



REPORT

Noise Impact Assessment

Thomas Cavanagh Construction Limited

Proposed Arnott Pit, Township of Lanark Highlands, Ontario

Submitted to:

Phil White, Quality Control

9094 Cavanagh Road
Ashton, Ontario
K0A 1B0

Submitted by:

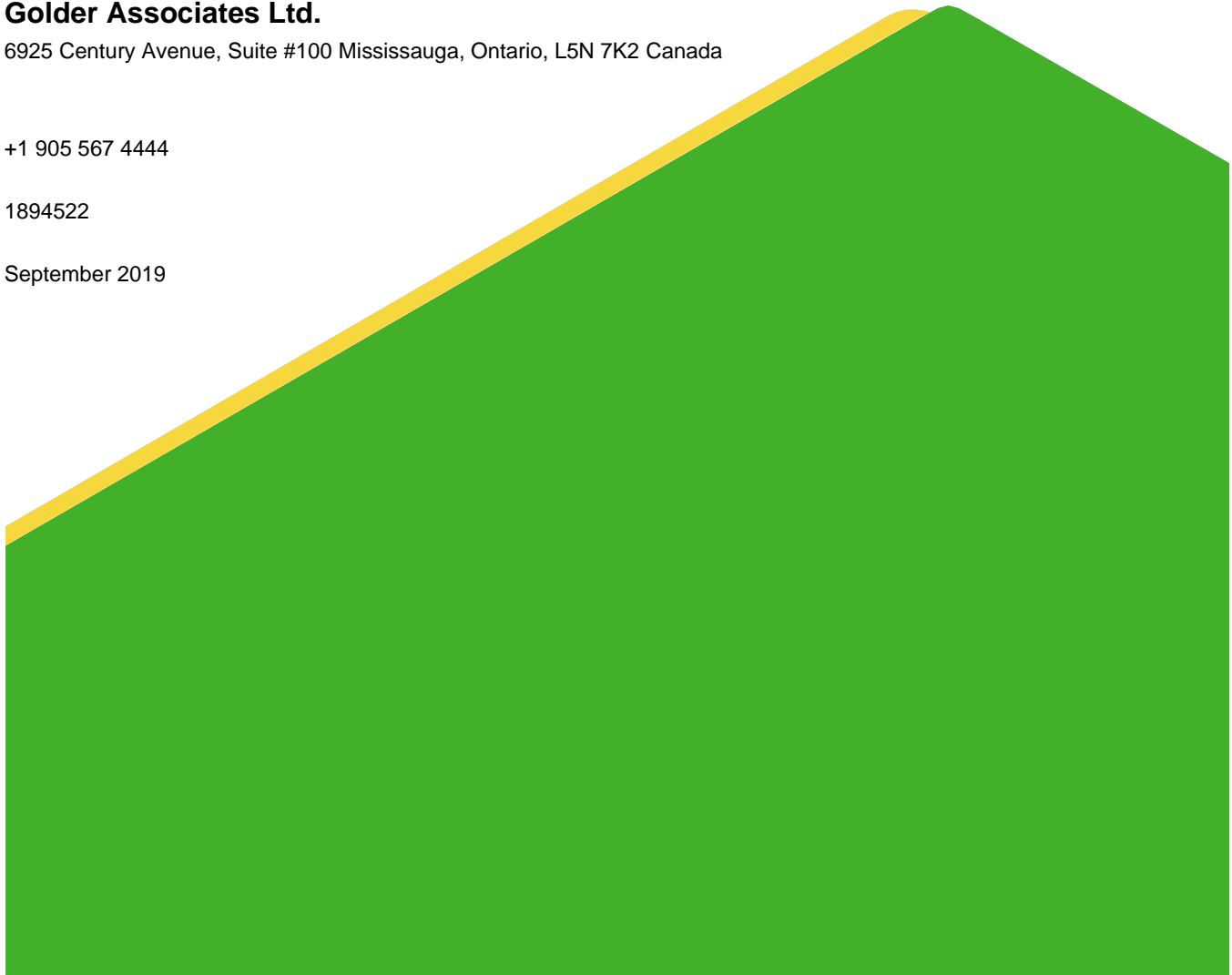
Golder Associates Ltd.

6925 Century Avenue, Suite #100 Mississauga, Ontario, L5N 7K2 Canada

+1 905 567 4444

1894522

September 2019



Distribution List

Electronic Copy - Thomas Cavanagh Construction Limited

Electronic Copy - Golder Associates Ltd.

Executive Summary

Thomas Cavanagh Construction Limited retained Golder Associates Ltd. to prepare a Noise Impact Assessment in support of a license application, under the *Aggregate Resources Act* (ARA) for a Category 3, Class A, Pit Above the Water Table associated with the proposed Arnott Pit located on Part of Lot 3, Concession 5 in the Geographic Township of Lanark (now part of the Township of Lanark Highlands), Ontario (the Site).

The Site, known as the Arnott Pit, is located on the south side of Pine Grove Road, southwest of the intersection of Pine Grove Road and Lanark 6th Concession A Road, approximately 3.5 kilometres northeast of Lanark, Ontario. The license area for the proposed pit is approximately 19.5 hectares. The Site is currently used for agricultural purposes. The lands surrounding the Site are primarily used for agricultural purposes, aggregate extraction (licensed pits or quarries are located to the north and west of the Site), or are undeveloped and heavily vegetated (i.e., to the east and southeast of the Site). There are also several residences within the vicinity of the Site.

The pit operations will include; extraction, and processing. The operations will occur during daytime hours between 07:00 and 19:00. Noise sources of concern include; two excavation/loading machines (i.e., two loaders or a loader and an excavator), a screening plant and shipping trucks.

Sound level limits for the proposed pit operations on neighbouring receptors were established in accordance with the Ministry of the Environment, Conservation and Parks (MECP) guideline, NPC 300 “*Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning*”. Noise predictions of the proposed pit operations onto neighbouring Point(s) of Reception (POR(s)) were completed to determine the potential noise impact.

The noise receptors selected are representative of sensitive PORs in all directions around the pit. For this assessment, seven (7) locations have been selected to represent the sensitive PORs labelled POR01 through POR07. The nearest POR (POR01) is adjacent to the western property line of the proposed extraction area.

The noise analysis indicates that the sound emissions from the pit operations for extraction of the proposed lands are expected to meet MECP noise limits at all PORs. Therefore, the pit will be able to operate in compliance with MECP noise limits.

Table of Contents

1.0 INTRODUCTION	1
2.0 SITE OPERATIONS.....	2
3.0 NOISE SOURCE SUMMARY	4
4.0 POINT(S) OF RECEPTION.....	5
5.0 ASSESSMENT CRITERIA (PERFORMANCE LIMITS).....	6
6.0 IMPACT ASSESSMENT	7
6.1 Methodology.....	7
6.2 Noise Impact Prediction Assumptions	7
7.0 RESULTS.....	8
7.1 Noise Assessment Summary	8
8.0 GENERAL PIT OPERATION NOISE CONTROLS	11
9.0 CONCLUSIONS.....	12
10.0 STATEMENT OF QUALIFICATIONS.....	12
11.0 LIMITATIONS.....	13

TABLES

Table 1: Operating Scenarios for the Concurrent Extraction of Areas 3 - 5.....	3
Table 2: Facility Source Summary.....	4
Table 3: Noise Impact Assessment Summary - Zone A & B.....	9
Table 4: Noise Impact Assessment Summary - Concurrent Extraction of Areas 3 - 5	10

FIGURES

Figure 1: Location Plan

Figure 2: Site Plan

Figure 3: Noise Assessment Areas

APPENDICES

APPENDIX A

Land Use Zoning Designation Plan

APPENDIX B

Description of Technical Terms

APPENDIX C

Sample Calculations

APPENDIX D

Statement of Qualifications

1.0 INTRODUCTION

Thomas Cavanagh Construction Limited (Cavanagh) retained Golder Associates Ltd. (Golder) to prepare a Noise Impact Assessment in support of a license application under the *Aggregate Resources Act* (ARA) for a Category 3, Class A, Pit Above the Water Table associated with the proposed Arnott Pit located on Part of Lot 3, Concession 5 in the Geographic Township of Lanark (now part of the Township of Lanark Highlands), Ontario (the Site).

The Site, known as the Arnott Pit, is located on the south side of Pine Grove Road, southwest of the intersection of Pine Grove Road and Lanark 6th Concession A Road, approximately 3.5 kilometres northeast of Lanark, Ontario. The license area for the proposed pit is approximately 19.5 hectares. A site location plan showing the proposed pit lands and proposed licensed boundary for the Arnott Pit along with the most sensitive Point(s) of Reception (POR(s)) is provided in Figure 1. For this assessment, seven (7) existing PORs were selected as being representative of the sensitive receptors in all directions around the Site and identified as POR01 through POR07. The nearest POR (POR01) is adjacent to the western property line at the northern end of the proposed extraction area.

The surrounding lands are utilized for residential, agricultural, and aggregate extraction/processing purposes. A zoning plan for the property and surrounding land use is provided in Appendix A.

Sound level limits for the proposed pit operations on neighbouring receptors were established in accordance with the Ministry of the Environment, Conservation and Parks (MECP) guideline, NPC 300 “*Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning*”. Noise predictions of the proposed pit operations onto neighbouring PORs were completed to determine the possible noise impact. To help understand the analysis and recommendations made in this report, a brief discussion of noise terminology is provided in Appendix B.

2.0 SITE OPERATIONS

The proposed Arnott Pit is located on Part of Lot 3, Concession 5 in the Geographic Township of Lanark (now part of the Township of Lanark Highlands), Ontario. The proposed area to be licensed is approximately 19.5 hectares. Lands in the surrounding area are currently used for residential, agricultural and aggregate extraction/processing use. Figure 2 illustrates both; the proposed licensed boundary and the limits of extraction.

The proposed pit operations will take place during daytime hours between 07:00 - 19:00 and will be limited to extraction above the water table. The proposed extraction area is divided into two Zones (Zone A and Zone B), as noted in Figure 2. Zone A is the northwest portion of the proposed extraction area and Zone B includes the remaining east and south portions of the extraction area. For the purpose of this noise assessment, Zone A has been divided into five areas denoted as Areas 1 through 5 and Zone B has been divided into four areas, Areas 6 through 9. The boundaries of Areas 1 through 9 and the general direction of extraction within each area are shown on Figure 3.

Based on available ground elevation information and pit floor elevations for the proposed pit extraction areas, the operations will require between one and two lifts with a maximum face height of 8 metres (m), except for Area 5 where the maximum face height is approximately 10 m.

The extraction equipment in the proposed pit will be limited to:

- One screening plant will be used for on-Site processing and is to operate within 30 m of the extraction face except when in Area 5, where it will be located as shown in Figure 3 and in Area 6, the screening plant will need to remain at least 30 m from the extraction face.
- One front end loader or excavator will be used to excavate from the active face. The extraction equipment at the active face will generally operate within 30 m of the extraction face, and will be used for excavation and/or transportation of material to the screening plant, while another front end loader, which will generally operate within 40 m of the screening plant, will be used to load processed material into shipping trucks. This equipment will generally operate under load for a maximum of 50 minutes during any given hour.
- Shipping trucks will transport material from the Site stockpiles off-Site for a maximum of 5 trucks/hour (i.e., 10 truck trips/hour) and while on-Site, will typically travel at a speed of 20 km/h. When transporting material from Area 5 the shipping trucks will operate along the route shown in Figure 3.

The location of the screening plant will generally vary along with the location of the mobile noise sources (i.e., loaders, excavator, trucks) as the extraction progresses unless noted. Operational controls and shielding (i.e., berms, extraction face, stockpiles) will be required during extraction. The following berms are to be installed:

- Prior to extraction in Area 5, Berm A, approximately 80 m in length and 3.5 m above existing grade, will be installed 15 m from the east property boundary of POR01, as shown in Figure 3.
- Prior to extraction in Area 6, Berm B, approximately 180 m in length and 2 m above existing grade, will be installed 15 m away from the northeastern proposed license boundary, as shown in Figure 3.

In addition, Golder has reviewed the feasibility of operating a central processing area for the concurrent extraction of Areas 3 through 5. As noted above, due to the proximity of POR01, a specific location for the screening plant was identified for processing activities in Area 5 (see location on Figure 3). If Areas 3 through 5 are being extracted concurrently, operation of the screening plant on the pit floor at the specified location within Area 5 may not be possible. As such, six operating scenarios using a central screening plant with concurrent extraction from Areas 3 through 5 were considered as part of the noise assessment (outlined in Table 1). For the concurrent extraction of Areas 3 through 5, Berm A must be constructed before excavating in Area 5 and the screening plant is to be located centrally within Area 2.

Table 1: Operating Scenarios for the Concurrent Extraction of Areas 3 - 5

Scenario	Description
Scenario 1 (Area 3)	One front end loader or excavator for extraction/processing at the screening plant will operate, under load, for 50 minutes during any given hour and the equipment will generally operate within 30 m of the extraction face in Area 3.
Scenario 2 (Area 4)	One front end loader or excavator for extraction/processing at the screening plant will operate, under load, for 50 minutes during any given hour and the equipment will generally operate within 30 m of the extraction face in Area 4.
Scenario 3 (Area 5)	One front end loader or excavator for extraction/processing at the screening plant will operate, under load, for 50 minutes during any given hour and the equipment will generally operate within 30 m of the extraction face in Area 5.
Scenario 4	One front end loader or excavator for extraction/processing at the screening plant will operate, under load, for 20 minutes in Area 3, 15 minutes in Area 4 and 15 minutes in Area 5 during any given hour. The equipment will generally operate within 30 m of the extraction faces.
Scenario 5	One front end loader or excavator for extraction/processing at the screening plant will operate, under load, for 15 minutes in Area 3, 20 minutes in Area 4 and 15 minutes in Area 5 during any given hour. The equipment will generally operate within 30 m of the extraction faces.
Scenario 6	One front end loader or excavator for extraction/processing at the screening plant will operate, under load, for 15 minutes in Area 3, 15 minutes in Area 4 and 20 minutes in Area 5 during any given hour. The equipment will generally operate within 30 m of the extraction faces.

Berms indicated in Figure 3 and within this report can be considered earth berms or berm / barrier combinations, provided the combined height of the berm / barrier matches the indicated minimum height above existing grade. Barriers are to have a minimum surface density of 20 kg / m² and constructed without gaps.

Stockpiles should be located between the screening plant and PORs wherever possible to reduce potential noise impacts; however, as a conservative approach, this study generally does not take shielding from stockpiles into consideration.

3.0 NOISE SOURCE SUMMARY

The primary noise sources of concern are summarized in Table 2.

Table 2: Facility Source Summary

Source ID	Source Description	Overall Sound Power Level (dBA) ¹	Source Location	Sound Characteristics	Noise Control Measures
SP01	Powerscreen	100	O	S	U
SL01	Shipping Trucks	105	O	S	U
SL02 ²	Loader or Excavator - Material Excavating/Dumping ²	97	O	S	U
SA01 ²	Loader - Material Loading ²	97	O	S	U

Notes:

- 1) Values presented in Table 1 do not include adjustments that were considered in the modelling (i.e., time weighting)
- 2) Average sound power level representing various loader/excavator activities

Noise Source Summary Table Nomenclature

Source Location

O – located/installed outside the building, including on the roof

I – located/installed inside the building

Sound Characteristics

S – Steady

Q – Quasi Steady Impulsive

I – Impulsive

B – Buzzing

C – Cyclic

T – Tonal

Noise Control Measures

S – Silencer, Acoustic Louver, Muffler

A – Acoustic Lining, Plenum

B – Barrier, Berm, Screening

L – Lagging

E – Acoustic Enclosure

O – Other

U – Uncontrolled

4.0 POINT(S) OF RECEPTION

Seven (7) residential receptors were identified as being representative of the most sensitive PORs within the vicinity of the Site as shown in Figure 1. The identified PORs are summarized below.

