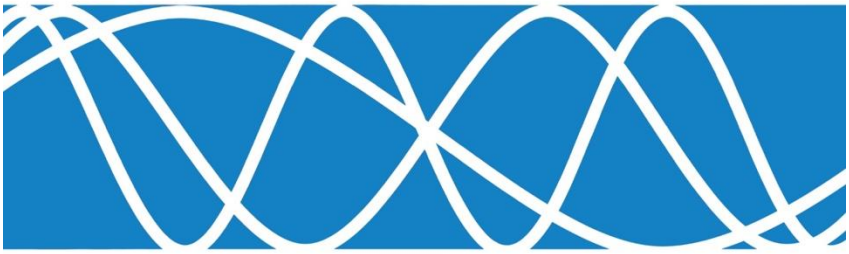
Noise Impact Assessment

Ramara Quarry
6059 Pearl Carricks Road
Township of Ramara, County of Simcoe, Ontario

February 3, 2026
HGC Project#: 020001234



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Version Control

Ramara Quarry, 6059 Pearl Carricks Road, Township of Ramara

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1.0	Feb 3, 2026	Original Noise Impact Assessment	H. Cai

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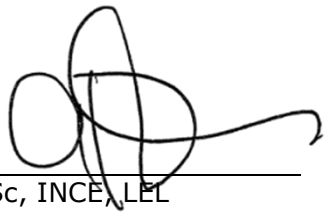

Andrew Dobson, BSc, INCE, LEL

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1 INTRODUCTION AND SUMMARY

HGC Noise Vibration Acoustics was retained by Brand X Materials and Supply Inc. (Brand X) to undertake an analysis of the potential impact of noise from the proposed Ramara Quarry at neighbouring noise sensitive receptors (i.e., residential dwellings), in accordance with the guidelines of the Ministry of Natural Resources (MNR) and the Ministry of the Environment, Conservation and Parks (MECP).

The analysis was based on consideration of the pertinent MNR and MECP guidelines, quarry plans prepared by MHBC Planning, equipment sound emission levels on file at HGC, and discussions with MHBC and Brand X regarding the proposed quarry.

Sound levels resulting from the proposed quarry were predicted at the selected receptor locations and compared to criteria established in accordance with MECP publication NPC-300 [1]. The results of the analysis indicate that sound levels from the proposed quarry, predicted under worst-case operating scenarios and with the noise control measures recommended herein, comply with the MECP guideline limits at surrounding sensitive receptors. Details of the analysis are included herein.

2 SITE AND SURROUNDING AREA

The Ramara Quarry is to be located north of Concession Road B-C and East of Pearl Carricks Road in Ramara Township, County of Simcoe, in Ontario. A scaled location map is included as Figure 1. The proposed licence area is 43.3 hectares, and the extraction area is 34.4 hectares with a maximum annual extraction of half a million tonnes. Aggregate extraction, drilling, processing, and shipping within and from the quarry are proposed to take place Monday to Saturday between 07:00 and 19:00, with no operations on Sundays or statutory holidays. Shipping activities will also take place between Monday to Saturday, between the hours of 06:00 and 20:00.

Existing points of reception surrounding the site are labelled in Figure 2 and designated as locations R1 through R9. These locations represent residential homes; the outdoor living areas are represented by locations R1A through R9A (each located within 30 metres of the respective dwelling, in the direction of the proposed quarry, as required by NPC-300).

Based on observations by HGC personnel made during a visit to the site and surrounding area, the background sound in the vicinity of points of reception is dominated by natural sounds and is thus best categorized as a Class 3 acoustical environment under MECP noise assessment guidelines.

3 CRITERIA FOR ACCEPTABLE SOUND LEVELS

MECP publication NPC-300 is the pertinent guideline for developing sound level limits for the assessment of aggregate operations, which are classified as *stationary sources of sound*. The acceptability limits for stationary sources are based on the existing background sound levels in the area of the subject site. In essence, sound from the stationary source is evaluated against (i.e., compared to) the typical background sound at neighbouring noise sensitive points of reception (e.g., residences). Background sound is considered to include road traffic sound, natural sound and other typical sounds; but excludes the sound of the site under assessment.

NPC-300 stipulates the sound level limits applicable at a point of reception are the greater of the minimum one-hour energy-equivalent ($L_{EQ,1\text{-}hr}$) background sound level or the exclusionary minimums of 45 dBA during the daytime (07:00 – 19:00), 40 dBA during the evening (19:00 – 23:00), and 40 dBA during nighttime (23:00 – 07:00) periods.

Based on observations during the site visits, background sound in the vicinity of all other receptor locations could fall as low as the exclusionary minimum limits, which are therefore the applicable criteria.

As the subject quarry will operate between 06:00 and 20:00, the applicable limits at all receptor locations are the following:

Table 1: Applicable Sound Level Limits, $L_{EQ,1\text{-}Hr}$ [dBA]

Early Morning (06:00 to 07:00)	Daytime (07:00 to 19:00)	Early Evening (19:00 to 20:00)
40	45	40

Compliance with MECP criteria generally results in acceptable levels of sound at residential receptors, although there may be residual audibility during periods of low background sound. Guideline NPC-300 applies to sound from the ongoing day-to-day operations of the subject site, but not to the temporary sound produced during the preparation and rehabilitation of extraction areas, or to the sound produced by highway trucks on public roadways, or by auditory warning devices required / authorized by law / in accordance with good safety practices (including 'back up beepers'). Within each phase of extraction, the initial operations of building access roadways, stripping topsoil, building noise berms and/or localized shielding, as well as the final operations of rehabilitation (and removal of noise berms/localized shielding) are defined as construction activities. In order to satisfy Provincial Standards, the sound emission levels of equipment involved in those construction activities must comply with MECP Guideline NPC-115 [2].

