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REPORT

Noise Assessment Report

Proposed CBM Caledon Pit/Quarry

Submitted to:

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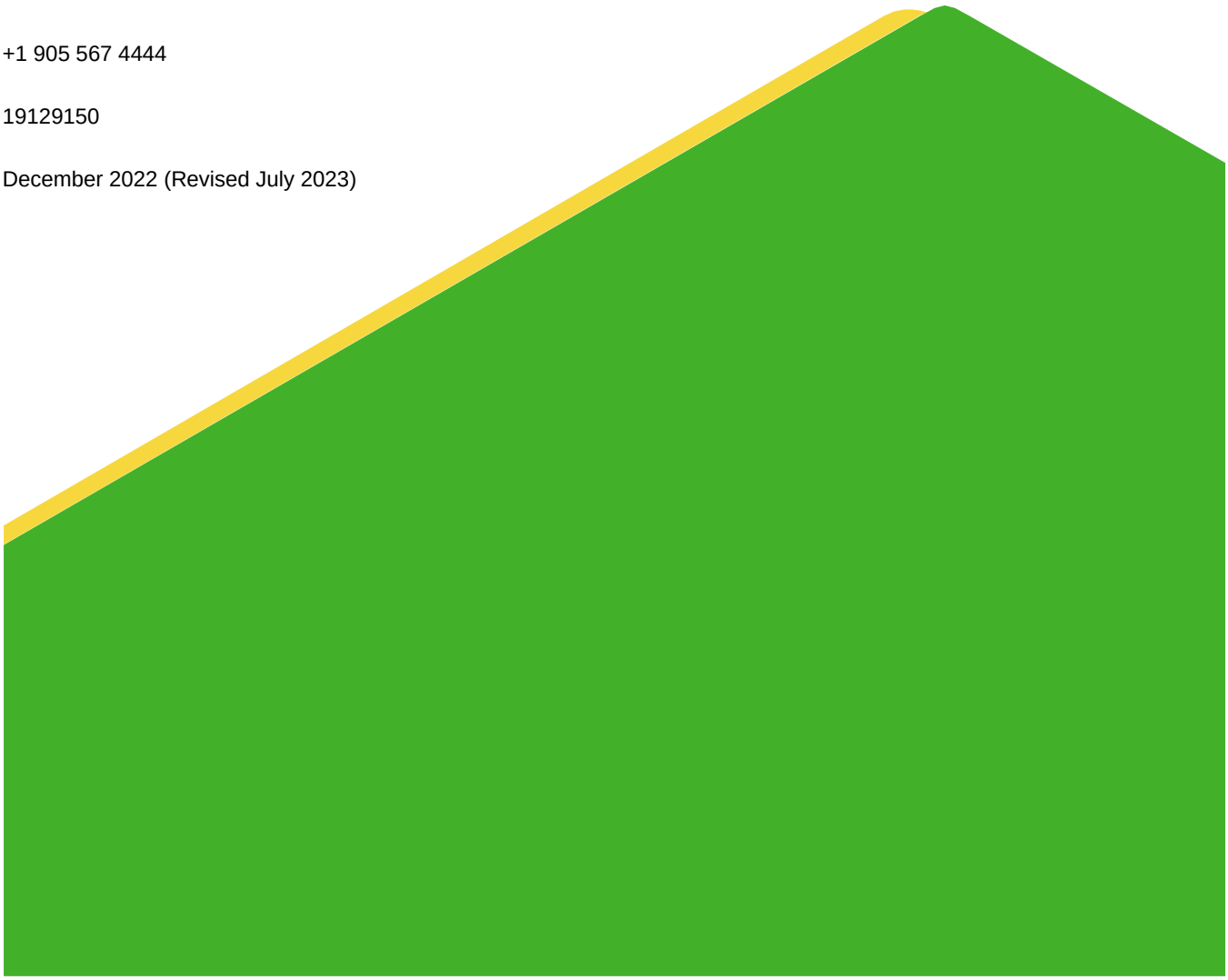

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1.0 INTRODUCTION

CBM Aggregates (CBM), a division of St. Marys Cement Inc. (Canada) is applying to the Ministry of Natural Resources and Forestry (MNRF) for a Class A Licence (Pit and Quarry Below Water) and to the Town of Caledon for an Official Plan Amendment and Zoning By-law Amendment to permit a mineral aggregate operation. Golder Associates Ltd. (Golder) has been retained by CBM to complete a Noise Assessment for the proposed CBM Caledon Pit / Quarry in accordance with the Terms of Reference developed in consultation with the Development Application Review Team (DART) (Appendix A).

CBM owns / controls approximately 323 hectares of land located at the northwest, northeast and southwest intersection of Regional Road 24 (Charleston Sideroad) and Regional Road 136 (Main Street). Of these lands, approximately 261 hectares are proposed to be licenced under the Aggregate Resources Act and designated / zoned under the Planning Act to permit the proposed CBM Caledon Pit / Quarry. These lands are mapped as a Caledon High Potential Mineral Aggregate Resource Area (CHPMARA) in the Town of Caledon Official Plan and High Potential Mineral Aggregate Resource Area (HPMARA) in the Region of Peel Official Plan and are protected for their aggregate potential.

The remaining approximately 62 hectares of land owned / controlled by CBM are not subject to the application. These lands are referred to as “CBM Additional Lands” and these lands include approximately 36 hectares of land that is located adjacent to the minor urban centre of Cataract. As part of the application, CBM is proposing to create an upland forest and meadow grassland on these lands and is exploring the potential of conveying them permanently to a public authority for long term protection.

The lands proposed to be licenced under the Aggregate Resources Act are referred to as the “Subject Site” or “Site” and are legally described as Part of Lots 15-18, Concession 4 WSCR and Part of Lot 16, Concession 3 WSCR (former Geographic Township of Caledon). The Subject Site is approximately 261 hectares and extraction is proposed on approximately 200 hectares. These lands are referred to as the “Extraction Area”. The remaining approximate 61 hectares within the Subject Site and outside of the Extraction Area are referred to as the “Setback / Buffer Lands”. The Setback / Buffer Lands are used to provide setbacks to surrounding land uses and natural heritage features and the majority of these lands include a 5 metre visual / acoustic berm and visual plantings. For the purpose of this study, “Adjacent Lands” are defined as lands within 120 m of the Subject Site and the Study Area for this assessment includes lands within 500 m of the Subject Site.

The proposed Extraction Area includes approximately 78 million tonnes of a high quality bedrock resource and approximately 4 million tonnes of a high quality sand and gravel resource. Testing has confirmed that the mineral aggregate resource found on-site is suitable for the production of a wide range of construction products, including the use for high performance concrete. The bedrock resource provides some of the strongest and most durable aggregate material in Southern Ontario. The primary market area for the proposed CBM Caledon Pit / Quarry is the Greater Toronto Area, including the Town of Caledon and the Region of Peel. This site represents a close to market source of a high quality mineral aggregate resource.

The proposed tonnage limit for the proposed CBM Caledon Pit / Quarry is 2.5 million tonnes per year and on average CBM anticipates shipping approximately 2.0 million tonnes per year. The proposed CBM Caledon Pit / Quarry is proposed to be operated in 7 phases. Phases 1, 2A, 3, 4, 5 are located to the northwest of the intersection of Regional Road 24 and 136. This area is referred to as the “Main Area”. Phase 2B is located to the northeast of the intersection of Regional Road 24 and 136. This area is referred to as the “North Area”. Phase 6

and 7 are located to the southwest of the intersection of Regional Road 24 and 136. This area is referred to as the “South Area”.

Operations would commence in the Main Area and Phase 1 would include the permanent processing area (crushing, screening and wash plant), aggregate recycling area and the entrance / exit for the proposed CBM Caledon Pit / Quarry. Until such time as sufficient space is opened up to establish the permanent processing area, a temporary mobile crushing and processing plant is proposed to be used in Phase 1. The entrance / exit for the CBM Caledon Pit / Quarry is proposed to be located onto Regional Road 24, approximately 775 m west of Regional Road 136. The entrance / exit is proposed to be controlled by a new traffic light and the installation of taper lanes and acceleration lanes on Regional Road 24 at CBM’s expense. The primary haul route for the proposed CBM Caledon Pit / Quarry is trucks will travel eastward on Regional Road 24 and then southward on Highway 10. The proposed haul route is an existing aggregate haul route and is designated as an aggregate haul route in the Town of Caledon Official Plan.

Access to the North Area for aggregate extraction is anticipated approximately 10 years after the start of the operations in the Main Area. There will be no processing in the North Area and aggregate extracted from the North Area is proposed to be transported to the Main Area through a proposed tunnel underneath Regional Road 136. Access to South Area is anticipated approximately 30 years after the start of the operations in the Main Area. In the South Area, CBM is proposing to permit a portable processing plant and the aggregate extracted and /or processed from the South Area is proposed to be moved to the Main Area through a proposed tunnel underneath Regional Road 24. Aside from the establishment of a 1 hectare stormwater settling pond on the easternmost portion of the North Area in the initial year of operation, the North and South areas will be maintained in their current state and agricultural uses until they are required for preparation for aggregate extraction.

The CBM Caledon Pit / Quarry is proposed to operate (extraction, processing and drilling) 7:00 am to 7:00 pm Monday to Saturday, excluding statutory holidays and shipping is proposed from 6:00 am to 7:00 pm Monday to Saturday consistent with other mineral aggregate operations in Caledon. CBM is also proposing to permit limited shipping in the evening and night (7:00 pm to 6:00 am) to support public authority contracts that require the delivery of aggregates during these hours to complete public infrastructure projects. These activities will be limited to only highway trucks and shipping loaders and no other operations will be permitted during evening or nighttime hours. Site preparation and rehabilitation is proposed to be permitted 7:00 am to 7:00 pm Monday to Friday.

The proposed CBM Caledon Pit / Quarry involves stripping topsoil and overburden from the subject site to create perimeter berms and any excess soil will be temporarily stored in the northern portion of the Main Area or used for progressive rehabilitation of the site. The proposed Extraction Area includes extracting both sand and gravel below the water table and the site will be dewatered to allow operations in a dry state. The site will be extracted in sequence of the proposed phases (Phase 1 to 7) and following extraction of Phase 7 the permanent processing plant in Phase 1 will be removed and this will be the final area to be extracted and rehabilitated. The phasing of the proposed mineral aggregate operation has been designed to reach final extraction limits and depths within each phase so progressive rehabilitation of the side slopes can be completed.

The overall goal of the final rehabilitation plan is to create a landform that represents an ecological and visual enhancement and provides future opportunities for conservation, recreational, tourism and water management. Overall the progressive and final rehabilitation plan for the Subject Site includes the creation of lakes, vegetated shorelines, islands, wetlands, upland forested areas, riparian plantings adjacent to the existing watercourse, nodal shrub and tree planting on upland areas, grassland meadows and specialized habitat features for bats and turtles.

The proposed rehabilitation has been designed to use of all of the on-site topsoil and overburden and does not require the importation of additional soils.

The purpose of the noise assessment is to assess impact of noise from the proposed Caledon pit and quarry (the Site) onto the noise sensitive points of reception (PORs) located in the area surrounding the Site. For the purpose of this assessment, forty-three (43) existing Points of Reception (PORs), two (2) potential vacant lots and two relocated heritage buildings were selected as being representative of the sensitive receptors around the Site and identified as POR001 through POR047. The locations of PORs are shown in Figure 1. The nearest POR (POR013) is located approximately 120 m north of the proposed extraction boundary. A zoning plan for the property and surrounding land use is provided in Appendix B.

Sound level limits for the proposed quarry 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”. A haul route analysis was completed in general accordance with the MECP’s “Noise Guidelines for Landfill Sites” (Landfill Guidelines) as this guideline has been used for similar projects across the province. Noise predictions of the proposed Site operations onto neighbouring PORs were completed to determine the potential noise levels. To help understand the analysis and recommendations made in this report, a brief discussion of noise terminology is provided in Appendix C.

The noise assessment was completed for the proposed CBM Caledon Pit / Quarry and based on the implementation of the recommendations found in Section 8 of this report, this assessment concluded the following:

- The Site, with implementation of the noise controls detailed in Section 8 of this report, can operate in compliance with the applicable noise limits
- Noise controls will include:
  - Property line barrier
  - Local noise barriers or acoustically equivalent treatment (e.g., equipment mounted screens)
- Area-specific operational controls (e.g., limiting the number of equipment)

The proposed Aggregate Resources Act Site Plans includes all of the technical recommendations from this report to ensure that the site operates in accordance with applicable provincial standards and the applicable policy requirements of the Provincial Policy Statement, Places To Grow Plan, Greenbelt Plan, Region of Peel Official Plan and Town of Caledon Official Plan.

1.1 Site Description

The Site is irregularly shaped and is composed of three parcels of land (bisected by Charleston Sideroad and Main Street) with an approximate total area of 261 hectares. As shown in Figure 1, the Main Area is located north of Charleston Sideroad and between Mississauga Road and Main Street; the North Area is located in the lands north of Charleston Sideroad and east of Main Street; and the South Area is located south of Charleston Sideroad and east of Mississauga Road.

To the west and north of the Site are agricultural lands. Immediately to the south of the Site is the Hamlet of Cataract. The Credit River is located to the west of the Site and the Osprey Valley Golf Course is located to the northwest of the Site.

The proposed extraction at the Site will be undertaken in seven Phases and involves the initial excavation in the Main Area and subsequently the advance of workings in a general counter-clockwise direction. Works will progress to the North Area in the initial operation phases and the South Area towards the latter phases. Further detail of each operational phase is provided below.

- **Phase 1** – Operations will commence north of Charleston Sideroad and an entrance to the Main Area satisfying sightline and access spacing requirements will be installed. This entrance will be located on a designated haul route and may be signalized for additional safety.

  Controlled blasting will be undertaken to extract material from Site faces. Following each blast, it may also be infrequently necessary to break down the blast rock further using an excavator with a hydraulic rock breaking attachment. Rock from blast piles will then be transported to a temporary mobile crushing and processing plant. Processed materials will be stockpiled for off site transportation.

  A permanent processing facility will be installed north of Charleston Sideroad and adjacent to the entrance once workings have progressed to the final Site floor level in this area.

- **Phase 2A** – Extraction operations will continue in a counter-clockwise direction in the Main Area. Controlled blasting and hydraulic breaking of blast rock will be undertaken at each active face, if required. Rock from blast piles will then be transported to the permanent processing facility north of Charleston Sideroad.

- **Phase 2B** – The North Area will be accessed with a tunnel under Main Street. Extraction activities will be the same as that carried out in the Main Area with the extracted materials being transported to the permanent processing facility.

- **Phase 3, 4 and 5** – Extraction operations will continue in a counter-clockwise direction in the Main Area.

- **Phase 6** – The South Area will be accessed with a tunnel under Charleston Sideroad. Extraction operations will proceed southwards, and materials will be moved to the permanent processing facility in the Main Area.

- **Phase 7** – Extraction operations will continue in a southward direction in the South Area and materials will be moved to the permanent processing facility in the Main Area.

For the purposes of this assessment the noise emissions were assessed for all operational phases and considered the location of the extraction equipment in the proximity to the nearest PORs. Where sand and gravel exist in the overburden, the available aggregate will be extracted, processed and sold to the market. Sand and gravel extraction will typically be completed using a single loader and 5 haul truck round trips per any 1-hour period was considered. Based on the Site morphology, the sand and gravel resources are located mostly in the south-west corner of the Main Area and within the South Area. Generally, the depth of the sand and gravel layer, within both areas, varies from 2 m to 12 m. It was assumed that the extracted material will be transferred to the washplant for treatment and shipped off the Site for the market. No additional equipment was considered for sand and gravel extraction beyond that already considered for the operation of the quarry.

2.0 SITE OPERATIONS

Extraction and processing on Site will be carried out between 07:00 and 19:00 hours. Haulage (shipping) from the Site will generally take place between 06:00 and 19:00 hours. Blasting will occur up to twice per week between the hours of 07:00 and 19:00 hours. The operations will include surface processing (temporary plant), below-grade processing plant (permanent plant), material extraction, haulage and offsite product shipment.

The equipment associated with operations will include:

- Temporary processing plant
  - Primary crusher
  - Secondary crusher
  - Two (2) screens
  - Generator
  - Four (4) plant loaders
- Permanent processing plant
  - Two (2) primary crushers
  - Three (3) secondary crushers
  - Two (2) primary screens
  - Five (5) secondary screens
  - Wash plant with two (2) screens
  - Four (4) plant loaders
- Extraction and haulage equipment
  - Three (3) extraction loaders
  - Haulage trucks
- Drilling equipment
  - Two (2) drills equipped with manufacturer supplied noise controls.
- Shipping truck
  - Highway truck (Up to 38 inbound and 38 outbound movements during any given 1-hour period)
- Sand and gravel extraction
  - Loader
  - Haul truck (Up to five (5) round trips during any given 1-hour period)

The equipment associated with operation of temporary and permanent processing plant is expected to operate for the full 60 minutes during any given 1-hour period. The temporary processing plant will be powered by generators and the permanent processing plant equipment will be powered by grid power. Plant loaders are generally expected to operate ‘under load’ for 30 minutes during any given 1-hour period. Extraction loaders are generally expected to operate ‘under load’ for 30 minutes during any given 1-hour period. Two drills are expected to operate concurrently and ‘under load’ for 45 minutes during any 1-hour period. Provincial road construction project may require operations of the Site to be extend into evening and nighttime periods.