- POR01: A two-storey residence located west of the Site;
- POR02: A one-storey residence located northeast of the Site;
- POR03: A two-storey residence located east of the Site;
- POR04: A one-storey residence located east of the Site;
- POR05: A one and half storey residence located east of the Site;
- POR06: A two-storey residence located southeast of the Site; and
- POR07: A one and half storey residence located south of the Site.

5.0 ASSESSMENT CRITERIA (PERFORMANCE LIMITS)

Based on a review of the area, it is expected the PORs near the Site could reasonably be defined as being in a Class 3 area as per MECP publication NPC-300. A Class 3 area can best be described as a rural area with an acoustical environment that is dominated by natural sounds, having little road traffic.

In assessing stationary noise sources, the MECP has established exclusionary Plane of Window (POW) and Outdoor POR (Outdoor POR) sound level limits for Class 3 areas. The POW sound level limit for the noise sensitive receptors in a Class 3 area is described as follows:

The sound level limit at a POW POR is set as the higher of either the applicable exclusionary limit of 45 dBA in the daytime period of 07:00-19:00, 40 dBA in the evening period of 19:00-23:00 and 40 dBA in the nighttime period of 23:00-07:00, or the minimum background sound level that occurs or is likely to occur during the time period corresponding to the operation of the stationary source under impact assessment.

The outdoor sound level limit for the noise sensitive receptors in a Class 3 area is described as follows:

The sound level limit at an Outdoor POR is set as the higher of either the applicable exclusionary limit of 45 dBA in the daytime period of 07:00-19:00 and 40 dBA in the evening period of 19:00-23:00, or the minimum background sound level that occurs or is likely to occur during the time period corresponding to the operation of the stationary source under impact assessment. In general, the Outdoor POR will be protected during the nighttime as a consequence of meeting the sound level limit at the adjacent POW.

Since the operations are limited to daytime hours, the daytime One Hour Equivalent Sound Level (L_{eq}) MECP exclusionary sound level limits for a POR in a Class 3 area were used to assess compliance of the pit operations.

6.0 IMPACT ASSESSMENT

6.1 Methodology

All relevant sound levels for sources were based on similar equipment used in other pit operations. Sound levels have been documented in 1/1 octave band level format. Noise impact predictions were generated using this data.

The predictive analysis was carried out using the commercially available software package Cadna/A V2019 MR 1. The predicted levels take into consideration that the sound from a stationary point noise source spreads spherically and attenuates at a rate of 6 dB per doubling of distance. Further, attenuation from barriers, ground effect and air absorption may be included in the analysis as determined from ISO 9613 (part 2), which is the current standard used for outdoor sound propagation predictions. It should be noted that this standard makes provisions to include a correction to address for downwind or ground-based temperature inversion conditions. Noise predictions have been made assuming a downwind or moderate temperature inversion conditions for all PORs, a design condition consistent with the accepted practice of the MECF.

As described in ISO 9613 (Part 2), ground factor values that represent the effect of ground on sound levels range between 0 and 1. Based on the specific site conditions, the ground factor value used in the modelling was a ground factor value of 0.5 within the pit and a value of 1 for all other areas. Attenuation from intervening structures (i.e., stockpiles) and woodlots were conservatively not considered in the noise modelling.

Extraction within Areas 1 through 9, as indicated in Figure 3, were modelled to determine the predictable worst-case noise levels on the identified representative PORs for the POW and Outdoor PORs. Outdoor POR sound levels (at a height of 1.5 m) were predicted by calculating sound levels using a 2 m by 2m grid resolution within the POR property boundaries and within 30 m of the POW, consistent with NPC 300 requirements. The higher of the POW or Outdoor sound levels were reported for the respective POR.

6.2 Noise Impact Prediction Assumptions

Assumptions were made in calculating the potential noise levels of the proposed operations on the identified PORs near the proposed pit. These are as follows:

- Extraction and processing operations are limited to daytime hours between 07:00 and 19:00.
- General extraction directions outlined in Figure 3 will be followed.
- The pit will be accessed from Cavanagh's adjacent property to the west along the western extraction limit of Area 1.
- Setback distances from the proposed licensed boundary are shown in Figure 3.
- A maximum of two lifts (each with a maximum height of 8 m, where possible except for Area 5 where the maximum face height is approximately 10 m).
- Approximate pit floor elevations for the initial lifts of each Area are as indicated on Figure 3.
- For Areas 1 through 9, the equipment will operate as specified in Section 2.0 and is expected to operate continuously unless noted.
- Equipment list and sound power emissions are consistent to those listed in Table 2.
- Shipping trucks while on-Site will typically travel at 20 km/h.
- The berms will be installed as specified above in Section 2.0 and as shown in Figure 3.
- POW PORs for which receptor heights could not be identified either through available imagery or during on-Site investigations were conservatively assessed at 4.5 m.

7.0 RESULTS

7.1 Noise Assessment Summary

Noise levels were determined for each Area of extraction. Due to the topography of the Site, the modelling assumed extraction equipment working at the initial lift elevations provided in brackets under the Area labels on Figure 3 (i.e., 148 metres above sea level (masl) for Area 2). A subsequent lift would then be carried out to the desired pit floor elevation, where required.

Table 3 provides a summary of the predictable worst-case noise levels at each of the identified PORs for the first lift of each Area. Table 4 provides a summary of the predictable worst-case noise levels at each of the identified PORs for the various operating scenarios for the concurrent extraction of Areas 3 through 5.

The overall predicted noise levels, based on proposed site operations described above, were found to be at or below the performance limits with the implementation of noise control measures (Section 8.0), indicating the Site can operate in compliance with MECP noise limits. Sample calculations are also provided in Appendix C.

Table 3: Noise Impact Assessment Summary - Zone A & B

POR ID	Area 1 Noise Impact (dBA)	Area 2 Noise Impact (dBA)	Area 3 Noise Impact (dBA)	Area 4 Noise Impact (dBA)	Area 5 Noise Impact (dBA)	Area 6 Noise Impact (dBA)	Area 7 Noise Impact (dBA)	Area 8 Noise Impact (dBA)	Area 9 Noise Impact (dBA)	Overall Maximum Noise Impact for Various Areas (dBA)	Daytime Performance Limit (dBA)
POR01	42	43	43	45	45	41	40	38	41	45	45
POR02	38	40	42	43	40	45	35	34	35	45	45
POR03	34	35	35	35	34	39	33	34	35	39	45
POR04	34	34	34	34	33	39	35	35	35	39	45
POR05	33	32	33	32	32	36	34	35	35	36	45
POR06	34	33	33	33	32	34	35	40	36	40	45
POR07	24	24	25	25	28	27	28	31	28	31	45

Table 4: Noise Impact Assessment Summary - Concurrent Extraction of Areas 3 - 5

POR ID	Scenario 1 Noise Impact (dBA)	Scenario 2 Noise Impact (dBA)	Scenario 3 Noise Impact (dBA)	Scenario 4 Noise Impact (dBA)	Scenario 5 Noise Impact (dBA)	Scenario 6 Noise Impact (dBA)	Overall Maximum Noise Impact for Various Scenarios (dBA)	Daytime Performance Limit (dBA)
POR01	44	44	45	44	44	44	45	45
POR02	41	41	40	41	41	41	41	45
POR03	35	35	35	35	35	35	35	45
POR04	34	35	34	35	35	34	35	45
POR05	33	33	33	33	33	33	33	45
POR06	33	33	33	33	33	33	33	45
POR07	24	25	26	25	25	25	26	45

8.0 GENERAL PIT OPERATION NOISE CONTROLS

The following summarizes general pit operation noise controls that shall be followed within the proposed extraction area:

- Equipment will be maintained in good condition.
- On-Site road-ways will be maintained to limit noise resulting from trucks driving over ruts and pot-holes.
- Truck routes should be designed to minimize the use of back-up warning devices.
- The berms will be installed as specified above in Section 2.0 and as shown in Figure 3, and as follows:
 - Prior to extraction in Area 5, Berm A, approximately 80 m in length and 3.5 m above existing grade, will be installed 15 m away from the east property boundary of POR01, as shown in Figure 3.
 - Prior to extraction in Area 6, Berm B, approximately 180 m in length and 2 m above existing grade, will be installed 15 m away from the northeastern proposed licensed boundary, as shown in Figure 3.
 - In the event Areas 3, 4 and 5 are extracted concurrently, Berm A must be constructed before excavating in Area 5 and the screening plant is to be located centrally within Area 2.
- Where possible, stockpiles should be placed to act as a barrier, shielding the PORs from the noise emitted by the screening plant.

9.0 CONCLUSIONS

Golder was retained by Cavanagh to prepare a Noise Impact Assessment in support of a license application under the ARA for a Category 3, Class A, Pit Above the Water Table associated with the proposed Arnott Pit. Golder established sound level limits according to MECP noise guidelines and compared the predicted noise levels at the identified representative PORs to the established limits. Based on the results presented in this report, it is expected the Site can operate in compliance with MECP noise guidelines for all PORs.

10.0 STATEMENT OF QUALIFICATIONS

Appendix D provides a statement of qualifications for the preparation of this Noise Impact Assessment document.

11.0 LIMITATIONS

Standard of Care

Golder has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practicing under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty expressed or implied is made.

Basis and Use of the Report

This report was prepared for the exclusive use of the Cavanagh and, once finalized, is intended to support the application of a Category 3, Class “A” license under the ARA associated with the proposed Arnott Pit. The draft application and supporting documents are based on observations of Site operations, discussions with Cavanagh about current Site practices, review of documentation provided by Cavanagh and calculations made to predict sound levels at PORs. The report cannot account for changes in Site conditions and operational practices completed after it has been finalized and submitted by Cavanagh.

The information, recommendations and opinions expressed in this report are for the sole benefit of the Cavanagh and the applicable regulatory authorities that are authorized to rely on the report as Authorized Users, subject to the limitations and purposes described herein. No other party may use or rely on this report or any portion thereof without Golder’s express written consent. Any other use of this report by others is prohibited and is without responsibility to Golder. The report, all plans, data, drawings and other documents as well as all electronic media prepared by Golder are considered its professional work product and shall remain the copyright property of Golder, who authorizes only Cavanagh and Approved Users to make copies of the report, but only in such quantities as are reasonably necessary for the use of the report by those parties. Cavanagh and Approved Users may not give, lend, sell, or otherwise make available the report or any portion thereof to any other party without the express written permission of Golder. Cavanagh acknowledges that electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore Cavanagh and any Authorized Users cannot rely upon the electronic media versions of Golder’s report or other work products.

When evaluating the Site and developing this report, Golder has relied on information provided by Cavanagh, the regulatory authorities, and others. Golder has acted in good faith and accepts no responsibility for any deficiencies, misstatements, or inaccuracies contained in this report resulting from omissions, misinterpretations or falsifications by those who provided Golder with information.

While ensuring that the documentation was prepared in general conformance with regulatory and guideline requirements, Golder cannot guarantee that the license will be issued by regulator once the final report has been submitted.

Signature Page

Golder Associates Ltd.



Paul Niejadlik, H.B.Sc., M.A.Sc.
Acoustics, Noise & Vibration Specialist

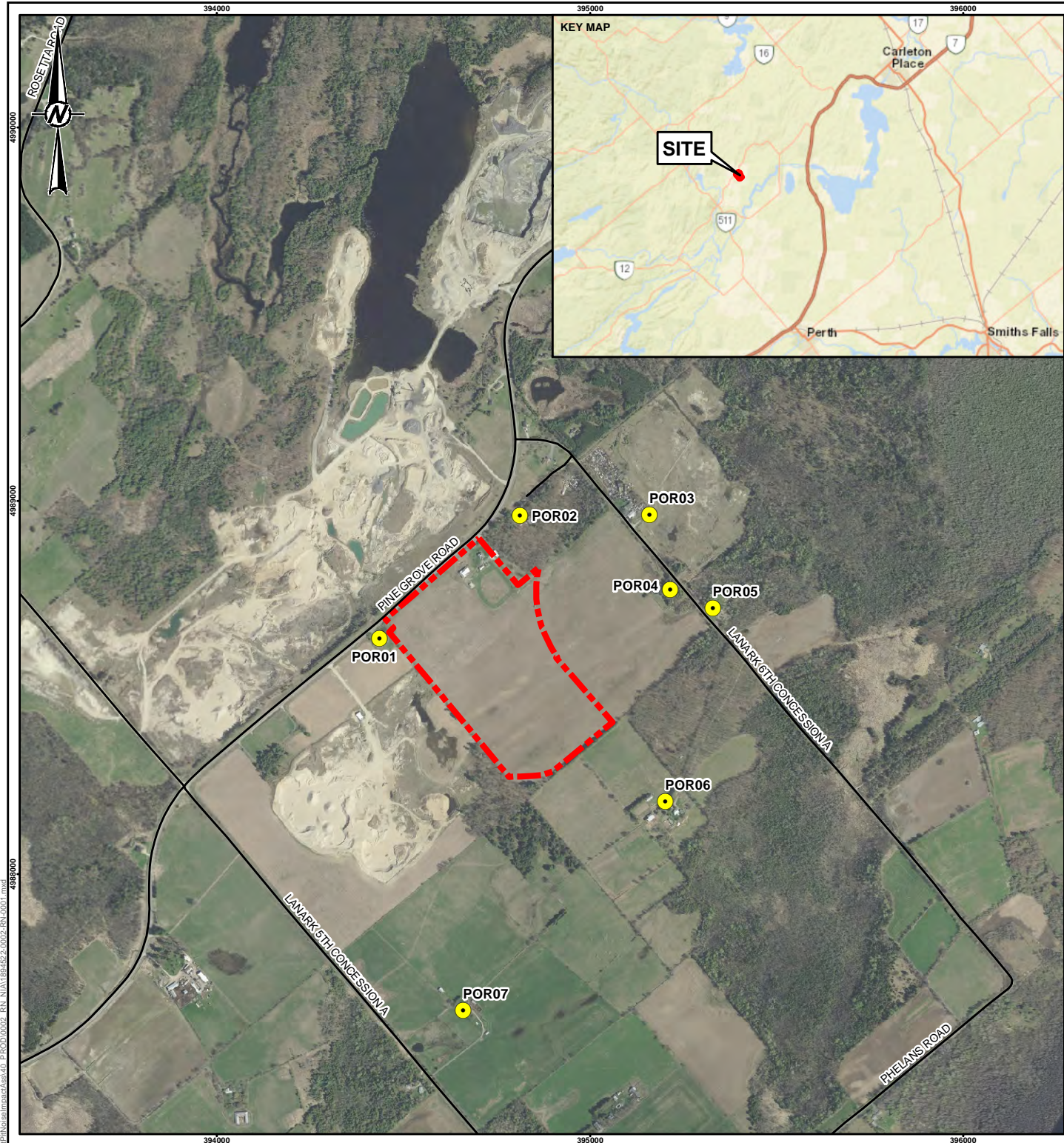
Joe Tomaselli, M.Eng., P.Eng.
Associate / Acoustics, Noise & Vibration Engineer