4 DESCRIPTION OF QUARRY OPERATIONS

The Ramara Quarry site plans have been submitted under separate cover. The simplified operation schematic included as Figure 3 was used to evaluate sound emissions from the proposed quarrying operations. The site will be operated in three phases. Materials will be extracted in one lift, but the site plan retains the flexibility to allow for two lifts, to a final elevation approximately 230 metres above sea level. Extraction with two lifts have been assessed as a conservative approach since it represents the worst-case scenario, providing the least amount of acoustical shielding by the working face.

In all phases, a rock drill will be used to establish the blast pattern, and finished product will be shipped from the site by highway trucks via the main entrance on Pearl Carricks Road. Material will be transported between the working face and the processing area by conveyors/loaders.

Operations will commence at grade at the northeast end of Phase 1. Extraction will take place throughout phase 1 proceeding in a south-westerly direction, while the processing equipment will remain at the lift grade.

During this and all subsequent extraction, the processing equipment, comprised of a primary and secondary crusher, will move throughout the quarry with the working face.

5 ASSESSMENT METHODOLOGY

The predictive model used for this study (*CadnaA, version 2025, build 209.5501*) is based on the methods from ISO Standard 9613-2.2 [3] which accounts for reductions in sound levels due to geometrical spreading, air absorption, ground attenuation and acoustical shielding by intervening structures, including the extraction face, topographic features, and foliage, where applicable. The ISO method tends to be conservative, as it assumes a moderate downwind condition (favorable for the propagation of sound from the source to a receiver) in all directions, at all times. This modelling technique is acceptable to the MNR and MECP.

Details of the acoustical modelling assumptions are included as Appendix A. The recommended noise control measures are included as Appendix B.

6 ASSESSMENT RESULTS

Using the simplified operation schematic included in Figure 3 and the operating parameters described in Section 4, the modelling assumptions detailed in Appendix A, along with the noise control recommendations detailed in Appendix B and Figure 4, the sound levels of the proposed quarry were predicted at each

of the selected receptors under predictable worst-case conditions. The results are summarized in the table below, with sample calculations provided in Appendix C.

Table 2: Predicted Quarry Sound Levels at Nearby Receptors, $L_{EQ,1\text{-}Hr}$ [dBA]

Point of Reception	Worst-Case Sound Level (Worst-Case Phase)		Sound Level Limit		Within Limit?	
	Early Morning & Evening[1]	Daytime	Early Morning & Evening	Daytime	Early Morning & Evening	Daytime
R1	22 (Ph 3)	36 (Ph 3)	40	45	Yes	Yes
R1A	--	36 (Ph 3)	--	45	N/A	Yes
R2	24 (Ph 3)	37 (Ph 3)	40	45	Yes	Yes
R2A	--)	37 (Ph 3)	--	45	N/A	Yes
R3	28 (Ph 3)	42 (Ph 3)	40	45	Yes	Yes
R3A	--	28 (Ph 3)	--	45	N/A	Yes
R4	34 (Ph 2)	45 (Ph 3)	40	45	Yes	Yes
R4A	--	45 (Ph 3)	--	45	N/A	Yes
R5	33 (Ph 2)	44 (Ph 3)	40	45	Yes	Yes
R5A	--	43 (Ph 3)	--	45	N/A	Yes
R6	29 (Ph 2)	41 (Ph 3)	40	45	Yes	Yes
R6A	--	41 (Ph 3)	--	45	N/A	Yes
R7	29 (Ph 2)	42 (Ph 3)	40	45	Yes	Yes
R7A	--	40 (Ph 3)	--	45	N/A	Yes
R8	25 (Ph 3)	37 (Ph 2)	40	45	Yes	Yes
R8A	--	36 (Ph 3)	--	45	N/A	Yes
R9	23 (Ph 2)	36 (Ph 2)	40	45	Yes	Yes
R9A	--	35 (Ph 2)	--	45	N/A	Yes

Notes: 1. Early Morning is 06:00 to 07:00, Daytime is 07:00 to 19:00. Evening is 19:00 to 20:00.

The analysis results summarized above indicate that the predicted sound levels of the Ramara Quarry comply with MECP guideline limits at all existing points of reception receptors under worst-case operating scenarios.

7 CONCLUSIONS & RECOMMENDATIONS

The acoustical analysis indicates that sound levels from the proposed Ramara Quarry, predicted under worst-case operating scenarios and with the noise control measures recommended herein, will comply with MECP guideline limits at the existing, most potentially impacted neighbouring receptors.

The noise control measures specified in Appendix B should be incorporated into the operational plans for the quarry. Any changes proposed for the quarry plans that may affect offsite sound levels should be reviewed by a Professional Engineer qualified to provide Acoustical Engineering services in the Province of Ontario, and any necessary modifications to the noise control measures should be incorporated into the quarry plans if/as appropriate.

8 REFERENCES

1. *Ontario Ministry of the Environment, Conservation and Parks Publication NPC-300, "Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning", August, 2013.*

2. *Ontario Ministry of the Environment, Conservation and Parks Publication NPC-115, "Construction Equipment", August, 1978.*

3. *International Organization for Standardization, "Acoustics – Attenuation of Sound during Propagation Outdoors – Part 2: General Method of Calculation", ISO-9613-2, Switzerland, 1996.*

