

ENVIRONMENTAL NOISE ASSESSMENT

**154 AND 164 CEMETERY ROAD
MOOREFIELD PROPERTIES LTD.
PROPOSED RESIDENTIAL DEVELOPMENT
PART OF LOTS 26 AND 27, CONCESSION 6**

TOWNSHIP OF UXBRIDGE

PREPARED FOR:

MOOREFIELD PROPERTIES LTD.

EXECUTIVE SUMMARY

The proposed residential development is located north of Highway No. 47 and approximately 230m east of the York-Durham Heritage Railway in the Township of Uxbridge.

The October 2016 Environmental Noise Assessment is issued to present the assessment of the proposed development and recommend any noise abatement features necessary to achieve sound levels acceptable to the Township of Uxbridge, the Region of Durham and the Ministry of Environment.

The transportation noise sources having the potential to affect the living environment within the proposed development area include Highway No. 47 and the York-Durham Heritage Railway. The ultimate traffic volumes on these noise sources are used as input to the Stamson's 5.04 to generate the resultant sound levels. Copies of the correspondence regarding traffic data is included in Appendix 2 in this report. The stationary noise sources having the potential to affect the proposed residential development are the existing commercial developments to the east and south.

Recommended noise abatement measures are described in Sections 5.1, 5.2, 5.3 and 5.4 and summarized in Table 5 of this report and on the attached Figure 2. These measures include:

1. Mandatory air conditioning is recommended for Lots 1, 21, 22, 42 and the future Block 59 (Apartment Units).
2. Provision for air conditioning is required for Lots 33 to 41 and 43.
3. A 2.0m high acoustic barrier is required at the side property lines of Lots 21, 22 and side/rear property lines of Lot 42.
4. Standard windows and exterior wall constructions meeting the Ontario Building Code requirement are sufficient for all residential units within the proposed development.
5. All applicable warning clauses shall be listed in the Township's Site Plan Agreement and also be inserted in the Agreements of Purchase and Sale or Lease and registered on title.

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1.0 INTRODUCTION

PURPOSE

A residential development has been proposed by Moorefield Properties Ltd. in the Township of Uxbridge. This report is an analysis of future sound levels within the Mixed Use development and describes the types and locations of noise mitigation measures which will be required.

SITE DESCRIPTION AND LOCATION

The proposed residential development will consist of 56 lots with (3) storey townhouse units and a future block (3 storey Apartment Building) located north/northwest of Highway No. 47, west of Cemetery Road and approximately 230m east of the York-Durham Heritage Railway in the Township of Uxbridge.

The surrounding land uses are existing residential development to the north and east, with existing commercial developments to the east of Cemetery Road and south of Highway No. 47 and open spaces to the west.

KEY PLAN

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

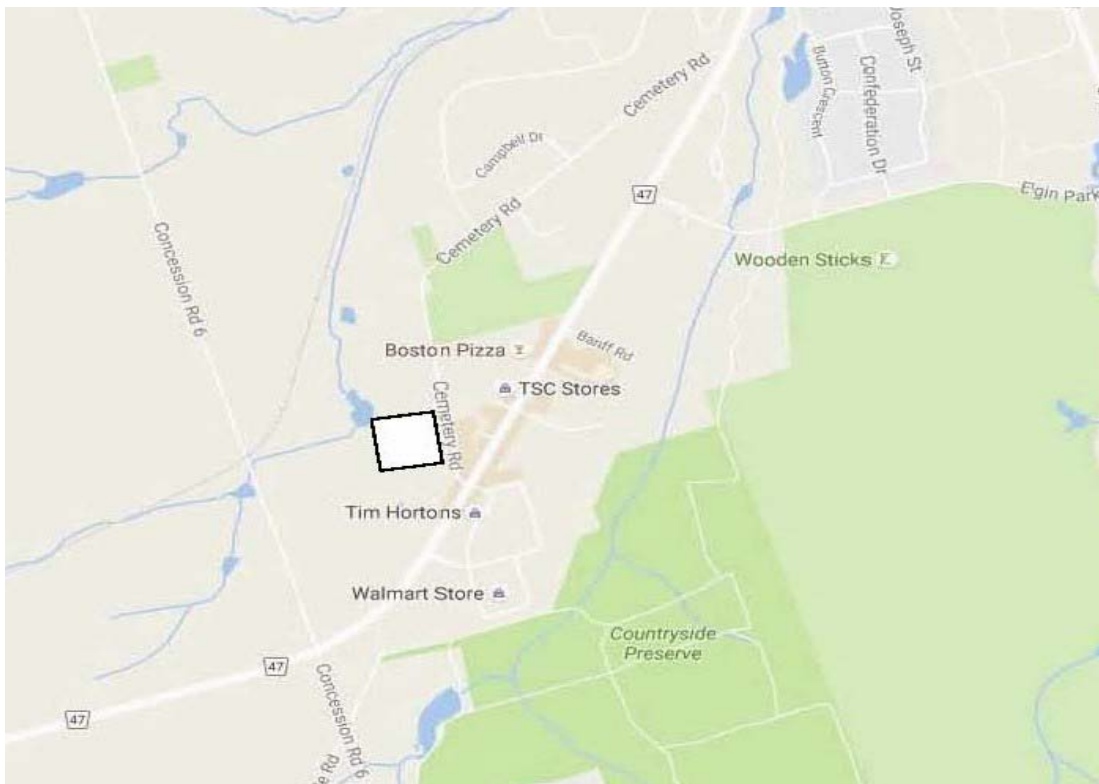


FIGURE 1

2.0 SOUND LEVEL CRITERIA

OUTDOOR SOUND LEVEL CRITERIA

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.

