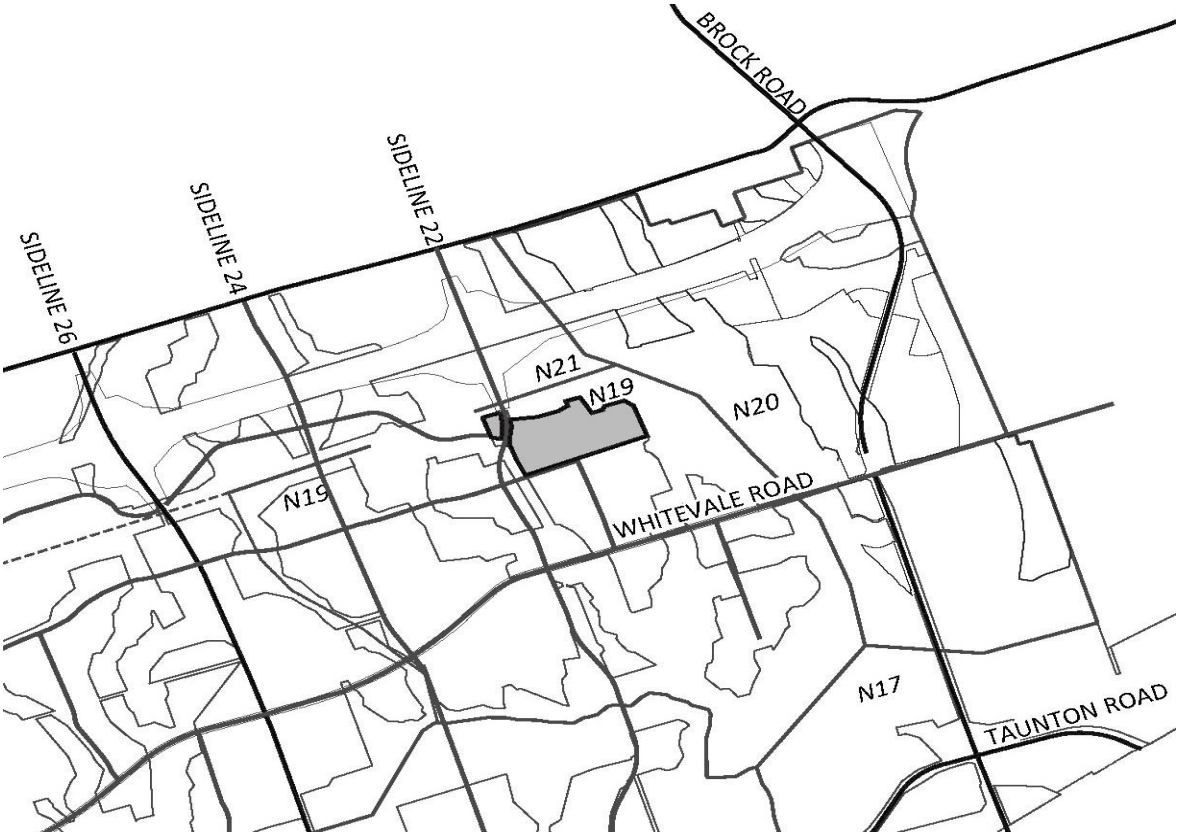
SITE DESCRIPTION AND LOCATION

The proposed residential development will consist of detached dwelling units, townhouse units, a Medium Density Residential and Residential Reserve Blocks, a storm water management pond, a park and trailhead, a Natural Heritage System, a school and local road located north and south of Whitevale Road and at approximately 500m south of Highway 407 in the City of Pickering.

The surrounding land uses are natural heritage lands and proposed residential developments.

KEY PLAN

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



2.0 SOUND LEVEL CRITERIA

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

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

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.

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

Living/Dining Area and Bedroom (7 a.m.–11 p.m.) = 45 dBA Roads,
Living/Dining Area (11 p.m.–7 a.m.) = 45 dBA Roads, 5 NEF/NEP Aircrafts
Bedroom (7 a.m.–11 p.m.) = 0 NEF/NEP Aircrafts
Bedrooms (11 p.m. – 7 a.m.) = 40 dBA Roads, 0 NEF/NEP Aircrafts

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.

STATIONARY SOURCES

As per the M.E.C.P. guidelines (Publication NPC-300), this development is considered to be a Class 2 area. The noise produced by a stationary source at the plane of window for noise sensitive spaces is the energy equivalent sound level (L_{EQ}), 50 dBA during daytime and evening time (0700-2300) or 45 dBA during night-time (2300-0700). For outdoor receptors, the energy equivalent sound level (L_{EQ}) is 50 dBA during daytime (0700-1900) or 45 dBA during night-time (1900-0700).

3.0 NOISE SOURCES

ROAD TRAFFIC

The proposed residential development will be located along Sideline 22/Peter Matthews Drive and approximately 500m south of Highway 407, 600m north of Whitevale Road with future E/W Type C arterial road and the South Employment Collector through the development in the City of Pickering.

Noise generated by Sideline 22/Peter Matthews Drive, future E/W Type C arterial road, the future South Employment Collector and Highway 407 have the potential to affect future residents.

All other roads within this site are local roadways. Due to distance separation and low traffic volumes, these local roads are considered acoustically insignificant.

The ultimate traffic information for Sideline 22/Peter Matthews Drive and the future South Employment Collector were not available at the Region of Durham. However, Sideline 22/Peter Matthews Drive is classified as an arterial road and the future South Employment Collector is considered to be a collector road.

Therefore, the traffic data were provided by the Traffic Study provided by BA Group dated November 2018, and projected further to the year 2033 at a growth rate of 2% per year. The truck percentages and posted speeds were assumed to be of similar to roads. The traffic data is summarized in Tables 1 and 2 below:

TABLE 1: SIDELINE 22/PETER MATTHEWS TRAFFIC DATA

Projected Annual Average Daily Traffic *	21,000
Percent Trucks	8%
Heavy and Medium trucks ratio	30:70
Speed (km/hr)	60
Number of Lanes	4

TABLE 2: SOUTH EMPLOYMENT COLLECTOR TRAFFIC DATA

Projected Annual Average Daily Traffic *	4,500
Percent Trucks	5%
Heavy and Medium trucks ratio	50:50
Speed (km/hr)	50
Number of Lanes	2

* Traffic information based on the Traffic Study provided by BA Group dated November 2018, projected further to the year 2033 at a growth rate of 2% per year.

Traffic volume information for E/W Arterial Road was obtained from the Region of Municipality of Durham dated December 2022. The traffic data is summarized in Table 3 below:

TABLE 3: E/W ARTERIAL ROAD TRAFFIC DATA	
Projected Annual Average Daily Traffic **	10,000
Percent Trucks	5%
Heavy and Medium trucks ratio	20:80
Speed (km/hr)	50
Number of Lanes	2

** The projected traffic data provided by the Region of Durham.

Updated traffic volume information for Highway 407 was obtained from the Ministry of Transportation dated July 2021. The traffic data obtained is summarized in Table 4 below.