Figure 1: Location Map

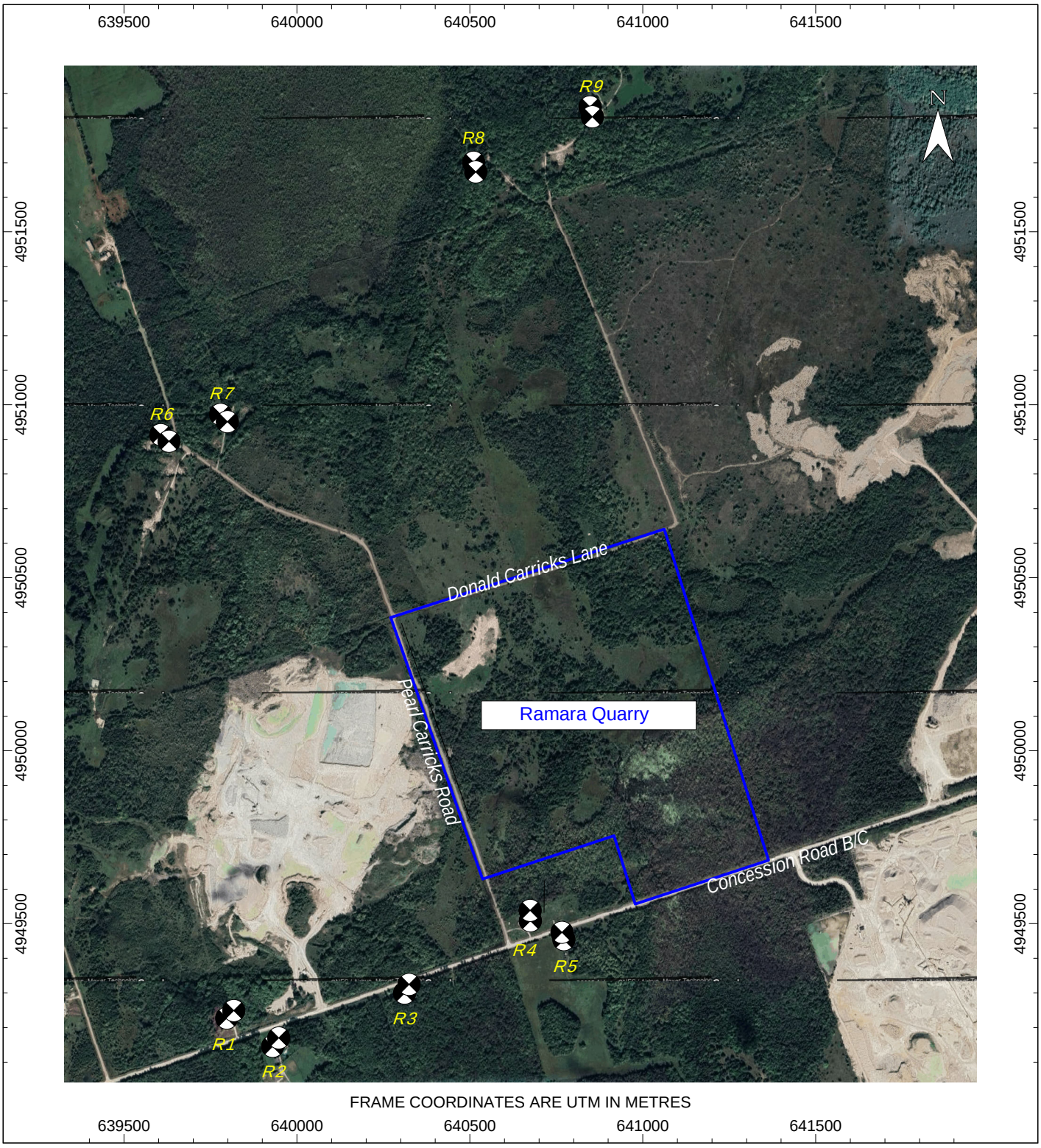

Figure 2: Ramara Quarry & Points of Reception

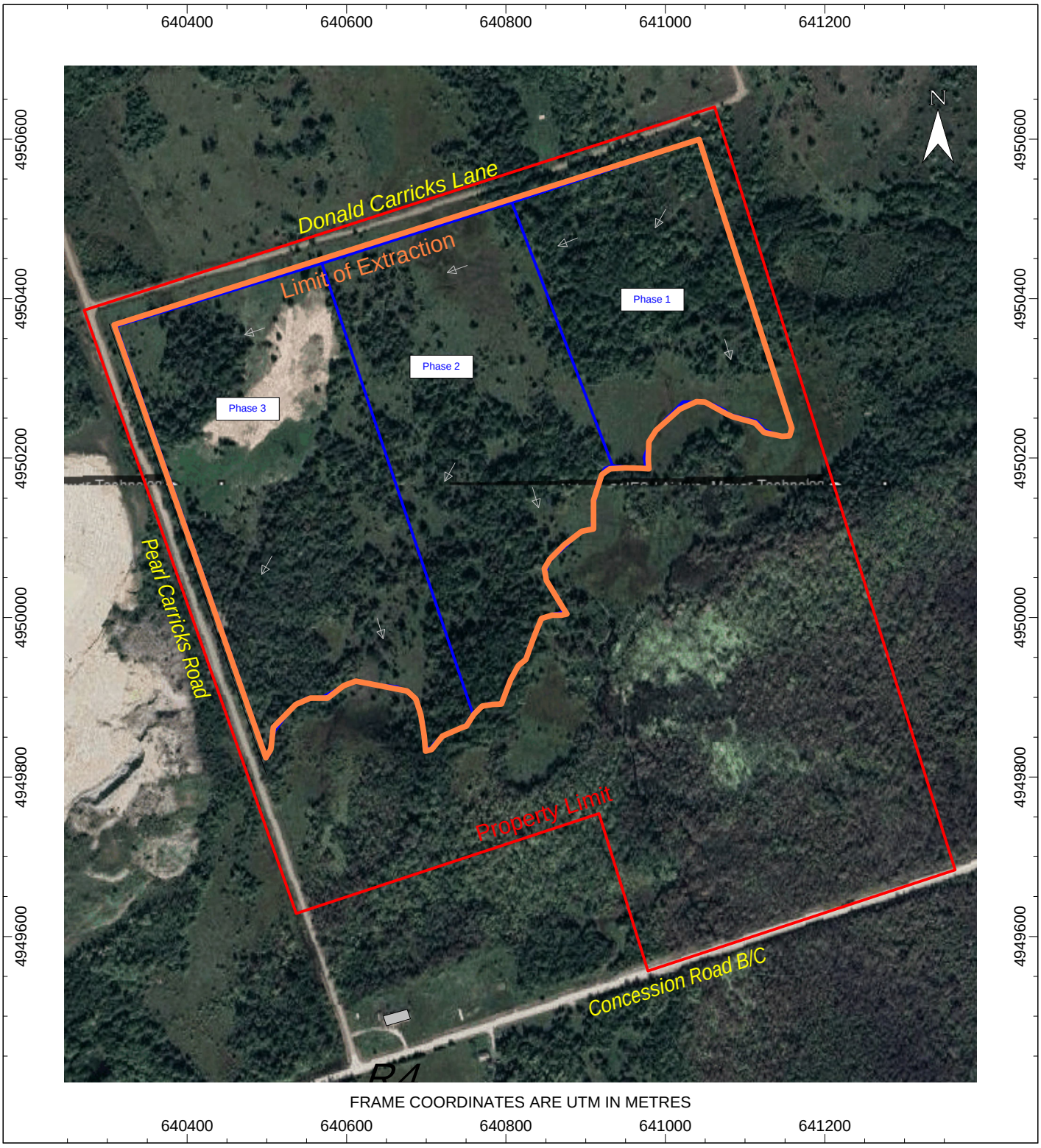

Figure 3: Extraction Phasing Plan

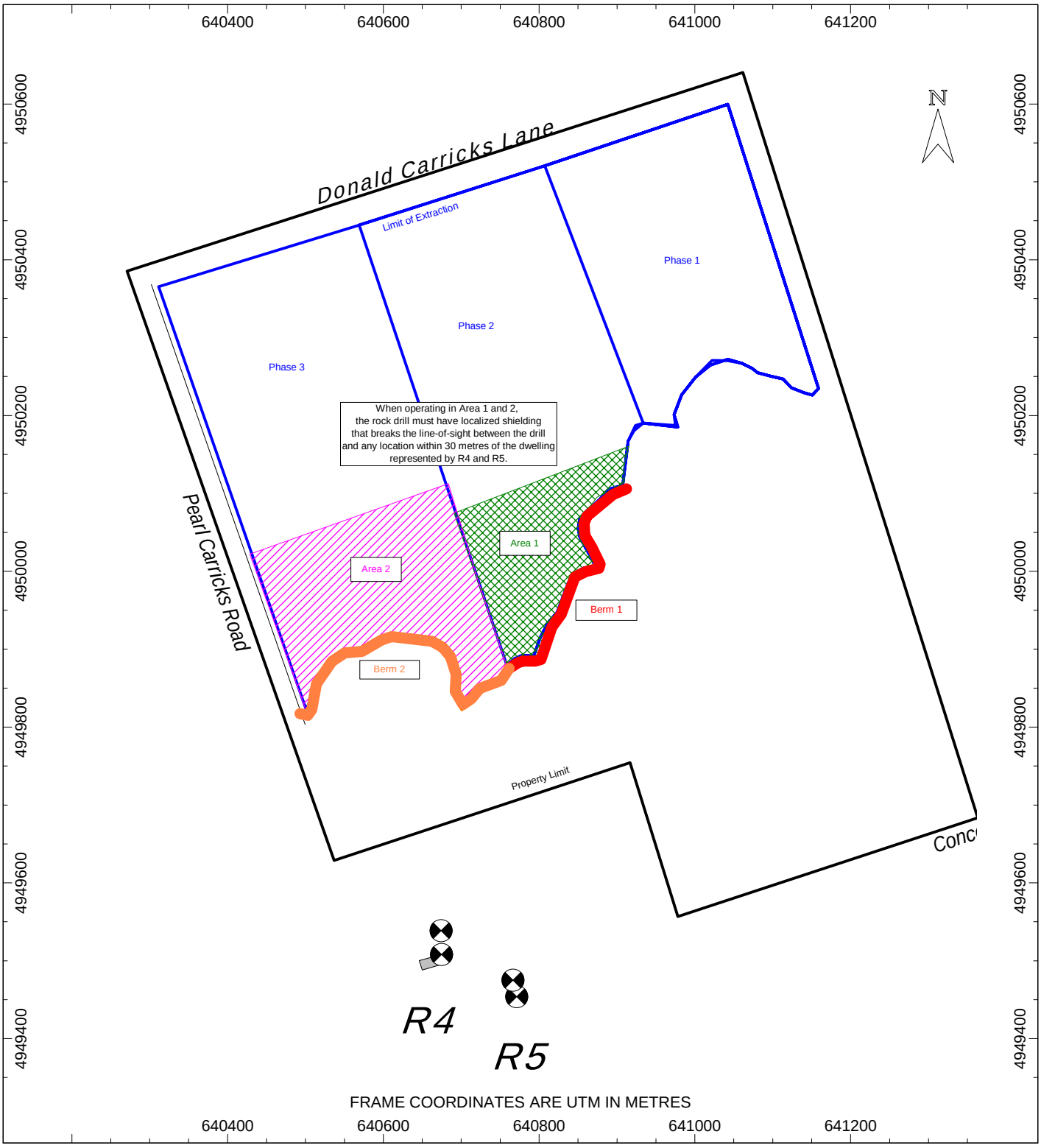

Figure 4: Noise Berms and Operating Restrictions in Phases 2 & 3

Appendix A
Details of Modelling Assumptions

In the development of worst-case hour operational scenarios with respect to each of the selected points of reception, the following assumptions were made:

- Drilling will occur during the daytime period only (07:00 to 19:00), with a drill assumed be operating at worst-case locations in terms of sound level impact at each of the surrounding receptors.
- The processing equipment (consisting of a primary and secondary crusher, screens, generators, etc.) may occur between 07:00 and 19:00.
- Movements of highway trucks shipping finished product may occur between 06:00 and 20:00.
- Drilling and processing equipment will not be operated simultaneously (i.e., no drilling activities when the processing equipment is active and vice versa).
- The processing equipment crusher, when moving throughout the quarry in a southeasterly direction, was assumed to operate near a working face, affording 5 dBA of attenuation at the receptors in the southeast direction (R1 through R5), in addition to attenuation afforded by the outer rim of the quarry and any noise berms.
- The following table presents the equipment sound power emission levels employed in the analysis. All equipment was assumed to operate continuously during a predictable worst-case hour.