INDOOR SOUND LEVEL CRITERIA

Living and Dining Area (7am–11pm) – 16 Hr. Leq. = 45 dBA Roads, 5 NEF/NEP Aircrafts
Bedrooms (11 p.m. – 7 a.m.) – 8 Hr. Leq. = 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.O.E. guidelines (Publication NPC-300), this area is considered to be a Class 1 classification 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 (0700-2300) and 45 dBA during night-time (2300-0700).

3.0 NOISE SOURCES

ROAD TRAFFIC

As indicated on Figure 2, the proposed residential development will be located north of Highway No. 47, west of Cemetery Road and at approximately 230m east of the York-Durham Heritage Railway in the Township of Uxbridge. Noise generated by Highway No. 47 has the potential to affect future development.

All other roads within or near this site are considered acoustically insignificant due to low traffic volumes and distance separation.

Traffic volume information for Highway No. 47 was obtained from the Regional Municipality of Durham dated September, 2016. The traffic data obtained is summarized in Table 1 below:

TABLE 1: HIGHWAY NO. 47 TRAFFIC DATA	
Projected Annual Average Daily Traffic*	16,000
Percent Trucks	15%
Heavy to Medium trucks ratio	80/20
Speed (km/hr)	50
Number of Lanes	2
Day/Night Traffic split	90/10

* Projected traffic provided by the Region of Durham.

The York-Durham Heritage Railway trains operate with limited seasonal services on the weekends and holidays only with a maximum of 4 trains per day, 2 locomotives and a maximum speed of 80 km/h. There are no GO transit trains and freight train pass-bys for this section of railway. See Table 2 and Appendix 2 for a sample calculation.

TABLE 2: TRAFFIC PARAMETERS FOR GO TRANSIT					
TRAIN TYPE	NO. OF TRAINS (DAYTIME)	NO. OF TRAINS (NIGHT-TIME)	MAX. SPEED (km/hr)	AVG. NO. OF CARS PER TRAIN	AVG. NO. OF LOCOMOTIVES PER TRAIN
GO	4 (9.0)**	0 (0)**	80	10	2

** 10 year projection was used to the year 2018 in noise calculations, based on 2.5% annual growth (assumed in accordance with M.O.E. policy).

Some lots within the development are within 300m of the Railway right-of-way. Therefore, a warning clause should be incorporated for these dwelling units. See section 5.4, Table 5 and Appendix 3. The proposed residential development is more than 75m of the Railway right-of-way. Therefore, a vibration study is not required.

EXISTING STATIONARY NOISE SOURCES

Existing retail commercial buildings are located east of Cemetery Road. The commercial development consist of offices, a Bulk Barn, cleaners, fast food restaurants and convenience store. A Fast food restaurant and Country Style coffee shop with drive thru facility is located at the northeast corner of Highway No. 47 and Cemetery Road with daytime and evening operation hours. There are a mechanical units on the west side of one of the commercial building facing the proposed residential development.

In addition, there are several commercial development are located south and east of Highway No. 47.

Due to distance separation, and high ambient sound levels due to traffic noise from Highway No. 47, all remaining commercial activities are considered to be acoustically insignificant.

4.0 NOISE ASSESSMENT

4.1 ROAD TRAFFIC NOISE ASSESSMENT

Figure 2 is based on the latest Concept Plan dated October 2016 showing various noise analysis locations and noise mitigation measures within the proposed development. Sound levels were calculated using the Ministry of Environment's Stanson 5.04 computer based noise prediction model. The noise criteria and warning clauses are listed in Appendix 4. Table 3 lists the unattenuated sound levels at various locations.

TABLE 3: UNATTENUATED SOUND LEVELS				
LOCATIONS	DISTANCE TO CENTRELINE OF ROAD (m)	DAYTIME 16 Hr. Leq dBA		NIGHT-TIME 8 Hr. Leq dBA
		REAR YARD	DWELLING WALL	SECOND STOREY
Unit 1	155.0 ¹	-	53.76	49.38
	320.0 ²		45.05 (54.31)	
	170.0 ¹	<55	-	-
	322.0 ²			
Unit 10	200.0 ¹	-	51.94	47.75
	250.0 ²		47.02 (53.15)	
Unit 21	130.0 ¹	-	55.02	50.50
	128.0 ¹	55.18		
Unit 22	110.0 ¹	-	56.22	51.57
	113.0 ¹	55.27	-	-
Unit 33	130.0 ¹	-	55.02	50.50
	127.0 ¹	54.98	-	-
Unit 42	85.0 ¹	-	58.07	53.21
	81.0 ¹	60.96	-	-
Unit 43	132.0 ¹	-	54.91	50.40
	280.0 ²		46.13 (55.45)	
	134.0 ¹	<55	-	-
	278.0 ²			
Unit 56	205.0 ¹		51.54	47.38
	230.0 ²		47.68 (53.04)	-
	207.0 ¹	<55	-	
	230.0 ²			
Future Block 59 (Apartment Units)	85.0 ¹	-	67.16	60.63

¹ Highway No. 47 Road

² York-Durham Heritage Railway

Note: In accordance to the M.O.E. policy, a -10 dB correction is applied to the free-field sound level at the walls opposite to the directly exposed wall.