3.0 NOISE SOURCE SUMMARY

The primary noise sources considered in the assessment are summarized in Table 1.

Table 1: Site Noise Source Summary

Source ID	Source Description	Quantity	Overall Sound Power Level [dBA](1)	Source Location	Sound Characteristics	Noise Control Measures
Generator	Temporary Processing Plant Generator	1	113	O	S	U
Screen 1-2	Temporary Processing Plant Screen	2	115	O	S	U
Jaw crusher	Temporary Processing Plant - Jaw Crusher	1	111	O	S	U
Cone crusher	Temporary Processing Plant - Cone Crusher	1	110	O	S	U
Loader PP	Processing Plant Loader	4	107	O	S	U
Loader EX	Extraction Loader	3	110	O	S	U
Drill 1-2	Rock Drill	2	116	O	S	U
Screen 1-7	Permanent Processing Plant - Screen	7	108	O	S	U
Jaw Crusher 1-2	Permanent Processing Plant - Jaw Crusher	2	111	O	S	U
Cone crusher 1-3	Permanent Processing Plant - Cone Crusher	3	107	O	S	U
Wash plant Screen 1-2	Permanent Processing Plant Wash plant - Screen	2	106	O	S	U
Haul truck	Articulated Haul Truck	26(2) 5(3)	107	O	S	S,L
Haul Truck Unloading	Haul Truck Unloading	26(4)	114	O	S	U
Shipment truck	Highway truck	38(2)	103	O	S	U

Notes:
(1) Values presented in Table 1 do not include adjustments that were considered in the modelling (i.e., time weighting) where applicable
(2) Number of round trips in a given hour
(3) 5 trucks per hour used in gravel extraction operations
(4) 26 unloading events

Noise Source Summary Table Nomenclature

Source Location

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

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

Sound Characteristics

S – Steady
Q – Quasi Steady Impulsive
I – Impulsive
B – Buzzing
C – Cyclic

4.0 POINTS OF RECEPTION

Forty-three (43) residential receptors, two (2) vacant lots and two relocated heritage buildings were identified as being representative of the most sensitive PORs within the vicinity of the Site as shown in Figure 1. Two heritage buildings located at 18667 Mississauga Road and 18501 Mississauga Road were identified and assessed in respective Heritage Impact Assessments (HIAs) (submitted separately as part of the overall application). The HIAs proposed to conserve the historical residences within these properties through relocation within the existing property parcels but beyond the proposed extraction zone. The purpose of the proposed relocation is to retain the general geographic and visual setting of the historical residences and conserve the contextual setting of the built heritage resource. Plots for relocation with the existing properties have been identified on Mississauga Road and temporary centre points within these plots have been defined for modelling and prediction purposes. The precise relocation position within the plot will be determined through the completion of a Heritage Conservation Plan (HCP). Based on the provided information two heritage residences (which are referred to as POR046 and POR047) were modelled as relocated to the CBM owned lands north of POR002 and south of POR001.The identified receptors were divided into 14 groups and for each group a representative point of reception (RPOR) was selected based on the highest predicted noise level for all operational phases. The height of each POR identified in the assessment corresponds to the highest elevation of the noise receptor (i.e., two-storey dwelling – 4.5 m and one story dweling – 1.5 m). The PORs and corresponding RPORs are summarized in the Table 2. As per the Site Plans, the building located at 1420 Charleston Sideroad (located withing the project boundary) will remain and will be used as a site office and laboratory and therefore is not considered further as a noise sensitive receptor.

Table 2: Points of Reception

POR ID	Noise Limit Daytime/ Nighttime [dBA] (1)	Representative Point of Reception	Description
POR001	45/40	RPOR001	Residence located west of the Main Area along Mississauga Road – representative of three residences in this area – modelled as a one-story building
POR002	45/40		
POR003	45/40		
POR004	45/40	RPOR002	Residence located west of the Main Area and along Mississauga Road – representative of three residences in this area – modelled as a two-storey building
POR005	45/40		
POR006	45/40		
POR007	45/40	RPOR003	Residence located north of the Main Area along Main Street – representative of the nine residences in this area – modelled as a two-storey building
POR008	45/40		
POR009	45/40		
POR010	45/40		
POR011	45/40		
POR012	45/40		
POR013	45/40		
POR014	45/40		
POR015	45/40		
POR016	50/45	RPOR004	Residence located east of the Main Area and south of North Area (Phase 2B) adjacent to the intersection of Main Street and Charleston Sideroad, representative of the five residences in this area – modelled as a two-storey building
POR017	50/45		
POR018	50/45		
POR019	50/45		
POR020	50/45		
POR021	50/45	RPOR005	Residence located east of the Main Area and south of North Area (Phase 2B) adjacent to the intersection of Main Street and Charleston Sideroad, representative of the three residences in this area – modelled as a two-storey building
POR022	50/45		
POR023	50/45		
POR024	50/45	RPOR006	Residence located south of the North Area (Phase 2B) adjacent to Charleston Sideroad, representative of two residences in the area Street – modelled as a two-storey building
POR025	50/45		
POR026	45/40	RPOR007	Vacant Lot located east of the South Area along Cataract Road – modelled as a two-storey building
POR027	45/40	RPOR008	Residence located east of the South Area along Cataract Road, representative of residences in the area (Community of Cataract) – modelled as a two-storey building
POR028	45/40		
POR029	45/40		
POR030	45/40		
POR031	45/40		
POR032	45/40		
POR033	45/40		
POR034	45/40		
POR035	45/40	RPOR009	Residence located south-east of the South Area along Cataract Road, representative of residences in the area (Community of Cataract) – modelled as a two-storey building
POR036	45/40		
POR037	45/40		

POR ID	Noise Limit Daytime/ Nighttime [dBA] (1)	Representative Point of Reception	Description
POR038	45/40	RPOR010	Residence located south of the South Area along Mississauga Road representative of four residences and one potential vacant lot in the area – modelled as a two-storey building
POR039	45/40		
POR040	45/40		
POR041	45/40		
POR042	45/40		
POR043	45/40	RPOR011	Residence located west of the South Area along Mississauga Road, representative of two residences in the area – modelled as a two-storey building
POR044	45/40		
POR045	50/45	RPOR012	Potential vacant lot located west of the Main Area along Mississauga Road – modelled as a two-storey building
POR046	45/40	RPOR013	Relocated heritage building – modelled as a two-storey building
POR047	45/40	RPOR014	Relocated heritage building – modelled as a two-storey building

Notes:
(1) Refer to Section 5.0 below for information on the applicable criteria and associated noise limits.

Noise levels were predicted for all identified receptors and for all receptors the predicted noise levels were compared against applicable noise limits to assess compliance. Although the noise level was reported for a single RPOR, it should be noted that all receptors from the associated group were at or below the applicable noise limits.

5.0 ASSESSMENT CRITERIA (PERFORMANCE LIMITS)

The PORs located in the vicinity of the Site are located in the area defined as Class 2 (i.e., noise sensitive receptors located along the Charleston Sideroad and in the vicinity of the intersection of Charleston Sideroad and Main Street) represented by RPOR004, RPOR005, ROPR006 and RPOR012 and Class 3 receptors including RPOR001, RPOR002, RPOR003, RPOR007, RPOR 008, RPOR009, RPOR010 and RPOR011 (i.e., with receptors located further away from local roads; Charleston Sideroad, Main Street, Mississauga Road and also those within the Community of Cataract less exposed to noise from road traffic) as per MECP publication NPC-300.

A Class 2 area refers to an area acoustically influenced by a combination of humanmade sources and a rural environment where sounds of nature would typically dominate the acoustical environment during the nighttime period but humanmade sources during the daytime period. A Class 3 area refers to a rural area with the acoustical environment is typically dominated by natural sounds having little or no road traffic.

In assessing stationary noise sources, the MECP has established exclusionary Plane of Window (POW) and Outdoor sound level limits for Class 2. The POW sound level limit for the noise sensitive receptors in a Class 2 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 50 dBA in the daytime period of 07:00-19:00, 50 dBA in the evening period of 19:00-23:00 and 45 dBA in the night-time 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 2 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 50 dBA in the daytime period of 07:00-19:00 and 45 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 night-time as a consequence of meeting the sound level limit at the adjacent POW.*

In assessing stationary noise sources, the MECP has also established exclusionary POW and Outdoor 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 night-time 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 night-time as a consequence of meeting the sound level limit at the adjacent POW.*

Table 3 summarizes the applicable noise limits for Class 2 and Class 3 areas.

Table 3: Noise Limits

Time Period	POW MECP Exclusionary Sound Level Limit (dBA)		Outdoor MECP Exclusionary Sound Level Limit (dBA)	
	Class 2	Class 3	Class 2	Class 3
Daytime	50	45	50	45
Nighttime	45	40	45	40

The MECP's Landfill Guidelines provide guidance for evaluating off-site vehicle traffic for which there are no specific sound level limits. The potential noise levels from off-site vehicles on the existing noise environment is described qualitatively and a change in level of 3 dB is typically described as being just perceptible by the normal human ear in the environment (Bies and Hansen 2009).

The Landfill Guideline is often used to help identify the acoustically preferred haul route.

6.0 IMPACT ASSESSMENT

6.1 Stationary Sources

6.1.1 Methodology

All relevant sound levels for sources were obtained from noise measurements from another CBM facility and Golder's database of similar sources. Noise impact predictions were generated using this data. Noise data is provided in Appendix D.

The predictive analysis was carried out using the commercially available software package Cadna/A 2021 MR2. 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 MECP and MNRF.

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 0.2 for the pit/quarry floor and a value of 1 for all other areas (e.g., absorbing ground coverage including grass and trees). Attenuation from intervening structures (i.e., stockpiles) and woodlots were conservatively not considered in the noise modelling.

6.1.2 Noise Impact Prediction Assumptions

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

- Site preparation and rehabilitation activities were not specifically assessed as they are considered as part of construction, however, to limit the potential noise emissions from these activities, the equipment proposed for construction is expected to meet the sound level limits outlined in MECP NPC-115.
- Extraction and processing will occur during the daytime period (i.e., between 07:00 and 19:00).
- Product shipment will occur during the daytime period (i.e., between 07:00 and 19:00) and for a single hour during the nighttime period (i.e., from 06:00 to 07:00).
- Drill operations will be limited to the daytime period.
- The initial operation of the Site will include a temporary processing plant located at - grade, after a Facility Pad is developed to its intended depth, a permanent processing plant will be constructed. In general, extraction is expected to commence in the east part of the Main Area and proceed in a counter-clockwise direction through sequence of Phases 1 to 7. The extraction in the North Area will occur in Phase 2B and the extraction area will be accessed via a tunnel under the Main Street. After the completion of the extraction within the Main Area (i.e., Phase 1 to Phase 5) and the North Area (i.e., Phase 2B) the extraction will move into the South Area (i.e., Phase 6 and Phase 7). Phase 6 and Phase 7 lands will be accessed via a tunnel under the Charleston Sideroad. During the operation in the lands associated with Phase 6 and Phase 7 (i.e., South Area) part of the processing plant (i.e., primary crusher and primary screen) will be relocated into Phase 6 lands (i.e., near the location of the tunnel, south of Charleston Sideroad. It is expected that the output from the processing equipment located in Phase 6 will be transferred to the Main Area permanent plant using a system of conveyors.
- It is expected that the Site will be generally extracted as a single bench. Where required due to thickness of the rock formation, two benches will be used. Conservatively the noise assessment was completed assuming the equipment located on the bottom of the first lift within the Main Area. Drills were assessed as operating at-grade of the material bearing rock (i.e., just below the overburden). The temporary processing plant will be located below the existing grade, located on the top of the rock, at an elevation of 404 m. The permanent processing plant will be located further below grade at an elevation of 396 m. The processing equipment relocated to Phase 6 will be located below the existing grade, at an elevation of 387 m.
- Temporary and permanent processing plants are not expected to operate concurrently.
- Temporary and permanent processing plants were assessed within the locations indicated in Figure 2. Should major changes in location of the processing equipment be required the potential change in noise levels resulting from equipment relocation will need to be evaluated by a qualified acoustical consultant.
- Equipment list and sound power emissions are consistent to those listed in Table 1 (or acoustically equivalent).
- Overall apparent sound power level of the temporary processing plant was assessed as 120 dBA.
- Overall apparent sound power level of the permanent processing plant was assessed as 120 dBA.

- During the operations, the equipment will operate as specified in Section 2.0 and is expected to operate continuously except for the extraction and plant loaders expected to operate “under load’ up to 30 minutes in a given 1-hour period and under ‘low rev’ condition for the remaining 30 minutes in the hour.
- Assessment was completed of the equipment indicated in Section 2, should acoustically significant changes be expected (e.g., increase the number of equipment) a supplemental study will be required to evaluate the potential changes in noise levels.
- The extraction loaders are expected to generally operate within 30 m from the working face.
- Although the height of the working face will vary throughout the site it is expected that the minimum height of the working face will be approximately 6 m.
- The drills were modelled as operating under load for 45 min in a given 1-hour period.
- Haul trucks will typically travel at the speed of approximately 25 km/h, and twenty-six round trips could occur between the extraction face and the processing plant in any given hour.
- It is assumed that up to 38 inbound and 38 outbound shipment truck trips will occur during each 1-hour period.
- To limit the potential noise impact of the material shipping, the trucks will be accessing the Site via an entrance along Charleston Sideroad.
- POW PORs for which receptor heights could not be identified either through available imagery or during onsite investigations were conservatively assessed at a height of 4.5 m.

6.1.3 Proposed Noise Controls

6.1.3.1 Temporary Processing Plant

Based on the noise assessment, the temporary processing plant will require noise mitigation to reduce its noise emissions. Based on; the assessed noise emissions and subsequent modelling results, a 7.5 m high “U-shaped”, approximately 117 m long barrier located 20 m west of the temporary plant and a 6 m high, approximately 80 m long barrier located 20 m east of the temporary plant (or acoustically equivalent) will be required. Furthermore, the west part of the Main Area Property Line Noise Barrier (which will need to be 5 m high) will need to be completed prior the operation of the temporary processing plant. In addition, a 265 m long section of the 5 m high Main Area Property Line Noise Barrier will need to be increased to 7 m. The proposed location of the property line boundary barriers is shown in Figure 2. To accommodate access to the office and laboratory that will be located at 1420 Charleston Sideroad, a gap in the property line is required. The gap was considered in the noise modelling.

6.1.3.2 Permanent Processing Plant

A 5 m high property line barrier will be constructed along the remaining property line of the Main Area prior to extraction commencing within the Main Area (i.e., Phase 1 through Phase 5). The proposed location of the property line boundary barriers is shown in Figure 2.

Based on; the assessed noise emissions and subsequent modelling results, the permanent plant will require the following noise mitigation (or acoustically equivalent) to reduce its noise emissions and noise levels at noise sensitive receptors:

- A 13 m high, approximately 108 m long barrier located 20 m north and east of the processing plant;
- A 13 m high, approximately 56 m long barrier located 20 m west of the processing plant; and

- A 13 m high, approximately 69 m long barrier located 20 m east and south of the processing plant equipment located in Phase 6 lands.

The required permanent processing plant noise mitigation is shown in Figure 2.

Based on the modelling results, the haul truck noise emissions will need to be reduced with the installation of on-equipment noise controls (e.g., intake silencers, acoustic lagging).

Drills operating within the areas indicated in Figure 2 will require the following noise mitigation and operational controls:

- Area 1 – operation of a single unmitigated drill;
- Area 2 – operation of a single mitigated drill with a “C- shaped” 4.5 m high, 22 m long barrier located approximately 5 m from the equipment in the direction of impacted receptors;
- Area 3 – operation of two mitigated drills with a “C- shaped” 4.5 m high, 22 m long barrier located approximately 5 m from the equipment in the direction of impacted receptors; and
- Area 4 – operation of two drills with one mitigated with a “C- shaped” 4.5 m high, 22 m long barrier located approximately 5 m from the equipment in the direction of impacted receptors.

Extraction equipment will require following changes in operations:

- Area 5 operation – restrict to two extraction loaders (i.e., reduced from three units); and
- Area 6 operations – restrict to two extraction loaders with a reduced sound power level (i.e., extraction loaders replaced by equipment with similar sound emissions as the equipment operating at the processing plant).

Barriers indicated in Figure 2 and described in this report can be considered earth berms, barriers or berm / barrier combinations, provided the height is consistent with the information presented in this report with a minimum height above existing local grade. Barriers are to have a minimum surface density of 20 kg / m^2 and constructed without gaps.

6.1.3.3 Pit operation

It was conservatively assumed that the pit and quarry operations will be completed concurrently, where applicable. The following three combined scenarios were considered in the assessment and the acoustical worst-case scenario was assessed.

- Scenario 1 – pit operation Phase 5 and quarry operation Phase 4;
- Scenario 2 – pit operation Phase 6 and quarry operation Phase 5; and
- Scenario 3 – pit operation Phase 7 and quarry operation Phase 6.