TABLE 4: HIGHWAY 407 TRAFFIC DATA	
Projected Annual Average Daily Traffic ***	60,000
Percent Trucks	20%
Heavy and Medium trucks ratio	70:30
Speed (km/hr)	100
Number of Lanes	10

*** The Ultimate (2041) traffic volume provided by the Ministry of Transportation

RAIL TRAFFIC

The Canadian Pacific Railway is located more than 1km from the proposed residential development. Due to distance separation, the noise impact from the railway is considered acoustically insignificant.

AIRCRAFT TRAFFIC

Due to the proximity of the future Pickering Airport, the proposed residential development has been verified and the proposed site is outside the NEF 25 Noise Contour Line. The noise contour line map for the future Pickering Airport is included in Appendix 1.

STATIONARY NOISE SOURCES

An elementary school is proposed within the proposed development. The possible stationary noise sources of concern are the mechanical roof top units.

The details of the proposed school are not available at this time. The noise impact from the proposed school should be investigated at the Site Plan approval stage of this block.

4.0 NOISE ASSESSMENT

Drawing Y1241D is based on the latest draft plan for the North Plan dated February 2023 prepared by Korsiak Urban Planning showing various noise analysis locations and noise mitigation measures within the proposed residential 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 5 lists the unattenuated sound levels at various locations.

TABLE 5: UNATTENUATED SOUND LEVELS

BLOCKS/UNITS		DISTANCE TO CENTRELINE OF ROAD (m)	DAYTIME (16 Hr. Leq (dBA))		NIGHT-TIME (8 Hr. Leq (dBA))
			REAR YARD	DWELLING WALL	SECOND STOREY
Block 1 (West Unit)	Rear Wall	500.0[1]	-	57.15	58.69
	Rear Yard	500.0[1]	55.62	-	-
Block 3 (West Unit)	Rear Wall	630.0[1]	-	56.85	58.25
	Rear Yard	630.0[1]	55.46	-	-
Block 9 (North Unit)	Side Wall	650.0[1] 26.0[2] 40.0[3]	-	54.60 65.15 (65.64) 50.23	55.97 59.00 (60.85) 44.19
	Rear Yard	650.0[1] 28.0[2] 42.0[3]	53.24 63.74 (64.25) 49.39	-	-
Block 10 (North Unit)	Rear Wall	670.0[1] 30.0[2] 48.0[3]	-	54.40 64.17 (64.72) 48.98	55.78 58.08 (60.18) 43.01
	Rear Yard	900.0[1] 27.0[2] 45.0[3]	53.03 64.54 (64.95) 48.89	-	-
Block 10 (South Unit)	Side Wall	800.0[1] 90.0[2] 15.0[4]	-	51.73 53.63 (62.88) 61.93	53.18 47.97 (58.00) 55.56
	Rear Yard	800.0[1] 87.0[2] 17.0[4]	50.29 56.10 (62.04) 60.36	-	-
Block 11 (South Unit)	Side Wall	800.0[1] 135.0[2] 15.0[4]	-	51.73 50.85 (62.26) 61.93	53.18 45.35 (57.80) 55.56
	Rear Yard	800.0[1] 148.0[2] 17.0[4]	50.29 50.90 (61.19) 60.36	-	-
Block 21 (South Unit)	Side Wall	780.0[1] 50.0[4]	-	53.39 51.71 (55.64)	54.83 45.75 (55.34)
	Rear Yard	780.0[1] 57.0[4]	51.96 50.90 (54.47)	-	-

Block 24 (North Unit)	Front Wall Rear Yard	500.0[1] 23.0[2] 38.0[3] 500.0[1] 33.0[2] 48.0[3]	- 53.22 50.62 (55.24) 39.48	54.75 65.99 (66.42) 50.58 -	56.29 59.79 (61.48) 44.52 -
Block 25 (North Unit)	Front Wall	480.0[1] 25.0[2] 25.0[3]	-	55.03 65.42 (66.05) 53.45	56.55 59.26 (61.30) 47.22

[1] Highway 407
[2] Future Sideline 22/Peter Matthews Drive
[3] Future South Employment Collector (Street 8)
[4] Future EW Arterial Road

5.0 RECOMMENDED NOISE MITIGATION MEASURES

5.1 OUTDOOR MEASURES

Based on the sound level results in Table 5, the daytime rear yard sound levels at the following locations are expected to be above 60 dBA due to the Future Sideline 22/Peter Matthews Drive, EW Arterial Road and the future South Employment Collector Road traffic in the absence of mitigative measures. Therefore, noise mitigation measures are required for:

- Block 9 (West Unit), Block 10 (All Units), Block 11 (South Unit)

The daytime rear yard sound levels at the following locations are expected to be between 55dBA and 60 dBA. Therefore, physical noise mitigation measures are not required; however, warning clauses will be required.

- Blocks 1, 2, 3, 24 (All Units) and Block 25 (Medium Density Units)

The outdoor amenity area for Block 24 is expected to be the rear yards or the balconies above the garages at the rear (facing away from Peter Matthews Drive).

The outdoor amenity area is not expected to be fronting Peter Matthews Drive. However, the details and the exact locations of the outdoor amenity areas for Block 25 is recommended to be reviewed once more details are available.

NOISE BARRIERS

In accordance with M.E.C.P. policy, mitigative measure are required for Block 9 (West Unit), Block 10 (All Units) and Block 11 (south Unit) to reduce the sound levels to below 60 dBA and as close to 55 dBA as technically, economically and administratively feasible. It should be noted that the fence heights recommended in this report were determined based on the preliminary grading information dated November 2022 provided by Burnside.

For Block 9 (West Unit) and Block 10 (All Units), a 2.4m high noise barrier (fence and berm combination) is required along the side/rear property lines to achieve a sound level of 58dBA or less at the rear yards. The 2.4m high noise barrier should return to the side wall of the houses on Block 9 (west Unit) and Block 10 (South Unit) as shown on Drawing Y1241D.

For Block 11 (South Unit), a 1.8m high noise barrier is required along the side property line to achieve a sound level of 58dBA or less at the rear yard. The 1.8m high noise barrier should return to the side wall of the house on Block 11 (South Unit) as shown on Drawing Y1241D.

The recommended barriers should be constructed of a material, which provides a minimum surface density of 20 kg per square meter. If desired, the height of the required fencing can be reduced by locating it on an earthen berm, provided that the total fence height remains as described above. In accordance with MECP. policy, minimized and localized gaps (25mm maximum) at fence bottoms may be used to accommodate surface drainage, if necessary.

The following warning clause should therefore be incorporated into the Subdivision Agreement, which will be registered on title and should be included in all offers of purchase and sale or lease of the dwelling units within Block 9 (West Unit), Block 10 (All Units) and Block 11 (South Unit).

Warning Clause Type B

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

5.2 VENTILATION REQUIREMENTS

Ventilation requirements were determined using the sound levels at the building facades listed in Table 5.

MANDATORY CENTRAL AIR CONDITIONERS

Based on the information in Table 6, the following residential dwelling units are expected to be above 65dBA during the daytime and/or above 60dBA during the nighttime. Therefore, mandatory central air conditioning is required for the following locations.

- Block 9 (West Unit), Blocks 10, 24 (All Units), Block 11 (South Unit);
- Block 25 (Medium Density Units)

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 dwelling units at the above locations:

Warning Clause Type D:

"This dwelling unit was fitted with a central 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: The location and installation of the outdoor air conditioning device should be done so as to comply with noise criteria of MECP and thus minimize the noise impacts both on and in the immediate vicinity of the subject property)."