4.2 STATIONARY NOISE SOURCES ASSESSMENT

The noise impact from the surrounding existing commercial developments with the mechanical roof top units have the potential to exceed the sound level limits at the proposed development.

Based on the location of the buildings and the mechanical roof top units as shown on the attached Figure 2, the Sound Power Levels for all the roof top units were taken to be an average of 84dBA for a similar type of mechanical equipment. All roof top units are assumed to be operating 100% of the time during the daytime/evening and operating 50% of the time during the night-time. The truck activities are assumed to be daytime operations. Analysis is included in Appendix 3.

The sound levels were calculated using the CadnaA Version 4.4.145 computer program using the International Standard ISO 9613-2.

TABLE 4 - STATIONARY SOURCES SOUND LEVELS (UMITIGATED)			
RECEPTOR	SOUND LEVEL RESULTS (dBA)		EXCEEDANCE (dBA)
	DAYTIME/EVENING (0700 -2300)	NIGHTTIME (2300 -0700)	
	Roof Top Units	Roof Top Units	Roof Top Units
R1 (Lot 1, 2nd Storey)	47	46	Yes
R1a (Lot 1, Rear Yard)	46	45	No
R2 (Lot 22, 2nd Storey)	47	46	Yes
R2a (Lot 22, Rear Yard)	47	46	Yes
R3 (Lot 42)	44	43	No
R4 (Lot 33)	36	35	No
R5 (Future Block 59)	38	37	No

The total sound level results from the mechanical roof top units are expected to be above the sound level limit of 45 dBA during night-times at Lots 1, 21 and 22 building facades and Lots 21 and 22 rear yards.

Therefore, noise mitigation measures are recommended for Lots 1, 21 and 22 due to stationary noise sources. See Section 5.1.2 and 5.2.2 for these noise mitigation recommendations.

5.0 RECOMMENDED NOISE MITIGATION MEASURES

5.1 OUTDOOR MEASURES

5.1.1 TRAFFIC NOISE OUTDOOR MEASURES

Table 3 indicates that daytime rear yard sound levels at the following location will exceed 60 dBA in the absence of mitigative measures. Therefore, noise mitigation measures is required.

- Lot 42

The daytime rear yard sound levels at the following locations are expected to be between 55dBA and 60dBA in the absence of mitigative measures. Therefore, noise mitigation measures are not required due to road traffic noise.

- Lots 21 and 22

Please note that there are no designated outdoor amenity areas for the future Block 59 (Apartment Units).

NOISE BARRIERS

In accordance with M.O.E.C.C., mitigative measure is required for Lot 42 to reduce the sound levels close to 55 dBA. For Lot 42, a 2.0m high acoustic barrier (fence and berm combination) is required along the side/rear properties as shown on the attached Figure 2 to achieve a sound level of 55 dBA.

5.1.2 STATIONARY NOISE OUTDOOR MEASURES

As per the sound level results in Table 4, the sound levels at the adjacent commercial developments (mechanical equipment) are expected to exceed the sound level limits at Lots 21 and 22 outdoor amenity areas.

Therefore, a 2.0m high noise fence is recommended at the side property lines of Lots 21 and 22 as shown on the attached Figure 2.

Following installation of the recommended acoustic barrier, future outdoor sound levels may exceed the sound level limits at the following locations due to road traffic noise and stationary noise sources:

- Lots 21, 22 and 42

A warning clause should therefore be incorporated into the Site Plan Agreement, which will be registered on title and should be included in all offers of purchase and sale or lease of the dwelling units at the above locations. The clause should state:

Warning Clause No. B

“Purchasers/tenants are advised that despite the inclusion of noise control features , the sound levels due to increasing road traffic and the existing commercial developments may continue to be of concern, occasionally

interfering with the activities of the dwelling occupants as the noise levels may exceed the noise criteria of the Municipality and the Ministry of the Environment and Climate Change."

5.2 VENTILATION REQUIREMENTS

5.2.1 VENTILATION REQUIREMENTS DUE TO ROAD TRAFFIC

Ventilation requirements were determined using the sound levels at the building facades listed in Table 3 due to road traffic noise sources.

MANDATORY CENTRAL AIR CONDITIONERS

Based on the information in Table 3, the following location is expected to be above 65dBA during the daytime and/or above 60dBA during the nighttime due to road traffic. Therefore, mandatory air conditioning is required for:

- Future Block 59 (Apartment Units)

PROVISION FOR AIR CONDITIONERS

Based on the information in Table 3, the following locations 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 due to road traffic:

- Lots 33 to 41 and 43

In addition, the following warning clause must be incorporated into the Site Plan Agreement, which will be registered on title and should be included in all offers of purchase, sale and lease of the above suites:

Warning Clause Type C:

"This unit was fitted with ducting sized to accommodate a central ventilation system to allow windows and exterior doors to be kept closed, thereby achieving indoor sound levels within the limits recommended by the Ministry of Environment and Climate Change"

5.2.2 VENTILATION REQUIREMENTS DUE TO STATIONARY NOISE SOURCES

All surrounding commercial developments are daytime operations and the noise activities of concern are the mechanical roof top units.