Based on the noise modelling, Scenario 3 will result in the highest predicted noise levels at the impacted noise receptors. The noise mitigation will require the replacement of an extraction loader with a unit with reduced noise emissions.

6.2 Haul Route Analysis

Future road and anticipated future Site traffic volumes were established using the CBM Caledon Pit and Quarry Traffic Impact Study (TIS) prepared by TYLin (TYLin 2022). As the Site and identified PORs can be acoustically impacted be traffic along Main Street, Charleston Sideroad and Mississauga Road, traffic on these roads was considered in the noise assessment. Future (i.e., 2032) traffic data for Charleston Sideroad was obtained from the TYLin 2022 TIS. The TIS provided counts for the; future 1-hour traffic volume, medium and heavy truck percentages, speed limit, and Site-related peak hour truck volumes (36 trucks inbound and 36 trucks outbound) for traffic on Charleston Sideroad (i.e., eastbound direction). Based on the TIS, the Site traffic distribution will generally include approximately 90% via Charleston Sideroad east of the Site and 10% via Charleston Sideroad west of the Site. Road traffic was assessed corresponding to the time of the greatest predicted impact due to the Site activities (i.e., during the period when ambient traffic volumes are expected to be the lowest and considering maximum typical Site traffic volumes).

7.0 RESULTS

7.1 Temporary Processing Plant

Table 4 summarizes the predicted noise level for the operations of the Site with the temporary processing plant.

Table 4: Results Operation of Temporary Processing Plant

Receptor ID	Predicted Mitigated Noise Level [dBA]	Applicable Daytime Noise Limit [dBA]	Compliance with Applicable Noise Limit (Yes/No)
RPOR001	44	45	Yes
RPOR002	45	45	Yes
RPOR003	44	45	Yes
RPOR004	46	50	Yes
RPOR005	46	50	Yes
RPOR006	43	50	Yes
RPOR007	42	45	Yes
RPOR008	42	45	Yes
RPOR009	44	45	Yes
RPOR010	41	45	Yes
RPOR011	42	45	Yes
RPOR012	47	50	Yes
RPOR013	45	45	Yes
RPOR014	45	45	Yes

7.2 Nighttime Product Shipment

As indicated in Section 2, the shipment of the product could occur between 06:00 and 19:00. Therefore, in the assessment of the shipping operations, the predicted noise levels were compared to both; the daytime noise limits (i.e., combined with the remaining daytime operations of the Site and summarized in Table 4 above) and the nighttime noise limits (i.e., shipping only).

Table 5 summarizes the predicted nighttime noise levels predicted for the RPORs from the shipping activities associated with the Site.

Table 5: Predicted Noise Levels from Nighttime Shipment

Receptor ID	Predicted Shipment Operations Nighttime Noise Level [dBA]	Applicable Nighttime Noise Limit [dBA]	Compliance with Applicable Noise Limit (Yes/No)
RPOR001	32	40	Yes
RPOR002	31	40	Yes
RPOR003	31	40	Yes
RPOR004	32	45	Yes
RPOR005	31	45	Yes
RPOR006	26	45	Yes
RPOR007	24	40	Yes
RPOR008	23	40	Yes
RPOR009	26	40	Yes
RPOR010	30	40	Yes
RPOR011	34	40	Yes
RPOR012	41	45	Yes
RPOR013	33	40	Yes
RPOR014	36	40	Yes

7.3 Permanent Processing Plant

7.3.1 Main Area

Table 6 summarizes the predicted noise levels from the operations of the Site with the permanent processing plant and considers the extraction activities within the areas associated with Phase 1, Phase 2A, Phase 3, Phase 4 and Phase 5.

Table 6: Predicted Noise Level Phase 1 to Phase 5

Receptor ID	Predicted Noise Level Phase 1 [dBA]	Predicted Noise Level Phase 2A [dBA]	Predicted Noise Level Phase 3 [dBA]	Predicted Noise Level Phase 4 [dBA]	Predicted Noise Level Phase 5 [dBA]	Predicted Maximum Noise Level [dBA]	Applicable Daytime Noise Limit [dBA]	Compliance with Applicable Noise Limit (Yes/No)
RPOR001	36	37	40	41	42	42	45	Yes
RPOR002	38	40	43	42	40	43	45	Yes
RPOR003	41	45	45	42	41	45	45	Yes
RPOR004	49	45	43	44	41	49	50	Yes
RPOR005	46	44	42	43	41	46	50	Yes
RPOR006	41	37	37	36	36	41	50	Yes
RPOR007	42	41	37	40	37	42	45	Yes
RPOR008	37	35	34	34	35	37	45	Yes
RPOR009	35	33	34	34	34	35	45	Yes
RPOR010	38	38	38	38	39	39	45	Yes

Receptor ID	Predicted Noise Level Phase 1 [dBA]	Predicted Noise Level Phase 2A [dBA]	Predicted Noise Level Phase 3 [dBA]	Predicted Noise Level Phase 4 [dBA]	Predicted Noise Level Phase 5 [dBA]	Predicted Maximum Noise Level [dBA]	Applicable Daytime Noise Limit [dBA]	Compliance with Applicable Noise Limit (Yes/No)
RPOR011	38	38	39	39	42	42	45	Yes
RPOR012	41	41	42	41	49	49	50	Yes
RPOR013	37	39	42	43	41	43	45	Yes
RPOR014	38	39	41	41	45	45	45	Yes

Sample calculations are provided in Appendix E.

7.3.2 North Area

Table 7 summarizes the predicted noise levels from the operations of the Site with the permanent processing plant and considers the extraction activities within the area associated with Phase 2B.

Table 7: Predicted Noise Levels Phase 2B

Receptor ID	Predicted Noise Level Phase 2B [dBA]	Applicable Daytime Noise Limit [dBA]	Compliance with Applicable Noise Limit (Yes/No)
RPOR001	39	45	Yes
RPOR002	40	45	Yes
RPOR003	42	45	Yes
RPOR004	49	50	Yes
RPOR005	45	50	Yes
RPOR006	47	50	Yes
RPOR007	40	45	Yes
RPOR008	38	45	Yes
RPOR009	36	45	Yes
RPOR010	38	45	Yes
RPOR011	41	45	Yes
RPOR012	46	50	Yes
RPOR013	39	45	Yes
RPOR014	41	45	Yes

7.3.3 South Area

Table 8 summarizes the predicted noise levels from the operations of the Site with the permanent processing plant and considers the extraction activities within the areas associated with Phase 6 and Phase 7.

Table 8: Predicted Noise Levels Phase 6 and Phase 7

Receptor ID	Predicted Noise Level Phase 6 [dBA]	Predicted Noise Level Phase 7 [dBA]	Predicted Maximum Noise Level [dBA]	Applicable Daytime Noise Limit [dBA]	Compliance with Applicable Noise Limit (Yes/No)
RPOR001	40	40	40	45	Yes
RPOR002	39	39	39	45	Yes
RPOR003	39	39	39	45	Yes
RPOR004	41	40	41	50	Yes
RPOR005	43	42	43	50	Yes
RPOR006	36	35	36	50	Yes
RPOR007	45	40	45	45	Yes
RPOR008	41	39	41	45	Yes
RPOR009	40	41	41	45	Yes
RPOR010	42	45	45	45	Yes
RPOR011	43	45	45	45	Yes
RPOR012	48	48	48	50	Yes
RPOR013	39	40	40	45	Yes
RPOR014	43	43	43	45	Yes

7.3.4 Pit Operations

Table 9 summarizes the predicted noise levels from the operations of the Site with the permanent processing plant and considers the extraction activities within the areas associated with Phase 6.

Table 9: Predicted Noise Levels Pit Operations

Receptor ID	Predicted Noise Level Phase 6 Pit Operations [dBA]	Applicable Daytime Noise Limit [dBA]	Compliance with Applicable Noise Limit (Yes/No)
RPOR001	42	45	Yes
RPOR002	40	45	Yes
RPOR003	41	45	Yes
RPOR004	42	50	Yes
RPOR005	43	50	Yes
RPOR006	37	50	Yes
RPOR007	44	45	Yes
RPOR008	41	45	Yes
RPOR009	36	45	Yes
RPOR010	40	45	Yes
RPOR011	42	45	Yes
RPOR012	49	50	Yes

Receptor ID	Predicted Noise Level Phase 6 Pit Operations [dBA]	Applicable Daytime Noise Limit [dBA]	Compliance with Applicable Noise Limit (Yes/No)
RPOR013	41	45	Yes
RPOR014	45	45	Yes

7.4 Haul Route Analysis

Based on the review of available information, the addition of the proposed CBM Caledon Pit / Quarry traffic is generally expected to result in an increase of noise levels of 3 dB or less over ambient conditions, which is in the range of barely perceptible (Bies and Hansen 2009).

Considering that Charleston Sideroad is identified as a haul route in the Caledon Official Plan and has a planned function to carry high volumes of traffic, it is not expected that the CBM Caledon Pit / Quarry will result in an acoustically substantial change at the identified POR(s). From a noise perspective, the use of Charleston Sideroad and ultimately Highway 10 is the preferred local route.

7.5 Cumulative Noise Impact from Other Aggregate Operations

Based on the review of available information, due to the distance of the identified PORs to other existing aggregate operations it is not expected there are any POR(s) that could be impacted by both; the proposed CBM Caledon Pit / Quarry and other aggregate operations to a point that it would alter the finings of this assessment. Accordingly, a more detailed cumulative noise assessment was not carried forward.

8.0 SITE PLAN NOISE CONTROL NOTES

The results of the Noise Assessment provide the basis for the following technical recommendations of guidelines and procedure to be followed during the extraction at the proposed Caledon Pit and Quarry:

- On-site equipment shall meet the limits as specified in Table 1 Section 3.0 of the noise assessment report (Golder 2022).
- Activities to prepare the Site, such as the stripping of topsoil, construction of the berms, or activities related to the rehabilitation of the Site after the extraction is completed are considered to be construction activities and are only permitted to occur during the daytime period (i.e., 07:00 to 19:00) Monday to Friday except statutory holidays.
- Activities for site operations, such as extraction, processing and drilling are permitted to occur during the daytime period (i.e. 07:00 am to 19:00) Monday to Saturday, except statutory holidays.
- Activities related to shipping are permitted from 6:00 to 19:00 Monday to Saturday, except statutory holidays. Shipping is permitted from 19:00 to 6:00 only where required to support public authority contracts that necessitate the delivery of aggregates during these hours. Shipping activities from 19:00 to 6:00 shall be limited to highway trucks and shipping loaders and no other operations shall be permitted.
- A 5-m high visual/acoustical barrier with a 265 m long section raised to 7 m, as specified on Figure 2, shall be installed around the Main Area, North Area and South Area prior to extraction commencing in the identified areas. The berm along the west part of the Main Area property boundary shall be constructed prior to the commencement of the use of the temporary processing plant.

- The temporary processing plant shall be mitigated by noise controls in the form of barriers or acoustically equivalent treatment (e.g., equipment mounted) to reduce the noise emissions. A 7.5 m high, approximately 117 m long barrier located 20 m west and a 6 m high, approximately 80 m long barrier located east of the temporary processing plant shall be installed.
- The permanent processing plant shall be mitigated by noise controls in the form of barriers or acoustically equivalent treatment (e.g., equipment mounted) intended to reduce the noise emissions. A 13 m high, approximately 108 m long barrier located 20 m north and east and a 13 m high, approximately 56 m long barrier located at 20 m west of the processing plant shall be installed. In addition, a 13 m high, approximately 69 m long barrier located at 20 m east and south of the processing plant equipment located in Phase 6 lands.
- Proposed barriers can be constructed of earth berms, product stockpiles or other suitable acoustic barriers such as trailers or shipping containers as long as the height and the density requirements of 20 kg/m^2, without gaps are maintained.
- Extraction loaders shall be generally operating within 30 m of the active working face to maximize noise screening by the working face.
- Drills procured for the Site operations shall be mitigated (e.g., manufacturer installed noise controls) resulting in a sound power level of 116 dBA. In addition, when operating within the identified areas on Figure 2, the drills shall be equipped with a 4.5 m high “C – shaped” and 22 m long local barriers located at the distance of 5 m from the equipment (or acoustically equivalent). In addition, operational restriction shall be considered for drills operating in specifics areas as indicated in Figure 2:
  - Area 1 - operation of a single unmitigated drill.
  - Area 2 - operation of a single mitigated drill.
  - Area 3 - operation of two mitigated drills.
  - Area 4 - operation of one mitigated and one unmitigated drill.
- The number of extraction loaders shall be reduced from three to two units when equipment operates in the areas identified as Area 5 through Area 6 and shown in Figure 2. In addition, the loaders operating in Area 6 shall be similar to the plant loader with sound power levels of 107 dBA.
- Gravel extraction shall be completed using a single loader with a sound power level of 107 dBA.
- The licensee shall utilize an alternative to narrow band back up alarms that meet Ministry of Labour safety requirements for on-site equipment.
- Prior to operations commencing, sound measurements of the equipment used on the Site shall be undertaken by a qualified professional to confirm maximum emission levels are not exceeded.
- To confirm that sound levels from the Site operations are in compliance with the MECP noise guideline limits, an acoustical audit shall be completed by a qualified professional once extraction and processing activities commence in the Main Area.

- Proposed mitigation may be substituted through equipment modification, other control measures and/or local barriers if an assessment by qualified professional is completed in accordance with MECP requirements and demonstrates the modification complies with MECP noise limits at surrounding sensitive receptors. Prior to any modification, notification shall be given to MNRF.

9.0 CONCLUSIONS

Golder Associates Ltd. (Golder) has been retained by CBM Aggregates (CBM), a division of St. Marys Cement Inc. (Canada) to complete a noise assessment to accompany the application to the Ministry of Natural Resources and Forestry (MNRF) for a Class A Licence (Pit Above Water / Quarry Below Water) and to the Town of Caledon for an Official Plan Amendment and Zoning By-law Amendment to permit a mineral aggregate operation.

Golder established sound level limits according to MECP noise guidelines and compared the predicted noise levels at the identified representative RPORs to the established noise limits. The results indicate that, after the implementation of identified noise controls or equivalent measures,

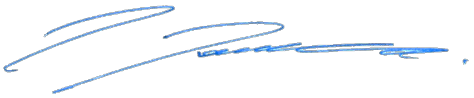
- The site will operate in accordance with applicable noise limits as outlined in NPC 300 at all surrounding sensitive land uses.
- The site has been designed to minimize and mitigate to acceptable levels any potential adverse effects from noise in accordance with provincial guidelines, standards and procedures.

Copies of CVs for the authors of this document are provided in Appendix F.

Signature Page

Golder Associates Ltd.