MAB/PRN/JT/ng



Golder and the G logo are trademarks of Golder Associates Corporation

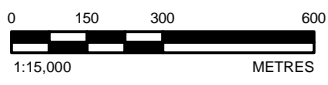
https://golderassociates.sharepoint.com/sites/23215g/deliverables/report/final/1894522-r-rev0_10sep2019_cavanagh_arnott_pit_nia.docx

FIGURES



LEGEND

-  POINTS OF RECEPTION
-  PROPOSED LICENSE BOUNDARY



NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, USGS, INTERMAP, INCREMENT P, NRCAN, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), ESRI KOREA, ESRI (THAILAND), NGCC, (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
2. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83
COORDINATE SYSTEM: UTM ZONE 18 VERTICAL DATUM: CGVD28

CLIENT
THOMAS CAVANAGH CONSTRUCTION LIMITED

PROJECT
NOISE IMPACT ASSESSMENT
PROPOSED ARNOTT PIT, LANARK HIGHLANDS, ONTARIO

TITLE
LOCATION PLAN

CONSULTANT	YYYY-MM-DD	2019-09-06
	DESIGNED	----
	PREPARED	BR
	REVIEWED	PRN
	APPROVED	PRN



PROJECT NO. 1894522	CONTROL 0002	REV. 0	FIGURE 1
------------------------	-----------------	-----------	--------------------

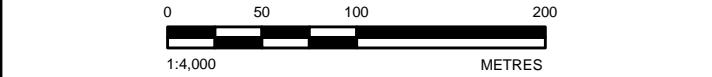
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm



- LEGEND**
- PROPOSED LICENSE BOUNDARY
 - PROPOSED EXTRACTION BOUNDARY
 - CAVANAGH PROPERTY BOUNDARY
 - ZONE A AND ZONE B BOUNDARY
 - ROADWAY

REFERENCE(S)

1. LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER ASSOCIATES LTD. UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2014
2. IMAGE OBTAINED FROM GOOGLE EARTH © 2018 GOOGLE INC. USED WITH PERMISSION. GOOGLE AND GOOGLE LOGO ARE REGISTERED TRADEMARKS OF GOOGLE INC.
3. SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, USGS, INTERMAP, INCREMENT P, NRCAN, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), ESRI KOREA, ESRI (THAILAND), NGCC, (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
4. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 18, VERTICAL DATUM: CGVD28



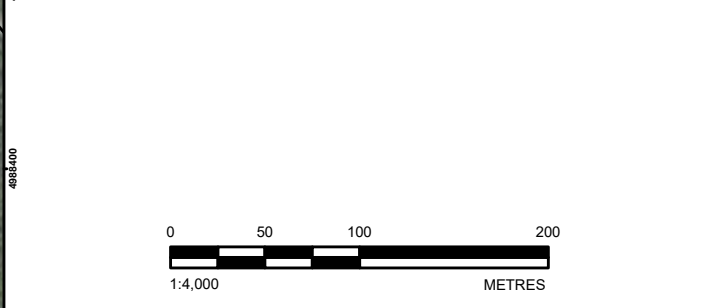
CLIENT		
THOMAS CAVANAGH CONSTRUCTION LIMITED		
PROJECT		
NOISE IMPACT ASSESSMENT		
PROPOSED ARNOTT PIT, LANARK HIGHLANDS, ONTARIO		
TITLE		
SITE PLAN		
CONSULTANT		
YYYY-MM-DD	2019-09-06	
DESIGNED	---	
PREPARED	BR	
REVIEWED	PRN	
APPROVED	PRN	
PROJECT NO.	CONTROL	REV.
1894522	0002	0
GOLDER		FIGURE
		2



- LEGEND**
- (MASL) PROPOSED INITIAL LIFT ELEVATION
 - AREA 5 - SCREENING PLANT LOCATION
 - AREAS 3-5 CONCURRENT OPERATIONS - SCREENING PLANT LOCATION
 - ➔ DIRECTION OF EXTRACTION
 - BERM LOCATION
 - AREA 5 - SHIPPING TRUCK ROUTE
 - ▭ AREAS
 - ▭ PROPOSED LICENSE BOUNDARY
 - ▭ PROPOSED EXTRACTION BOUNDARY
 - ▭ CAVANAGH PROPERTY BOUNDARY
 - ▭ ZONE A AND ZONE B BOUNDARY
 - ROADWAY

REFERENCE(S)

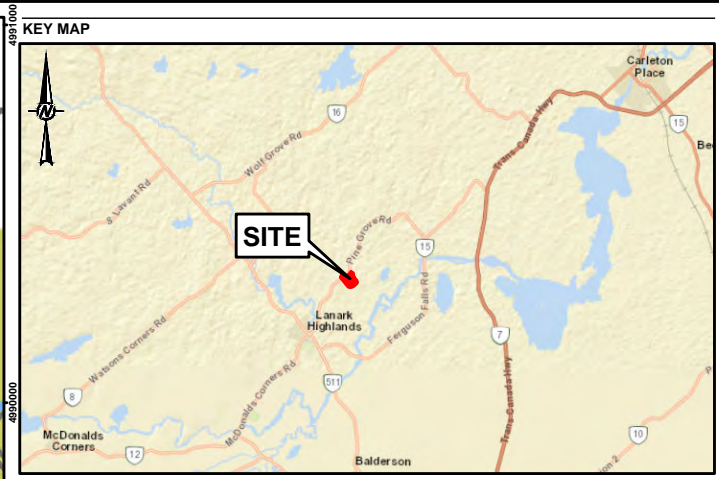
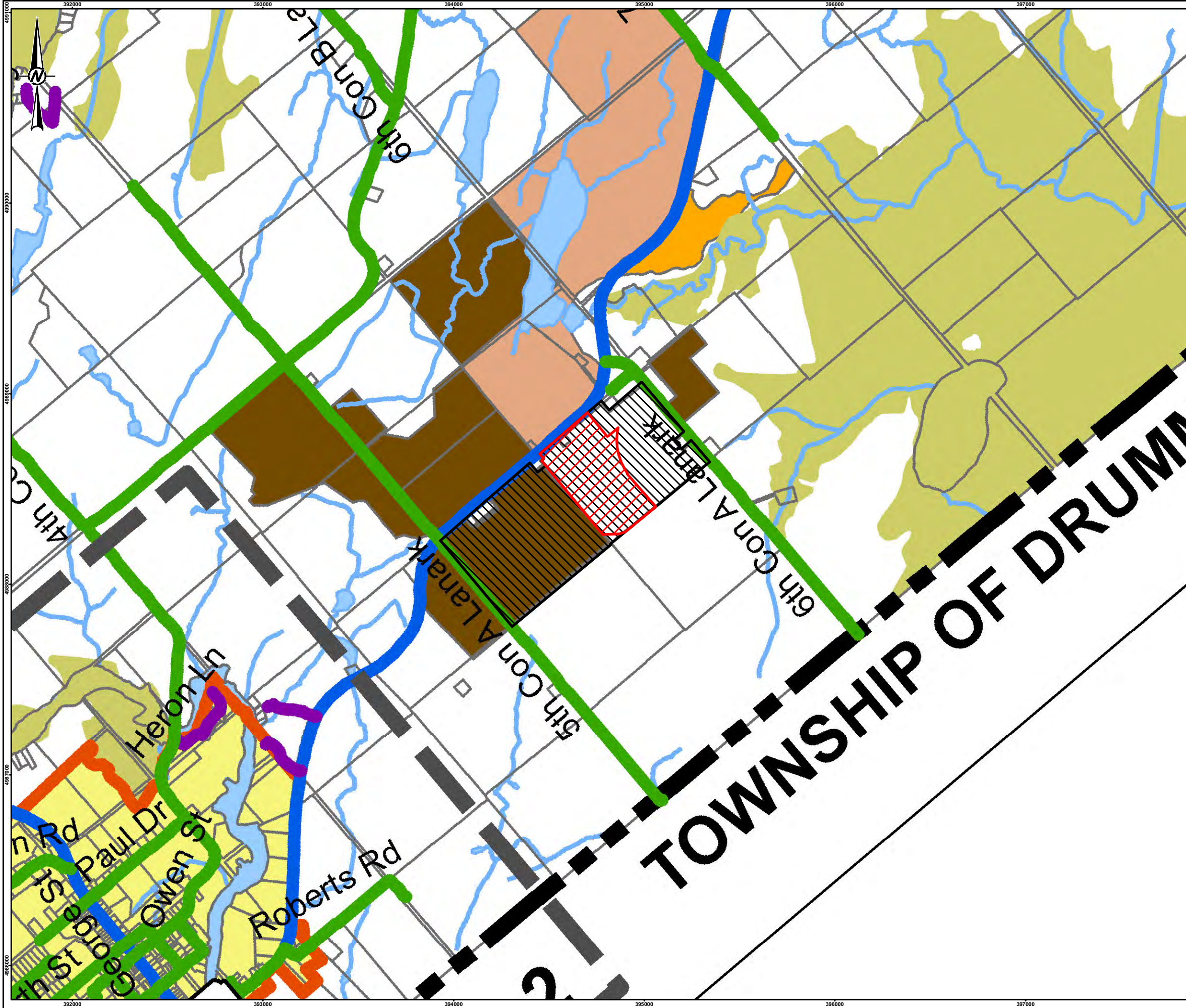
1. LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER ASSOCIATES LTD. UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2014
2. IMAGE OBTAINED FROM GOOGLE EARTH © 2018 GOOGLE INC. USED WITH PERMISSION. GOOGLE AND GOOGLE LOGO ARE REGISTERED TRADEMARKS OF GOOGLE INC.
3. SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, USGS, INTERMAP, INCREMENT P, NRCAN, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), ESRI KOREA, ESRI (THAILAND), NGCC, (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
4. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 18, VERTICAL DATUM: CGVD28



CLIENT			
THOMAS CAVANAGH CONSTRUCTION LIMITED			
PROJECT			
NOISE IMPACT ASSESSMENT			
PROPOSED ARNOTT PIT, LANARK HIGHLANDS, ONTARIO			
TITLE			
NOISE ASSESSMENT AREAS			
CONSULTANT			
YYYY-MM-DD	2019-09-06		
DESIGNED	---		
PREPARED	BR		
REVIEWED	PRN		
APPROVED	PRN		
PROJECT NO.		CONTROL	REV.
1894522		0002	0
		FIGURE	
		3	

APPENDIX A

Land Use Zoning Designation Plan

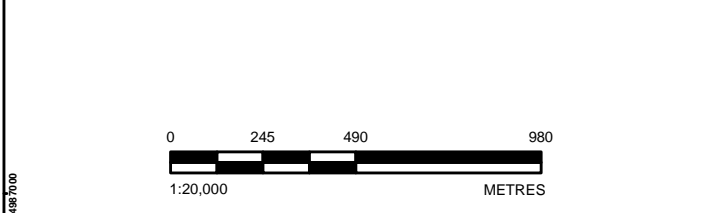


SCALE 1:400,000

- LEGEND**
- PROPOSED LICENSE BOUNDARY
 - CAVANAGH PROPERTY BOUNDARY
 - Village Communities
 - Rural Communities
 - Provincially Significant Wetland
 - Pit
 - Quarry
 - Pit and Quarry
 - Provincial Highway
 - County Road (ROW 26 metres)
 - Municipal Road (ROW 20 metres)
 - Private Road (ROW 20 metres)
 - Snowmobile Trail
 - Utility
 - Water Courses
 - Township Boundary

REFERENCE(S)

1. OFFICIAL PLAN SCHEDULE A LAND USE AND TRANSPORTATION. THE TOWNSHIP OF LANARK HIGHLANDS. SEPTEMBER 09, 2010.
2. SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, USGS, INTERMAP, INCREMENT P, NRCAN, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), ESRI KOREA, ESRI (THAILAND), NGCC, (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 18, VERTICAL DATUM: CGVD28



CLIENT			
THOMAS CAVANAGH CONSTRUCTION LIMITED			
PROJECT			
NOISE IMPACT ASSESSMENT			
PROPOSED ARNOTT PIT, LANARK HIGHLANDS, ONTARIO			
TITLE			
LAND USE ZONING PLAN			
CONSULTANT		YYYY-MM-DD	2019-09-06
		DESIGNED	---
		PREPARED	BR
		REVIEWED	PRN
		APPROVED	PRN
PROJECT NO.		CONTROL	REV.
1894522		0002	0
			FIGURE
			A

APPENDIX B

Description of Technical Terms

Description of Technical Terms

To help understand the analysis and recommendations made in this report, the following is a brief discussion of technical noise terms.

Sound pressure level is expressed on a logarithmic scale in units of decibels (dB). Since the scale is logarithmic, a sound that is twice the sound pressure level as another will be three decibels (3 dB) higher.

The noise data and analysis in this report have been given in terms of frequency distribution. The levels are grouped into octave bands. Typically, the center frequencies for each octave band are 31.5, 63, 125, 250, 500, 1000, 2000, 4000 and 8000 Hertz (Hz.). The human ear responds to the pressure variations in the atmosphere that reach the ear drum. These pressure variations are composed of different frequencies that give each sound we hear its unique character.

It is common practice to sum sound levels over the entire audible spectrum (i.e., 20 Hz to 20 kHz) to give an overall sound level. However, to approximate the hearing response of humans, each octave band measured has a weighting applied to it. The resulting “A-weighted” sound level is often used as a criterion to indicate a maximum allowable sound level. In general, low frequencies are weighted higher, as human hearing is less sensitive to low frequency sound.

Environmental noise levels vary over time and are described using an overall sound level known as the L_{eq} , or energy averaged sound level. The L_{eq} is the equivalent continuous sound level, which in a stated time, and at a stated location, has the same energy as the time varying noise level. It is common practice to measure L_{eq} sound levels in order to obtain a representative average sound level. The L_{90} is defined as the sound level exceeded for 90% of the time and is used as an indicator of the “ambient” noise level.