PROVISION FOR CENTRAL AIR CONDITIONERS

The following 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 as per Table 5 sound level results.

- Blocks 1 to 8, 11 to 23 (All Units), Block 9 (Remaining Units)

The following warning clause Type C 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: The location and installation of the outdoor air conditioning device should be done so as to comply with noise criteria of MECP and thus minimize the noise impacts both on and in the immediate vicinity of the subject property)."

5.3 BUILDING COMPONENTS

Building components within the proposed development were analyzed using the STC (Sound Transmission Class) method recommended by the MECP.

Detailed floor plans of the proposed dwelling units are required 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 30% of the floor area and the same side exterior walls are assumed to be 70% of the floor area.

DAYTIME SOUND LEVELS

For the worst-case location during daytime, Block 24 daytime dwelling wall sound level of 66 dBA was calculated at the first storey living/dining room.

To ensure acceptable daytime indoor sound levels of 45dBA from road noise source, the overall building components must provide an STC rating of 30 for windows and STC 37 for exterior wall construction.

NIGHT-TIME SOUND LEVELS

For the worst-case location during night-time, Block 24 night-time dwelling wall sound level of 61 dBA was calculated at the second storey bedroom.

To ensure acceptable night-time indoor sound levels of 40dBA from road noise source, the overall building components must provide an STC rating of 27 for windows and STC 34 for exterior wall construction.

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 building components for all residential houses are expected to meet the indoor sound level limits.

WINDOWS

The following are some window configurations meeting an STC rating of 30, assuming the ratio of window area to room floor area is 30%:

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

EXTERIOR WALLS

The following exterior wall construction EW1 meets more than the STC 37 rating, assuming a ratio of wall area to room floor area of 80%:

EW1 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 siding/stucco.

Sample window and exterior wall configurations have been provided in Appendix 4.

5.4 WARNING CLAUSES

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

- Blocks 1 to 24 (All Units) and Block 25 (Medium Density Units)

Warning Clause Type A

"Purchasers are advised that sound levels due to increasing road traffic, future aircraft traffic and the proposed elementary school may occasionally interfere with some activities of the dwelling occupants as the sound level will exceed the Ministry of Environment's noise criteria."

6.0 SUMMARY OF NOISE MITIGATION MEASURES

The summary of noise abatement measures are listed in the following Table 6 identifying sound barriers, mandatory central air conditioners, provision for central air conditioners, building components and warning clauses.

TABLE 6: SUMMARY OF NOISE MITIGATION MEASURES

BLOCKS/UNITS	VENTILATION REQUIREMENTS	BUILDING COMPONENTS	SOUND BARRIERS	WARNING CLAUSES
Block 9 (West Unit) Block 10 (All Units)	Mandatory air conditioning	Windows: OBC* Walls: OBC	2.4m**	Type A, B and D
Block 11 (South Unit)	Provision for air conditioning	Windows: OBC* Walls: OBC	1.8m**	Type A, B and C
Block 24 (All Units)	Mandatory air conditioning	Windows: OBC* Walls: OBC	No	Type A and D
Blocks 1 to 8, 12 to 23 (All Units) Blocks 9, 11 (Remaining Units)	Provision for air conditioning	Windows: OBC Walls: OBC	No	Type A and C
<u>Medium Density Block</u> Block 25 (All Units)	Mandatory air conditioning	Windows: OBC* Walls: OBC	-***	Type A and D

* OBC: Ontario Building Code Standard
** Noise fence located at the side/rear property lines.
*** To be determined once more detail becomes available.

7.0 RECOMMENDATIONS AND CONCLUSION

RECOMMENDATIONS

1. Mandatory air conditioning is required for Block 9 (West Unit), Blocks 10, 24 (All Units), Block 25 (Medium Density Units).

2. Provision for adding central air conditioning in the future for Blocks 1 to 8, 11 to 23 (All Units), Block 9 (Remaining Units).

3. For Block 9 (West Unit) and Block 10 (All Units), a 2.4m high noise barrier (fence and berm combination) is required along the side/rear property lines to achieve a sound level of 58dBA or less at the rear yards.

   For Block 11 (South Unit), a 1.8m high noise barrier is required along the side property line to achieve a sound level of 58dBA or less at the rear yard.

4. For all dwelling units within the proposed residential development, standard Ontario Building Construction will be acoustically acceptable for the exterior wall and window constructions.

5. It is recommended that the sound barrier heights be reviewed once the detailed grading information is available.

6. It is recommended that the Medium Density Block 25 noise mitigation measures to be further reviewed once more details become available.

7. All applicable warning clauses shall be listed in the City of Pickering's Subdivision Agreement and also be inserted in the Agreements of Purchase and Sale or Lease and registered on title.