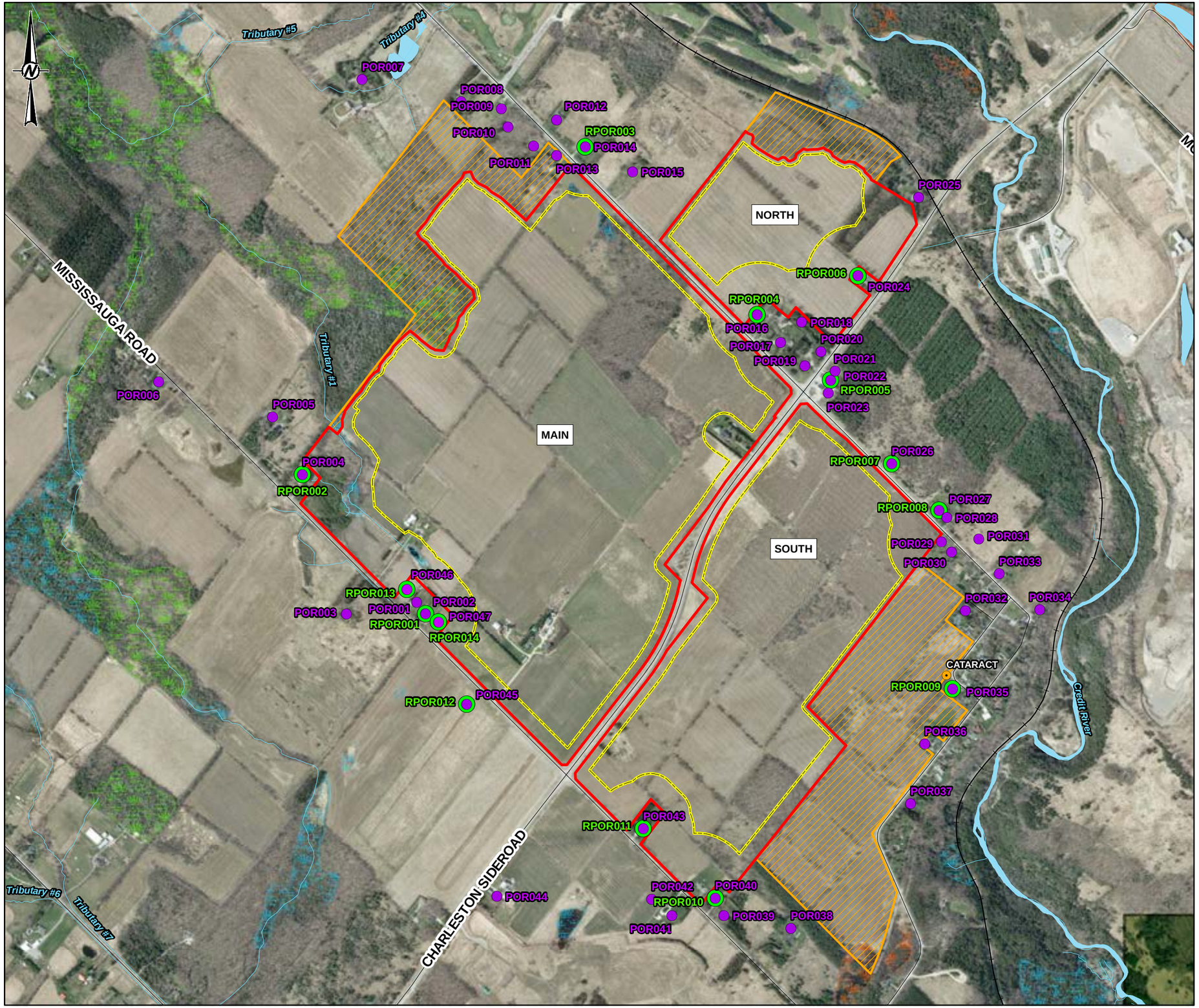
Tomasz Nowak, MSc, MEng
Acoustics, Noise and Vibration Specialist



Joe Tomaselli, MEng, PEng
Team Lead/Senior Acoustics, Noise and Vibration Engineer

TN/JT/sg/mp
https://golderassociates.sharepoint.com/sites/114392/project files/6 deliverables/ph 2600-noise assessment/noise assessment report - final rev july 2023.docx

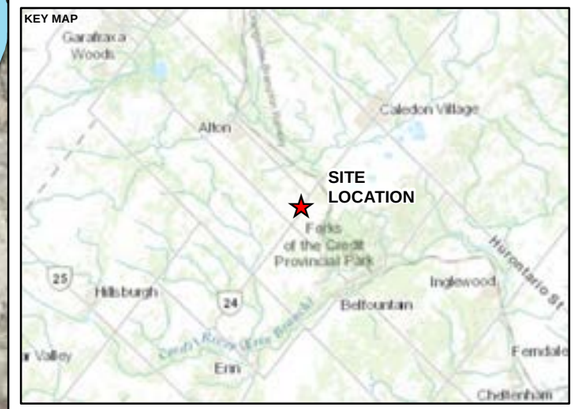
FIGURES



LEGEND

- TOWN/VILLAGE
- POINT OF RECEPTION
- REPRESENTATIVE POINT OF RECEPTION
- ROAD
- RAILWAY
- WATERCOURSE
- WATERBODY
- UNEVALUATED WETLAND
- OTHER EVALUATED WETLAND
- PROVINCIALLY SIGNIFICANT WETLAND
- LIMIT OF EXTRACTION
- LICENCE BOUNDARY
- ADDITIONAL LANDS OWNED / CONTROLLED BY CBM

KEY MAP



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REFERENCE(S)

1. BASEDATA MNRF LIO OBTAINED APRIL 2019
2. WATERCOURSES OBTAINED FROM CREDIT VALLEY CONSERVATION AUTHORITY OPEN DATA PORTAL, NOVEMBER 2022 IN COMBINATION WITH SITE WATERCOURSE SURVEY PROVIDED BY FIRST BASE SOLUTIONS NOVEMBER 2021.
3. IMAGERY FIRSTBASE SOLUTIONS SPRING 2019 (15CM RESOLUTION) AND SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY
4. LICENCE AND LIMIT OF EXTRACTION PROVIDED BY MHBC JULY 2023.
5. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

CLIENT
CBM AGGREGATES, A DIVISION OF ST. MARYS CEMENT INC. (CANADA)

PROJECT
CALEDON PIT / QUARRY

TITLE
SITE LOCATION

CONSULTANT
GOLDER
MEMBER OF WSP

YYYY-MM-DD	2023-07-20
DESIGNED	SO
PREPARED	SO
REVIEWED	TN
APPROVED	HM

PROJECT NO.	CONTROL	REV.	FIGURE
19129150	0036	0.0	1

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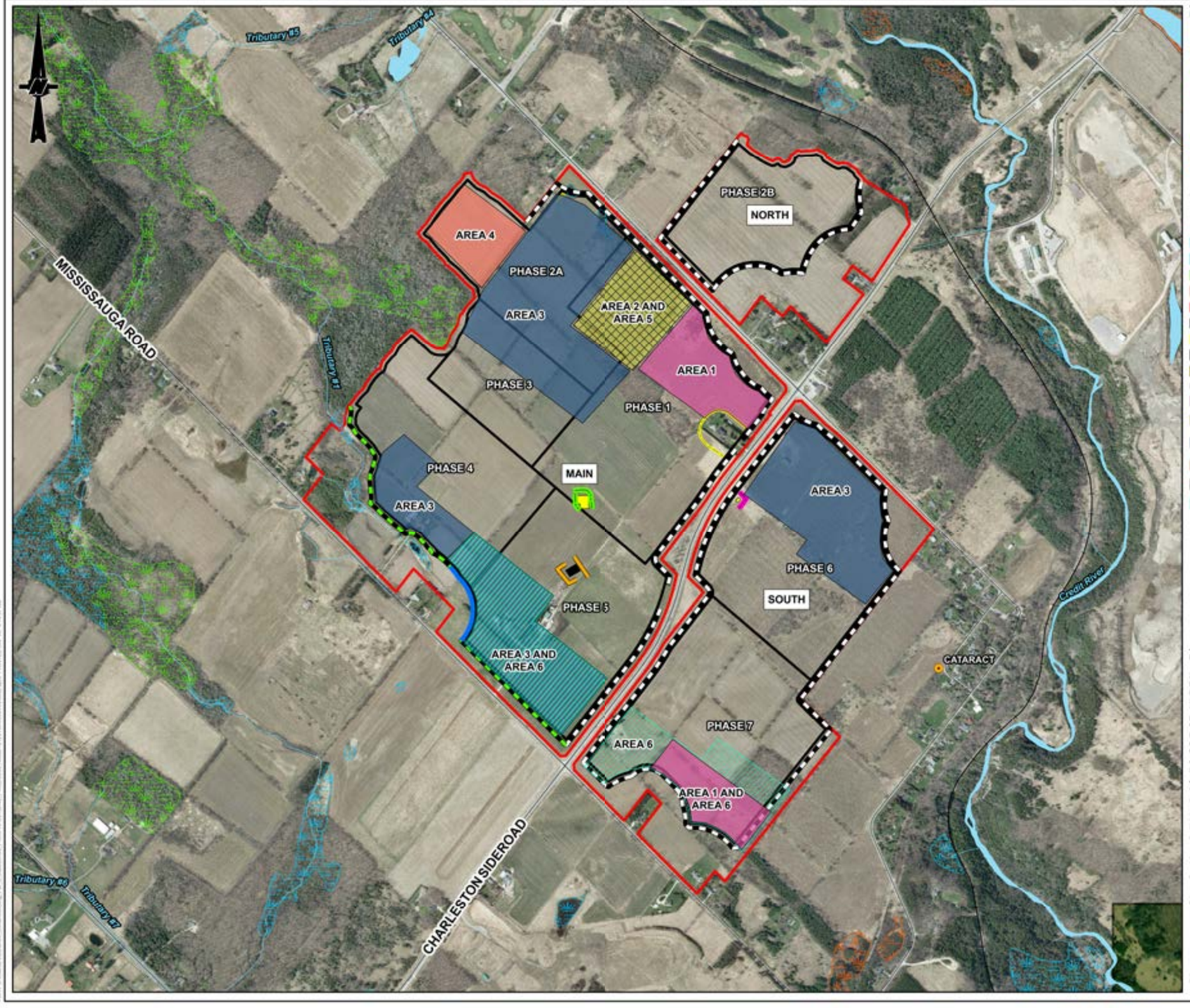

LEGEND

- TOWN/VILLAGE
- TEMPORARY PROCESSING PLANT 7.5 M HIGH BARRIER W AND 6 M HIGH BARRIER E
- 13 M HIGH PERMANENT PROCESSING PLANT BARRIER E AND W
- 13 M HIGH PERMANENT PROCESSING PLANT BARRIER PHASE 6 E AND S
- 5 M HIGH PROPERTY LINE BARRIER
- 5 M HIGH PROPERTY LINE BARRIER WILL NEED TO BE COMPLETED BEFORE TEMPORARY PROCESSING PLANT IS IN OPERATION
- PROPERTY LINE BARRIER REQUIRES AN INCREASE FROM 5 M TO 7 M BEFORE OPERATION OF THE TEMPORARY PROCESSING PLANT
- ROAD
- RAILWAY
- WATERCOURSE
- WATERBODY
- UNEVALUATED WETLAND
- OTHER EVALUATED WETLAND
- PROVINCIALLY SIGNIFICANT WETLAND
- LICENCE BOUNDARY
- EXTRACTION PHASE
- LIMIT OF EXTRACTION
- TEMPORARY PROCESSING PLANT
- PERMANENT PROCESSING PLANT

NOISE CONTROL AREAS

- AREA 1 OPERATION OF A SINGLE UNMITIGATED DRILL
- AREA 2 OPERATION OF A SINGLE MITIGATED DRILL WITH 4.5 M HIGH LOCAL BARRIER
- AREA 3 OPERATION OF TWO MITIGATED DRILLS WITH 4.5 M HIGH OCAL BARRIER
- AREA 4 OPERATION OF ONE UNMITIGATED AND ONE MITIGATED DRILL WITH 4.5 M HIGH LOCAL BARRIER
- AREA 5 OPERATION OF TWO EXTRACTION LOADERS
- AREA 6 OPERATIONS OF TWO EXTRACTION LOADERS (WITH LOWER SOUND POWER LEVEL)

0 500 1,000

1:12,000 METRES

REFERENCE(S)

1. BASEDATA MNRF LIO OBTAINED APRIL 2019
2. WATERCOURSES OBTAINED FROM CREDIT VALLEY CONSERVATION AUTHORITY OPEN DATA PORTAL, NOVEMBER 2022 IN COMBINATION WITH SITE WATERCOURSE SURVEY PROVIDED BY FIRST BASE SOLUTIONS NOVEMBER 2021.
3. IMAGERY FIRSTBASE SOLUTIONS SPRING 2019 (15CM RESOLUTION) AND WORLD TOPOGRAPHIC MAP: ESRI, © OPENSTREETMAP CONTRIBUTORS, HERE, GARMIN, FAO, USGS, NGA, EPA, NPS, AAFC, NRCAN
WORLD TOPOGRAPHIC MAP: CITY OF BRAMPTON, REGION OF PEEL, ONTARIO BASE MAP, PROVINCE OF ONTARIO, ONTARIO MNR, ESRI CANADA, ESRI, © OPENSTREETMAP CONTRIBUTORS, HERE, GARMIN, USGS, NGA, EPA, USDA, NPS, AAFC, NRCAN
WORLD IMAGERY: MAXAR
4. LICENCE AND LIMIT OF EXTRACTION PROVIDED BY MHBC JUNE 2023.
5. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE

CLIENT
CBM AGGREGATES, A DIVISION OF ST. MARYS CEMENT INC. (CANADA)

PROJECT
CALEDON PIT / QUARRY

TITLE
OPERATIONAL NOISE CONTROL AND MITIGATION MEASURES

CONSULTANT
GOLDER
MEMBER OF WSP

YYYY-MM-DD	2023-07-28
DESIGNED	SO
PREPARED	SO
REVIEWED	TN
APPROVED	HM

PROJECT NO.	CONTROL	REV.	FIGURE
19129150	0036	0.0	2

APPENDIX A

Terms of References

TECHNICAL MEMORANDUM

DATE August 19, 2022 **Project No.** 19129150

TO David Hanratty, PGeo
CBM Aggregates

CC Jennifer Deleemans, Mike Lebreton

FROM Heather Melcher **EMAIL heather_melcher@golder.com**

PROPOSED CBM CALEDON QUARRY TERMS OF REFERENCE – AIR, NOISE AND BLASTING

Golder Associates Ltd. (Golder) has been retained by CBM Aggregates (CBM), a division of St. Marys Cement Inc. (Canada) to complete technical studies to accompany an application to the Ministry of Northern Development, Mines, Natural Resources and Forestry (NDMNRF) for a new Class A Quarry Below Water licence under the *Aggregate Resources Act* (ARA) (project). These studies will also be used for a Planning Act approval and application for Town of Caledon Official Plan and Zoning By-law amendment. Furthermore, these studies will provide an assessment of the application taking into consideration the applicable in-effect policies contained in the relevant Provincial Plans, Region of Peel Official Plan and Town of Caledon Official Plan. The properties to be licensed are located on Charleston Sideroad and Mississauga Road, Town of Caledon, Region of Peel, Ontario (site). The site is approximately 262.4 hectares (ha) in size (Figure 1).

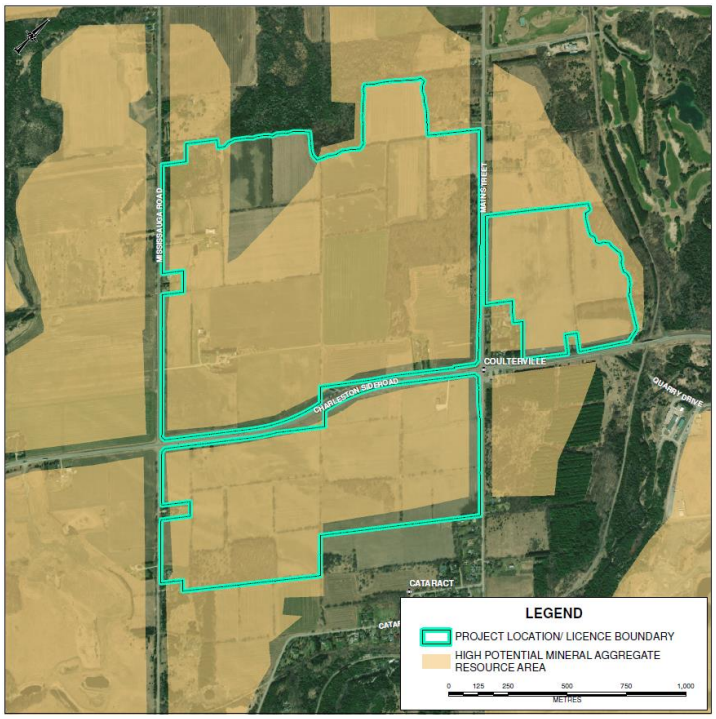

Figure 1: Proposed CBM Caledon Quarry Location

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This Terms of Reference (TOR) includes a summary of the assessment and deliverables associated with the air quality, noise, and vibration/blasting components. Where relevant, this study shall be shared with other technical experts completing studies for the application to avoid internal inconsistencies.

1.0 AIR QUALITY

1.1 Air Quality Impact Assessment

As the ARA does not provide specific guidance and standards for air quality assessments, the preparation of a detailed air quality assessment is not typically required for a licence application. However, the preparation of an air quality assessment (including dust) is required per Sec 5.11.2.4.2 the Town of Caledon's Official Plan and will be required as part of the *Planning Act* application for the Project. The air quality assessment will include quantification of baseline air quality, specifically dust, in the vicinity of the site as well as numerical modelling of the proposed operations of the project to determine the change in air quality as well as comparison to provincial/federal standards, guidelines or regulations. This will be completed through four tasks, as described below.

1.1.1 Desktop Baseline Study

Golder will quantify the baseline or existing air quality in the vicinity of the site using publicly available ambient air monitoring data from Environment and Climate Change Canada (ECCC) National Air Pollution Surveillance (NAPS) system and/or information reported to the National Pollutant Release Inventory (NPRI) by facilities located close to the site. These data will be used to prepare a summary of existing local air quality. The locations of the closest NAPS monitoring stations that will be considered to describe background air quality data are located in Brampton (NAPS IDs 60428 and 60450), approximately 30 km southeast of the project and Guelph (NAPS ID 61802), approximately 35 km southwest of the project. Data will be collected for dust as well as products as combustion, including Nitrogen dioxide. These monitoring stations are the closest NAPS monitoring stations to the project but are located in more suburban environments. They are therefore expected to provide a conservative assessment of baseline air quality as they are surrounded by a greater density of residential and commercial emission sources.

1.1.2 Baseline Monitoring

Golder will organize and manage an ambient air quality monitoring program for dust (over a one-year period) to assess the baseline levels of particulate matter in the vicinity of the project prior to operations. There are no significant industrial sources of dust in the immediate area, therefore the station will be sited in a location that is predominantly upwind of the site to help understand the particulate concentrations that are being transported into the local area from long-range sources. Meteorological data taken from the closest Environment and Climate Change Canada meteorological station will be used to establish the prevailing wind direction and the location of closest sensitive receptors in the downwind direction will also reviewed to identify a potential siting area that was upwind of these locations. Consideration was also given to locating the station away from tall trees and buildings which may interfere with local wind flow, in accordance with MECP recommended protocol.