APPENDIX C

Sample Calculations

Report (1894522 Cavanagh 23Sep2018V5.2.1.cna)

CALCULATION CONFIGURATION

Configuration	
Parameter	Value
General	
Country	(user defined)
Max. Error (dB)	0.00
Max. Search Radius (#(Unit,LEN))	2000.00
Min. Dist Src to Rcvr	0.00
Partition	
Raster Factor	0.50
Max. Length of Section (#(Unit,LEN))	1000.00
Min. Length of Section (#(Unit,LEN))	1.00
Min. Length of Section (%)	0.00
Proj. Line Sources	On
Proj. Area Sources	On
Ref. Time	
Reference Time Day (min)	960.00
Reference Time Night (min)	480.00
Daytime Penalty (dB)	0.00
Recr. Time Penalty (dB)	0.00
Night-time Penalty (dB)	0.00
DTM	
Standard Height (m)	0.00
Model of Terrain	Triangulation
Reflection	
max. Order of Reflection	2
Search Radius Src	100.00
Search Radius Rcvr	100.00
Max. Distance Source - Rcvr	1000.00 1000.00
Min. Distance Rcvr - Reflector	1.00 1.00
Min. Distance Source - Reflector	0.10
Industrial (ISO 9613)	
Lateral Diffraction	some Obj
Obst. within Area Src do not shield	On
Screening	Excl. Ground Att. over Barrier
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	3.0 20.0 0.0
Temperature (#(Unit,TEMP))	10
rel. Humidity (%)	70
Ground Absorption G	0.80
Wind Speed for Dir. (#(Unit,SPEED))	3.0
Roads (RLS-90)	
Strictly acc. to RLS-90	
Railways (Schall 03 (1990))	
Strictly acc. to Schall 03 / Schall-Transrapid	
Aircraft (???)	
Strictly acc. to AzB	

NOISE SOURCES

Noise Source Library

Name	ID	Type	Oktave Spectrum (dB)												Source
			Weight.	31.5	63	125	250	500	1000	2000	4000	8000	A	lin	
Loader	Loader	Lw		95.9	99.9	97.9	90.9	92.9	93.9	88.9	81.9	75.9	97.0	104.2	GDB
Shipping Truck	ShippingTruck	Lw		91.9	103.1	105.0	100.7	100.8	99.0	97.9	95.6	90.2	104.7	109.8	GDB
Powerscreen	PSC	Lw		88.3	102.9	97.1	86.9	91.0	91.8	94.5	94.7	92.3	100.5	105.6	GDB

Point Source(s)

Name	M.	ID	Result. PWL			Lw / Li		Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Height	Coordinates				
			Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night					X	Y	Z	
			(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)		(min)	(min)	(min)	(dB)	(Hz)		(m)	(m)	(m)	(m)	
Powerscreen	~	!01C!SP01	100.5	100.5	100.5	Lw	PSC		0.0	0.0	0.0							0.0		(none)	3.50	r	394719.11	4988591.92	151.50
Powerscreen	~	!02C!SP01	100.5	100.5	100.5	Lw	PSC		0.0	0.0	0.0							0.0		(none)	3.50	r	394692.90	4988696.35	151.50
Powerscreen	~	!03C!SP01	100.5	100.5	100.5	Lw	PSC		0.0	0.0	0.0							0.0		(none)	3.50	r	394639.34	4988710.18	153.50
Powerscreen	~	!04C!SP01	100.5	100.5	100.5	Lw	PSC		0.0	0.0	0.0							0.0		(none)	3.50	r	394612.26	4988767.52	157.50
Powerscreen	~	!05C!SP01	100.5	100.5	100.5	Lw	PSC		0.0	0.0	0.0							0.0		(none)	3.50	r	394558.17	4988719.32	158.50
Powerscreen	~	!07C!SP01	100.5	100.5	100.5	Lw	PSC		0.0	0.0	0.0							0.0		(none)	3.50	r	394778.24	4988461.26	151.50
Powerscreen	~	!08C!SP01	100.5	100.5	100.5	Lw	PSC		0.0	0.0	0.0							0.0		(none)	3.50	r	394910.00	4988343.43	154.50
Powerscreen	~	!09C!SP01	100.5	100.5	100.5	Lw	PSC		0.0	0.0	0.0							0.0		(none)	3.50	r	394814.13	4988548.60	149.50
Powerscreen	~	!10C!SP01	100.5	100.5	100.5	Lw	PSC		0.0	0.0	0.0							0.0		(none)	3.50	r	394687.01	4988699.55	151.50
Powerscreen	~	!06C!SP01	100.5	100.5	100.5	Lw	PSC		0.0	0.0	0.0							0.0		(none)	3.50	r	394826.61	4988773.38	151.50

Line Source(s)

Name	M.	ID	Result. PWL			Result. PWL'			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Moving Pt. Sr		
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night				Number		
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)	(m²)	(min)		(min)	(min)	(dB)				(Hz)	Day	Evening
Shipping Trucks	~	!01C!SL01	96.4	-13.6	-13.6	71.7	-38.3	-38.3	PWL-Pt	ShippingTruck		0.0	0.0	0.0							0.0		(none)	10.0	0.0	0.0
Shipping Trucks	~	!02C!SL01	98.4	-11.6	-11.6	71.7	-38.3	-38.3	PWL-Pt	ShippingTruck		0.0	0.0	0.0							0.0		(none)	10.0	0.0	0.0

Name	M.	ID	Result. PWL			Result. PWL'			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Moving Pt. Src		
			Day (dBA)	Evening (dBA)	Night (dBA)	Day (dBA)	Evening (dBA)	Night (dBA)	Type	Value	norm. dB(A)	Day dB(A)	Evening dB(A)	Night dB(A)	R	Area (m²)		Day (min)	Special (min)	Night (min)				Day	Evening	Night
Shipping Trucks	~	!03C!SL01	99.1	-10.9	-10.9	71.7	-38.3	-38.3	PWL-Pt	ShippingTruck		0.0	0.0	0.0							0.0		(none)	10.0	0.0	0.0
Shipping Trucks	~	!04C!SL01	99.6	-10.4	-10.4	71.7	-38.3	-38.3	PWL-Pt	ShippingTruck		0.0	0.0	0.0							0.0		(none)	10.0	0.0	0.0
Shipping Trucks	~	!05C!SL01	99.5	-10.5	-10.5	71.7	-38.3	-38.3	PWL-Pt	ShippingTruck		0.0	0.0	0.0							0.0		(none)	10.0	0.0	0.0
Shipping Trucks	~	!06C!SL01	100.3	-9.7	-9.7	71.7	-38.3	-38.3	PWL-Pt	ShippingTruck		0.0	0.0	0.0							0.0		(none)	10.0	0.0	0.0
Shipping Trucks	~	!07C!SL01	95.9	-14.1	-14.1	71.7	-38.3	-38.3	PWL-Pt	ShippingTruck		0.0	0.0	0.0							0.0		(none)	10.0	0.0	0.0
Shipping Trucks	~	!08C!SL01	99.3	-10.7	-10.7	71.7	-38.3	-38.3	PWL-Pt	ShippingTruck		0.0	0.0	0.0							0.0		(none)	10.0	0.0	0.0
Shipping Trucks	~	!09C!SL01	98.4	-11.6	-11.6	73.0	-37.0	-37.0	PWL-Pt	ShippingTruck		0.0	0.0	0.0							0.0		(none)	10.0	0.0	0.0
Loader - Material Excavating/Dumping		!10C!SL02a	97.0	97.0	97.0	71.5	71.5	71.5	Lw	Loader		0.0	0.0	0.0				10.00	0.00	0.00	0.0		(none)			
Loader - Material Excavating/Dumping		!10C!SL02b	97.0	97.0	97.0	78.1	78.1	78.1	Lw	Loader		0.0	0.0	0.0				7.50	0.00	0.00	0.0		(none)			
Loader - Material Excavating/Dumping		!10C!SL02c	97.0	97.0	97.0	75.4	75.4	75.4	Lw	Loader		0.0	0.0	0.0				7.50	0.00	0.00	0.0		(none)			
Shipping Trucks		!10C!SL01	99.8	-10.2	-10.2	73.0	-37.0	-37.0	PWL-Pt	ShippingTruck		0.0	0.0	0.0							0.0		(none)	10.0	0.0	0.0
Loader - Material Excavating/Dumping	~	!05C!SL02	97.0	97.0	97.0	72.0	72.0	72.0	Lw	Loader		0.0	0.0	0.0				25.00	0.00	0.00	0.0		(none)			

Area Source(s)

Name	M.	ID	Result. PWL			Result. PWL"			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Moving Pt. Src		
			Day (dBA)	Evening (dBA)	Night (dBA)	Day (dBA)	Evening (dBA)	Night (dBA)	Type	Value	norm. dB(A)	Day dB(A)	Evening dB(A)	Night dB(A)	R	Area (m²)		Day (min)	Special (min)	Night (min)				Day	Evening	Night
Loader - Material Excavating/Dumping	~	!01C!SA02	97.0	97.0	97.0	69.2	69.2	69.2	Lw	Loader		0.0	0.0	0.0				50.00	0.00	0.00	0.0		(none)			
Loader - Material Excavating/Dumping	~	!04C!SA02	97.0	97.0	97.0	69.2	69.2	69.2	Lw	Loader		0.0	0.0	0.0				50.00	0.00	0.00	0.0		(none)			
Loader - Material Excavating/Dumping	~	!05C!SA02	97.0	97.0	97.0	69.2	69.2	69.2	Lw	Loader		0.0	0.0	0.0				25.00	0.00	0.00	0.0		(none)			
Loader - Material Excavating/Dumping	~	!07C!SA02	97.0	97.0	97.0	69.2	69.2	69.2	Lw	Loader		0.0	0.0	0.0				50.00	0.00	0.00	0.0		(none)			
Loader - Material Excavating/Dumping	~	!08C!SA02	97.0	97.0	97.0	69.2	69.2	69.2	Lw	Loader		0.0	0.0	0.0				50.00	0.00	0.00	0.0		(none)			
Loader - Material Excavating/Dumping	~	!09C!SA02	97.0	97.0	97.0	69.2	69.2	69.2	Lw	Loader		0.0	0.0	0.0				50.00	0.00	0.00	0.0		(none)			
Loader - Material Excavating/Dumping		!10C!SA02a	97.0	97.0	97.0	69.2	69.2	69.2	Lw	Loader		0.0	0.0	0.0				10.00	0.00	0.00	0.0		(none)			
Loader - Material Excavating/Dumping		!10C!SA02b	97.0	97.0	97.0	69.2	69.2	69.2	Lw	Loader		0.0	0.0	0.0				7.50	0.00	0.00	0.0		(none)			
Loader - Material Excavating/Dumping		!10C!SA02c	97.0	97.0	97.0	69.2	69.2	69.2	Lw	Loader		0.0	0.0	0.0				7.50	0.00	0.00	0.0		(none)			
Loader - Material Loading	~	!01C!SA01	97.0	97.0	97.0	69.2	69.2	69.2	Lw	Loader		0.0	0.0	0.0				50.00	0.00	0.00	0.0		(none)			
Loader - Material Excavating/Dumping	~	!02C!SA02	97.0	97.0	97.0	69.2	69.2	69.2	Lw	Loader		0.0	0.0	0.0				50.00	0.00	0.00	0.0		(none)			
Loader - Material Loading	~	!02C!SA01	97.0	97.0	97.0	69.2	69.2	69.2	Lw	Loader		0.0	0.0	0.0				50.00	0.00	0.00	0.0		(none)			
Loader - Material Excavating/Dumping	~	!03C!SA02	97.0	97.0	97.0	69.2	69.2	69.2	Lw	Loader		0.0	0.0	0.0				50.00	0.00	0.00	0.0		(none)			
Loader - Material Loading	~	!03C!SA01	97.0	97.0	97.0	69.2	69.2	69.2	Lw	Loader		0.0	0.0	0.0				50.00	0.00	0.00	0.0		(none)			
Loader - Material Loading	~	!04C!SA01	97.0	97.0	97.0	69.2	69.2	69.2	Lw	Loader		0.0	0.0	0.0				50.00	0.00	0.00	0.0		(none)			
Loader - Material Loading	~	!05C!SA01	97.0	97.0	97.0	69.2	69.2	69.2	Lw	Loader		0.0	0.0	0.0				50.00	0.00	0.00	0.0		(none)			
Loader - Material Loading	~	!07C!SA01	97.0	97.0	97.0	69.2	69.2	69.2	Lw	Loader		0.0	0.0	0.0				50.00	0.00	0.00	0.0		(none)			
Loader - Material Loading	~	!08C!SA01	97.0	97.0	97.0	69.2	69.2	69.2	Lw	Loader		0.0	0.0	0.0				50.00	0.00	0.00	0.0		(none)			
Loader - Material Loading	~	!09C!SA01	97.0	97.0	97.0	69.2	69.2	69.2	Lw	Loader		0.0	0.0	0.0				50.00	0.00	0.00	0.0		(none)			
Loader - Material Loading		!10C!SA01	97.0	97.0	97.0	69.2	69.2	69.2	Lw	Loader		0.0	0.0	0.0				50.00	0.00	0.00	0.0		(none)			
Loader - Material Excavating/Dumping	~	!06C!SA02	97.0	97.0	97.0	69.2	69.2	69.2	Lw	Loader		0.0	0.0	0.0				50.00	0.00	0.00	0.0		(none)			
Loader - Material Loading	~	!06C!SA01	97.0	97.0	97.0	69.2	69.2	69.2	Lw	Loader		0.0	0.0	0.0				50.00	0.00	0.00	0.0		(none)			

Barrier(s)

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height	
			left	right		horz.	vert.	Begin	End
					(m)	(m)	(m)	(m)	
Berm A P5A	-	!05A!						2.00	r
Berm A P5		!05A!	0.60	0.60				3.50	r
Berm A P6	~	!06A!	0.60	0.60				2.00	r

Ground Absorption Area(s)

Name	M.	ID	G
Site			0.5

Result Table

Receiver		Land Use	Limiting Value		Predicted Noise Level																		
Name	ID		Day	Night	V01 - DAY	V02 - DAY	V03 - DAY	V04 - DAY	V05 - DAY	V06 - DAY	V07 - DAY	V08 - DAY	V09 - DAY	V10 - DAY	V11 - DAY	V12 - DAY	V02 - DAY	V03 - DAY	V04 - DAY	V05 - DAY	V06 - DAY	V07 - DAY	V08 - D
			dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
POR01	POR01		45.5	40.0	-	41.9	42.8	43.5	43.9	45.0	41.3	39.8	37.9	40.8	44.1	-	-	-	-	-	-	-	
POR02	POR02		45.0	40.0	-	36.7	39.2	40.5	41.5	39.0	43.9	31.2	33.4	33.5	39.8	-	-	-	-	-	-	-	
POR03	POR03		45.0	40.0	-	34.5	34.6	35.0	35.1	34.1	38.8	33.3	33.7	35.4	35.2	-	-	-	-	-	-	-	
POR04	POR04		45.0	40.0	-	33.7	33.2	33.7	33.5	32.6	37.9	34.2	34.1	34.7	33.9	-	-	-	-	-	-	-	
POR05	POR05		45.0	40.0	-	33.2	32.2	32.5	32.3	31.7	36.1	33.7	34.8	35.3	32.9	-	-	-	-	-	-	-	
POR06	POR06		45.0	40.0	-	33.7	33.0	32.5	32.2	32.3	33.7	34.8	39.9	35.7	33.2	-	-	-	-	-	-	-	
POR07	POR07		45.0	40.0	-	24.4	24.0	25.4	25.4	27.5	27.0	28.4	31.3	27.8	25.2	-	-	-	-	-	-	-	

APPENDIX D

Statement of Qualifications

Education

M.Eng. Mechanical
Engineering, University of
Toronto, 2004

B.A.Sc. Mechanical
Engineering, Waterloo
University, 2001

Mississauga

Employment History

Golder Associates – Mississauga, Ontario

Associate / Acoustics, Noise and Vibration Engineer (2005 to Present)

Responsible for the preparation of Ontario Ministry of the Environment (MOE) Environmental Compliance Approval applications, Noise and Vibration Impact Statements, Environmental Assessments and Peer Reviews. Duties include the measurement and prediction of noise and vibration sources, recommendation and design of noise and vibration control measures, maintaining project budgets and schedules, client liaison, conducting site visits, preparing reports and senior review. Recognized as an Expert Witness at OMB and ERT Proceedings. Permitting and EA support provided to many sectors including mining, power & energy, iron & steel, manufacturing, landfill & aggregate, oil & gas, urban, etc.