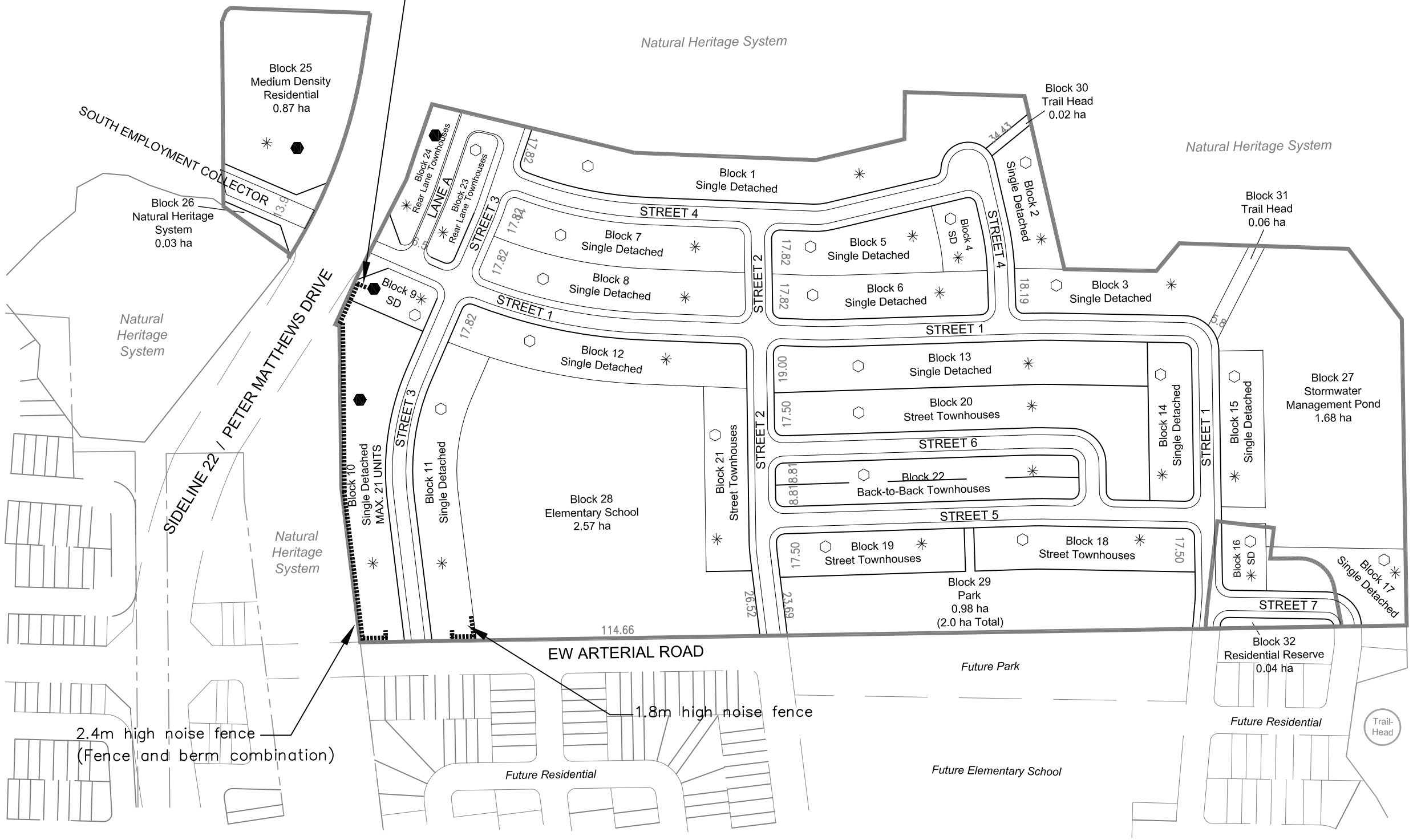
CONCLUSION

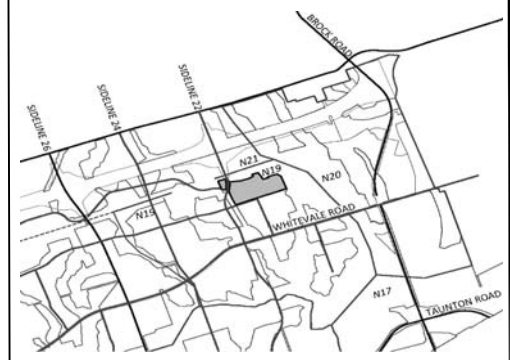
This report has determined that sound levels acceptable to the Ministry of Environment, Conservation and Parks, City of Pickering and the Region of Durham are expected to be achieved using the abatement measures in this report and as shown on the attached Drawing Y1241D.

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
- ▮▮▮▮▮ PROPOSED NOISE BARRIER AND WARNING CLAUSE B

YCA ENGINEERING Limited
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NOISE MITIGATION MEASURES

WHITEVALE (TFPM PH2 LANDS) NEIGHBOURHOOD 19

City of Pickering

SEATON TFPM INC.

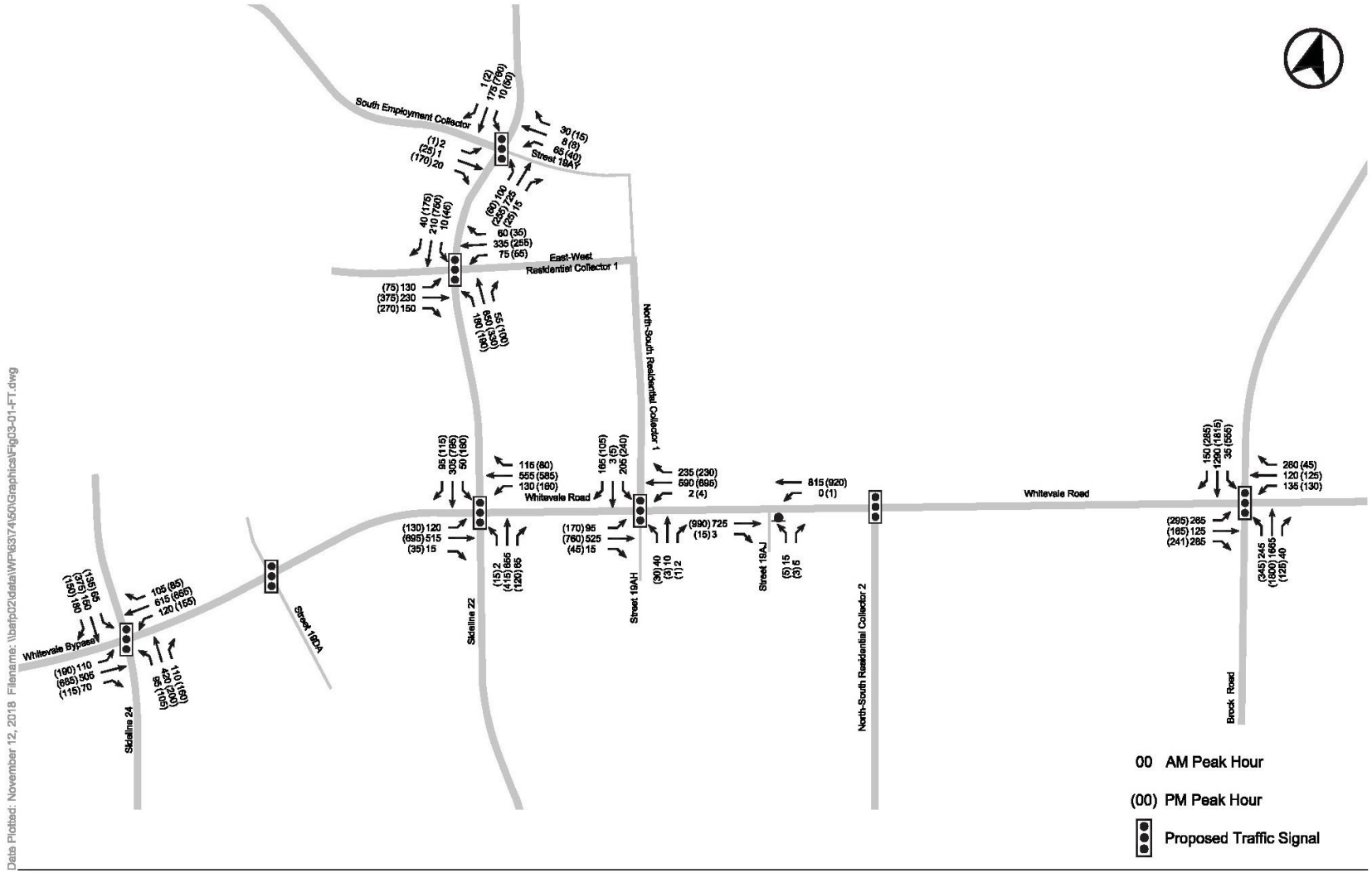
DRAWING: Y1241D

Scale: NTS

DATE: FEBRUARY 2023

APPENDIX 1

TRAFFIC DATA



FUTURE TRAFFIC VOLUMES
- ULTIMATE (FULL BUILD-OUT) CONDITIONS

BA Group

Mattamy Whitevale
6374-50 November 2018

Figure 3

Planning and Economic Development Department

Planning Division

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WHITBY, ON L1N 6A3
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Brian Bridgeman, MCIP, RPP
Commissioner of Planning and Economic Development

The Regional Municipality of Durham

ROAD SEGMENT TRAFFIC FORECASTS FOR NOISE ANALYSES

This information is to be used as the basis for assessing the potential impacts of noise, generated by traffic on Provincial Highways and arterial roads, on proposed land uses that are sensitive (e.g., residential subdivisions). Arterial roads include existing and future Type A, B and C, as designated in the Durham Regional Official Plan.