Table A1: Source Sound Power Levels [dBA re: 10^{-12} Watts]

Source Type/Name	Sound Power Level
Rock Drill (qty. 1)	119
Processing Equipment (primary and secondary crusher, screens, wash plant, generators, etc.)	120
Highway Trucks (each)	102

- Conveyors and loaders that will be used to transport material between the working face and the processing area were also not explicitly included in the analysis, given their acoustical insignificance relative to the balance of equipment in the processing area.
- A predictable worst-case hour of shipping was assumed to include 20 inbound / outbound highway trucks, travelling along the access route between the main entrance and the processing area at a conservative average speed of 10 km/hr.

Appendix B
Noise Control Recommendations

The following noise controls are recommended for inclusion on the Ramara Quarry Site Plans.

Hours of Operation

The quarry shall be limited to the following hours of operation:

- Aggregate extraction, including drilling and processing, is permitted Monday to Saturday between 07:00 and 19:00
- Shipping activities are permitted to occur between 06:00 and 20:00.
- No operations are permitted on Sundays or statutory holidays.

Acoustical Shielding

When following the active face of extraction, the processing equipment shall be located as close as possible to the excavated face of each phase, in order to maximize acoustical shielding.

The following subsections refer to noise berms, the locations of which are depicted in Figure 4, and heights/extents are tabulated below:

Table B1: Summary of Noise Berm Dimensions (metres)

Berm	Height	Length
1	3	325
2	3	400

Note: All heights are expressed relative to the natural grade on which the berms will be located, which differs along the length of a given berm.

The berms noted above may be constructed of any earthen material (i.e., overburden or extracted/processed aggregate materials).

Phase 1

- Operation of the rock drill and processing equipment shall be restricted to between 07:00 and 19:00 and shall not take place simultaneously in any given hour (i.e., only one of the two may operate at a time).

Phase 2

- Berm 1 and 2 shall be constructed prior to commencement of operations in Phase 2.

- Operation of the rock drill and processing equipment shall be restricted to between 07:00 and 19:00 and shall not take place simultaneously in any given hour (i.e., only one of the two may operate at a time).

- When the rock drill is operated within "Area 1" in Figure 4 (hatched in green), it shall be accompanied by localized shielding that breaks the line-of-sight between the rock drill and locations R4 and R5. The shielding material should be of a solid construction with a surface density of no less than 20 kg/m^2.

Phase 3

- Berm 1 and 2 (which were constructed prior to commencement of operations in Phase 2) shall remain in place during operations in Phase 3.

- Operation of the rock drill and processing equipment shall be restricted to between 07:00 and 19:00 and shall not take place simultaneously in any given hour (i.e., only one of the two may operate at a time).

- When the rock drill is operated within "Area 2" in Figure 4 (hatched in purple), it shall be accompanied by localized shielding that breaks the line-of-sight between the rock drill and locations R4 and R5. The shielding material should be of a solid construction with a surface density of no less than 20 kg/m^2.

Equipment Restrictions

The drill and processing equipment employed within the licenced area shall be limited to those detailed in this study (see Table A1), with sound power levels not greater than those in Table A1. All mobile construction equipment used to prepare for, rehabilitate, or maintain the operations shall produce sound levels which comply with MECP Guidelines NPC-115.

Variations

It is recognized that advancements of equipment or different configurations may allow additional equipment or equipment to be substituted for certain activities while still meeting MECP guidelines. Variations to the noise control measures may be permitted, provided that the sound level revisions can demonstrably meet the applicable MECP limits as confirmed through documentation by a Professional Engineer. Prior to modification, notification shall be given to the MNR.

Appendix C
Sample Calculation

R1	7204 Concession Road B/C - One-Storey Home	639797	4949227	253.4												
Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahous	Cmet	Refl	Lr
R1_Ph3_Drill_0500	Ph3_Drill_0500_WorstR1	640541	4950129	248.1	119	72.4	0	0.0	3.0	3.7	5.5	0.0	0.0	0.0	0.0	35
R1_R1A_Ph3_Crush_1239	Ph3_Crush_1239_WorstR1_R1A	640681	4949951	240.5	115	72.2	0	0.0	3.5	2.7	2.7	0.0	0.0	0.0	0.0	34
Trucks_Phase1	Trucks_Phase1	640623	4950100	232.6	108	73.7	0	0.0	5.2	1.9	6.2	0.0	0.0	0.0	0.0	21

R1a	7204 Concession Road B/C - One-Storey Home OLA	639818	4949249	253.5												
Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahous	Cmet	Refl	Lr
R1_R1A_Ph3_Crush_1239	Ph3_Crush_1239_WorstR1_R1A	640681	4949951	240.5	115	71.9	0	0.0	3.5	2.8	2.6	0.0	0.0	0.0	0.0	34
R1A_Ph3_Drill_0288	Ph3_Drill_0288_WorstR1A	640521	4950151	248.8	119	72.2	0	0.0	3.0	3.8	5.4	0.0	0.0	0.0	0.0	35
Trucks_Phase1	Trucks_Phase1	640612	4950094	232.7	108	73.5	0	0.0	5.2	2.0	6.1	0.0	0.0	0.0	0.0	21