Golder will install one ambient dust continuous monitoring station at the site. Meteorological parameters will also be recorded. The dust monitoring program will include continuous monitoring of Total Suspended Particulate (TSP), Coarse Particulate Matter (PM_{10}), and Fine Particulate Matter ($PM_{2.5}$). The monitoring station will be

equipped with an Aeroqual Dust Sentry Pro (Dust Sentry Pro) that measures dust and fine particulates (TSP, PM_{10}, and $PM_{2.5}$) continuously in real-time.

The Dust Sentry Pro is an instrument that delivers simultaneous measurements of dust particulates and reports real-time data in one-minute intervals. Meteorological conditions will also be monitored. The monitoring of meteorological conditions will be completed with a Vaisala WXT536 Weather Transmitter connected directly to the Dust Sentry Pro.

The baseline monitoring data will be used to supplement the data collected from publicly available sources, identified in Section 1.1.1. A comparison of data from all three stations will be provided.

1.1.3 Predictive Modelling

Predictive impacts on air quality from the proposed operations require an estimate of the emissions released into the atmosphere as well as representative local meteorology. Impacts are predicted using an approved regulatory atmospheric dispersion model to provide estimates of contaminant concentrations at various receptors around the project. These estimates will be combined with baseline data to provide a cumulative impact of the operations which can be compared to various regulatory standards, guidelines, and objectives. Generally, air quality modelling results are compared to provincial and/or federal Ambient Air Quality Criteria.

Golder will prepare emission estimates of indicator compounds during project operations. This includes consideration of the 1-hour, 24-hour, and annual operating scenarios that the project may be subject to. The relevant indicator compounds will include the following:

- Carbon monoxide (CO)
- Nitrogen oxides, expressed as nitrogen dioxide (NO_2)
- Suspended particulate matter[1] (SPM)
- PM_{10}
- $PM_{2.5}$
- Respirable Crystalline Silica.

The emission estimates for all indicator compounds will be used to complete atmospheric dispersion modelling for the following scenarios:

- Effects of the project operations only.
- Cumulative effects of the project in addition to baseline ambient air quality.

Modelling will be used to estimate predicted concentrations at sensitive receptor locations within 1 km of the proposed licence area. All dispersion modelling will be completed using the US EPA AERMOD dispersion model and carried out in accordance with the Ministry of the Environment, Conservation and Parks (MECP) "*Air*

[1] SPM can also be referred to as total suspended particulate or TSP

Dispersion Modelling Guideline for Ontario – Version 3.0" dated March 2017. Golder will use a 5-year hourly meteorological data set from the MECP.

1.1.4 Impact Assessment and Reporting

Time-averaged concentrations of all indicator compounds will be predicted at identified sensitive receptors with results compared to provincial and/or federal ambient air quality standards, guidelines and/or criteria. If necessary, Golder will identify proposed mitigation measures to reduce the potential for nuisance as a result of the project. The results of the air quality impact assessment will be documented in a report. The report will provide a detailed description of the methodology and results including the calculations and modelling.

1.2 Fugitive Dust Best Management Practices Plan and Follow Up Monitoring

Golder will use the results of the air quality impact assessment and recommended mitigation measures to prepare a comprehensive fugitive dust Best Management Practices plan (BMPP). The BMPP will document CBM's commitment to control the fugitive dust emissions from being carried beyond the limits of the site. The BMPP will give consideration to the following:

- Identification of the main sources of fugitive dust emissions.
- Identification of potential causes for high dust emissions and opacity from these sources.
- Description of preventative and control measures in place or under development to minimize the likelihood of high dust emissions and opacity from the sources of fugitive dust identified above.
- Implementation schedule for the BMPP.
- Inspection and maintenance procedures and monitoring initiatives to allow effective implementation of the preventative and control measures.

The need and frequency for monitoring recommendations will be reviewed as part of the air quality assessment.

2.0 NOISE

A noise impact assessment will be completed in accordance with applicable NDMNRF and MECP requirements to identify potential noise levels from the project onto sensitive Point(s) of Reception (POR(s)) in the vicinity of the site. Based on a review of available information, it is expected existing or potential (i.e., vacant lots) POR(s) exist within 500 metres (m), in all cardinal directions of the proposed licence area. For completeness noise contour modelling results will also be provided extending 1 km beyond the proposed licence area. The noise impact assessment will be completed through the tasks described below.

2.1 Site Reconnaissance and Establishment of Existing Conditions (Baseline Noise Monitoring Program)

Golder will complete a site reconnaissance field program to review the site surroundings and to complete a ground-based review of PORs. Golder will also gather noise data to document existing noise levels in the vicinity of PORs that could be impacted by the proposed project.

Based on an initial review of publicly available imagery of the site and surrounding environment, it is expected the POR(s) in the vicinity of the site are in an area defined by the MECP as either Class 2 or Class 3 (Rural). This will be confirmed by the site reconnaissance. Documented levels will be compared against any previous noise studies completed for other lands in the area, if available.

In establishing existing conditions Golder will complete a noise monitoring program where existing baseline noise levels will be documented through unattended noise monitoring at four locations, generally in four cardinal directions of the main proposed processing plant location, to establish representative noise levels at PORs located in the vicinity of the site. The monitoring will be completed over a period of approximately one week.

2.2 Predictive Modelling and Impact Assessment

Golder will complete noise prediction modelling based on proposed operational information provided by CBM. Golder will also use available information, including Golder's database of similar noise sources, manufacturer's sound level data (to be provided by CBM, if required) and data gathered from operations at an existing CBM site (i.e., CBM's Osprey Quarry) using similar equipment to predict the off-site noise levels at the identified sensitive POR(s) using the International Standard "*Acoustics – Attenuation of Sound During Propagation Outdoors"* (i.e., ISO 9613 part 2) as required by the NDMNRF and MECP.

Through a review of publicly readily available information, if it is determined that an identified POR could also be directly impacted (through noise) from other aggregate operations in the area, a semi-quantitative cumulative noise impact assessment will be completed. If detailed modelling results or modelling files are available for the other aggregate operations a detailed quantitative study will be completed. If detailed modelling results or modelling files are not available for the other aggregate operations, the assessment will be limited to a semi-quantitative assessment. In accordance with accepted practices and guidance provided by the MECP, the haul-route analysis will consider the potential noise impacts of the project through a review of noise levels along the haul-route with and without the project. This will be completed through a high-level quantitative haul-route analysis to assess haul-route project truck noise levels resulting from project-associated truck travel on local roadways.

Prediction results from project on-site operations will be compared to the MECP exclusionary noise limits at the identified sensitive POR(s). Based on modelling results, Golder will identify mitigation that will need to be incorporated into the design of the project in order to be in compliance with applicable noise limits.

2.3 Reporting

Once the noise modelling is complete and demonstrates that the project can operate in compliance with the applicable MECP noise limits, Golder will prepare a noise impact assessment report documenting the findings of the assessment.

3.0 VIBRATION

3.1 Background Data Compilation and Review

Background data review for this phase of the project will include a review of existing documents and a number of information sources. These sources include, but are not limited to:

- Existing provincial and federal guidelines for the assessment of environmental impacts from blasting.
- Proposed blasting parameters.
- Current vibration monitoring records from an existing nearby quarry operated by CBM (Osprey Quarry).
- Blast vibration attenuation models from Golder's experience and from published literature.

3.2 Site Reconnaissance and Existing Conditions

The field investigation includes a site visit to identify the sensitive receptors and other features that may be potentially impacted.

3.3 Predictive Modelling

Predictive modelling to estimate the attenuation characteristics of ground and air vibration levels from blasting operations at sensitive receptors would typically involve monitoring a number of site blasts at specific locations. Since there are currently no blasting operations at the site, the investigation includes the compilation and analysis vibration monitoring information currently being collected at residential properties located nearby to a similar quarry operation (i.e., CBM's Osprey Quarry). A site visit will also be arranged to visit a nearby CBM operated aggregate quarry (Osprey Quarry) where the blasting operations are similar to those proposed for the site. Predictive modelling of both ground and air vibrations from the proposed blasting operations will be carried out using the historic data from the existing CBM Osprey Quarry. The impact assessment will assume maximum explosive weights per delay period and minimum distances between the blast source and receptor.

3.4 Impact Assessment and Reporting

There is a requirement for a Blast Design Report, which is also commonly referred to as a Blast Impact Assessment. The data collected during the site reconnaissance will be analyzed with the data provided by CBM to assess the ground and air vibration decay characteristics. This will provide ground and air attenuation models. The impact assessment will address the following topics:

- An estimate of the potential ground and air vibration levels at potential points of impact.
- Evaluations of:
  - The potential impact on the nearby sensitive receptors.
  - The potential impact of the blasting operations on bedrock strata and adjacent water wells.
  - The long-term impact of the blasting operations on surrounding structures.
  - The impact of ground vibration effects at adjacent Canadian Fisheries waters if and where applicable.
  - The risk for flyrock.

- Recommendations for the continued control of ground and air vibration effects.
- General recommendations to prevent wild flyrock events (as required by Ontario Regulation 244/97).
- The assessment will not include specific recommendations related to fly rock since this is addressed during the operational phase of the quarry when detailed design is completed for each individual blast.

The study findings, impact assessment, and recommended mitigation strategies will be presented in a report.

The Blast Design Report will reference Ontario Regulation 244/97 and note that this requirement applies to the proposed quarry.

4.0 CARBON FOOTPRINT STUDY

Golder will complete a carbon footprint study which will include analyses of direct and purchased electricity related greenhouse gas (GHG) emissions associated with the following aspects of the project:

- Land clearing of the project site
- Project operations
- GHG removals as a result of rehabilitation of the project site

The analysis will be conducted in accordance with applicable guidance from the GHG Protocol Initiative document *"GHG Protocol Corporate Accounting and Reporting Standard"* and the recently released Environment and Climate Change Canada document entitled *"Technical Guide Related to the Strategic Assessment of Climate Change"* (SACC). In order to prepare the above analysis, current and post-rehabilitation land use information will be incorporated, along with fuel and electricity consumption projections for the project during operations. The assessment will also include a comparison if the material was imported further from market and a discussion of potential GHG impacts related to removal of rock.

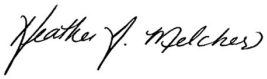
A technical memorandum will be developed, which will include a description of the methodology and the results of the assessment. The magnitude of GHG estimates associated with the project will be put into context using metrics available in public literature (e.g., the project's contribution to local/regional GHG emissions).

5.0 CLOSURE

We trust that this technical memorandum meets your current needs. Please contact Golder and CBM with any questions or comments.

Golder Associates Ltd.

Joe Tomaselli, MEng, PEng
Senior Acoustics, Noise and Vibration Engineer



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Air Quality Specialist

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https://golderassociates.sharepoint.com/sites/114392/project files/6 deliverables/terms of reference/atmospheric tor/19129150-tm-rev1-cbm caledon quarry atmospheric tor-19aug2022.docx

APPENDIX B

Land Use Zoning Designation Plan

580000

ALTON

CALEDON VILLAGE

CATARACT

SLIGO

BINKHAM

QUEEN STREET WEST

MAIN STREET

MISSISSAUGA ROAD

BEECH GROVE SIDEROAD

SHAWS CREEK ROAD

CHARLESTON SIDEROAD

WILDFIELD ROAD

MCLAREN ROAD

HAMILTON CHRISTIAN HIGH ROAD

4850000

580000

4850000

LEGEND

- ROAD
- RAILWAY
- WATERBODY
- LICENCE
- LIMIT OF
- NIAGARA ESCARPMENT PLAN
- OAK RIDGES MORAINE PLAN

GENERAL LAND

- RESIDENTIAL
- OTHER USES
- PARK

0 1,000 2,000

1:35,000 METRES

REFERENCE(S)

1. BASEDATA MNRF LIO OBTAINED APRIL 2019
2. WATERCOURSES OBTAINED FROM CREDIT VALLEY CONSERVATION AUTHORITY OPEN DATA PORTAL, NOVEMBER 2022 IN COMBINATION WITH SITE WATERCOURSE SURVEY PROVIDED BY FIRST BASE SOLUTIONS NOVEMBER 2021.
3. GENERAL LAND USE OBTAIN FROM THE REGION OF PEEL, 2006
4. LICENCE AND LIMIT OF EXTRACTION PROVIDED BY MHBC JULY 2023.
5. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

CLIENT
CBM AGGREGATES, A DIVISION OF ST. MARYS CEMENT INC. (CANADA)

PROJECT
CALEDON PIT / QUARRY

TITLE
LAND ZONING DESIGNATION PLAN

CONSULTANT
GOLDER
MEMBER OF WSP

YYYY-MM-DD	2023-07-20
DESIGNED	SO
PREPARED	SO
REVIEWED	TN
APPROVED	HM

PROJECT NO.	CONTROL	REV.	FIGURE
19129150	0036	0.0	1B

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

0 25mm

PATH: S:\Clients\Votorantim_Cimentos\Lorg_Par_5_Caledon\99_PROJ\19129150\40_PROD\0036_Noise\19129150-0036-RN-0001B.mxd PRINTED ON: 2023-07-20 AT: 3:36:42 PM

APPENDIX C

Description of Technical 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 centre 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 D

Noise Data

Name	ID	Type	Octave Spectrum (dB)											Source Data
			Weight.	31.5	63	125	250	500	1000	2000	4000	8000	A	lin	
Generator	Generator	Lw		98	111	117	113	108	107	106	102	96	113	120	Golder Database
Screen 1 - 2	Screen1_2	Lw		110	114	115	109	110	109	109	105	99	115	120	Golder Database
Jaw crusher	Jaw_crusher	Lw		108	115	116	111	108	106	103	99	92	111	120	Golder Database
Cone crusher	Cone_crusher	Lw		98	105	109	105	105	106	103	96	88	110	114	Golder Database
Loader PP	Loader_CAT980	Lw		106	110	108	101	103	104	99	92	86	107	114	Golder Database
Loader EX	Loader	Lw		69	94	103	101	104	103	102	95	88	110	110	Golder Database
Drill 1-2	Drill	Lw		111	111	111	110	107	110	108	110	106	116	119	Golder Database
Screen 1 - 7	PP_S_A	Lw		103	107	108	102	103	102	102	98	92	108	113	Golder Database
Jaw crusher 1-2	PP_PC_A	Lw		107	114	115	110	107	105	102	98	91	111	119	Golder Database
Cone crusher 1-3	PP_SC_A	Lw		95	102	106	102	102	103	100	93	85	107	111	Golder Database
Washpalnt Screen 1-2	WP	Lw		109	108	103	97	100	102	100	97	94	106	113	Golder Database
Haul truck	Haultruck_Volvo	Lw		110	109	111	109	103	100	99	97	93	107	116	Golder Database
Haul truck unloading	Truck_U	Lw		110	115	116	114	111	109	106	100	92	114	121	Golder Database
Shipment truck	Transport_truck	Lw		109	110	108	102	101	97	94	89	86	103	114	Golder Database

APPENDIX E

Sample Calculations

Report (Caledon noise model V65 AAR new rec July 2023 berm opening.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)	6.00
Night-time Penalty (dB)	10.00
DTM	
Standard Height (m)	320.00
Model of Terrain	Triangulation
Reflection	
max. Order of Reflection	1
Search Radius Src	100.00
Search Radius Rcvr	100.00
Max. Distance Source - Rcvr	1000.00 1000.00
Min. Distance Rvcr - 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	1.00
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	1/3 Oktave Spectrum (dB)												Source
			Weight.	31.5	63	125	250	500	1000	2000	4000	8000	A	lin	
Generator air discharge	Generator	Lw		98.0	111.0	117.0	113.0	108.0	107.0	106.0	102.0	96.0	112.9	120.0	Golder database
Screen 1 and 2	Screen1_2	Lw		110.0	114.0	115.0	109.0	110.0	109.0	109.0	105.0	99.0	114.7	120.2	Golder database
Jaw crusher	Jaw_crusher	Lw		108.0	115.0	116.0	111.0	108.0	106.0	103.0	99.0	92.0	111.3	120.2	Golder database
Cone crusher	Cone_crusher	Lw		98.0	105.0	109.0	105.0	105.0	106.0	103.0	96.0	88.0	109.7	113.9	Golder database
Loader CAT 980	Loader_CAT980	Lw		106.0	110.0	108.0	101.0	103.0	104.0	99.0	92.0	86.0	107.1	114.3	Golder database
Loader extractiion face	Loader	Lw		108.0	120.0	119.0	110.0	107.0	103.0	101.0	94.0	89.0	110.0	123.1	Golder database
Drill	Drill	Lw		110.9	110.9	111.1	110.4	107.0	109.7	108.4	109.9	105.8	115.8	119.2	Golder database
Screen	PP_S_A	Lw		83.9	87.9	88.9	82.9	83.9	82.9	82.9	78.9	72.9	88.6	94.1	Golder database
Primary crusher	PP_PC_A	Lw		93.3	100.3	101.3	96.3	93.3	91.3	88.3	84.3	77.3	96.6	105.5	Golder database
Secondary crusher	PP_SC_A	Lw		79.0	86.0	90.0	86.0	86.0	87.0	84.0	77.0	69.0	90.7	94.9	Golder database
Washpalnt	WP	Lw		109.0	108.0	103.0	97.0	100.0	102.0	100.0	97.0	94.0	106.4	113.2	Golder database
Haul truck	Haultruck_Volvo	Lw		110.0	109.0	111.0	109.0	103.0	100.0	99.0	97.0	93.0	107.2	116.3	Golder database
Truck unloading	Truck_U	Lw		110.0	115.0	116.0	114.0	111.0	109.0	106.0	100.0	92.0	114.0	121.2	Golder database
Transport truck	Transport_truck	Lw		109.0	110.0	108.0	102.0	101.0	97.0	94.0	89.0	86.0	102.9	114.5	Golder database