Aercoustics Engineering Limited – Toronto, Ontario

Acoustics Noise and Vibration Consultant (2001 to 2005)

Responsible for measuring, analyzing and predicting the noise / vibration impacts on sensitive receptor locations. Ensured compliance with client, MOE or other governing body guidelines by providing acoustical performance specifications for the recommended noise / vibration control measures. Performing seismic designs of mechanical, electrical and life safety systems to ensure compliance with applicable codes, including but not limited to; OBC, SMACNA and NFPA-13. Projects included noise impact assessments, EAs, noise control specification for performing arts schools and universities, baseline noise studies for landfills and pits and quarries, acoustic audits, ambient noise assessments, assessment of rail and road, noise impact statements for residential developments, mechanical noise / vibration control, structural vibration isolation, vibration monitoring, design of vibration isolated buildings and software development for; the prediction of noise impacts and the qualifications of seismic restraints.

PROJECT EXPERIENCE – MINING

Morelos - Media Luna

Cocula, Guerrero State,
Mexico

The proposed project consists of a new underground gold, copper and silver mine development in Mexico. To date, Golder has completed a gap analysis to identify the necessary information needs and baseline data requirements that would support both the Mexican permitting and approvals (MIA), as well as any future Environmental and Social Impact Assessment in accordance with the International Finance Corporation's Performance Standards. Participated in the analysis of potential gaps, the identification of a planned course of action to address the gaps and the development of the report for the noise, vibration and light disciplines

Morelos - El Limon

Cocula, Guerrero State,
Mexico

Retained to carry out a noise, vibration and light assessment in support local permitting and an SEIA for a proposed precious metals mine in Mexico. The noise, vibration and light studies included the assessment of the mining/processing operations, and transportation facilities. Potential impacts were assessed against applicable limits, and controls (where required) and an environmental monitoring program were developed.

Glencore - Raglan

Nunavik, Quebec,
Canada

Retained by Glencore to complete a light assessment in support local permitting requirements. The assessment was completed in response to the regulators request to confirm light emissions onto the Pingualuit National Park (the Park) were within applicable limits. The assessment involved a field program, to quantify all on-site emissions and levels at the Park, and detailed modelling to confirm the source of the measured levels.

Matamec - Témiscamingue

Témiscamingue,
Québec, Canada

Retained to carry out a baseline noise assessment in support local permitting and an Environmental Assessment for a proposed mine in Témiscamingue, Québec, Canada. The noise study included areas potentially expected to be affected by the mining/processing operations, and transportation activities. Monitored noise levels were compared against applicable limits.

Meliadine

Nunavut, Canada

Retained to carry out a noise assessment in support local permitting and an Environmental Assessment for a proposed precious metals mine in Nunavut, Canada. The noise study included the assessment of the mining/processing operations, transportation (air and ground) and port facility in Rankin Inlet. Potential noise impacts were assessed against applicable limits, and noise controls (where required) and an environmental monitoring program were developed.

Various

Various, Peru

The projects consisted of various; expansion to existing mines and new mines throughout Peru. The project involved the completion of baseline studies (where appropriate) and an EIA for projects across Peru in accordance applicable regulating authorities. Was the Noise and Vibration Lead for assessments in support of the numerous EIAs. Projects ranged from power plants to resource and precious metal mines

PROJECT EXPERIENCE – REGULATORY

ACME Sample Application Package Toronto, Ontario

Worked with the Ministry of the Environment and Climate Change (MOECC) in preparing a sample Acoustic Assessment Report, which forms part of the sample application package prepare in cooperation with the MOE that demonstrates the technical requirements for CofA (Air and Noise) applications.

Revised - ACME Sample Application Package Toronto, Ontario

Worked with the MOECC in preparing a revised sample Acoustic Assessment Report, in support of the MOECC Modernization initiative, which forms part of the sample application package prepare in cooperation with the MOECC that demonstrates the technical requirements for Environmental Compliance Approval (ECA) applications.

ACME Aggregates Sample Application Package Toronto, Ontario, Canada

Retained by OSSGA to prepare a sample Acoustic Assessment Report, which forms part of a sample application package for MOECC approval for an aggregate site in Ontario. The package demonstrated the technical requirements for ECA applications.

PROJECT EXPERIENCE – POWER AND ENERGY SECTOR

Environmental Assessment Tiverton, Ontario

Preparing an environmental noise impact assessment for a proposed 4000 MW New Build Project at the Bruce Nuclear Power Facility. Noise predictions will be carried out to determine the noise impact over the life of the project. The noise assessment will include construction and operations. Acoustic Assessment Reports will be prepared in support of permitting with the Ministry of the Environment, which will include the design and recommendation of required noise controls to ensure noise impacts on neighbouring receptors during operations were within MOE guideline limits.

Environmental Assessment Sarnia, Ontario

Prepared an environmental noise impact assessment for a proposed 570 MW Natural Gas Cogeneration facility. Noise predictions were carried out to determine the noise impact over the life project. The noise assessment included construction and operations. Acoustic Assessment Reports were prepared in support of permitting with the Ministry of the Environment, which included the design and recommendation of required noise controls to ensure noise impacts on neighbouring receptors during operations were within MOE guideline limits.

Environmental Assessment York Region, Ontario

Preparing an environmental noise impact assessment for a proposed 400 MW Natural Gas Peaking Power Facility. Noise predictions were carried out to determine the noise impact over the life of the project. The noise assessment included construction and operations. Acoustic Assessment Reports will be prepared in support of permitting with the Ministry of the Environment, which included the design and recommendation of required noise controls to ensure noise impacts on neighbouring receptors during operations were within MOE guideline limits.

Renewable Energy Application - Noise Assessment

Nanticoke, Ontario

Responsible for the preparation of a noise study report for a proposed Windfarm with a rated capacity of approximately 130 MW. Noise predictions were carried out to determine the noise impact over the life project. The Noise Study Report was prepared in support of a Renewable Energy Application through the Ministry of the Environment, which included the assistance in optimizing the turbine layout to help lower project noise levels.

Noise Impact Assessment

Adelaide, Ontario

Prepared a Noise Impact Assessment for a proposed wind farm in Adelaide Ontario, consisting of forty (40) 1.5 MW wind turbines. Noise predictions were carried out to determine the noise impact of the project at participating and non-participating receptors.

Environmental Assessment

Bradford, Ontario

Prepared an environmental noise impact assessment for a proposed Natural Gas Peak Power facility. Noise predictions were carried out to determine the noise impact over the life project. The noise assessment included construction and operations. An Acoustic Assessment Report was prepared in support of permitting with the Ministry of the Environment, which included the design and recommendation of required noise controls to ensure noise impacts on neighbouring receptors during operations were within MOE guideline limits.

Boiler Tube Vibration

Burlington, Ontario

Carried out vibration measurements and analysis for IST on boiler tube bundles to determine whether or not tube resonant frequencies excited by vortex shedding of steam passing over the tubes could be reduced with the installation of an agitator.

Monitoring and Calibration of Active Noise Cancellation

Ottawa, Ontario

Monitored and re-calibrated an active noise cancellation system fitted at a Trans-Alta power generation facility in Ottawa, Ontario.

Noise Control Design

Hartford, Connecticut

Designed noise controls to ensure a sub-megawatt stationary multi-fuel fuel cell unit meets designed noises limit for application in Japan.

Environmental Noise Impact and Site Selection

Kitchener, Ontario

Carried out an Environmental Noise Impact Assessment for a proposed power generation and transformer station for Northland Power. The noise impact assessment involved establishing the ambient noise environment at various sites, which would be impacted with the installation of a proposed power generation and transformer station

Environmental Noise Impact Assessment

Various, Ontario

Predicted the noise impact of proposed emergency back-up power generator. Designed and recommended required noise controls to ensure noise impacts on neighbouring receptors during periodic testing are within MOE guideline limits. These include projects across Ontario and one in Calgary Alberta

Noise and Vibration Impact Assessment

Toronto, Ontario

Retained to assess and mitigate the impact of four (4) 1200 kW emergency diesel back-up generators on receptors outside the building, and receptors within the building, which included the CARLU center in Toronto. Noise and vibration controls were designed and recommended.

Heartland Generating Station
Alberta, Canada

Retained by ATCO Power to carry out a Noise Impact Assessment for a proposed Combined Cycle Gas Turbine Generating Station facility within the Alberta Industrial Heartland. Potential noise impacts were assessed against the Alberta Utilities Commission Rule 012: 'Noise Control' regulation.

Fenix Power Plant
Peru, Peru

Retained to carry out a noise assessment in support local permitting and an ESIA for a proposed single cycle natural gas power plant in Peru in close proximity to sensitive points of reception. Potential noise impacts were assessed against applicable limits and noise controls were developed.

PROJECT EXPERIENCE – OIL & GAS

**TransCanada
PipeLines – MLV149
Senneville**
Quebec, Canada

Retained to support TransCanada to develop a construction plan and noise control program for an impending construction program where a number of significant acoustic and vibration sources will be used. The project was in response to complaints received from local residents from activities completed the previous year. Support will likely also include carrying out vibration (and potentially noise) monitoring during construction.

**TransCanada
PipeLines -
Gravenhurst Mainline
Expansion**
Ontario, Canada

Retained to carry out a noise assessment in support of the preparation of a National Energy Board Section 58 application, related permitting and bylaw exemption support of TransCanada's proposed expansion of their Canadian Mainline in the Gravenhurst Area in Ontario. Support included; identify significant on-site noise and vibration sources onsite associated with DPI activities, recommending controls and carrying out indoor and environmental noise and vibration monitoring during construction.

**TransCanada
PipeLines - Vaughan
Mainline Expansion**
Ontario, Canada

Retained to carry out a noise assessment in support of the preparation of a National Energy Board Section 58 application, related permitting and bylaw exemption support of TransCanada's proposed expansion of their Canadian Mainline in the Greater Toronto Area in Ontario, consisting of an approximately 12 km natural gas pipeline. Support also included carrying out vibration monitoring during construction

**TransCanada
PipeLines - King's
North Connection**
Ontario, Canada

Retained to carry out a noise assessment in support of the preparation of a National Energy Board Section 58 application, related permitting and bylaw exemption support of TransCanada's proposed expansion of their Canadian Mainline in the Greater Toronto Area in Ontario, consisting of an approximately 11 km natural gas pipeline. Support also included carrying out noise and vibration monitoring during construction, and providing conceptual control design.

**TransCanada
PipeLines - Eastern
Mainline Pipeline**
Ontario, Canada

Retained to carry out a noise and light assessment in support of the preparation of a National Energy Board Section 52 application in support of TransCanada's proposed expansion of their Canadian Mainline in the Eastern Triangle region of Ontario, consisting of an approximately 356 km natural gas pipeline and 6 compressor stations along an existing pipeline corridor paralleling the 401 Highway between the Cornwall area southwest to the Greater Toronto Area.

**TransCanada
PipeLines - Various
Compressor Stations**
Ontario, Canada

Retained by TransCanada's compression design team (over a number of projects) to support them and/or their external design consultants to provide detailed noise design services for proposed compressor station upgrades. The support included providing complete noise engineering design services for a number of compressor stations within Ontario.

**TransCanada
PipeLines - Parkway
West.**
Ontario, Canada

Retained to provide noise services in support of the preparation of a National Energy Board Section 58 application, related permitting and bylaw exemption support of TransCanada's proposed project to construct and operate a pipeline between Union Gas Limited's (Union Gas) neighbouring Parkway West Compressor Station and TransCanada's existing mainline

**TransCanada
PipeLines- Greater
Golden Horseshoe
Project.**
Ontario, Canada

Retained to provide noise services in support of the preparation of a National Energy Board Section 58 application, related permitting and bylaw exemption support of TransCanada's proposed project upgrade the Ancaster and Douglastown Compressor Stations, the Mainline Valve Regulating Station, and the Parkway Belt, Douglastown Border and Niagara Border Meter Stations all along TransCanada Mainline between Fort Erie and Mississauga.

**TransCanada
PipeLines - Cacunna –
Energy East Project**
Quebec, Canada

Retained to complete a noise assessment of proposed construction activities associated with a proposed natural gas port. The noise assessment required the establishment of baseline conditions and prediction of expected noise levels from construction activities at off-site points of reception.

**TransCanada
PipeLines - Otter Lake
Compressor Station**
Alberta , Canada

A noise assessment was carried out to assess the construction and operation of a compressor, which is located northeast of the Town of Peace River, Alberta, for a National Energy Board 58 Application

Noise Study
Melchorita, Peru

Retained by Compania Operadora de LNG del Peru (COLP) to carry out a noise assessment of the Melchrita Liquefaction Process Train, which included an export terminal port, to identify significant noise sources on-site and determine whether noise mitigation was feasible. A noise mitigation program was developed, which addressed significant noise sources and would reduce noise levels within the plant to a levels where the auditory emergency notification system could be perceived by operators.

**Noise Impact
Assessment**
Bowmanville, Ontario

Retained by TransCanada PipeLines Limited to carry out a noise impact assessment as a technical report as part of TransCanada's application to the National Energy Board (NEB) for the proposed upgrade to the Bowmanville Compressor Station. The proposed equipment was assessed and noise mitigation was provided.

**TransCanada
PipeLines Carmon
Creek Pipeline**
Alberta, Canada

A noise assessment was carried out to assess the construction and operation activities of a pipeline, which is located northeast of the Town of Peace River, Alberta, for a National Energy Board (NEB) 52 Application

Noise Impact Audits
Various Sites, Ontario,
Quebec

Retained by Trans-Canada Pipelines (TCPL) to perform site surveys of various remote pumping stations. To determine the noise impact on neighbouring receptors. The results of the Audits were compared to historical Audits to ensure that the acoustic emissions of the facility have not changed significantly.

Acoustic Assessment

Paris, Ontario

Retained by Sun Canadian Pipelines (SCPL) to perform an Acoustic Assessment of an existing pumping facility for permitting applications with MOE. The Acoustic Assessment included an assessment of proposed equipment as part of an expansion project. A report was prepared in support of permitting with the Ministry of the Environment, which included the design and recommendation of required noise controls to ensure noise impacts on neighbouring receptors during operations were within MOE guideline limits. As the project design develops, will be taking an active role in the noise control designs to ensure MOE requirements are realized and SCPL's design criteria met.

PROJECT EXPERIENCE – LANDFILL & AGGREGATE SECTOR

Environmental Impact Assessment

Niagara, Ontario

Noise task manager preparing a noise assessment for the Humberstone Landfill in, which involved site specific noise measurements and modelling in order to assess compliance with MOECC Guidelines.

Environmental Impact Assessment

Ottawa, Ontario

Senior technical noise support for the noise assessment completed for the expansion of the Brighton Landfill providing support with the Environmental Assessment.

Environmental Permitting Assessments

Various, Ontario

Noise task manager responsible for ECA applications for various landfill sites operated by Simcoe County. These projects involved site-specific noise measurements and modelling in order to assess compliance with MOE Guidelines. Where required, noise mitigation was provided and designed to ensure compliance.

Environmental Permitting Support

Various, Ontario

Noise task manager responsible for supporting various landfill operations in meeting ECA requirements for sites in the Ottawa region. These projects involved annual or twice annual noise monitoring programs to document noise levels in the environment to allow the landfill operations to demonstrate compliance with EA and ECA conditions.