Noise assessment reports recommend specific measures to be integrated into the design of sensitive developments to reduce road noise impacts to acceptable levels.

Provided For:

Name / Name of Firm: Hava Jouharchi, YCA Engineering Ltd.

Address: 9251 Yonge Street, Suite 8557, Richmond Hill ON L4C 9T3

Telephone: (416) 894-3213 Fax:

Location of Proposal:

North of Whitevale Road - future Sideline 22/Peter Mathrews Drive Extension

Municipality: Lot(s): Concession:

Durham Region File No. (if available):

Name of Property Owner (if available):

Date Request Received: December 5, 2022 Received By: Anthony Caruso

Date Forecast Sent: December 9, 2022

Name of Road Segment	Forecasted AADT*	No. of Lanes	% of Trucks	Heavy : Medium Truck Ratio		Speed (km/h)
Whitvale Road (by-pass ext) Rossland to Brock	25,000	4	8	30	70	60
Future E/W Type C arterial road (N of Whitevale)	10,000	2	5	20	80	50

* Average Annual Daily Traffic. Forecast based on ultimate development according to the Durham Regional Official Plan.

From: Wang, Zach (MTO) [Zach.Wang@ontario.ca]
Sent: Tuesday, July 27, 2021 9:40 AM
To: Hava Jouharchi
Cc: Tai, Arthur (MTO)
Subject: RE: Traffic data, Hwy 407 in Pickering (Jul26,21)

Hello Hava,

In response to your request please find below the information available from this office for:

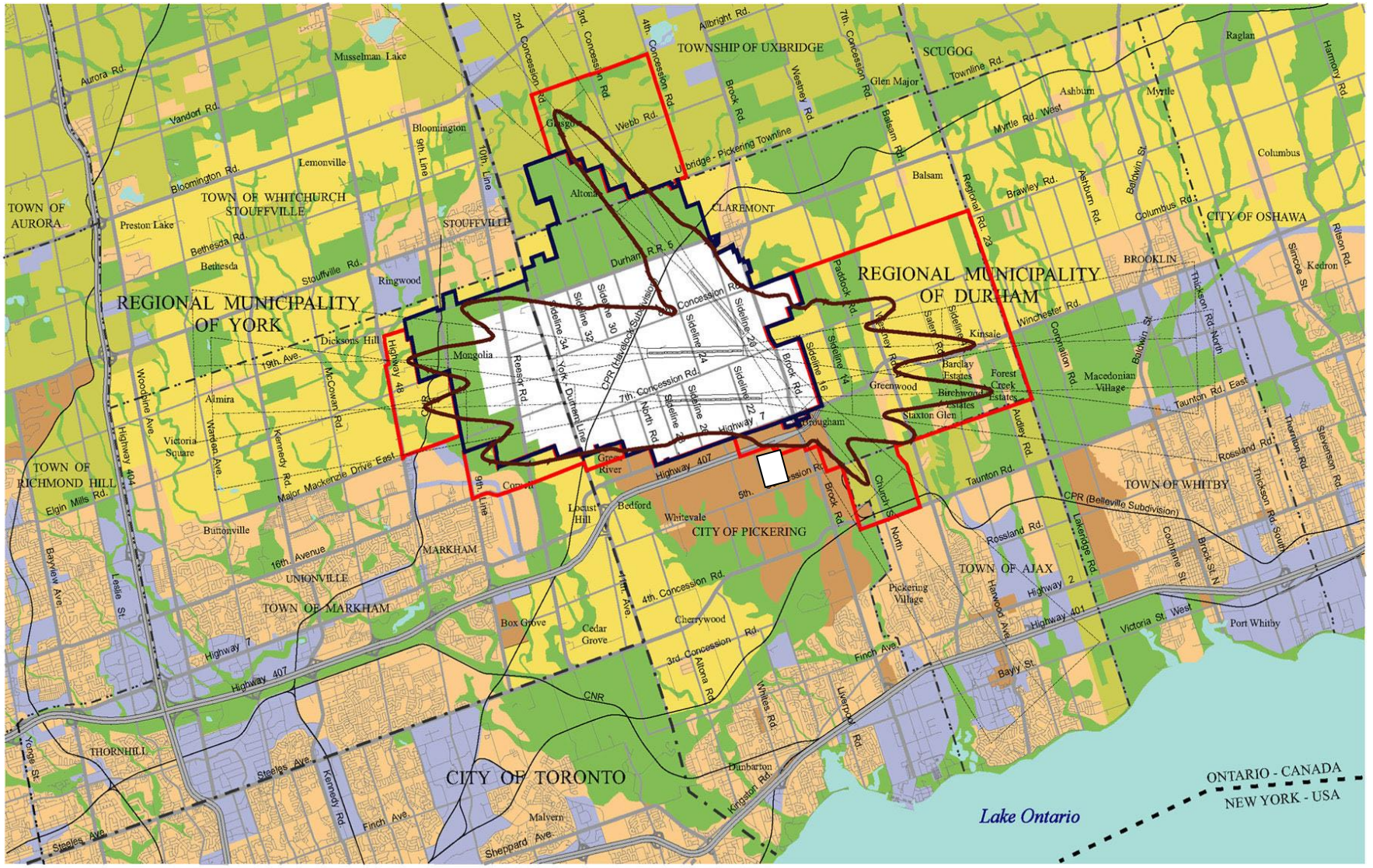
- Highway 407 at Brock Rd.:
  - Ultimate (2041) AADT = 60,000

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 and gradient will be available from Central Region Traffic Office.

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

Regards,
Zach

Zach Wang | EIT
Systems Analysis and Forecasting Office, Ministry of Transportation



LAND USE IN THE VICINITY OF AIRPORT

- Pickering Airport Lands Boundary
- International Boundary
- Regional Boundary
- Municipal Boundary
- 25 NEF Noise Contour
- Interim Airport Protection Area
- Freeways
- Primary/Secondary/Local Roads
- Rail Line
- Residential Area
- Rural Area
- Agricultural Area
- Mixed Use Area
- Employment Area
- Environmental and Open Space Area

1km 0 1 2 3 4 5km

Note: Map has been created using data from the following sources:
- *Ministry of Municipal Affairs and Housing*
- *Public Works Government Services Canada*
- *Printed with the permission of Her Majesty the QueenÕs Printer*
- *Subject to revision as new data become available*
- *Revision: October, 2004*