Based on the MOECC Noise Guideline, the use of air conditioning is generally not acceptable for noise mitigation in the context of controlling the noise from a stationary source. However, in addition to the recommended noise mitigation measure, the noise activities from the surrounding commercial development may be audible at times.

MANDATORY AIR CONDITIONERS

Therefore, mandatory air conditioning is recommended for the following locations adjacent to the existing commercial development as a means of noise mitigation measure to allow the windows and doors to be closed if the noise activities exceed the sound level limits:

- Lots 1, 21, 22 and 42
- Future Block 59 (Apartment Units)

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

Warning Clause Type D:

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

5.3 BUILDING COMPONENTS

Building components within the proposed development were analyzed using the STC (Sound Transmission Class) method recommended by the M.O.E.C.C.

DAYTIME SOUND LEVELS

For the worst case location during daytime, (Block 59: Apartment Units) a daytime sound level of 67.16 dBA was calculated due to road and rail traffic. To ensure acceptable daytime indoor sound levels of 45 dBA from road noise source, the building components must provide an STC rating of 32 for windows, STC 37 for exterior wall construction.

NIGHT-TIME SOUND LEVELS

For the worst case location during night-time, (Future Block 59: Apartment Units) night-time sound level of 60.63 dBA was calculated. To ensure acceptable nighttime indoor sound levels of 40 dBA from road noise source, the building components must provide an STC rating of 29 for windows, 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, the windows at (Future Block 59: Apartment Units) need to be upgraded. Standard windows and exterior wall constructions meeting the Ontario Building Code requirement are sufficient for all other residential units.

WINDOWS

The following are some window configurations meeting an STC rating of 32, assuming the ratio of window area to room floor area is 25%:

- double glazing 4mm x 4mm thickness with 6mm air space (Casement/fixed) or
- double glazing 4mm x 4mm thickness with 16mm air space (Slider) or
- any other window type yielding a similar or greater STC rating

EXTERIOR WALLS

The following exterior wall constructions EW5 meet the STC 37 rating:

EW5 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 brick/concrete.

Sample window and exterior wall configurations are included in Appendix 5 for additional options.

5.4 WARNING CLAUSES

We recommend the following warning clauses to be incorporated into the Site Plan Agreement, which will be registered on title and included in all offers of purchase and sale or lease of suites noted below.

- Lots 1, 21, 22, 33 to 43 and Block 59 (Apartment Units)

Warning Clause Type A:

“Purchasers/tenants are advised that despite the inclusion of noise control features, the sound levels due to increasing road traffic and existing commercial developments may continue to be of concern, occasionally interfering with the activities of the occupants as the noise levels may exceed the noise criteria of the Ministry of the Environment and Climate Change.”

The following residential units are within 300m of the CP railway and require the Railway Warning Clause.

- Lots 2 to 17, 29 to 32 and 43 to 56

Railway Warning Clause

“A clause should be inserted in all offers of purchase and sale or lease and in the title deed or lease of each dwelling within 300m of the railway right-of-way, warning prospective purchasers or tenants of the existence of the Railway's operating right-of-way; the possibility of alterations including the possibility that the Railway may expand its operations, which expansion may affect the living environment of the residents notwithstanding the inclusion of noise and vibration attenuating measures in the design of the subdivision and individual units, and that the Railway will not be responsible for complaints or claims arising from the use of its facilities and/or operations.”

6.0 SUMMARY OF NOISE MITIGATION MEASURES

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

TABLE 5: SUMMARY OF NOISE MITIGATION MEASURES				
LOCATIONS	VENTILATION REQUIREMENTS	BUILDING COMPONENTS	SOUND BARRIERS	WARNING CLAUSES
Lot 1	Mandatory air conditioning	Windows: OBC Walls: OBC*	-	Type A and D
Lots 21, 22 and 42	Mandatory air conditioning	Windows: OBC Walls: OBC*	2.0m	Type A, B and D
Lots 33 to 41	Provision for air conditioning	Windows: OBC Walls: OBC*	-	Type A and C
Lots 2 to 17, 29 to 32 and 43 to 56	Provision for air conditioning	Windows: OBC Walls: OBC*	-	Type A, C and Railway Warning Clause
Future Block 59 (Apartment Units)	Mandatory air conditioning	Windows: STC 32 Walls: OBC*	-	Type A and D

* OBC: Ontario Building Code Standard.

7.0 RECOMMENDATIONS AND CONCLUSION

RECOMMENDATIONS

1. Mandatory air conditioning is required for Lots 1 , 21, 22, 42 and Future Block 59 (Apartment Units).
2. Provision for air conditioning is required for Lots 33 to 41 and 43.
3. A 2.0m high acoustic barrier is required at the side property lines of Lots 21, 22 and the side/rear property lines of Lot 42.
4. Standard windows and exterior wall constructions meeting the Ontario Building Code requirement are sufficient for all other faces of the proposed building.
5. All applicable warning clauses shall be listed in the Township's Site Plan 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, Township of Uxbridge and the Region of Durham are expected to be achieved using the abatement measures in this report and as shown on the attached Figure 2.