Environmental Permitting Assessment

New York State, US

Noise task manager responsible for completing a noise assessment for a proposed expansion to a quarry in up-state New York, which involved baseline monitoring, site specific noise measurements, and modelling in order to assess compliance with applicable noise limits. Conceptual noise mitigation was provided and designed to ensure compliance.

Environmental Permitting Assessment

Halifax, Nova Scotia

Noise task manager responsible for completing a noise assessment for a proposed quarry, which involved baseline monitoring, site specific noise measurements, and modelling in order to assess compliance with applicable noise limits. Conceptual noise mitigation was provided and designed to ensure compliance.

Environmental Permitting Assessments

Various, Ontario

Noise task manager preparing acoustic assessments of various Lafarge Canada Inc.'s pits, quarries, asphalt and ready-mix facilities across Ontario, which involved site specific noise measurements and modelling in order to assess compliance with MOE Guidelines. Where required, noise mitigation was provided and designed to ensure compliance.

**Noise Impact
Assessment
Kawartha Lakes,
Ontario**

Responsible for predicting the potential noise levels from a proposed pit expansion. Designed noise controls to address site operations against Ministry of Natural Resources (MNR) and Ministry of Environment (MOE) guidelines. Preparation of reports as part of MNR licensing requirements. Noise predictions included noise emissions from extraction, processing and transport equipment.

**Noise Impact
Assessment
Cambridge, Ontario**

Responsible for predicting the potential noise levels from various proposed pit expansions for sites across Cambridge Ontario. Designed noise controls to address site operations against Ministry of Natural Resources (MNR) and Ministry of Environment (MOE) guidelines. Preparation of reports as part of MNR licensing requirements. Noise predictions included noise emissions from extraction, processing and transport equipment.

**Noise / Vibration
Impact Assessment
Cambridge, Ontario**

Responsible for overseeing the assessment of potential noise/vibration levels from a proposed pit expansion for a site in Cambridge Ontario. Designed noise controls to address site operations against Ministry of Natural Resources (MNR) and Ministry of Environment (MOE) guidelines. Preparation of reports as part of MNR licensing requirements. Noise/vibration predictions included noise emissions from extraction, processing and transport equipment.

**Environmental Noise
Impact Assessment
Watford, Ontario**

Project manager involved in the EA process of the Waste Management Warwick Landfill Expansion. Noise predictions were carried out over a period of 25 years and included options for Reclamation and / or Land Filling. The noise assessment included haul route analysis, berm construction, leachate equipment and on-site landfill operations equipment. Project duties also involved presentation of results and reports at public open houses.

**Environmental Noise
Impact Assessment
Napanee, Ontario**

Involved in the noise modelling of the Richmond Landfill Expansion. Noise predictions were carried out over a period of 25 years and included options for Reclamation and / or Land Filling. The noise assessment included haul route analysis, berm construction, leachate equipment and on-site landfill operations equipment.

**Noise/Vibration Impact
Assessment
Orillia, Ontario**

Responsible for predicting the noise and vibration impact of a proposed quarry expansion. Designed noise controls and blast designs to ensure operations are within Ministry of Natural Resources (MNR) and Ministry of Environment (MOE) guidelines. Preparation of reports as part of MNR licensing requirements. Noise predictions included noise emissions from hydraulic drills, front-end loaders, portable crushers, dump trucks, conveying equipment and other associated equipment.

**Noise Impact
Assessment
Cambridge, Ontario**

Responsible for the prediction of the noise impact of a proposed expansion to an aggregate pit. Assisted in the design of extraction procedures to minimize noise impacts on residential receptors as part of a licensing application with the MNR.

**Noise Impact
Assessment
Manitoulin Island,
Ontario**

Responsible for the prediction of the noise impact of a proposed expansion to an aggregate quarry, which had an associated port facility. Assisted in the design of extraction procedures to minimize noise impacts on residential receptors as part of a licensing application with the MNR.

**Noise Impact
Assessment**
Vaughan, Ontario

Responsible for the prediction and assessment of the noise impacts of an asphalt recycling facility. Assessed noise impact on neighbouring receptors. Designed required noise controls and assisted in the design of operations to minimize further impact.

**Aggregate Pit and
Waste Transfer Facility
Operation
Measurements**
Various, Ontario

Carried out noise measurements of on-site operations including specific equipment measurements. Measurements were used to ensure that operation of equipment at various locations on the site would remain in compliance with MOE Noise Guidelines, where the impact exceeds MOE Noise Guidelines noise controls were designed and recommended.

**Environmental
Permitting
Assessments**
Ontario, Canada

Noise task manager preparing acoustic assessment for a quarry in Ontario that included a shipping port. The noise assessment involved site specific noise measurements and modelling in order to assess compliance with MOE Guidelines. Where required, noise mitigation was provided and designed to ensure compliance.

PROJECT EXPERIENCE – MANUFACTURING/DISTRIBUTION SECTOR

Colacem
L'Orignal, Ontario

Retained by Colacem Canada Inc. to be responsible for preparing an AAR for the proposed new Portland cement manufacturing facility. Was responsible for providing design input to help demonstrate the site could operate in compliance with MOECC noise limits.

Sanofi Pasteur
Toronto, Ontario

Retained by Sanofi Pasteur to be responsible for overseeing the site-wide MOECC ECA. Was responsible for preparing the AAR and overseeing the Noise Abatement implementation team to ensure the site was in compliance with MOE noise limits.

Acoustic Assessments
Various, Ontario

Responsible for preparing and overseeing acoustic assessments of numerous sites manufacturing facilities throughout Ontario, which involved site specific noise measurements and modelling in order to assess compliance with MOE Guidelines. Where required, noise mitigation was provided and designed to ensure compliance. Liaison and negotiations with the MOE review engineers were carried out when required.

Acoustic Assessments
Various, Quebec

Responsible for preparing and overseeing noise studies of numerous sites manufacturing facilities throughout Quebec, which involved site specific noise measurements and modelling in order to assess compliance with MDDELCC Guidelines. Where required, noise mitigation was provided and designed to ensure compliance. Liaison and negotiations with the MDDELCC staff were carried out when required. Clients include Saputo, and Parmalat.

Acoustic Audit
Wingham, Ontario

Performed an acoustic audit of the Wescast Industries Auto Parts Machining Plant. Noise measurements were taken of all on-site noise sources in order to establish compliance with MOE Guidelines. Identified noise sources requiring mitigation and specified the appropriate noise control measures.

Acoustic Audit Ingersoll, Ontario	Performed an acoustic audit of the Ingersoll Fasteners Plant. Noise measurements were taken of all on-site noise sources in order to establish compliance with MOE Guidelines. Identified noise sources requiring mitigation and specified the appropriate noise control measures.
Noise Survey & Acoustic Audit Cambridge, Ontario	Retained to perform a noise survey and acoustic audit of the Loblaws Distribution Facility. Established the background noise levels at the nearest residential receptors and performed noise impact predictions based on source measurements.
Impulse Noise Cambridge, Ontario	Responsible for the measurement of impulse noise generated by truck marshalling events for the Loblaws Distribution facility. Measurements were used to determine whether or not the Loblaws Distribution facility was within the MOE guidelines for impulse noise at the nearest residential receptor locations.
Acoustic Audit Trent, Ontario	Performed an acoustic audit of the Quaker Trenton Plant for an application for a Certificate of Approval (CofA). Noise measurements were taken of all on-site noise sources in order to establish compliance with MOE Guidelines. Identified noise sources requiring mitigation and specified the appropriate noise control measures.
Acoustic/Vibration Audit Port Robinson, Ontario	Performed an acoustic and vibration audit of Demshe Products stamping plant. Noise and vibration measurements were taken of all on-site noise sources and at residential receptors in the vicinity in order to establish compliance with MOE Guidelines. Identified noise sources requiring mitigation and specified the appropriate noise control measures.
Noise Survey & Acoustic Audit Woodbridge, Ontario	Retained to perform a noise survey and acoustic audit of the Woodbridge Foam Facility. Established the background noise levels at the nearest residential receptors and performed noise impact predictions based on source measurements. Based on these predictions, offending noise sources were identified and noise control measures were specified accordingly.
Noise/Vibration Audit Sarnia, Ontario	Performed an internal noise and vibration audit of a Woodbridge Foam manufacturing facility. The measured levels were compared to OSHA guidelines and various international (ISO) standards. Noise and vibration controls were recommended.
Noise Control Design Toronto, Ontario	Measured emission noise levels on an air handling unit, and designed a silencer for the Air handling unit manufacturer. Performance of the installed silencer was verified.
Vibration Analysis Shelburne, Ontario	Performed intensive vibration studies to qualify a state-of-the-art load and acceleration transducer setup for Johnson Controls for the active control of automotive airbag deployment.

PROJECT EXPERIENCE – IRON AND STEEL

Environmental Noise Studies

Ottawa area, Ontario

Responsible for preparing and overseeing acoustic assessments for a steel mill in eastern Ontario, which involved site specific noise measurements and modelling in order to assess compliance with MOE Guidelines. Noise mitigation support was provided and designed to ensure compliance. Liaison and negotiations with the MOE review engineers were carried out as part of the permitting efforts for the site

Environmental Noise Survey

Sault Ste. Marie, Ontario

Retained to perform a facility wide noise survey for Algoma Steel as required for their Certificate of Approval (Air) application. Long-term noise monitoring was used to establish the appropriate ambient noise levels for the surrounding residential receptors.

PROJECT EXPERIENCE – TRANSPORTATION

Noise Impact Study - Third Crossing - Cataraqui River

Kingston, Ontario

Golder was retained by the City of Kingston, through JLR to assess the potential environmental noise impact of the proposed third crossing of the Cataraqui River to the atmosphere, specifically considering human receptors. Golder identified that noise mitigation is required for certain locations in the vicinity of the Project.

Environmental Noise Studies

Brampton, Ontario

Retained to carry out a noise assessment in support of a Municipal Class Environmental Assessment for Airport Road (Braydon Blvd to Countryside Road) in Peel Region. Golder will support with the alternative assessment. The noise assessment will be carried out in general accordance with MOECC/MTO and the City's Noise Wall retrofit Policy guidelines which form the basis for the City's requirements.

Noise and Vibration Assessment

Montreal, Quebec

Retained to carry out a noise and vibration assessment to identify the potential noise and vibration levels of a proposed LRT project in Montreal, Quebec. The study included the establishment of existing levels (without the LRT), and establish expected future levels (with the LRT) on sensitive receivers, which included a state of the art movie production studio.

On-Board Sound Intensity (OBSI)

Various, Ontario

Retained to complete OBSI assessments for various road sections in central and eastern Ontario. Work was completed under the MTO Assignment No. 4013-E-0030. Sections included recently grooved sections along Hwys 115, 417, 410 and 401.

Environmental Noise Studies

York, Ontario

Retained to carry out a noise assessment in support of a Municipal Class Environmental Assessment for Teston Road (Pine Valley to Weston Road) in York Region. Golder supported with the alternative assessment. The noise assessment will be carried out in general accordance with MOECC/MTO guidelines which form the basis for the Region's requirements.

Environmental Noise Studies

York, Ontario

Retained to carry out a noise assessment in support of a Municipal Class Environmental Assessment for Portage Road (Jane Street to Credit Stone) in York Region. The noise assessment was carried out in general accordance with MOECC/MTO guidelines which form the basis for the Region's requirements.

West Toronto Diamond (WTD) Toronto, Ontario, Canada	Retained on behalf of Go/Metrolinx to complete a noise and vibration assessment of the WTD Grade Separation Project. Golder was responsible to assess baseline conditions, monitor construction activities, support in the development of best practices and mitigation plans and provide expert advice in relation to noise and vibration.
Environmental Noise Studies Regina, Saskatchewan, Canada	Retained by City of Regina to undertake a noise study of significant roadways within the City of Regina limits to identify locations where noise mitigation is warranted. The studies will identify locations and will provide recommendations as to the appropriate mitigation methods.
Environmental Noise Studies Innisfil, Ontario	Was the senior acoustics engineer for the noise assessment in support of a Municipal Class Environmental Assessment for 6th Line (County Road 27 to St. John's Road) in the Town of Innisfil. The noise assessment will be in general accordance with MOECC/MTO guidelines which form the basis for the Region's requirements.
Environmental Noise Studies Durham, Ontario	Was the senior acoustics engineer for the noise assessment in support of a Class Environmental Assessment for Regional Road #57, from Baseline Road to Nash Road in the Municipality of Clarington in the Region of Durham, Ontario. In their Noise Policy, the Region of Durham adopted the MOECC/MTO guidelines. The noise assessment predicted future noise levels and identified noise barrier requirements for the entire corridor.
Environmental Noise Studies Eastern Region, Ontario	Was the noise/vibration lead on a project for the MTO, which required the assessment of potential noise and vibration impacts from activities associated with the redesign of three (3) intersections in eastern Ontario. The studies were designed to; establish existing conditions and assess potential noise and vibration impacts from construction and operational activities associated with the proposed project.
Environmental Noise Studies Eastern Region, Ontario	Retained by Ministry of Transportation (MTO) to undertake noise studies from various road re-surfacing techniques in the MTO's Eastern Region. The studies aimed to quantify and compare the noise levels from vehicle tire and road surface interaction for various road surfacing techniques.
In-Vehicle Noise Studies Eastern Region, Ontario	Retained by Ministry of Transportation (MTO) to undertake noise studies from various road re-surfacing techniques in the MTO's Eastern Region. The studies aimed to quantify and compare the noise levels in the vehicle from vehicle tire and road surface interaction for various road surfacing techniques.
Road/Rail Noise Assessment Various, Ontario	As part of the preparation of numerous noise impact statements required for proposed residential development projects, road and rail noise was assessed according to MOE protocol to ensure that the noise impacts met the MOE prescribed noise limits. Where noise limits were exceeded, noise mitigation was designed. Mitigation involved the design of noise barriers, selection for appropriate window glazings and design of wall constructions.

Road Noise Assessments Niagara Region, Ontario	Part of a team contracted to the MTO to carry out an assessment of proposed rehabilitation to MTO roadways in the Niagara Region, Ontario. The studies were designed to; establish existing conditions and assess potential noise and vibration impacts from construction activities associated with the proposed project.
Noise/Vibration Assessments Central Ontario	Was the noise/vibration lead on a project for the MTO, which required the assessment of potential noise and vibration impacts from activities associated with the redesign of eight (8) intersections throughout central Ontario. The studies were designed to; establish existing conditions and assess potential noise and vibration impacts from construction and operational activities associated with the proposed project.
Noise/Vibration Assessment Central Ontario	Part of a team contracted to the MTO to carry out an assessment of proposed realignment of the Highway 401 interchange at Highway 8 in the Kitchener/Waterloo Region, Ontario. The studies were designed to; establish existing conditions and assess potential noise and vibration impacts from construction and operation activities associated with the proposed project.
Environmental Noise Studies Various, Ontario	Was retained by a number of design firms to carryout noise studies for various roadways throughout Ontario. These studies involved the assessment on noise levels from both construction and motorway public use. Studies were carried out for both existing roadways undergoing rehabilitation, to roadways undergoing realignments.
Construction Noise Monitoring Toronto, Ontario	Retained to carryout construction noise monitoring for the redevelopment of a rail corridor in Toronto. This support included providing construction noise management recommendations.
Road/Rail Noise Assessments Various, Ontario	As part of the preparation of numerous noise impact statements required for proposed residential development projects, road and rail noise was assessed according to MOE protocol to ensure that the noise impacts met the MOE prescribed noise limits. Where noise limits were exceeded, noise mitigation was designed. Mitigation involved the design of noise barriers, selection for appropriate window glazings and design of wall constructions.