APPENDIX 2

STAMSON 5.04
SOUND LEVEL CALCULATIONS

```
STAMSON 5.0        SUMMARY REPORT        Date: 25-01-2023 17:00:22
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: bk1rwd.te            Time Period: Day/Night 16/8 hours
Description: Block 1, Rear Wall

Road data, segment # 1: Highway 407 (day/night)
----------------------------------------------
Car traffic volume  : 32002/15998 veh/TimePeriod  *
Medium truck volume :  2400/1200  veh/TimePeriod  *
Heavy truck volume  :  5600/2800  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):  60000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   6.00
    Heavy Truck  % of Total Volume     :  14.00
    Day (16 hrs) % of Total Volume     :  66.67
Data for Segment # 1: Highway 407 (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  : 500.00 / 500.00 m
Receiver height           :   4.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Result summary (day)
--------------------
                     !  source  !   Road   !  Total
                     !  height  !   Leq    !   Leq
                     !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Highway 407       !     1.93 !    57.15 !    57.15
--------------------+---------+---------+---------
                       Total                 57.15 dBA
Result summary (night)
----------------------
                     !  source  !   Road   !  Total
                     !  height  !   Leq    !   Leq
                     !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Highway 407       !     1.93 !    58.69 !    58.69
--------------------+---------+---------+---------
                       Total                 58.69 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 57.15
                           (NIGHT): 58.69
```

```
STAMSON 5.0        SUMMARY REPORT        Date: 25-01-2023 17:03:54
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: bk9swd.te            Time Period: Day/Night 16/8 hours
Description: Block 9, Side Wall

Road data, segment # 1: SDLine 22 (day/night)
-----------------------------------------------
Car traffic volume  : 18216/2024  veh/TimePeriod
Medium truck volume :  1109/123   veh/TimePeriod
Heavy truck volume  :   475/53    veh/TimePeriod
Posted speed limit  :    60 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1: SDLine 22 (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  :  26.00 / 26.00  m
Receiver height           :   4.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Road data, segment # 2: S Emplymnt C (day/night)
-----------------------------------------------
Car traffic volume  :  3848/428   veh/TimePeriod  *
Medium truck volume :   101/11    veh/TimePeriod  *
Heavy truck volume  :   101/11    veh/TimePeriod  *
Posted speed limit  :    50 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):   4500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   2.50
    Heavy Truck  % of Total Volume     :   2.50
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 2: S Emplymnt C (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  :  40.00 / 40.00  m
Receiver height           :   4.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Road data, segment # 3: Hwy 407 (day/night)
-----------------------------------------------
Car traffic volume  : 32002/15998 veh/TimePeriod  *
Medium truck volume :  2400/1200  veh/TimePeriod  *
Heavy truck volume  :  5600/2800  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):  60000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   6.00
    Heavy Truck  % of Total Volume     :  14.00
    Day (16 hrs) % of Total Volume     :  66.67
Data for Segment # 3: Hwy 407 (day/night)
-----------------------------------------------
```

```
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      1       (Wood depth 30 to less than 60 metres)
No of house rows          :      1 / 1
House density             :     50 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 325.00 / 325.00 m
Receiver height           :   4.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Result summary (day)
--------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.SDLine 22        !     1.24 !    65.15 !    65.15
 2.S Emplymnt C     !     1.26 !    50.23 !    50.23
 3.Hwy 407          !     1.93 !    57.60 !    57.60  -3=54.60
--------------------+---------+---------+---------
                      Total                  65.97 dBA

Result summary (night)
----------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.SDLine 22        !     1.25 !    59.00 !    59.00
 2.S Emplymnt C     !     1.25 !    44.19 !    44.19
 3.Hwy 407          !     1.93 !    58.97 !    58.97 -3=55.97
--------------------+---------+---------+---------
                      Total                  62.07 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 65.64
                           (NIGHT): 60.85
```

```
STAMSON 5.0        SUMMARY REPORT        Date: 25-01-2023 17:20:00
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: bk9ryd.te            Time Period: Day/Night 16/8 hours
Description: Block 9, Rear Yard

Road data, segment # 1: SDLine 22 (day/night)
-----------------------------------------------
Car traffic volume  : 18216/2024  veh/TimePeriod
Medium truck volume :  1109/123   veh/TimePeriod
Heavy truck volume  :   475/53    veh/TimePeriod
Posted speed limit  :    60 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1: SDLine 22 (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   55.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  28.00 / 28.00  m
Receiver height           :   1.50 / 7.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 55.00 deg
Barrier height            :   2.40 m
Barrier receiver distance :   4.50 / 4.50   m
Source elevation          : 210.00 m
Receiver elevation        : 209.90 m
Barrier elevation         : 209.80 m
Road data, segment # 2: S Emplymnt C (day/night)
-----------------------------------------------
Car traffic volume  :  3848/428   veh/TimePeriod  *
Medium truck volume :   101/11    veh/TimePeriod  *
Heavy truck volume  :   101/11    veh/TimePeriod  *
Posted speed limit  :    50 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):   4500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   2.50
    Heavy Truck  % of Total Volume     :   2.50
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 2: S Emplymnt C (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  :  42.00 / 42.00  m
Receiver height           :   1.50 / 7.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 0.00 deg
Barrier height            :   2.40 m
Barrier receiver distance :   4.50 / 4.50   m
Source elevation          : 210.50 m
Receiver elevation        : 209.90 m
Barrier elevation         : 209.80 m
Road data, segment # 3: Hwy 407 (day/night)
-----------------------------------------------
Car traffic volume  : 32002/15998 veh/TimePeriod  *
Medium truck volume :  2400/1200  veh/TimePeriod  *
Heavy truck volume  :  5600/2800  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):  60000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   6.00
    Heavy Truck  % of Total Volume     :  14.00
    Day (16 hrs) % of Total Volume     :  66.67
Data for Segment # 3: Hwy 407 (day/night)
--------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      1       (Wood depth 30 to less than 60 metres)
No of house rows          :      1 / 1
House density             :     50 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 325.00 / 325.00 m
Receiver height           :   1.50 / 7.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   2.40 m
Barrier receiver distance :   4.50 / 10.00  m
Source elevation          : 205.00 m
Receiver elevation        : 209.90 m
Barrier elevation         : 209.80 m
Result summary (day)
--------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.SDLine 22        !     1.24 !    56.75 !    56.75
 2.S Emplymnt C     !     1.26 !    43.35 !    43.35
 3.Hwy 407          !     1.93 !    53.77 !    53.77  -3=50.77
--------------------+---------+---------+---------
                      Total                 57.88 dBA  (with 2.4m high noise barrier)

                                            64.25 dBA   (No barrier)
```

```
STAMSON 5.0        SUMMARY REPORT        Date: 25-01-2023 17:01:15
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: bk10swnd.te          Time Period: Day/Night 16/8 hours
Description: Block 10, Rear Wall

Road data, segment # 1: SDLine 22 (day/night)
-----------------------------------------------
Car traffic volume  : 18216/2024  veh/TimePeriod
Medium truck volume :  1109/123   veh/TimePeriod
Heavy truck volume  :   475/53    veh/TimePeriod
Posted speed limit  :    60 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)
Data for Segment # 1: SDLine 22 (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  30.00 / 30.00  m
Receiver height           :   4.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Road data, segment # 2: EW Type C (day/night)
-----------------------------------------------
Car traffic volume  :  3848/428   veh/TimePeriod  *
Medium truck volume :   101/11    veh/TimePeriod  *
Heavy truck volume  :   101/11    veh/TimePeriod  *
Posted speed limit  :    50 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):   4500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   2.50
    Heavy Truck  % of Total Volume     :   2.50
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 2: EW Type C (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  :  48.00 / 48.00  m
Receiver height           :   4.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Road data, segment # 3: Hwy 407 (day/night)
-----------------------------------------------
Car traffic volume  : 32002/15998 veh/TimePeriod  *
Medium truck volume :  2400/1200  veh/TimePeriod  *
Heavy truck volume  :  5600/2800  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):  60000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   6.00
    Heavy Truck  % of Total Volume     :  14.00
    Day (16 hrs) % of Total Volume     :  66.67
Data for Segment # 3: Hwy 407 (day/night)
```

```
-----------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      1       (Wood depth 30 to less than 60 metres)
No of house rows          :      1 / 1
House density             :     50 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 335.00 / 335.00 m
Receiver height           :   4.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Result summary (day)
--------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.SDLine 22        !     1.24 !    64.17 !    64.17
 2.EW Type C        !     1.26 !    48.98 !    48.98
 3.Hwy 407          !     1.93 !    57.40 !    57.40 -3=54.40
--------------------+---------+---------+---------
                      Total                  65.11 dBA

Result summary (night)
----------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.SDLine 22        !     1.25 !    58.08 !    58.08
 2.EW Type C        !     1.25 !    43.01 !    43.01
 3.Hwy 407          !     1.93 !    58.78 !    58.78  -3=55.78
--------------------+---------+---------+---------
                      Total                  61.52 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 64.72
                           (NIGHT): 60.18
```

```
STAMSON 5.0        SUMMARY REPORT        Date: 25-01-2023 17:04:32
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: bk10swsd.te          Time Period: Day/Night 16/8 hours
Description: Block 10s, Side Wall

Road data, segment # 1: SDLine 22 (day/night)
-----------------------------------------------
Car traffic volume  : 18216/2024  veh/TimePeriod
Medium truck volume :  1109/123   veh/TimePeriod
Heavy truck volume  :   475/53    veh/TimePeriod
Posted speed limit  :    60 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1: SDLine 22 (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  :  90.00 / 90.00  m
Receiver height           :   4.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)

Road data, segment # 2: EW Type C (day/night)
-----------------------------------------------
Car traffic volume  :  8550/950   veh/TimePeriod  *
Medium truck volume :   360/40    veh/TimePeriod  *
Heavy truck volume  :    90/10    veh/TimePeriod  *
Posted speed limit  :    50 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):  10000
    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     :   1.00
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 2: EW Type C (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 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Road data, segment # 3: Hwy 407 (day/night)
-----------------------------------------------
Car traffic volume  : 32002/15998 veh/TimePeriod  *
Medium truck volume :  2400/1200  veh/TimePeriod  *
Heavy truck volume  :  5600/2800  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):  60000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   6.00
    Heavy Truck  % of Total Volume     :  14.00
    Day (16 hrs) % of Total Volume     :  66.67
```