Respectfully submitted,

YCA ENGINEERING Limited

Hava Jouharchi, P.Eng.
Senior Project Engineer



APPENDIX 1

FIGURES



FIGURE 3

DISTANCES FROM THE STATIONARY NOISE SOURCES

APPENDIX 2

TRAFFIC DATA



The Regional Municipality of Durham

Planning and Economic Development Department

Planning Division

605 ROSSLAND RD. E.
4TH FLOOR
P.O. BOX 623
WHITBY, ON L1N 6A3
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905-668-7711
1-800-372-1102
Fax: 905-666-6208
E-Mail: planning@durham.ca

www.durham.ca

Brian Bridgeman, MCIP, RPP
Commissioner of Planning and Economic Development

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 St., Suite 8557, Richmond Hill, ON
Telephone: (416) 894-3213 Fax:

Location of Proposal:

West side of Cemetery Road, north of Toronto Street (Reg. Hwy. 47)

Municipality: Uxbridge Lot(s): Concession:
Durham Region File No. (if available):
Name of Property Owner (if available):

Date Request Received: September-21-16 Received By: Chris Leitch

Date Forecast Sent: September-23-16

Table with 7 columns: Name of Road Segment, Forecasted AADT*, No. of Lanes, % of Trucks, Heavy : Medium Truck Ratio, Speed (km/h). Row 1: Toronto Street, east of Concession Road 6, 16,000, 2, 15, 80:20, 50. Rows 2-4: 0, 0, 0, 0:0, 0.

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

APPENDIX 3

SOUND LEVEL CALCULATIONS

STAMSON 5.04 SUMMARY REPORT Date: 22-10-2016 07:06:00
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
 Filename: lsw.te Time Period: Day/Night 16/8 hours
 Description: Lot 1, Side Wall

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

Train Type	! Trains ! (Left)	! Trains ! (Right)	! Speed ! (km/h)	! # loc ! /Train!	! # Cars ! /Train!	! Eng type !	! Cont ! weld
1. YRH	! 2.7/0.0	! 2.7/0.0	! 80.0	! 2.0	! 10.0	! Diesel	! Yes

Data for Segment # 1: YD Heritage (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 : 320.00 / 320.00 m
 Receiver height : 1.50 / 7.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Whistle Angle : 0 deg Track 1

Result summary (day)

	! Loc ! Leq ! (dBA)	! Wheel ! Leq ! (dBA)	! Whistle ! Left Leq ! (dBA)	! Whistle ! Right Leq ! (dBA)	! Total ! Leq ! (dBA)
1.YD Heritage	! 40.34	! 29.34	! 40.07	! 40.07	! 45.05 *
Total					45.05 dBA

* Bright Zone !

Result summary (night)

	! Loc ! Leq ! (dBA)	! Wheel ! Leq ! (dBA)	! Whistle ! Left Leq ! (dBA)	! Whistle ! Right Leq ! (dBA)	! Total ! Leq ! (dBA)
1.YD Heritage	! 0.00	! 0.00	! 0.00	! 0.00	! 0.00 *
Total					0.00 dBA

* Bright Zone !

Road data, segment # 1: Highway 47 (day/night)

Car traffic volume : 12240/1360 veh/TimePeriod *
 Medium truck volume : 432/48 veh/TimePeriod *
 Heavy truck volume : 1728/192 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): 16000
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 3.00
 Heavy Truck % of Total Volume : 12.00
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Highway 47 (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 : 155.00 / 155.00 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.Highway 47	! 1.86 !	53.76	! 53.76
	Total		53.76 dBA

Result summary (night)

	! source !	Road	! Total
	! height !	Leq	! Leq
	! (m) !	(dBA)	! (dBA)
1.Highway 47	! 1.86 !	49.38	! 49.38
	Total		49.38 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 54.31
(NIGHT): 49.38

STAMSON 5.04 SUMMARY REPORT Date: 22-10-2016 07:28:47
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
 Filename: lry.te Time Period: Day/Night 16/8 hours
 Description: Lot 1, Rear Yard

Road data, segment # 1: Highway 47 (day/night)

 Car traffic volume : 12240/1360 veh/TimePeriod *
 Medium truck volume : 432/48 veh/TimePeriod *
 Heavy truck volume : 1728/192 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): 16000
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 3.00
 Heavy Truck % of Total Volume : 12.00
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Highway 47 (day/night)

 Angle1 Angle2 : -60.00 deg 50.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 170.00 / 170.00 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.Highway 47	!	1.86	!	51.93	!	51.93
Total						51.93 dBA

STAMSON 5.04 SUMMARY REPORT Date: 22-10-2016 07:06:22
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
 Filename: 10sw.te Time Period: Day/Night 16/8 hours
 Description: Lot 10, Side Wall

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

Train Type	! Trains (Left)	! Trains (Right)	! Speed (km/h)	! # loc /Train	! # Cars /Train	! Eng type	! Cont !weld
1. YDH	2.7/0.0	2.7/0.0	80.0	2.0	10.0	!Diesel	! Yes

Data for Segment # 1: YR Haritage (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 : 250.00 / 250.00 m
 Receiver height : 1.50 / 7.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Whistle Angle : 0 deg Track 1

Result summary (day)

	! Loc Leq (dBA)	! Wheel Leq (dBA)	! Whistle Left (dBA)	! Whistle Right (dBA)	! Total Leq (dBA)
1.YR Haritage	42.04	31.12	42.19	42.19	47.02 *
Total					47.02 dBA

* Bright Zone !