PROJECT EXPERIENCE – MEDICAL SECTOR

Pharmaceutical Toronto, Ontario	Retained to support a vaccine production facility in Toronto to prepare a CofA (Air and Noise) Application package. Responsible for the preparation of the AAR, development of the NAAP, and providing on-going engineering support on capital expenditure projects.
Subway Vibration Toronto, Ontario	Measured existing subway and building vibration levels at Mount Sinai Hospital and compared these levels with GE Medical's acceptable vibration levels for their MRIs. Based on these measurements and manufacturer's specifications, vibration isolated floors were designed and recommended to support these MRIs and ensure that subway induced vibration would not interfere with image quality.

Environmental Noise Assessment
Burlington, Ontario

Retained to conduct an environmental noise assessment for Burlington Long-term Care Facility. Predicted noise impact for all rooftop mechanical equipment and ground level noise sources. Background measurements were used as inputs for predicting the noise impact from the hospital equipment on neighbouring receptors. Identified sources requiring noise abatement and provided noise control design.

Environmental Noise Assessment
Thunder bay, Ontario

Retained to conduct a preliminary environmental noise assessment for Thunder Bay General Hospital. Predicted noise impact for all rooftop mechanical equipment and ground level noise sources. Used the MOE minimum noise limits as background for predicting the noise impact from the hospital equipment on neighbouring receptors.

Environmental Noise Assessment
Oakville, Ontario

Retained to conduct a preliminary environmental noise assessment for Grace Long-term Care Facility. Predicted noise impact for all rooftop mechanical equipment and ground level noise sources. Minimum MOE limits were used as background for predicting the noise impact from the hospital equipment on neighbouring receptors.

PROJECT EXPERIENCE – MUNICIPAL / URBAN SECTOR

Noise and Vibration Study
Toronto, Ontario

Retained by SmartReit to support with completing a noise and vibration assessment for a proposed construction project that would implement piling activities. The support included a preliminary assessment of expected noise and vibration levels of associated constructions activities, which included piling activities. Sensitive receptors were identified surrounding the proposed site. The support also included the monitoring of piling activities at a number of locations within the site. Golder was responsible for monitoring noise and vibration emissions and documenting them against piling progression. A noise and vibration management plan was developed to support the proposed construction plans

Noise Feasibility Study – Former CFB Rockcliffe Lands
Ottawa, Ontario

Golder was retained to prepare a noise feasibility study as supporting documentation for a draft plan of subdivision approval for the former Canadian Forces Base Rockcliffe Lands property, which encompasses approximately 140 hectares, in the City of Ottawa. Golder's study assessed the feasibility of the community design plan with respect to the expected noise impact on the Site from road traffic and other facilities, and outlines recommended mitigation measures for the proposed development.

Feasibility Noise Study – All Seniors Care
Kingston, Ontario

Golder was retained by the developer of a proposed retirement home development in the City of Kingston to assess the potential environmental noise impacts of existing transportation and stationary noise sources on the proposed development. In the scope of the noise work, Golder will consider the: impacts on the environment on the development; the potential impacts of the development on the environment; and the potential impacts of the development on itself. Where required, Golder will identify noise mitigation that will need to be designed into the development

**Noise Impact Study -
Various**
Ottawa, Ontario

Retained to carry out an environmental noise impact study for a number of proposed residential developments of single family; attached, and detached homes in the vicinity of roadways identified as major collector roadways. The noise assessments were carried out in accordance with both; the City of Ottawa Environmental Noise Control Guidelines and MOE noise guideline NPC-300. Noise predictions were performed in order to determine whether or not additional, in addition to the minimum Ontario Building Code, noise control measures would be required. Construction wall, window and door types were provided.

Ville de Sept Ilse
Sept Ilse, Quebec

Retained by the Ville de Sept Ilse to be responsible for preparing a noise study for their snow dump facility. Golder's scope of work included three phases; 1) establishment of noise levels during operations, 2) establishment of ambient conditions and 3) the preparation of a detailed noise model to predict current and future noise levels and assist in the development of noise controls if required

**Noise Impact Study -
Concord Adex - City
Place**
Toronto, Ontario,
Canada

Completed various noise and vibration impact studies for a number of proposed high rise residential buildings along the Queens Elizabeth Highway (the Gardiner), and adjacent to a major rail corridor rail right-of-way. As a result of the development's proximity to the rail lines, on-site vibration measurements were conducted to ensure that vibration levels at the proposed condominium locations, due to a nearby rail corridor, were below the Ministry of the Environment limits. Noise predictions were completed in order to determine whether or not additional, in addition to the minimum Ontario Building Code, noise and vibration controls measures would be required. Construction wall, window and door types were provided.

**Noise Impact Study -
Concord Adex**
Toronto, Ontario,
Canada

Completed a noise impact study for a proposed highrise residential buildings along Highway 401 (one of the busiest highways in Canada). Noise predictions were completed in order to determine whether or not additional, in addition to the minimum Ontario Building Code, noise and vibration controls measures would be required. Construction wall, window and door types were provided.

Noise Impact Study
Brampton, Ontario

Retained to perform an environmental noise impact study for a proposed residential development of single family attached, detached and town-homes in the vicinity of transformer yards in Brampton. Noise predictions were performed in order to determine whether or not additional, in addition to the minimum Ontario Building Code, noise control measures would be required. Construction wall, window and door types were provided.

Noise Impact Study

Various, Ontario

Conducted a noise and vibration impact study for a proposed residential development of single family attached, detached and town-homes. All within 45m of CN rail right-of-way and in the vicinity of either; provincial, regional and/or local roadways. As a result of the development's proximity to the CN rail lines, on-site vibration measurements were conducted to ensure that vibration levels at the proposed condominium locations, due to a nearby rail corridor, were below the Ministry of the Environment limits. Noise predictions were performed in order to determine whether or not additional, in addition to the minimum Ontario Building Code, noise and vibration controls measures would be required. Construction wall, window and door types were provided. These include developments in; Toronto, Brampton, North-bay and Alliston.

Noise Impact Study

Various, Ontario

Retained to perform an environmental noise impact study for a proposed residential development of single family attached, detached and town-homes in the vicinity of; provincial, regional and/or local roadways. Noise predictions were performed in order to determine whether or not additional, in addition to the minimum Ontario Building Code, noise control measures would be required. Construction wall, window and door types were provided. These include developments in; Toronto, Mississauga, Brampton, Caledon, Gravenhurst and Wasaga Beach.

Vibration Impact Study

Toronto, Ontario

Conducted a noise and vibration impact study for a proposed residential condominium development located along TTC subway and streetcar lines. Predictions of the vibration impact were performed with documented and/or measured data. Building isolation systems were designed and proposed where appropriate.

Noise and Vibration Impact Study - Bayview Mansions

Toronto, Ontario,
Canada

Completed a noise impact study for a proposed high density residential development along a major local roadway. The assessment required the predictions of the potential vibration impacts from a proposed TTC subway line were performed with documented and/or measured data. Predictions were completed in order to determine whether or not additional, in addition to the minimum Ontario Building Code, noise and vibration controls measures would be required. Construction wall, window and door types were provided.

Noise/Vibration Impact Study

Toronto, Ontario

Retained to perform a study reviewing the possible noise and vibration intrusion between suites for a proposed building conversion from commercial/industrial to residential lofts.

Noise/Vibration Investigation

Toronto, Ontario

Conducted a noise and/or vibration intrusion investigation to determine the source of the noise/vibration intrusion for numerous residential buildings in the City of Toronto.

PROJECT EXPERIENCE – MUSICAL/ARTS PERFORMANCE AND FILM VIEWING VENUES AND SCHOOLS

HVAC Noise Control Ottawa, Ontario

Responsible for performing noise analysis of HVAC systems and proposing noise controls for HVAC noise from intruding into the sensitive technical spaces including Studios and booths in the CBC Ottawa building. Noise control recommendations included the use of duct liner, plenums and high performance silencers for the air handling units servicing these rooms.

Mechanical Equipment Noise Control Toronto, Ontario

Reviewed noise control measures for the TVO voice over booths and control rooms. Noise controls for the HVAC system were proposed to mitigate noise levels to within the design criteria.

Vibration Intrusion Investigation Toronto, Ontario

Investigation of the noise/vibration intrusion into the Glenn Gould studio within the CBC Toronto building.

Mechanical Equipment Noise Control and Architectural Acoustics Toronto, Ontario

Performed noise and vibration analysis for the proposed mechanical equipment for the National Ballet School. Performed room acoustic analysis to design the dance studios and music rooms. Results of the various analysis were used to specify noise and vibration controls including, suspended ceilings, equipment vibration isolation and studio architectural designs.

Mechanical Equipment Noise Control Various

Responsible for analyzing and proposing noise controls for HVAC noise to ensure that noise is prevented from intruding into the sensitive spaces including; classrooms and auditoria in various schools and universities. Noise control recommendations included the use of duct liner, plenums and high performance silencers for the air handling units servicing these rooms. Provided the silencer schedule for all air handling units servicing the buildings:

- UBC Life Sciences Building Vancouver, British Columbia
- Ajax Multi-use School Ajax, Ontario
- Jean Vanier Collingwood, Ontario
- Toronto French School Toronto, Ontario
- Brock University Brock, Ontario
- Trent University Trent, Ontario

PROJECT EXPERIENCE – FLOOR AND STRUCTURAL VIBRATION

Subway Induced Vibration Toronto, Ontario

Responsible for the design of the structural isolation pads for 20 Gothic, a residential condominium in Toronto, Ontario. In order to ensure that vibration levels are not perceptible, the building structure needed to be isolated from the subway induced vibration.

Streetcar Induced Vibration Toronto, Ontario

Retained to determine the intrusive vibration levels due to streetcar movement on a proposed office space. Unmitigated vibration and noise levels induced by streetcar pass-bys would have caused fixtures to rattle. In addition, the excessive noise levels would have made it unbearable to work in the office space.

**Subway Induced
Vibration**

Toronto, Ontario

Designed the vibration isolation system for a residential condominium development along the TTC Sheppard subway transit line. Predictions were made before the Sheppard Line was commissioned. The isolation system design was limited to theoretical modelling, post construction measurements were performed and found to be as predicted.

**Subway Vibration
Monitoring Program**

Toronto, Ontario

Responsible for performing measurements for the TTC at track level and ground level at receptors, before and after work was performed on either the tracks and/or wheels of the subway car. A comparison analysis was performed to assess the effectiveness of the efforts in reducing vibration levels perceived by receptors.

PROJECT EXPERIENCE – SEISMIC

Software Development

Toronto, Ontario

Responsible for the development of software which could incorporate many aspects of seismic restraint design.

Post Disaster Building Various, Ontario

Responsible for the design and specification of seismic restraint systems and seismic restraint layouts of piping systems for fire protection systems under NFPA-13 and Factory Mutual, and piping/conduit and ducting systems under ASHRAE guidelines. Including the design and specification of restraint systems for mechanical equipment, which includes but not limited to; back-up power generators, Chillers/cooling equipment, HVAC equipment, pumps and tanks for post disaster buildings, as required in the Ontario Building Code (OBC). A list of projects includes;

Toronto General Hospital, Toronto Ontario. Systems restrained included; fire protection, medical gas, mechanical piping, ducting and air-handling equipment, back-up diesel generators, and general mechanical and electrical equipment.

Children's Hospital of Eastern Ontario, Ottawa, Ontario. Mechanical equipment and layouts were seismically qualified.

Glebe Center Long-term Care Facility, Ottawa, Ontario. Seismically qualified the fire protection system, mechanical and electrical equipment and layouts

St Vincent Hospital, Ottawa, Ontario. Seismically qualified the mechanical and electrical equipment and layouts.

Queensway Carton Hospital, Ottawa, Ontario. Seismically qualified the fire protection system.

Royal Canadian Mounted Police (R.C.M.P) Ottawa, Ontario. Seismically qualified the installation of equipment, piping/conduit and ducting as part of an expansion of base building.

Etisalat, United Arab Emirates. Seismically qualified the installation of equipment, including diesel back-up generator systems, piping/conduit and ducting as part of the design and construction of their flag ship office tower.

Ottawa Airport, Ottawa, Ontario. Seismically qualified the installation of equipment, piping/conduit and ducting as part of the construction project.

MDS Nordion, Ottawa, Ontario. Seismically qualified the installation of equipment, piping/conduit and ducting as part of the construction project, which included hazardous material equipment.

School Building

Various, Ontario

Responsible for the design and specification of seismic restraint systems and seismic restraint layouts of piping systems for fire protection systems under NFPA-13 and Factory Mutual, and piping/conduit and ducting systems under ASHRAE guidelines. Including the design and specification of restraint systems for mechanical equipment, which includes but not limited to; back-up power generators, Chillers/cooling equipment, HVAC equipment, pumps and tanks for school buildings, as required in the Ontario Building Code (OBC). A list of projects include:

North Grenville, Ottawa, Ontario. Seismically qualified the fire protection system installed as part of the project.

For various schools and universities, in the Ottawa and Kingston areas, the mechanical equipment restraint system was designed and seismically qualified. These projects included; Bridlewood School, Cambridge Public School, Samuel Genest School, St Bernadette School, Ottawa University Bioscience Building, Terre Des Jeunes and College Catholique Samuel.

Joules Leger, Ottawa, Ontario – Seismically qualified the electrical equipment and conduit layout as part of the construction contract.

For various schools and universities, in the Ottawa area, the mechanical equipment restraint system, along with the fire protection system was designed and seismically qualified. These projects included; Cumberland High-school, Carlton University, Tory building & student residence and Russell Catholic High-school.

Not a Post Disaster Building

Various, Ontario

Responsible for the design and specification of seismic restraint systems and seismic restraint layouts of piping systems for fire protection systems under NFPA-13 and Factory Mutual, and piping/conduit and ducting systems under ASHRAE guidelines. Including the design and specification of restraint systems for mechanical equipment, which includes but not limited to; back-up power generators, Chillers/cooling equipment, HVAC equipment, pumps and tanks for non-post disaster buildings, as required in the Ontario Building Code (OBC). A list of projects include:

For various projects in the Ottawa area, the electrical and mechanical equipment restraint systems were designed and seismically qualified. These projects included; Canadian War Museum, Morrisburg Water Treatment/Pumping Station, East Market and Joules Leger.

For various projects in the Ottawa area, the mechanical equipment restraint system was designed and seismically qualified. These projects included; 269 Laurier, Metropole, Adelaide Preston Square, Louis Riel Dome, Bell Semplex, 181 Queen Street, West District Ice Rink and CBC Ottawa.

1600 Startop, Ottawa, Ontario. Seismically qualified the restraint of the mechanical equipment and fire protection systems.

For various projects in the Ottawa area, the fire protection restraint system was designed and seismically qualified. These projects included; Canadian Aviation Museum, Nortel, Loeb Center, and the Glebe Center.