Data for Segment # 3: Hwy 407 (day/night)

```
----------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      1       (Wood depth 30 to less than 60 metres)
No of house rows          :      2 / 2
House density             :     50 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 400.00 / 400.00 m
Receiver height           :   4.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
```

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)	
1.SDLine 22	1.24	53.63	53.63	
2.EW Type C	1.00	61.93	61.93	
3.Hwy 407	1.93	54.73	54.73	-3=51.73
Total			63.20 dBA	

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)	
1.SDLine 22	1.25	47.97	47.97	
2.EW Type C	1.00	55.56	55.56	
3.Hwy 407	1.93	56.18	56.18	-3=53.18
Total			59.23 dBA	

TOTAL Leq FROM ALL SOURCES (DAY): 62.88
(NIGHT): 58.00

```
STAMSON 5.0        SUMMARY REPORT        Date: 25-01-2023 17:22:21
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: bk10rysd.te          Time Period: Day/Night 16/8 hours
Description: Block 10s, Rear Yard

Road data, segment # 1: SDLine 22 (day/night)
-----------------------------------------------
Car traffic volume  : 18216/2024  veh/TimePeriod
Medium truck volume :  1109/123   veh/TimePeriod
Heavy truck volume  :   475/53    veh/TimePeriod
Posted speed limit  :    60 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1: SDLine 22 (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  :  87.00 / 87.00  m
Receiver height           :   1.50 / 7.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   2.40 m
Barrier receiver distance :   4.50 / 3.00   m
Source elevation          : 205.00 m
Receiver elevation        : 197.50 m
Barrier elevation         : 197.00 m
Road data, segment # 2: EW Type C (day/night)
-----------------------------------------------
Car traffic volume  :  8550/950   veh/TimePeriod  *
Medium truck volume :   360/40    veh/TimePeriod  *
Heavy truck volume  :    90/10    veh/TimePeriod  *
Posted speed limit  :    50 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):  10000
    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     :   1.00
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 2: EW Type C (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 / 17.00  m
Receiver height           :   1.50 / 7.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -55.00 deg   Angle2 : 90.00 deg
Barrier height            :   2.40 m
Barrier receiver distance :   4.50 / 4.50   m
Source elevation          : 197.00 m
Receiver elevation        : 197.50 m
Barrier elevation         : 197.00 m
Road data, segment # 3: Hwy 407 (day/night)
-----------------------------------------------
Car traffic volume  : 32002/15998 veh/TimePeriod  *
Medium truck volume :  2400/1200  veh/TimePeriod  *
```