R2	7181 Concession Road B/C - Raised Bungalow Home	639930	4949145	255.4												
Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahous	Cmet	Refl	Lr
R2_Ph3_Crush_1097	Ph3_Crush_1097_WorstR2	640631	4949951	240.5	115	71.6	0	0.0	1.1	3.8	3.6	0.0	0.0	0.0	0.0	35
R2_Ph3_Drill_0810	Ph3_Drill_0810_WorstR2	640571	4950080	246.6	119	72.1	0	0.0	1.5	4.3	6.1	0.0	0.0	0.0	0.0	35
Trucks_Phase1	Trucks_Phase1	640610	4950083	232.9	108	73.5	0	0.0	3.3	3.5	5.6	0.0	0.0	0.0	0.0	22

R2a	7181 Concession Road B/C - Raised Bungalow Home OLA	639947	4949170	253.5												
Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahous	Cmet	Refl	Lr
R2A_Ph3_Crush_1163	Ph3_Crush_1163_WorstR2A	640651	4949960	240.5	115	71.5	0	0.0	3.5	2.8	2.5	0.0	0.0	0.0	0.0	35
R2A_Ph3_Drill_0702	Ph3_Drill_0702_WorstR2A	640561	4950080	246.8	119	71.8	0	0.0	3.6	3.5	5.3	0.0	0.0	0.0	0.0	35
Trucks_Phase1	Trucks_Phase1	640610	4950083	232.9	108	73.3	0	0.0	5.3	2.0	6.0	0.0	0.0	0.0	0.0	21

R3	7111 Concession Road B/C - Two-Storey Home	640311	4949299	252.5												
Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahous	Cmet	Refl	Lr
R3_Ph3_Crush_0570	Ph3_Crush_0570_WorstR3	640551	4949938	240.5	115	67.7	0	0.0	0.5	4.7	2.5	0.0	0.0	0.0	0.0	40
R3_Ph3_Drill_1158	Ph3_Drill_1158_WorstR3	640641	4950200	246.4	119	70.6	0	0.0	0.6	2.3	6.1	0.0	0.0	0.0	0.0	40
Trucks_Phase1	Trucks_Phase1	640614	4950080	232.9	108	70.9	0	0.0	2.8	4.5	4.2	0.0	0.0	0.0	0.0	25

R3a	7111 Concession Road B/C - Two-Storey Home OLA	640324	4949325	249.4												
Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahous	Cmet	Refl	Lr
R3A_Ph3_Crush_0682	Ph3_Crush_0682_WorstR3A	640561	4949969	240.5	115	67.7	0	0.0	2.2	3.1	2.6	0.0	0.0	0.0	0.0	39
R3A_Ph3_Drill_1036	Ph3_Drill_1036_WorstR3A	640611	4950089	246.0	119	69.2	0	0.0	3.0	3.2	4.6	0.0	0.0	0.0	0.0	39
Trucks_Phase1	Trucks_Phase1	640612	4950077	232.9	108	70.7	0	0.0	5.2	2.7	4.5	0.0	0.0	0.0	0.0	25

R4	7006 Concession Road B/C - Raised Bungalow Home	640675	4949508	250.0												
Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahous	Cmet	Refl	Lr
R4_R4A_Ph3_Crush_1302	Ph3_Crush_1302_WorstR4_R4A	640711	4949929	240.5	115	63.5	0	0.0	0.8	4.7	1.7	0.0	0.0	0.0	0.0	44
R4_R4A_R5_R5A_Ph3_Drill_0046	Ph3_Drill_0046_WorstR4_R4A_R5_R5A	640501	4950049	247.4	119	66.1	0	0.0	1.0	4.2	4.3	0.0	0.0	0.0	0.0	44
Trucks_Phase1	Trucks_Phase1	640624	4950102	232.3	108	68.0	0	0.0	2.7	3.9	3.5	0.0	0.0	0.0	0.0	29

R4a	7006 Concession Road B/C - Raised Bungalow Home OLA	640674	4949539	247.7												
Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahous	Cmet	Refl	Lr
R4_R4A_R5_R5A_Ph3_Drill_0046	Ph3_Drill_0046_WorstR4_R4A_R5_R5A	640501	4950049	247.4	119	65.6	0	0.0	2.6	3.5	3.6	0.0	0.0	0.0	0.0	44
R5_Ph3_Crush_1259	Ph3_Crush_1259_WorstR5	640691	4949929	240.5	115	62.9	0	0.0	3.5	5.3	1.2	0.0	0.0	0.0	0.0	42
Trucks_Phase1	Trucks_Phase1	640634	4950110	232.4	108	67.6	0	0.0	4.7	2.7	3.5	0.0	0.0	0.0	0.0	29

R5	6989 Concession Road B/C - Raised Bungalow Home	640771	4949454	251.1												
Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahous	Cmet	Refl	Lr
R4_R4A_R5_R5A_Ph3_Drill_0046	Ph3_Drill_0046_WorstR4_R4A_R5_R5A	640501	4950049	247.4	119	67.3	0	0.0	1.1	4.2	4.6	0.0	0.0	0.0	0.0	42
R5_Ph3_Crush_1259	Ph3_Crush_1259_WorstR5	640691	4949929	240.5	115	64.7	0	0.0	0.8	4.5	1.9	0.0	0.0	0.0	0.0	43
Trucks_Phase1	Trucks_Phase1	640630	4950117	232.4	108	68.6	0	0.0	3.0	4.0	3.5	0.0	0.0	0.0	0.0	28

R5a	6989 Concession Road B/C - Raised Bungalow Home OLA	640766	4949475	249.0												
Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahous	Cmet	Refl	Lr
R4_R4A_R5_R5A_Ph3_Drill_0046	Ph3_Drill_0046_WorstR4_R4A_R5_R5A	640501	4950049	247.4	119	67.0	0	0.0	2.8	3.4	3.9	0.0	0.0	0.0	0.0	42
R5A_Ph3_Crush_1260	Ph3_Crush_1260_WorstR5a	640691	4949938	240.5	115	64.5	0	0.0	3.1	2.4	1.9	0.0	0.0	0.0	0.0	48
Trucks_Phase1	Trucks_Phase1	640632	4950112	232.4	108	68.4	0	0.0	5.0	3.1	3.6	0.0	0.0	0.0	0.0	27