Result summary (night)

	! Loc Leq (dBA)	! Wheel Leq (dBA)	! Whistle Left (dBA)	! Whistle Right (dBA)	! Total Leq (dBA)
1.YR Haritage	0.00	0.00	0.00	0.00	0.00 *
Total					0.00 dBA

* Bright Zone !

Road data, segment # 1: Highway 47 (day/night)

Car traffic volume : 12240/1360 veh/TimePeriod *
 Medium truck volume : 432/48 veh/TimePeriod *
 Heavy truck volume : 1728/192 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): 16000
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 3.00
 Heavy Truck % of Total Volume : 12.00
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Highway 47 (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 : 200.00 / 200.00 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.Highway 47	!	1.86	!	51.94	!	51.94
	Total					51.94 dBA

Result summary (night)

	! source	!	Road	!	Total	
	! height	!	Leq	!	Leq	
	! (m)	!	(dBA)	!	(dBA)	
1.Highway 47	!	1.86	!	47.75	!	47.75
	Total					47.75 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 53.15
(NIGHT): 47.75

STAMSON 5.04 SUMMARY REPORT Date: 22-10-2016 07:07:00
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
 Filename: 42rw.te Time Period: Day/Night 16/8 hours
 Description: Lot 42, Rear Wall

Road data, segment # 1: Highway 47 (day/night)

 Car traffic volume : 12240/1360 veh/TimePeriod *
 Medium truck volume : 432/48 veh/TimePeriod *
 Heavy truck volume : 1728/192 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): 16000
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 3.00
 Heavy Truck % of Total Volume : 12.00
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Highway 47 (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 : 85.00 / 85.00 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.Highway 47	! 1.86 !	58.07 !	58.07
Total			58.07 dBA

Result summary (night)

	! source !	Road !	Total
	! height !	Leq !	Leq
	! (m) !	(dBA) !	(dBA)
1.Highway 47	! 1.86 !	53.21 !	53.21
Total			53.21 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 58.07
 (NIGHT): 53.21

STAMSON 5.04 SUMMARY REPORT Date: 22-10-2016 07:29:18
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
 Filename: 42ry.te Time Period: Day/Night 16/8 hours
 Description: Lot 42, Rear Yard

Road data, segment # 1: Highway 47 (day/night)

 Car traffic volume : 12240/1360 veh/TimePeriod *
 Medium truck volume : 432/48 veh/TimePeriod *
 Heavy truck volume : 1728/192 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): 16000
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 3.00
 Heavy Truck % of Total Volume : 12.00
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Highway 47 (day/night)

 Angle1 Angle2 : -70.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 82.00 / 82.00 m
 Receiver height : 1.50 / 7.50 m
 Topography : 0 (Define your own alpha.)
 Barrier angle1 : -70.00 deg Angle2 : 90.00 deg
 Barrier height : 2.00 m
 Barrier receiver distance : 4.50 / 4.50 m
 Source elevation : 0.00 m
 Receiver elevation : 0.00 m
 Barrier elevation : 0.00 m
 Alpha : 0.33

Result summary (day)

	! source !	Road !	Total
	! height !	Leq !	Leq
	! (m) !	(dBA) !	(dBA)
1.Highway 47	! 1.86 !	55.06 !	55.06
	Total		55.06 dBA

STAMSON 5.04 SUMMARY REPORT Date: 22-10-2016 07:05:11
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
 Filename: 59fw.te Time Period: Day/Night 16/8 hours
 Description: Block 59, Front Wall

Road data, segment # 1: Highway 47 (day/night)

```
-----
Car traffic volume : 12240/1360 veh/TimePeriod *
Medium truck volume : 432/48 veh/TimePeriod *
Heavy truck volume : 1728/192 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): 16000
  Percentage of Annual Growth : 0.00
  Number of Years of Growth : 0.00
  Medium Truck % of Total Volume : 3.00
  Heavy Truck % of Total Volume : 12.00
  Day (16 hrs) % of Total Volume : 90.00
```

Data for Segment # 1: Highway 47 (day/night)

```
-----
Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 45.00 / 45.00 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.Highway 47 ! 1.86 ! 67.16 ! 67.16
-----+-----+-----+-----
Total 67.16 dBA
```

Result summary (night)

```
-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----+-----
1.Highway 47 ! 1.86 ! 60.63 ! 60.63
-----+-----+-----+-----
Total 60.63 dBA
```