Point Source(s)

Name	M.	ID	Result. PWL			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Tim	
			Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special
			(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)		(min)	(min)
Cone crusher temporary	~	!O01!PS003	109.7	109.7	109.7	Lw	Cone_crusher		0.0	0.0	0.0				60.00	0.00
Drill 1	~	!R06!PS001	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 1	~	!R05!PS001	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 1	~	!R02!PS001	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 1	~	!P09!PS001	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 1	~	!P07!PS001	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 1	~	!P03!PS001	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 1	~	!O01!PS001	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 1	~	!E03!PS001	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				60.00	0.00
Drill 1	~	!D08!PS001	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 1	~	!D07!PS001	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 1	~	!D06!PS001	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 1	~	!D09!PS001	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 1	~	!D04!PS001	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 1	~	!D03!PS001	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 1	~	!R01!PS001	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 1	~	!D01!PS001	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				60.00	0.00
Drill 2	~	!R06!PS002	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 2	~	!R05!PS002	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 2	~	!R02!PS002	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 2	~	!P09!PS002	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 2	~	!P07!PS002	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 2	~	!P03!PS002	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 2	~	!O01!PS002	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 2	~	!E03!PS002	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				60.00	0.00
Drill 2	~	!D08!PS002	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 2	~	!D07!PS002	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 2	~	!D06!PS002	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 2	~	!D05!PS002	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 2	~	!D04!PS002	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 2	~	!D03!PS002	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 2	~	!D01!PS002	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				60.00	0.00
Jaw crusher temporary	~	!O01!PS003	111.3	111.3	111.3	Lw	Jaw_crusher		0.0	0.0	0.0				60.00	0.00
Loader 1 980 production	~	!O01!PS001	107.1	107.1	107.1	Lw	Loader_CAT980		0.0	0.0	0.0				30.00	0.00
Loader 1 980 production	~	!O01!PS001	107.1	107.1	107.1	Lw	Loader_CAT980		0.0	0.0	0.0				30.00	0.00
Loader 1 production CAT980 (or equivalent)	~	!E04!PS001	107.1	107.1	107.1	Lw	Loader_CAT980		0.0	0.0	0.0				30.00	0.00
Loader 1 production CAT980 (or equivalent)		!E02!PS002	107.1	107.1	107.1	Lw	Loader_CAT980		0.0	0.0	0.0				30.00	0.00
Loader 2 980 production	~	!O01!PS002	107.1	107.1	107.1	Lw	Loader_CAT980		0.0	0.0	0.0				30.00	0.00
Loader 2 980 production	~	!O01!PS002	107.1	107.1	107.1	Lw	Loader_CAT980		0.0	0.0	0.0				30.00	0.00
Loader 2 production CAT980 (or equivalent)	~	!E04!PS002	107.1	107.1	107.1	Lw	Loader_CAT980		0.0	0.0	0.0				30.00	0.00
Loader 2 production CAT980 (or equivalent)		!E02!PS002	107.1	107.1	107.1	Lw	Loader_CAT980		0.0	0.0	0.0				30.00	0.00
Loader 3 production CAT980 (or equivalent)	~	!E04!PS003	107.1	107.1	107.1	Lw	Loader_CAT980		0.0	0.0	0.0				30.00	0.00
Loader 3 production CAT980 (or equivalent)		!E02!PS002	107.1	107.1	107.1	Lw	Loader_CAT980		0.0	0.0	0.0				30.00	0.00
Loader 4 production CAT980 (or equivalent)	~	!E04!PS004	107.1	107.1	107.1	Lw	Loader_CAT980		0.0	0.0	0.0				30.00	0.00
Loader 4 production CAT980 (or equivalent)		!E02!PS002	107.1	107.1	107.1	Lw	Loader_CAT980		0.0	0.0	0.0				30.00	0.00
Loader extraction 1 L350H	~	!O01!PS009	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 1 L350H	~	!E03!PS009	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				60.00	0.00
Loader extraction 1 L350H	~	!R07!PS000	107.1	107.1	107.1	Lw	Loader_CAT980		0.0	0.0	0.0				30.00	0.00
Loader extraction 1 L350H	~	!R03!PS009	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 1 L350H	~	!QE08!PS009	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 1 L350H	~	!QE07!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 1 L350H	~	!QE06!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 1 L350H	~	!QE04!PS009	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 1 L350H	~	!QE03!PS009	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00

Name	M.	ID	Result. PWL			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Tim	
			Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special
			(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)		(min)	(min)
Loader extraction 1 L350H	~	!QE02!PS009	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 1 L350H	~	!QE01!PS009	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 1 L350H	~	!P08!PS009	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 1 L350H	~	!P06!PS009	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 1 L350H	~	!P05!PS009	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 1 L350H	~	!P04!PS009	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 1 L350H	~	!P02!PS009	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 1 L350H		!P01!PS009	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 1 L350H	~	!O06!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 1 L350H	~	!O03!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 1 L350H	~	!G02!PS000	107.1	107.1	107.1	Lw	Loader_CAT980		0.0	0.0	0.0				30.00	0.00
Loader extraction 1 L350H	~	!G01!PS009	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 1 L350H	~	!R04!PS009	107.1	107.1	107.1	Lw	Loader_CAT980		0.0	0.0	0.0				30.00	0.00
Loader extraction 2 L350H	~	!R03!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 2 L350H	~	!QE08!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 2 L350H	~	!QE04!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 2 L350H	~	!QE03!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 2 L350H	~	!QE02!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 2 L350H	~	!QE01!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 2 L350H	~	!P08!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 2 L350H	~	!P06!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 2 L350H	~	!P05!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 2 L350H	~	!P04!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 2 L350H	~	!P02!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 2 L350H		!P01!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 2 L350H	~	!O01!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 2 L350H	~	!E03!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				60.00	0.00
Loader extraction 2 L350H	~	!R04!PS000	107.1	107.1	107.1	Lw	Loader_CAT980		0.0	0.0	0.0				30.00	0.00
Loader extraction 2 L350H	~	!R07!PS000	107.1	107.1	107.1	Lw	Loader_CAT980		0.0	0.0	0.0				30.00	0.00
Loader extraction 2 L350H	~	!QE07!PS009	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 2 L350H	~	!QE06!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 2 L350H	~	!QE05!PS009	107.1	107.1	107.1	Lw	Loader_CAT980		0.0	0.0	0.0				30.00	0.00
Loader extraction 2 L350H	~	!O06!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 2 L350H	~	!O03!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 2 L350H	~	!G03!PS009	107.1	107.1	107.1	Lw	Loader_CAT980		0.0	0.0	0.0				60.00	0.00
Loader extraction 3 L350H	~	!R03!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 3 L350H	~	!QE08!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 3 L350H	~	!QE03!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 3 L350H	~	!P08!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 3 L350H	~	!P06!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 3 L350H	~	!P05!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 3 L350H	~	!P02!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 3 L350H	~	!O01!PS009	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 3 L350H	~	!E03!PS009	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				60.00	0.00
Loader extraction 3 L350H	-	!R04!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				0.00	0.00
Loader extraction 3 L350H	~	!QE07!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 3 L350H	~	!QE06!PS000	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 3 L350H	~	!QE05!PS000	107.1	107.1	107.1	Lw	Loader_CAT980		0.0	0.0	0.0				30.00	0.00
Loader extraction 3 L350H	~	!QE02!PS009	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 3 L350H	~	!QE01!PS009	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 3 L350H	~	!P04!PS009	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 3 L350H	~	!O06!PS009	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Loader extraction 3 L350H	~	!O03!PS009	110.0	110.0	110.0	Lw	Loader		0.0	0.0	0.0				30.00	0.00
Screen 1 temporary	~	!O01!PS004	114.7	114.7	114.7	Lw	Screen1_2		0.0	0.0	0.0				60.00	0.00
Screen 2 temporary	~	!O01!PS008	114.7	114.7	114.7	Lw	Screen1_2		0.0	0.0	0.0				60.00	0.00
Truck unloading	~	!O01!TU	114.0	114.0	114.0	Lw	Truck_U		0.0	0.0	0.0				6.00	0.00
Truck unloading	~	!E04!TU	114.0	114.0	114.0	Lw	Truck_U		0.0	0.0	0.0				6.00	0.00
Truck unloading		!E02!TU	114.0	114.0	114.0	Lw	Truck_U		0.0	0.0	0.0				6.00	0.00
Washplant 1	~	!E04!PS011	106.4	106.4	106.4	Lw	WP		0.0	0.0	0.0				60.00	0.00
Washplant 1		!E02!PS011	106.4	106.4	106.4	Lw	WP		0.0	0.0	0.0				60.00	0.00
Washplant 2	~	!E04!PS012	106.4	106.4	106.4	Lw	WP		0.0	0.0	0.0				60.00	0.00
Washplant 2		!E02!PS012	106.4	106.4	106.4	Lw	WP		0.0	0.0	0.0				60.00	0.00
Drill 1	-	!D02!PS001	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00
Drill 1	~	!D05!PS001	115.8	115.8	115.8	Lw	Drill		0.0	0.0	0.0				45.00	0.00

Line Source(s)

Name	M.	ID	Result. PWL			Result. PWL'			Lw / Li			Correction			Attenuation	Operating Time			Movi	
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night		Day	Special	Night		Numb
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(min)	(min)	(min)	Day	Even
Haul truck Volvo	~	!P06!LS001	108.6	-5.6	-5.6	77.3	-36.8	-36.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0
Haul truck Volvo	~	!E03!LS001	106.9	-7.3	-7.3	78.3	-35.8	-35.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0
Haul truck Volvo	~	!QE02!LS001	111.0	-3.1	-3.1	77.3	-36.8	-36.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0
Haul truck Volvo	~	!O06!LS001	105.7	-8.5	-8.5	77.3	-36.8	-36.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0
Haul truck Volvo	~	!QE05!LS001	110.5	-3.7	-3.7	77.3	-36.8	-36.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0
Haul truck Volvo		!P01!LS001	108.8	-5.4	-5.4	77.3	-36.8	-36.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0
Haul truck Volvo	~	!R07!LS001	109.8	-4.3	-4.3	77.3	-36.8	-36.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0
Haul truck Volvo	~	!P04!LS001	109.5	-4.6	-4.6	77.3	-36.8	-36.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0
Haul truck Volvo	~	!QE01!LS001	109.1	-5.1	-5.1	78.3	-35.8	-35.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0
Haul truck Volvo	~	!QE04!LS001	108.5	-5.7	-5.7	77.3	-36.8	-36.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0
Haul truck Volvo	~	!QE08!LS001	108.2	-6.0	-6.0	77.3	-36.8	-36.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0
Haul truck Volvo	~	!QE07!LS001	108.1	-6.0	-6.0	77.3	-36.8	-36.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0

Name	M.	ID	Result. PWL			Result. PWL'			Lw / Li			Correction			Attenuation	Operating Time			Movi	
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night		Day	Special	Night	Numb	
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(min)	(min)	(min)	Day	Even
Haul truck Volvo	~	!P02!LS001	108.1	-6.1	-6.1	78.3	-35.8	-35.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0
Haul truck Volvo	~	!QE03!LS001	107.9	-6.2	-6.2	77.3	-36.8	-36.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0
Haul truck Volvo	~	!R04!LS001	107.6	-6.6	-6.6	77.3	-36.8	-36.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0
Haul truck Volvo	~	!P05!LS001	107.6	-6.6	-6.6	77.3	-36.8	-36.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0
Haul truck Volvo	~	!P08!LS001	106.8	-7.4	-7.4	77.3	-36.8	-36.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0
Haul truck Volvo	~	!O06!LS001	106.7	-7.5	-7.5	78.3	-35.8	-35.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0
Haul truck Volvo	~	!QE06!LS001	106.6	-7.6	-7.6	77.3	-36.8	-36.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0
Haul truck Volvo	~	!O03!LS001	106.4	-7.8	-7.8	77.3	-36.8	-36.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0
Haul truck Volvo	~	!O01!LS001	106.0	-8.2	-8.2	77.3	-36.8	-36.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0
Haul truck Volvo	~	!O06!LS001	105.7	-8.5	-8.5	77.3	-36.8	-36.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0
Haul truck Volvo	~	!O03!LS001	105.7	-8.4	-8.4	77.3	-36.8	-36.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0
Haul truck Volvo	~	!O03!LS001	105.7	-8.4	-8.4	77.3	-36.8	-36.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0
Offsite tuck	~	!E04!LS002	104.7	-14.2	104.7	78.7	-40.1	78.7	PWL-Pt	Transport_truck		0.0	0.0	0.0		60.00	0.00	60.00	76.0	0.0
Offsite tuck		!E02!LS002	104.7	-14.2	104.7	78.7	-40.1	78.7	PWL-Pt	Transport_truck		0.0	0.0	0.0		60.00	0.00	60.00	76.0	0.0
Haul truck Volvo	~	!R03!LS001	104.3	-9.9	-9.9	77.3	-36.8	-36.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	26.0	0.0
Offsite tuck	~	!O01!LS002	104.3	-14.5	104.3	78.7	-40.1	78.7	PWL-Pt	Transport_truck		0.0	0.0	0.0		60.00	0.00	0.00	76.0	0.0
Offsite tuck	~	!E03!LS002	104.3	-14.5	104.3	78.7	-40.1	78.7	PWL-Pt	Transport_truck		0.0	0.0	0.0		60.00	0.00	60.00	76.0	0.0
Haul truck Volvo	~	!G03!LS001	103.0	-4.0	-4.0	70.2	-36.8	-36.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	5.0	0.0
Haul truck Volvo	~	!G02!LS001	99.4	-7.6	-7.6	70.2	-36.8	-36.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	5.0	0.0
Haul truck Volvo	~	!G01!LS001	99.0	-8.0	-8.0	70.2	-36.8	-36.8	PWL-Pt	Haultruck_Volvo		0.0	0.0	0.0		60.00	0.00	0.00	5.0	0.0

Area Source(s)

Name	M.	ID	Result. PWL			Result. PWL"			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time		
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)		(min)	(min)	(min)
Secondary crusher 3	~	!E04!PP_SC3	99.3	99.3	99.3	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0				60.00	0.00	0.00
Secondary crusher 2	~	!E04!PP_SC2	99.3	99.3	99.3	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0				60.00	0.00	0.00
Secondary crusher 1	~	!E04!PP_SC1	99.3	99.3	99.3	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0				60.00	0.00	0.00
Screen 7	~	!E04!PP_S7	98.4	98.4	98.4	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0				60.00	0.00	0.00
Screen 6	~	!E04!PP_S6	98.4	98.4	98.4	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0				60.00	0.00	0.00
Screen 5	~	!E04!PP_S5	98.4	98.4	98.4	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0				60.00	0.00	0.00
Screen 4	~	!E04!PP_S4	98.4	98.4	98.4	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0				60.00	0.00	0.00
Screen 3	~	!E04!PP_S3	98.4	98.4	98.4	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0				60.00	0.00	0.00
Screen 2	~	!E04!PP_S2	98.4	98.4	98.4	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0				60.00	0.00	0.00
Screen 1	~	!E04!PP_S1	98.4	98.4	98.4	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0				60.00	0.00	0.00
Primary crusher 1	~	!E04!PP_PC	104.0	104.0	104.0	96.6	96.6	96.6	Lw"	PP_PC_A		0.0	0.0	0.0				60.00	0.00	0.00
Primary crusher 1	~	!E04!PP_PC	104.0	104.0	104.0	96.6	96.6	96.6	Lw"	PP_PC_A		0.0	0.0	0.0				60.00	0.00	0.00
Secondary crusher 3		!E02!PP_SC3	99.3	99.3	99.3	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0				60.00	0.00	0.00
Secondary crusher 2		!E02!PP_SC2	99.3	99.3	99.3	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0				60.00	0.00	0.00
Secondary crusher 1		!E02!PP_SC1	99.3	99.3	99.3	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0				60.00	0.00	0.00
Screen 7		!E02!PP_S7	98.4	98.4	98.4	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0				60.00	0.00	0.00
Screen 6		!E02!PP_S6	98.4	98.4	98.4	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0				60.00	0.00	0.00
Screen 5		!E02!PP_S5	98.4	98.4	98.4	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0				60.00	0.00	0.00
Screen 4		!E02!PP_S4	98.4	98.4	98.4	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0				60.00	0.00	0.00
Screen 3		!E02!PP_S3	98.4	98.4	98.4	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0				60.00	0.00	0.00
Screen 2		!E02!PP_S2	98.4	98.4	98.4	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0				60.00	0.00	0.00
Screen 1		!E02!PP_S1	98.4	98.4	98.4	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0				60.00	0.00	0.00
Primary crusher 1		!E02!PP_PC	104.0	104.0	104.0	96.6	96.6	96.6	Lw"	PP_PC_A		0.0	0.0	0.0				60.00	0.00	0.00
Primary crusher 2		!E02!PP_PC	104.0	104.0	104.0	96.6	96.6	96.6	Lw"	PP_PC_A		0.0	0.0	0.0				60.00	0.00	0.00