*Heavy truck volume : 5600/2800 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): 60000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 6.00
Heavy Truck % of Total Volume : 14.00
Day (16 hrs) % of Total Volume : 66.67
Data for Segment # 3: Hwy 407 (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 1 (Wood depth 30 to less than 60 metres)
No of house rows : 2 / 2
House density : 50 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 400.00 / 400.00 m
Receiver height : 1.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.SDLine 22	1.24	52.38	52.38
2.EW Type C	1.00	53.59	53.59
3.Hwy 407	1.93	53.29	53.29 -3=50.29
Total			***57.06 dBA (with 2.4m high noise barrier)***
			62.04 dBA (No barrier)

```
STAMSON 5.0        SUMMARY REPORT        Date: 25-01-2023 17:36:29
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: bk11ryd.te           Time Period: Day/Night 16/8 hours
Description: Block 11, Rear Yard

Road data, segment # 1: SDLine 22 (day/night)
----------------------------------------------
Car traffic volume  : 18216/2024  veh/TimePeriod
Medium truck volume :  1109/123   veh/TimePeriod
Heavy truck volume  :   475/53    veh/TimePeriod
Posted speed limit  :    60 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1: SDLine 22 (day/night)
----------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 148.00 / 87.00  m
Receiver height           :   1.50 / 7.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   1.80 m
Barrier receiver distance :   4.50 / 3.00   m
Source elevation          : 205.00 m
Receiver elevation        : 197.50 m
Barrier elevation         : 197.00 m
Road data, segment # 2: EW Type C (day/night)
----------------------------------------------
Car traffic volume  :  8550/950   veh/TimePeriod  *
Medium truck volume :   360/40    veh/TimePeriod  *
Heavy truck volume  :    90/10    veh/TimePeriod  *
Posted speed limit  :    50 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):  10000
    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     :   1.00
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 2: EW Type C (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 / 17.00  m
Receiver height           :   1.50 / 7.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -55.00 deg   Angle2 : 90.00 deg
Barrier height            :   1.80 m
Barrier receiver distance :   4.50 / 4.50   m
Source elevation          : 197.00 m
Receiver elevation        : 197.50 m
Barrier elevation         : 197.00 m
Road data, segment # 3: Hwy 407 (day/night)
----------------------------------------------
Car traffic volume  : 32002/15998 veh/TimePeriod  *
Medium truck volume :  2400/1200  veh/TimePeriod  *
Heavy truck volume  :  5600/2800  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):  60000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   6.00
    Heavy Truck  % of Total Volume     :  14.00
    Day (16 hrs) % of Total Volume     :  66.67
Data for Segment # 3: Hwy 407 (day/night)
------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      1       (Wood depth 30 to less than 60 metres)
No of house rows          :      2 / 2
House density             :     50 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 400.00 / 400.00 m
Receiver height           :   1.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)

Result summary (day)
--------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.SDLine 22        !     1.24 !    50.90 !    50.90 *
 2.EW Type C        !     1.00 !    55.51 !    55.51
 3.Hwy 407          !     1.93 !    53.29 !    53.29  -3=50.29
--------------------+---------+---------+---------
                      Total                 57.68 dBA  (with 1.8m high noise fence)

                                            61.19 dBA  (No barrier)
```

```
STAMSON 5.0        SUMMARY REPORT        Date: 25-01-2023 17:05:04
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: bk21swd.te           Time Period: Day/Night 16/8 hours
Description: Block 21, Side Wall

Road data, segment # 1: S Emplymnt C (day/night)
-----------------------------------------------
Car traffic volume  :  3848/428   veh/TimePeriod  *
Medium truck volume :   101/11    veh/TimePeriod  *
Heavy truck volume  :   101/11    veh/TimePeriod  *
Posted speed limit  :    50 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):   4500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   2.50
    Heavy Truck  % of Total Volume     :   2.50
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 1: S Emplymnt C (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  :  50.00 / 50.00  m
Receiver height           :   4.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Road data, segment # 2: Hwy 407 (day/night)
-------------------------------------------
Car traffic volume  : 32002/15998 veh/TimePeriod  *
Medium truck volume :  2400/1200  veh/TimePeriod  *
Heavy truck volume  :  5600/2800  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):  60000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   6.00
    Heavy Truck  % of Total Volume     :  14.00
    Day (16 hrs) % of Total Volume     :  66.67
Data for Segment # 2: Hwy 407 (day/night)
-----------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      1       (Wood depth 30 to less than 60 metres)
No of house rows          :      1 / 1
House density             :     50 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 390.00 / 390.00 m
Receiver height           :   4.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Result summary (day)
--------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.S Emplymnt C     !     1.26 !    51.71 !    51.71
 2.Hwy 407          !     1.93 !    56.39 !    56.39 -3=53.39
--------------------+---------+---------+---------
```

	Total		57.66 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)	
1.S Emplymnt C	1.25	45.75	45.75	
2.Hwy 407	1.93	57.83	57.83	=3=54.83
	Total		58.09 dBA	

TOTAL Leq FROM ALL SOURCES (DAY): 55.64
(NIGHT): 55.34

```
STAMSON 5.0        SUMMARY REPORT        Date: 25-01-2023 17:07:31
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: bk24swd.te           Time Period: Day/Night 16/8 hours
Description: Block 24, Front Wall

Road data, segment # 1: SDLine 22 (day/night)
-----------------------------------------------
Car traffic volume  : 18216/2024  veh/TimePeriod
Medium truck volume :  1109/123   veh/TimePeriod
Heavy truck volume  :   475/53    veh/TimePeriod
Posted speed limit  :    60 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)
Data for Segment # 1: SDLine 22 (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  :  23.00 / 23.00  m
Receiver height           :   4.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Road data, segment # 2: S Emplymnt C (day/night)
-----------------------------------------------
Car traffic volume  :  3848/428   veh/TimePeriod  *
Medium truck volume :   101/11    veh/TimePeriod  *
Heavy truck volume  :   101/11    veh/TimePeriod  *
Posted speed limit  :    50 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):   4500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   2.50
    Heavy Truck  % of Total Volume     :   2.50
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 2: S Emplymnt C (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  :  38.00 / 38.00  m
Receiver height           :   4.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Road data, segment # 3: Hwy 407 (day/night)
-----------------------------------------------
Car traffic volume  : 32002/15998 veh/TimePeriod  *
Medium truck volume :  2400/1200  veh/TimePeriod  *
Heavy truck volume  :  5600/2800  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):  60000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   6.00
    Heavy Truck  % of Total Volume     :  14.00
    Day (16 hrs) % of Total Volume     :  66.67
Data for Segment # 3: Hwy 407 (day/night)
-----------------------------------------------
```

```
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      1       (Wood depth 30 to less than 60 metres)
No of house rows          :      1 / 1
House density             :     50 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 500.00 / 500.00 m
Receiver height           :   4.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Result summary (day)
--------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.SDLine 22        !     1.24 !    65.99 !    65.99
 2.S Emplymnt C     !     1.26 !    50.58 !    50.58
 3.Hwy 407          !     1.93 !    54.75 !    54.75
--------------------+---------+---------+---------
                      Total                  66.42 dBA

Result summary (night)
----------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.SDLine 22        !     1.25 !    59.79 !    59.79
 2.S Emplymnt C     !     1.25 !    44.52 !    44.52
 3.Hwy 407          !     1.93 !    56.29 !    56.29
--------------------+---------+---------+---------
                      Total                  61.48 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 66.42
                           (NIGHT): 61.48
```

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

Time Period	*L_{eq}(16) (dBA)*
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)

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

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	*ROAD*	*Less than or equal to 65 dBA*	*Building compliant with the Ontario Building Code*
		Greater than 65 dBA	*Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria*
	RAIL	*Less than or equal to 60 dBA*	*Building compliant with the Ontario Building Code*
		Greater than 60 dBA	*Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria*

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	*ROAD*	*Less than or equal to 60 dBA*	*Building compliant with the Ontario Building Code*
		Greater than 65 dBA	*Building components (walls, windows, etc.) must bed designed to achieve indoor sound level criteria*
	RAIL	*Less than or equal to 60 dBA*	*Building compliant with the Ontario Building Code*
		Greater than 60 dBA	*Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria*

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:

“Purchasers are advised that sound levels due to increasing road traffic, future aircraft traffic and the proposed elementary school may occasionally interfere with some activities of the dwelling occupants as the sound level will exceed 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, future aircraft traffic and the proposed elementary school may be of concern, occasionally interfering with some activities of the dwelling occupants as the noise level will exceed the Ministry of Environment’s noise criteria.”

TYPE C:

"This dwelling unit has been fitted with a forced air heating system and the ducting, etc. was sized to accommodate central air conditioning. 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 Municipality's and the Ministry of the Environment's noise criteria. (Note: The location and installation of the outdoor air conditioning device should be done so as to comply with noise criteria of MOE and thus minimize the noise impacts both on and in the immediate vicinity of the subject property.)"

TYPE D:

"This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the Municipality's and the Ministry of the Environment's noise criteria. (Note: The location and installation of the outdoor air conditioning device should be done so as to comply with noise criteria of MOE and thus minimize the noise impacts both on and in the immediate vicinity of the subject property.)"

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.