TOTAL Leq FROM ALL SOURCES (DAY): 67.16
 (NIGHT): 60.63

PROJECT NO.: Y1627
 PROJECT NAME: 164 Cemetery Road
 DATE: Oct.24,16

RECEIVER TABLE

Name	M.	ID	Level Lr		Limit. Value		Land Use		Coordinates		
			Day (dBA)	Night (dBA)	Day (dBA)	Night (dBA)	Type	Height (m)	X (m)	Y (m)	Z (m)
R1		R1	47.3	46	50	45	4.5 r	146	953.96	4.5	
R2		R2	46.5	45.2	50	45	4.5 r	146	901.84	4.5	
R3		R3	44	42.8	50	45	4.5 r	146	835.96	4.5	
R4		R4	36	34.7	50	45	4.5 r	68	832.99	4.5	
R5		R5	38.1	36.8	50	45	4.5 r	121.23	794.74	4.5	
R5		R5	46.8	45.5	50	45	4.5 r	143.51	953.17	4.5	
R1a		R1a	45.9	44.7	50	45	1.5 r	145.76	950.92	1.5	
R2a		R2a	47	45.8	50	45	1.5 r	146.07	900.18	1.5	

SOURCE TABLE

Name	M.	ID	Result. PWL		Lw / Li		Operating Time			KO (dB)	Freq. (Hz)	Direct.	Height (m)	Coordinates		
			Day (dBA)	Night (dBA)	Evening (dBA)	Night (dBA)	Type	Value	norm. dB(A)					Day (min)	Special (min)	Night (min)
S1		S1	94.5	94.5	94.5	Lw	85	85	60	60	30	0	(none)	172.35	949.99	4.7
S2		S2	96.5	96.5	96.5	Lw	87	87	60	60	30	0	(none)	179.36	943.66	4.7
S3		S3	94.5	94.5	94.5	Lw	85	85	60	60	30	0	(none)	189.69	953.99	4.7
S4		S4	96.5	96.5	96.5	Lw	87	87	60	60	30	0	(none)	197.69	942.99	4.7
S5		S5	94.5	94.5	94.5	Lw	85	85	60	60	30	0	(none)	208.69	949.66	4.7
S13		S13	87.5	87.5	87.5	Lw	78	78	60	60	30	0	(none)	175.47	832.54	4.5
S14		S14	95.5	95.5	95.5	Lw	86	86	60	60	30	0	(none)	176.44	825.98	4.5
S15		S15	86	86	86	Lw	86	86	60	60	30	0	(none)	183.03	825.78	4.5
S16		S16	87.5	87.5	87.5	Lw	78	78	60	60	30	0	(none)	188.12	825.77	4.5
S6		S6	87.5	87.5	87.5	Lw	78	78	60	60	30	0	(none)	171.56	930.5	3
S7		S7	89.5	89.5	89.5	Lw	80	80	60	60	30	0	(none)	171.57	919.71	3
S8		S8	87.5	87.5	87.5	Lw	78	78	60	60	30	0	(none)	171.86	908.37	3
S9		S9	87.5	87.5	87.5	Lw	78	78	60	60	30	0	(none)	171.75	895.59	3
S10		S10	91.5	91.5	91.5	Lw	82	82	60	60	30	0	(none)	171.72	896.38	2.5
S11		S11	87.5	87.5	87.5	Lw	78	78	60	60	30	0	(none)	171.78	883	3
S12		S12	87.5	87.5	87.5	Lw	78	78	60	60	30	0	(none)	171.56	872.47	3

RESULT TABLE

Receiver Name	ID	Limiting Value		rel. Axis Station m	Lr w/o Noise Control		d.l req.		Lr w/ Noise Control		Exceeding		passive NC dB(A)
		Day dB(A)	Night dB(A)		Day dB(A)	Night dB(A)	Day dB(A)	Night dB(A)	Day dB(A)	Night dB(A)			
R1	R1	50	50	45	47.3	46 -	46 -	1	0	0 -	-	-	-
R2	R2	50	50	45	46.5	45.2 -	45.2 -	0.2	0	0 -	-	-	-
R3	R3	50	50	45	44	42.8 -	42.8 -	-	0	0 -	-	-	-
R4	R4	50	50	45	36	34.7 -	34.7 -	-	0	0 -	-	-	-
R5	R5	50	50	45	38.1	36.8 -	36.8 -	-	0	0 -	-	-	-
R5	R5	50	50	45	46.8	45.5 -	45.5 -	0.5	0	0 -	-	-	-
R1a	R1a	50	50	45	45.9	44.7 -	44.7 -	-	0	0 -	-	-	-
R2a	R2a	50	50	45	47	45.8 -	45.8 -	0.8	0	0 -	-	-	-

APPENDIX 4

SOUND LEVEL CRITERIA

MINISTRY OF THE ENVIRONMENT

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 than 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 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 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 (L_{eq} 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 (L_{eq} 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/tenants are advised that despite the inclusion of noise control features, sound levels due to increasing road traffic and existing commercial developments may occasionally interfere with some activities of the occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of Environment and climate change.”

TYPE B:

“Purchasers/tenants are advised that despite the inclusion of noise control features , the sound levels due to increasing road traffic and the existing commercial developments may continue to be of concern, occasionally interfering with the activities of the dwelling occupants as the noise levels may exceed the noise criteria of the Municipality and the Ministry of the Environment and Climate Change.”