Vertical Area Source(s)

Name	M.	ID	Result. PWL			Result. PWL"			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time		
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Ni
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)		(min)	(min)	(m
Generator air dishcarge	~	!O01!VAS001	122.5	122.5	122.5	112.9	112.9	112.9	Lw"	Generator		0.0	0.0	0.0			0	60.00	0.00	
Secondary crusher 3	~	!E04!PP_SC3	100.2	100.2	100.2	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0			0	60.00	0.00	
Secondary crusher 3	~	!E04!PP_SC3	100.3	100.3	100.3	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0			0	60.00	0.00	
Secondary crusher 3	~	!E04!PP_SC3	100.2	100.2	100.2	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0			0	60.00	0.00	
Secondary crusher 3	~	!E04!PP_SC3	100.3	100.3	100.3	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0			0	60.00	0.00	
Secondary crusher 2	~	!E04!PP_SC2	100.2	100.2	100.2	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0			0	60.00	0.00	
Secondary crusher 2	~	!E04!PP_SC2	100.3	100.3	100.3	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0			0	60.00	0.00	
Secondary crusher 2	~	!E04!PP_SC2	100.2	100.2	100.2	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0			0	60.00	0.00	
Secondary crusher 2	~	!E04!PP_SC2	100.3	100.3	100.3	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0			0	60.00	0.00	
Secondary crusher	~	!E04!PP_SC1	100.3	100.3	100.3	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0			0	60.00	0.00	
Secondary crusher	~	!E04!PP_SC1	100.2	100.2	100.2	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0			0	60.00	0.00	
Secondary crusher	~	!E04!PP_SC1	100.3	100.3	100.3	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0			0	60.00	0.00	
Secondary crusher	~	!E04!PP_SC1	100.2	100.2	100.2	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0			0	60.00	0.00	
Screen 7	~	!E04!PP_S7	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	
Screen 7	~	!E04!PP_S7	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	
Screen7	~	!E04!PP_S7	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	
Screen7	~	!E04!PP_S7	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	
Screen 6	~	!E04!PP_S6	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	
Screen 6	~	!E04!PP_S6	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	
Screen6	~	!E04!PP_S6	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	
Screen6	~	!E04!PP_S6	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	
Screen 5	~	!E04!PP_S5	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	
Screen 5	~	!E04!PP_S5	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	
Screen 5	~	!E04!PP_S5	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	

Name	M.	ID	Result. PWL			Result. PWL"			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time		
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Ni
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)		(min)	(min)	(m
Screen5	~	!E04!PP_S5	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 4	~	!E04!PP_S4	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 4	~	!E04!PP_S4	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 4	~	!E04!PP_S4	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen4	~	!E04!PP_S4	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 3	~	!E04!PP_S3	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 3	~	!E04!PP_S3	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 3	~	!E04!PP_S3	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen3	~	!E04!PP_S3	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 2	~	!E04!PP_S2	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 2	~	!E04!PP_S2	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 2	~	!E04!PP_S2	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen2	~	!E04!PP_S2	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 1	~	!E04!PP_S1	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 1	~	!E04!PP_S1	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 1	~	!E04!PP_S1	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 1	~	!E04!PP_S1	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Primary crusher 2	~	!E04!PP_PC02	105.1	105.1	105.1	96.6	96.6	96.6	Lw"	PP_PC_A		0.0	0.0	0.0			0	60.00	0.00	(
Primary crusher 2	~	!E04!PP_PC02	103.2	103.2	103.2	96.6	96.6	96.6	Lw"	PP_PC_A		0.0	0.0	0.0			0	60.00	0.00	(
Primary crusher 2	~	!E04!PP_PC02	105.2	105.2	105.2	96.6	96.6	96.6	Lw"	PP_PC_A		0.0	0.0	0.0			0	60.00	0.00	(
Primary crusher 2	~	!E04!PP_PC02	103.1	103.1	103.1	96.6	96.6	96.6	Lw"	PP_PC_A		0.0	0.0	0.0			0	60.00	0.00	(
Primary crusher 1	~	!E04!PP_PC01	105.1	105.1	105.1	96.6	96.6	96.6	Lw"	PP_PC_A		0.0	0.0	0.0			0	60.00	0.00	(
Primary crusher 1	~	!E04!PP_PC01	103.2	103.2	103.2	96.6	96.6	96.6	Lw"	PP_PC_A		0.0	0.0	0.0			0	60.00	0.00	(
Primary crusher 1	~	!E04!PP_PC01	105.2	105.2	105.2	96.6	96.6	96.6	Lw"	PP_PC_A		0.0	0.0	0.0			0	60.00	0.00	(
Primary crusher 1	~	!E04!PP_PC01	103.1	103.1	103.1	96.6	96.6	96.6	Lw"	PP_PC_A		0.0	0.0	0.0			0	60.00	0.00	(
Secondary crusher 3		!E02!PP_SC3	100.3	100.3	100.3	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0			0	60.00	0.00	(
Secondary crusher 3		!E02!PP_SC3	100.2	100.2	100.2	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0			0	60.00	0.00	(
Secondary crusher 3		!E02!PP_SC3	100.3	100.3	100.3	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0			0	60.00	0.00	(
Secondary crusher 3		!E02!PP_SC3	100.2	100.2	100.2	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0			0	60.00	0.00	(
Secondary crusher 2		!E02!PP_SC2	100.3	100.3	100.3	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0			0	60.00	0.00	(
Secondary crusher 2		!E02!PP_SC2	100.3	100.3	100.3	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0			0	60.00	0.00	(
Secondary crusher 2		!E02!PP_SC2	100.2	100.2	100.2	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0			0	60.00	0.00	(
Secondary crusher 2		!E02!PP_SC2	100.2	100.2	100.2	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0			0	60.00	0.00	(
Secondary crusher		!E02!PP_SC1	100.3	100.3	100.3	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0			0	60.00	0.00	(
Secondary crusher		!E02!PP_SC1	100.2	100.2	100.2	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0			0	60.00	0.00	(
Secondary crusher		!E02!PP_SC1	100.3	100.3	100.3	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0			0	60.00	0.00	(
Secondary crusher		!E02!PP_SC1	100.2	100.2	100.2	90.7	90.7	90.7	Lw"	PP_SC_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 7		!E02!PP_S7	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 7		!E02!PP_S7	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen7		!E02!PP_S7	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen7		!E02!PP_S7	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 6		!E02!PP_S6	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 6		!E02!PP_S6	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 6		!E02!PP_S6	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen6		!E02!PP_S6	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 5		!E02!PP_S5	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 5		!E02!PP_S5	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 5		!E02!PP_S5	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen5		!E02!PP_S5	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 4		!E02!PP_S4	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 4		!E02!PP_S4	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 4		!E02!PP_S4	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen4		!E02!PP_S4	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 3		!E02!PP_S3	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 3		!E02!PP_S3	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 3		!E02!PP_S3	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen3		!E02!PP_S3	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 2		!E02!PP_S2	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 2		!E02!PP_S2	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 2		!E02!PP_S2	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 2		!E02!PP_S2	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 1		!E02!PP_S1	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 1		!E02!PP_S1	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 1		!E02!PP_S1	97.2	97.2	97.2	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Screen 1		!E02!PP_S1	102.9	102.9	102.9	88.6	88.6	88.6	Lw"	PP_S_A		0.0	0.0	0.0			0	60.00	0.00	(
Primary crusher 2		!E02!PP_PC02	105.1	105.1	105.1	96.6	96.6	96.6	Lw"	PP_PC_A		0.0	0.0	0.0			0	60.00	0.00	(
Primary crusher 2		!E02!PP_PC02	103.2	103.2	103.2	96.6	96.6	96.6	Lw"	PP_PC_A		0.0	0.0	0.0			0	60.00	0.00	(
Primary crusher 2		!E02!PP_PC02	105.2	105.2	105.2	96.6	96.6	96.6	Lw"	PP_PC_A		0.0	0.0	0.0			0	60.00	0.00	(
Primary crusher 2		!E02!PP_PC02	103.1	103.1	103.1	96.6	96.6	96.6	Lw"	PP_PC_A		0.0	0.0	0.0			0	60.00	0.00	(
Primary crusher 1		!E02!PP_PC01	105.1	105.1	105.1	96.6	96.6	96.6	Lw"	PP_PC_A		0.0	0.0	0.0			0	60.00	0.00	(
Primary crusher 1		!E02!PP_PC01	103.2	103.2	103.2	96.6	96.6	96.6	Lw"	PP_PC_A		0.0	0.0	0.0			0	60.00	0.00	(
Primary crusher 1		!E02!PP_PC01	105.2	105.2	105.2	96.6	96.6	96.6	Lw"	PP_PC_A		0.0	0.0	0.0			0	60.00	0.00	(
Primary crusher 1		!E02!PP_PC01	103.1	103.1	103.1	96.6	96.6	96.6	Lw"	PP_PC_A		0.0	0.0	0.0			0	60.00	0.00	(

Barrier(s)

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height				
			left	right		horz.	vert.	Begin		End		
					(m)	(m)	(m)	(m)		(m)		
working face year 11 to 14	~	!O03!	0.21	0.21				8.00	r	8.00	r	
Working face year Phase 1		!P01!north	0.21	0.21	30.00							
working face year 11 to 14	~	!QE03!	0.21	0.21	30.00							

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height			
			left	right		horz.	vert.	Begin		End	
					(m)	(m)	(m)	(m)		(m)	
working face year 26 to 27	~	!QE06!	0.21	0.21	30.00						
working face year 26 to 27	~	!QE07!	0.21	0.21							
working face year 11 to 14	~	!QE02!	0.21	0.21	30.00						
Working face Phase 3	~	!QE08!	0.84	0.84	30.00						
Phase 6 drill local barrier	~	!D07!DLB1	0.84	0.84				4.50	r	4.50	r
Phase 6 drill local barrier	~	!D07!DLB2	0.84	0.84				4.50	r	4.50	r
working face	~	!G01!	0.21	0.21	30.00						
Working face	~	!G02!	0.21	0.21	30.00						
Working face year Phase 1	~	!QE01!north	0.21	0.21	30.00						
Phase 1 drill local barrier	~	!D08!	0.84	0.84				4.00	r	4.00	r
Phase 4 drill local barrier	~	!D03!	0.84	0.84				4.50	r	4.50	r
Phase 5 drill local barrier	~	!D01!	0.84	0.84				4.00	r	4.00	r
Phase 4 drill local barrier	~	!D03!	0.84	0.84				4.50	r	4.50	r
Phase 5 drill local barrier	~	!D01!	0.84	0.84				4.50	r	4.50	r
PLB SA	-	!BE06!	0.84	0.84				5.00	r	5.00	r
PLB W TP	~	!BE07!	0.84	0.84				5.00	r	5.00	r
PP BNE	~	!E04!	0.84	0.84				13.00	r	13.00	r
drill working face	~	!R01!	0.60	0.60	40.00						
Phase 1 drill local barrier	~	!P04!	0.37	0.37	30.00						
PP BW		!E02!	0.84	0.84				13.00	r	13.00	r
PP BNE	~	!E04!	0.84	0.84				13.00	r	13.00	r
Phase 3 processing plant	~	!D04!	0.60	0.60				4.50	r	4.50	r
Phase 3 processing plant	~	!D04!	0.60	0.60				4.50	r	4.50	r
Drill Phase4 working face	~	!D03!	0.60	0.60	30.00						
Extrration Phase4 working face	~	!P06!	0.60	0.60	30.00						
Phase 4 working face area 2	~	!P08!	0.60	0.60	30.00						
Phase 4 drill local barrier	~	!P09!	0.84	0.84				4.50	r	4.50	r
Phase 4 drill local barrier	~	!P09!	0.84	0.84				4.50	r	4.50	r
PPB P6	~	!E04!	0.84	0.84				13.00	r	13.00	r
Drill Phase 1 Area 3	~	!R01!	0.60	0.60				4.50	r	4.50	r
TPP BW	~	!O01!	0.84	0.84				7.50	r	7.50	r
TPP BE	~	!O01!	0.84	0.84				6.00	r	6.00	r
PP BW	~	!E04!	0.84	0.84				13.00	r	13.00	r
PP BNE		!E02!	0.84	0.84				13.00	r	13.00	r
PP BNE		!E02!	0.84	0.84				13.00	r	13.00	r
property line berm north area		!BE06!	0.84	0.84				5.00	r	5.00	r
property line barrier main area 1		!BE06!	0.84	0.84				5.00	r	5.00	r
property line barrier main area 1	-	!BE06!	0.84	0.84				5.00	r	5.00	r
property line barrier main area 1		!BE06!	0.84	0.84				5.00	r	5.00	r
Property line barrier 5 m		!BE06!	0.84	0.84				5.00	r	5.00	r
		!BE06!	0.84	0.84				5.00	r	5.00	r
working face	~	!R07!	0.37	0.37	30.00						
Property line barrier increased		!BE06!	0.84	0.84				7.00	r	7.00	r
working face	-	!BE06!	0.21	0.21				12.00	r	12.00	r

Building(s)

Name	M.	ID	RB	Residents	Absorption	Height	
						Begin	
						(m)	
Generator/crusher operator	~	!O01!	x	0	0.21	4.00	r
Primary crusher	~	!E04!	x	0	0.21	4.75	r
Primary crusher	~	!E04!	x	0	0.21	4.75	r
Screen 1	~	!E04!	x	0	0.21	4.75	r
Screen 1	~	!E04!	x	0	0.21	4.75	r
Screen 1	~	!E04!	x	0	0.21	4.75	r
Screen 1	~	!E04!	x	0	0.21	4.75	r
Screen 1	~	!E04!	x	0	0.21	4.75	r
Screen 1	~	!E04!	x	0	0.21	4.75	r
Screen 1	~	!E04!	x	0	0.21	4.75	r
Secondary crusher	~	!E04!	x	0	0.21	5.75	r
Secondary crusher	~	!E04!	x	0	0.21	5.75	r
Secondary crusher	~	!E04!	x	0	0.21	5.75	r
Primary crusher		!E02!	x	0	0.21	4.75	r
Primary crusher		!E02!	x	0	0.21	4.75	r
Screen 1		!E02!	x	0	0.21	4.75	r
Screen 1		!E02!	x	0	0.21	4.75	r
Screen 1		!E02!	x	0	0.21	4.75	r
Screen 1		!E02!	x	0	0.21	4.75	r
Screen 1		!E02!	x	0	0.21	4.75	r
Screen 1		!E02!	x	0	0.21	4.75	r
Screen 1		!E02!	x	0	0.21	4.75	r
Secondary crusher		!E02!	x	0	0.21	5.75	r
Secondary crusher		!E02!	x	0	0.21	5.75	r
Secondary crusher		!E02!	x	0	0.21	5.75	r

Ground Absorption Area(s)

Name	M.	ID	G
Quarry bottom	~	!O02!QB	0.2

Name	M.	ID	G
bottom edge east	~	!T07!BEE	0.2
Bottom edge north extension	~	!T08!BEN	0.2
Bottom edge north extension	~	!T08!BEN	0.0
Roads		R	0.0
Road		R	0.0
Road		R	0.0
extracted area	~	!D06!	0.2
extracted area	~	!D01!	0.2
extracted area	~	!D08!	0.2
extracted area	~	!D04!	0.2
extracted area	-	!D02!	0.2
Quarry bottom	~	!D07!	0.2
Quarry bottom	~	!D02!	0.2
Quarry bottom	~	!QE02!	0.2
Quarry bottom	~	!QE04!	0.2
Quarry bottom	~	!QE03!	0.2
initial cut	~	!O01!	0.2
Quarry bottom	-	!T08!	0.2
Quarry bottom	~	!QE08!	0.2
extracted area	~	!D03!	0.2
extracted area	~	!O01!	0.2
Quarry bottom		!P01!	0.2
Quarry bottom	~	!QE01!	0.2
area weheDrill phase 2A	~	!D08!	0.2
Bottom edge north extension	~	!P03!BEN	0.2
Bottom edge north extension	~	!D01!BEN	0.2
ground	~	!D07!	0.2
ground	~	!D05!	0.2
ground	~	!D09!	0.2
ground	~	!D09!	0.2
ground	~	!D03!	0.2
Phase 2B	~	!T08!	0.2
Phase 2B	~	!G03!	0.2
Phase 2B	~	!G02!	0.2
Phase 2B	-	!R01!	0.2
Phase 4	~	!P09!	0.2
Phase 5	~	!R04!	0.2
extracted area	~	!P09!	0.2
Quarry bottom	~	!D09!	0.2
Bottom edge north extension	~	!D09!BEN	0.2
Bottom edge north extension	~	!D07!BEN	0.2
Bottom edge north extension	~	!D04!BEN	0.2
Bottom edge north extension	~	!D06!BEN	0.2
Bottom edge north extension	~	!P09!BEN	0.2
Bottom edge north extension	~	!D02!BEN	0.2