PROJECT EXPERIENCE – EXPERT WITNESS

Ontario Municipal Board

Toronto, Ontario

Was retained by the City of Toronto to support the City at an OMB preceding, involving a proposed residential development directly exposed to noise levels from industry, road and rail activities.

Environmental Review Tribunal

Haldimand, Ontario

Appeared at an ERT for a proposed Windfarm in Haldimand County. Was recognized as an expert witness on the subject of environmental noise, specifically with respect to the Noise Study Report prepared in support of the Renewable Energy Approval issued by the MOE.

Planning Board Hearing

Nova Scotia

Supported an application for an aggregate facility in Nova Scotia. Carried out the noise work in preparation for the hearings and was put forward as the Expert Witness on behalf of the proponent.

Ontario Municipal Board

Lincoln, Ontario

Retained by the Town of Lincoln as their expert noise specialist, with respect to an application for site plan approval for a proposed waste management facility.

Quebec Hearing Board

Salaberry-de-Valleyfield, Quebec

Retained by the City of Salaberry-de-Valleyfield as their expert noise specialist, with respect to noise concern associated with the recently expended Autoroute NA 30 and associated noise barriers.

PROFESSIONAL AFFILIATIONS

Professional Engineers of Ontario (P.Eng)

Canadian Council for Human Resources in the Environment Industry (CCHREI)

MTO – RAQs approved for the provision of Acoustic and Vibration Services

Air and Waste Management Association (AWMA)

National Fire Protection Agency (NFPA)

Ontario Sand Stone and Gravel Association - Environmental Committee

Ready Mix Concrete Association of Ontario - Environmental Committee

Education

M.A.Sc. Environmental Applied Science and Management, Ryerson University, Toronto, 2013

Post Graduate Certificate Environmental Control, Sheridan College, Brampton, 2001

B.Sc., Honours Geology (Geosciences), The University of Western Ontario, London, 1998

Languages

English – Fluent

Golder Associates Ltd. – Mississauga

Noise, Vibration and Air Quality Specialist / Project Manager

Mr. Niejadlik is a Noise, Vibration and Air Quality Specialist who has been based in Golder's Mississauga Environmental Planning and Permitting Division for over 14 years. Mr. Niejadlik has worked with clients to ensure compliance with the appropriate regulations and guidelines through source testing; ambient air monitoring; and calculation, analysis and prediction of air quality/noise/vibration impacts of their sites on surrounding sensitive receptors. He has prepared Compliance Source Testing Reports, Emission Summary and Dispersion Modelling (ESDM) reports, Acoustic Assessment Reports (AAR), Environmental Compliance Approval (ECA) applications and Environmental Assessments for a wide range of industries. He has also presented at the CANECT Approvals Training program in collaboration with the Ministry of the Environment, Conservation and Parks (MECP) regarding the Modernization of Approval process in Ontario. Mr. Niejadlik has experience in providing permitting and project management services to sectors including: power generation (energy from waste, biomass/biosolid, wind, nuclear, natural gas, and diesel), construction materials, waste, transportation, mining, iron & steel, automotive and other industrial/commercial/institutional clients.

Employment History

Golder Associates Ltd. – Mississauga, Ontario

Air Quality & Noise Specialist (2004 to Present)

Responsibilities include project management, noise measurement and assessment, preparation of emission inventories, dispersion modelling, preparation of Environmental Compliance Approval (ECA) applications, emission abatement and source control, ambient air monitoring, odour measurements, data analysis, development of Predictive Emission Monitoring Systems (PEMS) and source testing. Permitting and environmental services provided to transportation, mining, power & energy, pulp & paper, iron & steel, automotive and other commercial/industrial clients.

Golder Associates Ltd. – GTA

GTA Atmospheric Services Group Leader (Air Quality, Meteorology, Acoustics, Noise, Vibration and Energy) (2011 to 2015)

Responsibilities included group leadership, people management and maintaining staff engagement. Accountable for the development of the business plan strategy, monitoring and achieving group financials, recruiting staff, and overseeing group workload and project deliverables.

Stephen Lamming Associates Ltd – Burlington, Ontario

Environmental Specialist (2001 to 2004)

Responsibilities included preparation of Certificate of Approval (Air & Noise) applications, NPRI/O.Reg. 127 reports, emission inventories, sources test reports, dispersion modelling studies, noise measurement surveys, ambient air

monitoring, odour sampling, compliance audits, and Phase I & II Environmental Site Assessments (ESA). Conducted compliant emission testing programs for Provincial and Federal governments.

PROJECT EXPERIENCE – LANDFILL AND AGGREGATE SECTOR

Noise Impact Report Cambridge, ON, Canada	Carried out onsite noise measurements and prepared noise impact report to be used in the completion of an aggregate licensing application.
Environmental Permitting Milton, Ontario, Canada	Completed an Environmental Compliance Approval (ECA) application for a landfill proposing to install a 4.2 MW power plant. The facility proposed to use landfill gas to generate electricity. The project received approval from the Ministry of the Environment, Conservation and Parks (MECP).
Environmental Permitting Various, Ontario, Canada	Carried out onsite noise measurements and gathered air quality data for various pits, quarries, asphalt and ready-mix facilities across Ontario. Measurements and data used to complete Environmental Compliance Approval (ECA) and licensing applications.
Acoustic Assessment Kingston, Ontario, Canada	Carried out an acoustic assessment for aggregate site located in Kingston, Ontario. Assessed the facility's impact on neighbouring receptors.

PROJECT EXPERIENCE – MINING

Environmental Assessment Northern Ontario, Canada	Retained to carry out a noise, vibration and light assessment in support local permitting and Environmental Assessment (EA) for a proposed gold mine in Northern Ontario. The noise, vibration and light studies included the assessment of the mining/processing operations. Potential impacts were assessed against applicable limits, and controls (where required) and an environmental monitoring program were developed.
Acoustic Assessment Sudbury, Ontario	Carried out an acoustic assessment for the CVRD Inco Copper Refinery located in Sudbury, Ontario. Assessed the facility's impact on neighbouring receptors.
Acoustic Assessment Sudbury, Ontario	Carried out an acoustic assessment for the CVRD Inco North Mine facility located in Sudbury, Ontario. Assessed the facility's impact on neighbouring receptors.
Acoustic Assessment Falconbridge, Ontario	Carried out an acoustic assessment for the Glencore located in Falconbridge, Ontario. Assessed the facility's impact on neighbouring receptors.

PROJECT EXPERIENCE – TRANSPORTATION

Environmental Noise Studies Innisfil, ON, Canada	Technical Lead for the noise assessment in support of a Municipal Class Environmental Assessment for the Town of Innisfil. The noise assessment was carried out in general accordance with Ministry of Transportation (MTO) / Ministry of the Environment, Conservation and Parks (MECP).
Ambient Air Quality Monitoring and Source Apportionment Modelling Program Toronto, ON, Canada	Project management responsibilities for the Metrolinx Ambient Air Quality Monitoring and Source Apportionment Modelling program as well as being involved in the preparation and submission of the required quarterly and annual reports.

Environmental Noise Studies

Various, Ontario, Canada

Ministry of Transportation (MTO) required noise studies be completed on the various road re-surfacing techniques in the MTO's Eastern Region. Carried out the noise level measurements associated with the vehicle tire and road surface interaction for the various road surfacing techniques.

PROJECT EXPERIENCE – MANUFACTURING**Acoustic Assessment**

Brantford, ON, Canada

Project Management responsibilities for the preparation of an acoustic assessment for a facility which recycles used tires located in Brantford, Ontario. Assessed the facility's impact on neighbouring receptors. Provided liaison between Ministry of the Environment, Conservation and Parks (MECP) and the client.

Acoustic Assessments

Various, ON, Canada

Responsible for preparing and overseeing acoustic assessments of numerous sites manufacturing facilities throughout Ontario, which involved site specific noise measurements and modelling to assess compliance with Ministry of the Environment, Conservation and Parks (MECP) Guidelines. Where required, noise mitigation was provided and designed to ensure compliance. Liaison and negotiations with the MECP review engineers were carried out when required.

Environmental Permitting

Toronto, ON, Canada

Retained by Sanofi Pasteur to be responsible for overseeing the site-wide Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA). Responsible for preparing the Acoustic Assessment Report (AAR) and overseeing the Noise Abatement implementation team to ensure the site was in compliance with MECP noise limits.

Acoustic Assessment

Aurora, Ontario, Canada

Carried out an acoustic assessment for a facility which produces custom chemicals for the pharmaceutical industry located in Aurora, Ontario. Assessed the facility's impact on neighbouring receptors.

Environmental Permitting

Barrie, Ontario, Canada

Responsible for the completion of an Environmental Compliance Approval (ECA) application for an automotive parts manufacturer. The project received approval from the Ministry of the Environment, Conservation and Parks (MECP).

Environmental Permitting

Various, Ontario, Canada

Responsible for the completion of NPRI/O. Reg. 127 reports for various manufacturing facilities.

PROJECT EXPERIENCE – URBAN SECTOR**Environmental Permitting**

Vaughan, Ontario, Canada

Completed an Environmental Compliance Approval (ECA) application for a long-term care facility installing a 335 kW natural gas fired co-generation unit. The project received approval from the Ministry of the Environment, Conservation and Parks (MECP).

Noise Impact Study

Toronto, Ontario, Canada

Involved in a noise impact study for a proposed residential condominium development located in the downtown core of Toronto. Assessed the noise impact of traffic and surrounding areas on the condominium suites.

PROJECT EXPERIENCE – MEDICAL**Source Testing**

Toronto, ON, Canada

Project manager and Technical lead for the compliance source testing program at the Sanofi Pasteur cogeneration facility in Toronto, Ontario.

Acoustic Assessment

Toronto, ON, Canada

Technical lead on the preparation of the Acoustic Assessment Report for the Sanofi Pasteur facility in Toronto, Ontario.

PROJECT EXPERIENCE – OIL & GAS**Acoustic Assessment**

Paris, ON, Canada

Retained by Sun Canadian Pipelines (SCPL) to perform an Acoustic Assessment of an existing pumping facility for permitting applications with the Ministry of the Environment, Conservation and Parks (MECP). The Acoustic Assessment included an assessment of proposed equipment as part of an expansion project. A report was prepared in support of permitting with the MECP, which included the design and recommendation of required noise controls to ensure noise impacts on neighbouring receptors during operations are within MECP guideline limits.

**TransCanada Pipelines
- Various Compressor
Stations**Various, Ontario,
Canada

Retained by TransCanada's compression design team (over several projects) to support them and/or their external design consultants to provide detailed noise design services for proposed compressor station upgrades. The support included providing complete noise engineering design services for several compressor stations in Ontario.

**Noise Impact
Assessment**Bowmanville, ON,
Canada

Retained by TransCanada Pipelines Limited to carry out a noise impact assessment as a technical report as part of TransCanada's application to the National Energy Board (NEB) for the proposed upgrade to the Bowmanville Compressor Station. The proposed equipment was assessed, and noise mitigation was provided.

PROJECT EXPERIENCE – REGULATORY**Ontario Predictive
Emission Monitoring
(PEM) System
Guideline**Toronto, Ontario,
Canada

Worked with the Ministry of the Environment, Conservation and Parks (MECP) in preparing a Predictive Emission Monitoring (PEM) System guideline which outlined the requirements for developing and documenting a PEM System for use at power generation facilities.

PROJECT EXPERIENCE – POWER AND ENERGY SECTOR**Multi-media
Environmental
Compliance Approval
Application**

Clarington, Ontario,
Canada

Project Manager for the Multi-media ECA application (Air, Noise, Waste and Stormwater) for the Durham York Energy Centre submitted by the private-public partnership between the Regional Municipalities of Durham and York (Owners) and Covanta Durham York Renewable Energy Limited Partnership (Operator). Responsible for the coordination and preparation of the Environmental Compliance Approval (ECA) documentation which was subsequently approved by the Ministry of the Environment, Conservation and Parks (MECP).

**Predictive Emission
Monitoring System
(PEM System)**

Various, Ontario,
Canada

Responsible for development of Predictive Emission Monitoring (PEM) systems for various power generation facilities. PEM systems use a site specific artificial neural network model to predict oxides of nitrogen (NOx) emissions. The development program included the coordination of multiple source testing programs to acquire the necessary data to develop the PEM systems.

Source testing

Toronto, ON, Canada

Coordination of a Ministry of Environment, Conservation and Parks (MECP) compliant source testing program for one 2.5 MW reciprocating engine generator used for electricity generation during hours of peak demand (i.e., peak shaving) or for emergency power. Preparation of the Pre-test plan and Source Testing report for submission to the MECP.

Source Testing

Toronto, ON, Canada

Coordination of a Ministry of Environment, Conservation and Parks (MECP) compliant source testing program for two co-generation units (6 MW and 3 MW). Preparation of the Pre-test plan and Source Testing report for submission to the MECP.

**Environmental
Permitting**

Vaughan, ON, Canada

Completed Environmental Compliance Approval (ECA) for a long-term care facility installing a 335 kW natural gas fired co-generation unit. The project received approval from the Ministry of the Environment, Conservation and Parks (MECP).

**Environmental
Permitting**

Holland Landing,
Ontario, Canada

Completed noise prediction modelling and report preparation for the Noise component of an Environmental Screening Report and an Environmental Compliance Approval (ECA) application for a 400 MW natural gas fired peaking station.

**Environmental
Permitting**

Hamilton, Ontario,
Canada

Completed air emission calculations for the Air Quality component of an Environmental Screening Report and an Environmental Compliance Approval (ECA) application for a renewable energy facility using waste biomass and biosolids.

**Environmental
Permitting**

Milton, Ontario, Canada

Completed an Environmental Compliance Approval (ECA) application for a landfill proposing to install a 4.2 MW power plant. The facility proposed to use landfill gas to generate electricity. The project received approval from the Ministry of the Environment, Conservation and Parks (MECP).

**Environmental Noise
Monitoring Program**

Pickering, ON, Canada

Carried out environmental noise monitoring for the Ontario Power Generation (OPG) facility in relation to an Environmental Risk Assessment.

**Environmental Noise
Impact Assessment**

Tiverton, Ontario,
Canada

Carried out onsite noise measurements to determine the significance of re-starting Units 1 & 2 of Bruce A.

Acoustic Assessment

Guelph, Ontario, Canada

Involved in an acoustic assessment of a facility proposing to install two 1.0 MW co-generation units.

Acoustic Assessment

Windsor, Ontario,
Canada

Project management and preparation of an Environmental Compliance Approval (ECA) application for the installation of a natural gas fired co-generation plant at and existing manufacturing facility. Upon approval of the ECA by the Ministry of the Environment, Conservation and Parks (MECP) carried out the project management and coordination of the required source testing compliance program for the co-generation plant.

PROJECT EXPERIENCE – PULP AND PAPER SECTOR

**Predictive Emission
Monitoring System
(PEM System)**

Fort Frances, Ontario,
Canada

Responsible for development of a Predictive Emission Monitoring (PEM) system for a co-generation unit located at a pulp and paper power generation facility. PEM systems use a site specific artificial neural network model to predict oxides of nitrogen (NO_x) emissions.

SUPPLEMENTAL SKILLS

Canadian Environmental Conference and Tradeshow

Speaker at the successful CANECT Approvals Training program offered in collaboration with the Ontario Ministry of the Environment, Conservation and Parks (MECP). The program includes training on all aspects of the Provincial Permitting Process including the Modernization of Approvals.



golder.com