TYPE C:

“This unit was fitted with ducting sized to accommodate a central ventilation system to allow windows and exterior doors to be kept closed, thereby achieving indoor sound levels within the limits recommended by the Ministry of Environment and Climate Change”

TYPE D:

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

Railway Warning Clause

“A clause should be inserted in all offers of purchase and sale or lease and in the title deed or lease of each dwelling within 300m of the railway right-of-way, warning prospective purchasers or tenants of the existence of the Railway's operating right-of-way; the possibility of alterations including the possibility that the Railway may expand its operations, which expansion may affect the living environment of the residents notwithstanding the inclusion of noise and vibration attenuating measures in the design of the subdivision and individual units, and that the Railway will not be responsible for complaints or claims arising from the use of its facilities and/or operations.”

APPENDIX 5

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.



KEY PLAN

LEGEND:

- MANDATORY AIR CONDITIONING AND WARNING CLAUSE D
- OPTIONAL AIR CONDITIONING AND WARNING CLAUSE C
- * WARNING CLAUSE A
- PROPOSED ACOUSTIC BARRIER AND WARNING CLAUSE B

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DRAFT PLAN –
 NOISE
 MITIGATION MEASURES

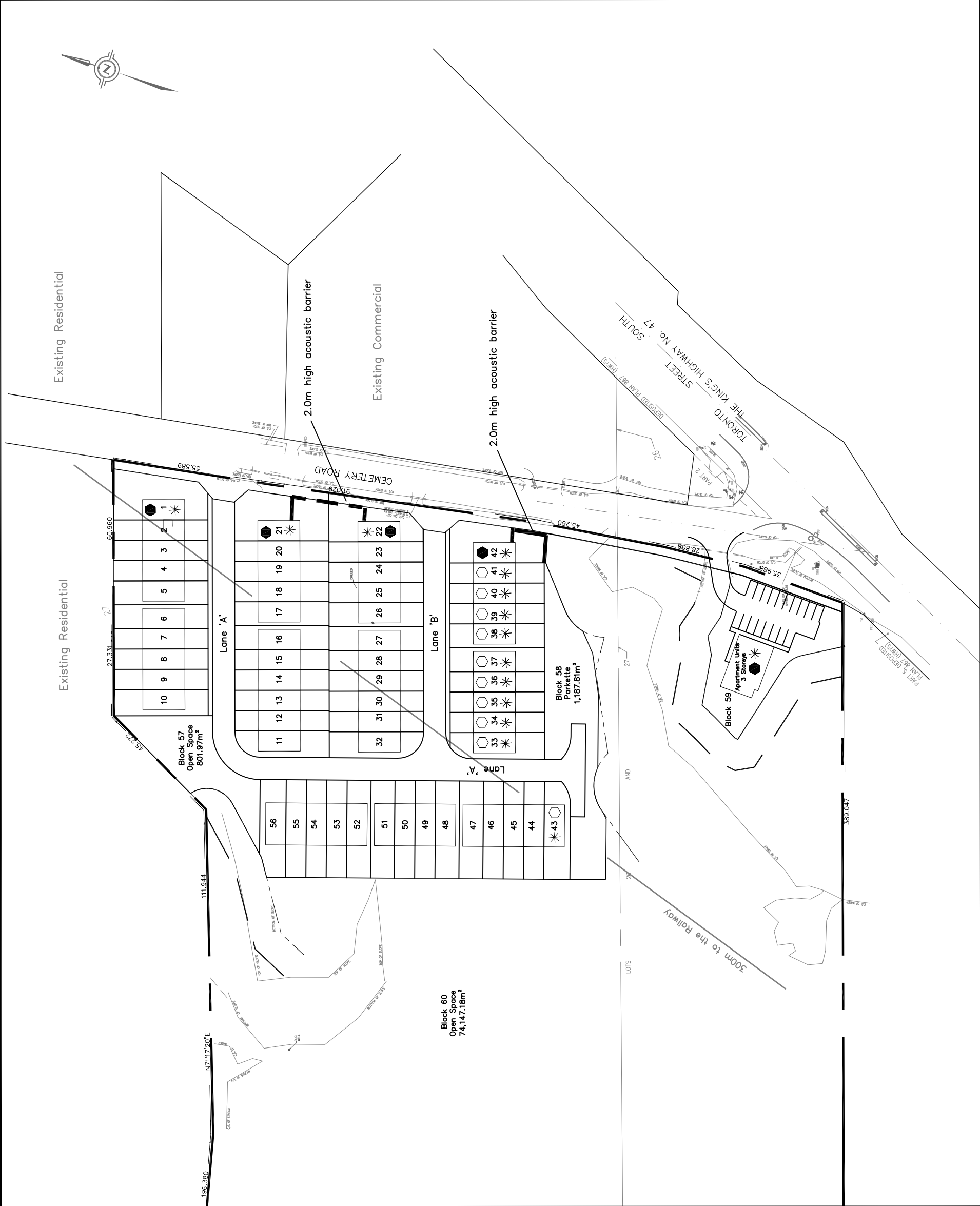
154 and 164 CEMETERY RD
 PROPOSED RESIDENTIAL

TOWN OF
 WHITCHURCH – STOUFFVILLE
 MOOREFIELD PROPERTIES LTD.

DRAWING: DWG Y1627

Scale: NTS

DATE: OCTOBER 2016



Existing Residential

Existing Residential

Existing Commercial

300m to the Railway