R6	6290 Pearl Carrick's Road - Raised Bungalow Home	639606	4950914	242.0												
Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahous	Cmet	Refl	Lr
R6_Ph3_Crush_0695	Ph3_Crush_0695_WorstR6	640391	4950320	240.5	120	70.9	0	0.0	1.1	3.7	3.4	0.0	0.0	0.0	0.0	41
R6_Ph3_Drill_0879	Ph3_Drill_0879_WorstR6	640321	4950360	246.1	119	70.1	0	0.0	1.3	4.1	5.4	0.0	0.0	0.0	0.0	38
Trucks_Phase1	Trucks_Phase1	640642	4950122	232.3	108	73.4	0	0.0	3.4	5.0	3.6	0.0	0.0	0.0	0.0	22

R6a	6290 Pearl Carrick's Road - Raised Bungalow Home OLA	639630	4950895	241.4												
Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahous	Cmet	Refl	Lr
R6A_Ph3_Crush_0737	Ph3_Crush_0737_WorstR6A	640381	4950320	240.5	120	70.5	0	0.0	2.3	2.9	3.4	0.0	0.0	0.0	0.0	41
R6A_R7A_Ph3_Drill_0873	Ph3_Drill_0873_WorstR6A_R7A	640331	4950369	246.0	119	69.8	0	0.0	3.1	3.1	4.8	0.0	0.0	0.0	0.0	38
Trucks_Phase1	Trucks_Phase1	640624	4950110	232.4	108	73.2	0	0.0	2.7	5.3	5.4	0.0	0.0	0.0	0.0	21

R7	6323 Pearl Carrick's Road - Two-Storey Home	639779	4950973	240.2												
Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahous	Cmet	Refl	Lr
R7_Ph3_Crush_0515	Ph3_Crush_0515_WorstR7	640421	4950258	240.5	120	70.6	0	0.0	0.5	4.5	3.3	0.0	0.0	0.0	0.0	41
R7_Ph3_Drill_0861	Ph3_Drill_0861_WorstR7	640341	4950369	246.0	119	69.3	0	0.0	0.6	4.4	5.5	0.0	0.0	0.0	0.0	39
Trucks_Phase1	Trucks_Phase1	640623	4950116	232.4	108	72.8	0	0.0	3.6	4.9	4.4	0.0	0.0	0.0	0.0	22

R7a	6323 Pearl Carrick's Road - Two-Storey Home OLA	639799	4950952	237.5												
Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahous	Cmet	Refl	Lr
R6A_R7A_Ph3_Drill_0873	Ph3_Drill_0873_WorstR6A_R7A	640331	4950369	246.0	119	68.9	0	0.0	3.1	3.4	4.4	0.0	0.0	0.0	0.0	39
R7A_Ph3_Crush_0089	Ph3_Crush_0089_WorstR7A	640471	4950191	240.5	120	71.1	0	0.0	2.8	3.6	3.0	0.0	0.0	0.0	0.0	39
Trucks_Phase1	Trucks_Phase1	640625	4950112	232.4	108	72.6	0	0.0	7.1	5.8	3.8	0.0	0.0	0.0	0.0	18

R8	6478 Donald Carrick's Lane - Two-Storey Home	640511	4951702	239.1												
Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahous	Cmet	Refl	Lr
R8_Ph2_CRUSH_0345	Ph2_CRUSH_0345_WorstR8	640639	4950294	240.5	120	74.0	0	0.0	0.6	4.6	4.2	0.0	0.0	0.0	0.0	37

Where: Lr = Lx - Adiv + K0 + Dc - Agnd - Abar - Aatm - Afol - Ahous + Cmet + Refl

Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahous	Cmet	Refl	Lr
R8_Ph2_Drill_1124	Ph2_Drill_1124_WorstR8	640729	4950494	246.9	119	72.8	0	0.0	0.7	4.3	6.8	0.0	0.0	0.0	0.0	35
Trucks_Phase1	Trucks_Phase1	640614	4950107	232.3	108	75.0	0	0.0	3.6	5.6	3.7	0.0	0.0	0.0	0.0	20

R8a	6478 Donald Carrick's Lane - Two-Storey Home OLA	640517	4951674	236.9

Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahous	Cmet	Refl	Lr
R8A_Ph3_Crush_0844	Ph3_Crush_0844_R8A	640571	4950240	240.5	120	74.1	0	0.0	3.7	2.9	3.2	0.0	0.0	0.0	0.0	36
R8A_Ph3_Drill_0774	Ph3_Drill_0774_WorstR8A	640561	4950440	247.4	119	72.8	0	0.0	3.5	2.9	5.9	0.0	0.0	0.0	0.0	34
Trucks_Phase1	Trucks_Phase1	640623	4950110	232.4	108	74.9	0	0.0	2.9	6.1	5.8	0.0	0.0	0.0	0.0	18

R9	6475 Donald Carrick's Lane - Two-Storey Home	640847	4951862	241.5

Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahous	Cmet	Refl	Lr
R9_Ph2_CRUSH_0546	Ph2_CRUSH_0546_WorstR9	640799	4950294	240.5	120	74.9	0	0.0	0.6	5.0	4.3	0.0	0.0	0.0	0.0	35
R9_R9A_Ph2_Drill_0500	Ph2_Drill_0500_WorstR9_R9A	640789	4950513	247.1	119	73.6	0	0.0	0.8	4.3	7.1	0.0	0.0	0.0	0.0	33
Trucks_Phase1	Trucks_Phase1	640668	4950175	232.0	107	75.8	0	0.0	3.8	3.9	5.9	0.0	0.0	0.0	0.0	18

R9a	6475 Donald Carrick's Lane - Two-Storey Home OLA	640854	4951833	238.6

Src ID	Src Name	X	Y	Z	Lx	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahous	Cmet	Refl	Lr
R9_R9A_Ph2_Drill_0500	Ph2_Drill_0500_WorstR9_R9A	640789	4950513	247.1	119	73.4	0	0.0	3.7	2.9	6.1	0.0	0.0	0.0	0.0	33
R9A_Ph2_CRUSH_0856	Ph2_CRUSH_0856_WorstR9A	640869	4950153	240.5	120	75.5	0	0.0	3.7	2.8	3.7	0.0	0.0	0.0	0.0	34
Trucks_Phase1	Trucks_Phase1	640625	4950107	232.4	108	75.7	0	0.0	7.5	4.1	5.1	0.0	0.0	0.0	0.0	15

Where: Lr = Lx - Adiv + K0 + Dc - Agnd - Abar - Aatm - Afol - Ahous + Cmet + Refl

Appendix D
Consultant Curriculum Vitae

Harry Ao Cai *MEng, P.Eng, INCE*

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NOISE VIBRATION ACOUSTICS

Education

McGill University, Bachelor of Civil Engineering
University of Toronto, Master of Engineering

Professional Memberships

Professional Engineers Ontario (PEO)
Canadian Acoustical Association (CAA)
Institute of Noise Control Engineers (INCE)

Professional History

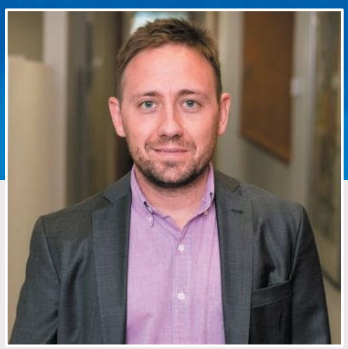
2025 to Present	Sr. Acoustical Engineer, HGC Noise Vibration Acoustics, Toronto, ON
2019 to 2025	Project Consultant, HGC Noise Vibration Acoustics, Toronto, ON
2018	Research Intern, Ruhr Universität Bochum, Bochum, Germany
2016-2017	Project Coordinator Intern, Aecon Utility Engineering, Toronto, ON

Experience

Harry's experience include the measurement, analysis, and mitigation of environmental noise and vibration found in various land use scenarios and for government approvals. He has conducted feasibility and impact studies of commercial, retail, and industrial developments, and is proficient with a variety of measurement and analysis techniques for stationary and transportation sources.

Selected Projects

Lennox and Addington County General Hospital, Napanee, ON
Porsche Centre Downtown Toronto, Toronto, ON
Circa 1877 Condos, Waterloo, ON
West Fraser, Alabama, USA Yee Hong Retirement Living, Mississauga, ON
Zebra Industries, Mississauga, ON
St. Marys Cement, St. Marys, ON
TransAlta Cogeneration Plant, Sarnia, ON
Art on Main Condos, Milton, ON
Bistro 6 West, Barrie, ON
SXSW, Primont Homes, Vaughan, ON
Dockside Whitby, Whitby, ON
Empire Legacy, Thorold, ON
Oakville Water Treatment Plant, Oakville, ON
Coca Cola Minute Maid, Peterborough, ON
Westcliff Pit, John Aarts Group, London, ON



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NOISE VIBRATION ACOUSTICS

Education

University of Waterloo, Bachelor of Science, 2006
Recording Arts Canada (Digital Arts), 2007

Professional Memberships

Professional Engineers Ontario (PEO), Limited Engineering Licensee
Ontario Society of Professional Engineers (OSPE)
Institute of Noise Control Engineering USA (INCE)
Canadian Acoustical Association (CAA)
Ontario Mining Association (OMA), Environment Committee

Professional History

2007 to 2014: Acoustical Consultant, HGC Engineering
2014 to 2023: Senior Acoustical Consultant, Associate, HGC Engineering
2023 to present: Senior Associate, HGC Engineering

Experience

Andrew Dobson has widespread experience in the assessment of noise, vibration, and mitigation of industrial and commercial facilities, and has been involved in a wide variety of projects related to acoustics, noise, and vibration over the past 17 years. He has a comprehensive understanding of the Ministry of Environment guidelines regarding noise/vibration, along with the associated requirements and methods for the prediction of noise from industrial, aggregate, and commercial facilities. He specializes in the use of advanced sound intensity instrumentation and techniques and has extensive experience conducting computer aided modelling of environmental noise using CadnaA prediction software. The accurate measurement of large power transformers and noise control of mine ventilation systems have been two of his recent areas of innovation and study, having authored several papers and presentations on these topics, in conjunction with industry.

Selected Projects

Hydro One Networks, 70+ Transmission Stations and 30+ Distribution Stations
New Brunswick Power, Various substations in the Moncton area
Guelph Hydro Systems Inc., Various Distribution Stations, Rockwood, Ontario
Vale Canada Limited, Numerous facilities in the Sudbury Basin, Ontario
Evolution Mining, Red Lake Operations and Cochenour Complex, Ontario
Air Liquide, Birmingham ASU Oxygen Plant, Hamilton, Ontario
Epiroc, ST1030 Electric Mine Scoop Project, Lively, Ontario
Norgalv Limited, North Bay, Ontario
West Lincoln Township, Spring Creek Heights Secondary Plan, Smithville, Ontario
Metrolinx, Eglington Crosstown West Extension, Toronto, Ontario
Goldcorp, Hollinger Pit, Timmins, Ontario
Suncor Energy Products, Various terminals in Ontario
Interfor Timber Corporation, Various lumber mills in northern Ontario
SNOLAB Deep Underground Research Lab, Creighton, Ontario
ARAUCO Wood Products, Sault Ste. Marie, Ontario
Midhurst Land Owners Group, Midhurst Water Treatment Plant, Ontario
Convertus Group, Organic Waste Treatment Plant, London, Ontario
Vi-Lux Building Products Inc., Napanee, Ontario
Weir ESCO, Porth Hope, Ontario
Port Royal Mills / Grainboys, Uxbridge, Ontario
Voyant Beauty, Etobicoke, Ontario