Receptor Noise Impact Level(s)

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Evening	Night	Day	Evening	Night	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(m)		(m)	(m)	(m)
POR001		POR001	35.9	-80.2	24.0	45.4	40.4	40.4				1.50	r	576831.64	4852931.91	406.89
POR002		POR002	35.8	-80.2	24.2	45.4	40.4	40.4				1.50	r	576804.23	4852967.98	407.50
POR003		POR003	36.4	-80.2	24.8	45.4	40.4	40.4				4.50	r	576585.49	4852931.24	412.15
POR004		POR004	37.9	-80.2	27.5	45.4	40.4	40.4				4.50	r	576448.60	4853365.12	420.57
POR005		POR005	36.6	-80.2	25.5	45.4	40.4	40.4				4.50	r	576355.76	4853544.05	425.65
POR006	+	POR006	34.3	-80.2	22.9	45.4	40.4	40.4				4.50	r	576001.15	4853653.74	433.50
POR007		POR007	33.4	-80.2	21.6	45.4	40.4	40.4				4.50	r	576633.73	4854594.46	420.44
POR008		POR008	35.8	-80.2	23.6	45.4	40.4	40.4				4.50	r	576941.96	4854524.63	419.76
POR009		POR009	33.2	-80.2	21.2	45.4	40.4	40.4				1.50	r	577067.85	4854502.87	412.74
POR010		POR010	34.5	-80.2	20.8	45.4	40.4	40.4				1.50	r	577087.80	4854446.38	414.14
POR011		POR011	38.1	-80.2	24.3	45.4	40.4	40.4				4.50	r	577168.08	4854387.26	417.84
POR012		POR012	38.3	-80.2	25.2	45.4	40.4	40.4				4.50	r	577239.57	4854467.76	419.50
POR013		POR013	40.4	-80.2	25.8	45.4	40.4	40.4				4.50	r	577239.16	4854357.68	417.67
POR014		POR014	40.7	-80.2	25.9	45.4	40.4	40.4				4.50	r	577328.99	4854384.74	419.50
POR015		POR015	42.0	-80.2	25.4	45.4	40.4	40.4				1.50	r	577476.28	4854306.87	416.20
POR016		POR016	47.1	-80.2	35.0	50.4	45.4	45.4				4.50	r	577863.82	4853862.12	414.78
POR017		POR017	44.9	-80.2	33.9	50.4	45.4	45.4				4.50	r	577936.59	4853775.33	412.88
POR018	+	POR018	44.8	-80.2	33.9	50.4	45.4	45.4				4.50	r	578001.89	4853839.22	414.50
POR019		POR019	43.1	-80.2	32.5	50.4	45.4	45.4				1.50	r	578012.00	4853703.09	410.50
POR020		POR020	44.5	-80.2	34.0	50.4	45.4	45.4				4.50	r	578062.42	4853746.86	413.87
POR021		POR021	44.9	-80.2	34.7	50.4	45.4	45.4				4.50	r	578106.21	4853686.36	413.88
POR022		POR022	45.2	-80.2	34.8	50.4	45.4	45.4				4.50	r	578092.20	4853658.36	414.42
POR023		POR023	43.8	-80.2	33.3	50.4	45.4	45.4				4.50	r	578085.39	4853618.98	412.16
POR024		POR024	38.5	-80.2	25.8	50.4	45.4	45.4				4.50	r	578177.36	4853983.41	410.36
POR025		POR025	33.5	-80.2	23.0	50.4	45.4	45.4				4.50	r	578366.25	4854227.54	401.72
POR026 vacant lot		POR026	40.9	-80.2	31.3	45.4	40.4	40.4				4.50	r	578282.33	4853398.55	409.95
POR027		POR027	35.3	-80.2	24.2	45.4	40.4	40.4				4.50	r	578429.91	4853253.77	407.50
POR028		POR028	34.0	-80.2	23.0	45.4	40.4	40.4				1.50	r	578453.98	4853230.97	404.50
POR029		POR029	34.7	-80.2	24.2	45.4	40.4	40.4				4.50	r	578437.48	4853155.79	407.01
POR030		POR030	33.9	-80.2	22.6	45.4	40.4	40.4				1.50	r	578468.65	4853124.28	403.50
POR031 vacant lot		POR031	34.1	-80.2	22.8	45.4	40.4	40.4				4.50	r	578553.64	4853164.93	405.98
POR032		POR032	34.3	-80.2	22.9	45.4	40.4	40.4				4.50	r	578511.39	4852941.08	404.31
POR033	+	POR033	34.1	-80.2	22.1	45.4	40.4	40.4				4.50	r	578617.11	4853055.91	404.86

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Evening	Night	Day	Evening	Night	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(m)		(m)	(m)	(m)
POR034	+	POR034	33.0	-80.2	21.4	45.4	40.4	40.4				4.50	r	578743.36	4852944.76	404.34
POR035		POR035	34.5	-80.2	25.6	45.4	40.4	40.4				4.50	r	578471.95	4852697.83	403.89
POR036		POR036	35.2	-80.2	27.5	45.4	40.4	40.4				4.50	r	578384.89	4852527.40	403.50
POR037	+	POR037	35.6	-80.2	27.4	45.4	40.4	40.4				4.50	r	578341.42	4852341.44	402.03
POR038		POR038	36.1	-80.2	28.5	45.4	40.4	40.4				4.50	r	577968.43	4851953.57	406.22
POR039		POR039	37.4	-80.2	28.4	45.4	40.4	40.4				4.50	r	577760.03	4851992.95	406.18
POR040		POR040	37.8	-80.2	28.7	45.4	40.4	40.4				4.50	r	577733.23	4852047.06	405.60
POR041		POR041	37.4	-80.2	27.9	45.4	40.4	40.4				4.50	r	577598.10	4851993.50	405.50
POR042 vacant lot		POR042	37.6	-80.2	28.4	45.4	40.4	40.4				4.50	r	577535.09	4852043.90	404.68
POR043		POR043	38.1	-80.2	27.9	45.4	40.4	40.4				4.50	r	577509.31	4852263.73	401.14
POR044	+	POR044	34.7	-80.2	23.3	45.4	40.4	40.4				4.50	r	577053.54	4852052.54	401.61
POR045 vacant lot		POR045	40.5	-80.2	30.3	50.4	40.4	40.4				4.50	r	576959.56	4852649.93	408.50
POR046		POR046	37.1	-80.2	25.5	45.4	40.4	40.4				4.50	r	576773.35	4853007.72	411.25
POR047		POR047	37.5	-80.2	25.6	45.4	40.4	40.4				4.50	r	576872.06	4852906.21	409.39
RPOR001		RPOR001	35.9	-80.2	24.0	45.4	40.4	40.4				1.50	r	576831.64	4852931.91	406.89
RPOR002		RPOR002	37.9	-80.2	27.5	45.4	40.4	40.4				4.50	r	576448.60	4853365.12	420.57
RPOR003A		RPOR003A	40.4	-80.2	25.8	45.4	40.4	40.4				4.50	r	577239.16	4854357.68	417.67
RPOR003B		RPOR003B	40.7	-80.2	25.9	45.4	40.4	40.4				4.50	r	577328.99	4854384.74	419.50
RPOR004		RPOR004	47.1	-80.2	35.0	50.4	45.4	45.4				4.50	r	577863.82	4853862.12	414.78
RPOR005		RPOR005	45.2	-80.2	34.8	50.4	45.4	45.4				4.50	r	578092.20	4853658.36	414.42
RPOR006		RPOR006	38.5	-80.2	25.8	50.4	45.4	45.4				4.50	r	578177.36	4853983.41	410.36
RPOR007 vacant lot		RPOR007	40.9	-80.2	31.3	45.4	40.4	40.4				4.50	r	578282.33	4853398.55	409.95
RPOR008		RPOR008	35.3	-80.2	24.2	45.4	40.4	40.4				4.50	r	578429.91	4853253.77	407.50
RPOR009		RPOR009	34.5	-80.2	25.6	45.4	40.4	40.4				4.50	r	578471.95	4852697.83	403.89
RPOR010		RPOR010	37.8	-80.2	28.7	45.4	40.4	40.4				4.50	r	577733.23	4852047.06	405.60
RPOR011		RPOR011	38.1	-80.2	27.9	45.4	40.4	40.4				4.50	r	577509.31	4852263.73	401.14
RPOR012 vacant lot		RPOR012	40.5	-80.2	30.3	50.4	40.4	40.4				4.50	r	576959.56	4852649.93	408.50
RPOR013		RPOR013	37.1	-80.2	25.5	45.4	40.4	40.4				4.50	r	576773.35	4853007.72	411.25
RPOR014		RPOR014	37.5	-80.2	25.6	45.4	40.4	40.4				4.50	r	576872.06	4852906.21	409.39

Receiver
Name: POR001
ID: POR001
X: 576831.64 m
Y: 4852931.91 m
Z: 406.89 m

Point Source, ISO 9613, Name: "Loader 2 production CAT980 (or equivalent) ", ID: "!E02!PS002"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1	577318.24	4853257.13	398.71	0	D	A	107.1	0.0	-3.0	0.0	0.0	66.3	2.5	1.0	0.0	0.0	22.2	0.0	0.0	12.0

Point Source, ISO 9613, Name: "Loader 1 production CAT980 (or equivalent) ", ID: "!E02!PS002"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
3	577316.17	4853277.00	398.95	0	D	A	107.1	0.0	-3.0	0.0	0.0	66.5	2.5	0.7	0.0	0.0	21.6	0.0	0.0	12.7

Point Source, ISO 9613, Name: "Loader 3 production CAT980 (or equivalent) ", ID: "!E02!PS002"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
25	577334.55	4853256.37	398.69	0	D	A	107.1	0.0	-3.0	0.0	0.0	66.5	2.5	0.9	0.0	0.0	20.2	0.0	0.0	14.0

Point Source, ISO 9613, Name: "Loader 4 production CAT980 (or equivalent) ", ID: "!E02!PS002"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
55	577342.77	4853258.30	398.71	0	D	A	107.1	0.0	-3.0	0.0	0.0	66.7	2.6	0.7	0.0	0.0	18.9	0.0	0.0	15.2
57	577342.77	4853258.30	398.71	1	D	A	107.1	0.0	-3.0	0.0	0.0	66.9	2.6	0.5	0.0	0.0	14.3	0.0	8.0	11.7

Line Source, ISO 9613, Name: "Offsite tuck", ID: "!E02!LS002"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
345	577521.16	4853097.64	398.48	0	D	A	78.7	16.1	0.0	0.0	0.0	68.0	2.4	2.2	0.0	0.0	11.3	0.0	0.0	10.9

Point Source, ISO 9613, Name: "Washplant 1 ", ID: "!E02!PS011"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
283	577329.26	4853249.15	400.85	0	D	A	106.4	0.0	0.0	0.0	0.0	66.4	3.8	0.8	0.0	0.0	20.9	0.0	0.0	14.4

Point Source, ISO 9613, Name: "Washplant 2", ID: "!E02!PS012"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
295	577335.58	4853249.48	400.85	0	D	A	106.4	0.0	0.0	0.0	0.0	66.5	3.8	0.8	0.0	0.0	15.9	0.0	0.0	19.4

vert. Area Source, ISO 9613, Name: "Primary crusher 1", ID: "!E02!PP_PC01"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
610	577323.95	4853282.49	399.77	0	D	A	96.6	4.7	0.0	3.0	0.0	66.6	2.3	1.9	0.0	0.0	19.5	0.0	0.0	13.9
680	577323.95	4853282.49	400.77	0	D	A	96.6	4.7	0.0	3.0	0.0	66.6	2.3	2.1	0.0	0.0	18.0	0.0	0.0	15.3
727	577323.95	4853281.60	400.76	1	D	A	96.6	0.8	0.0	3.0	0.0	67.3	2.5	1.7	0.0	0.0	10.1	0.0	8.4	10.3

vert. Area Source, ISO 9613, Name: "Primary crusher 1", ID: "!E02!PP_PC01"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
796	577321.94	4853282.49	399.77	0	D	A	96.6	4.7	0.0	3.0	0.0	66.6	2.3	2.0	0.0	0.0	17.2	0.0	0.0	16.3
887	577321.94	4853282.49	400.77	0	D	A	96.6	4.7	0.0	3.0	0.0	66.6	2.3	2.1	0.0	0.0	16.2	0.0	0.0	17.1
3252	577321.94	4853282.49	399.07	0	D	A	96.6	0.7	0.0	3.0	0.0	66.6	2.3	1.7	0.0	0.0	17.9	0.0	0.0	11.8

vert. Area Source, ISO 9613, Name: "Primary crusher 2", ID: "!E02!PP_PC02"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1003	577332.00	4853282.84	399.77	0	D	A	96.6	4.7	0.0	3.0	0.0	66.7	2.4	1.9	0.0	0.0	19.2	0.0	0.0	14.2
1119	577332.00	4853282.84	400.77	0	D	A	96.6	4.7	0.0	3.0	0.0	66.7	2.4	2.1	0.0	0.0	17.2	0.0	0.0	16.0

vert. Area Source, ISO 9613, Name: "Primary crusher 2", ID: "!E02!PP_PC02"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1200	577329.99	4853282.84	400.77	0	D	A	96.6	4.7	0.0	3.0	0.0	66.7	2.4	2.1	0.0	0.0	14.5	0.0	0.0	18.6
1247	577329.99	4853282.84	399.77	0	D	A	96.6	4.7	0.0	3.0	0.0	66.7	2.4	1.9	0.0	0.0	15.6	0.0	0.0	17.8
3392	577329.99	4853282.84	399.07	0	D	A	96.6	0.7	0.0	3.0	0.0	66.7	2.4	1.6	0.0	0.0	16.3	0.0	0.0	13.3

Point Source, ISO 9613, Name: "Truck unloading ", ID: "!E02!TU"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1379	577326.64	4853287.45	406.58	0	D	A	114.0	0.0	-10.0	0.0	0.0	66.7	2.3	2.3	0.0	0.0	9.1	0.0	0.0	23.6
1393	577326.64	4853287.45	406.58	1	D	A	114.0	0.0	-10.0	0.0	0.0	67.3	2.4	2.2	0.0	0.0	5.3	0.0	8.1	18.7

vert. Area Source, ISO 9613, Name: "Primary crusher 1", ID: "!E02!PP_PC01"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1662	577322.95	4853280.94	400.75	0	D	A	96.6	2.8	0.0	3.0	0.0	66.6	2.3	2.1	0.0	0.0	16.0	0.0	0.0	15.3
1711	577322.95	4853280.94	400.75	1	D	A	96.6	2.8	0.0	3.0	0.0	67.3	2.5	1.7	0.0	0.0	10.1	0.0	8.4	12.3
1737	577322.95	4853280.94	399.75	0	D	A	96.6	2.8	0.0	3.0	0.0	66.6	2.3	2.0	0.0	0.0	16.9	0.0	0.0	14.5
2134	577322.95	4853280.94	399.05	0	D	A	96.6	-1.2	0.0	3.0	0.0	66.6	2.3	1.7	0.0	0.0	17.7	0.0	0.0	10.0

vert. Area Source, ISO 9613, Name: "Primary crusher 1", ID: "!E02!PP_PC01"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1855	577323.31	4853284.03	400.79	0	D	A	96.6	0.6	0.0	3.0	0.0	66.6	2.3	2.1	0.0	0.0	18.0	0.0	0.0	11.1

vert. Area Source, ISO 9613, Name: "Primary crusher 2", ID: "!E02!PP_PC02"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1897	577330.99	4853281.29	399.75	0	D	A	96.6	2.8	0.0	3.0	0.0	66.7	2.4	1.9	0.0	0.0	15.4	0.0	0.0	16.0
1978	577330.99	4853281.29	400.75	0	D	A	96.6	2.8	0.0	3.0	0.0	66.7	2.4	2.1	0.0	0.0	14.4	0.0	0.0	16.8
2270	577330.99	4853281.29	399.05	0	D	A	96.6	-1.2	0.0	3.0	0.0	66.7	2.4	1.6	0.0	0.0	16.2	0.0	0.0	11.5

vert. Area Source, ISO 9613, Name: "Primary crusher 2", ID: "!E02!PP_PC02"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2049	577331.02	4853284.38	399.79	0	D	A	96.6	2.6	0.0	3.0	0.0	66.7	2.4	1.9	0.0	0.0	19.1	0.0	0.0	12.1
2121	577331.02	4853284.38	400.79	0	D	A	96.6	2.6	0.0	3.0	0.0	66.7	2.4	2.1	0.0	0.0	17.2	0.0	0.0	13.8

Point Source, ISO 9613, Name: "Loader extraction 1 L350H ", ID: "!P01!PS009"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2448	577492.97	4853911.14	399.70	0	D	A	110.0	0.0	-3.0	0.0	0.0	72.4	2.8	2.0	0.0	0.0	6.2	0.0	0.0	23.6

Area Source, ISO 9613, Name: "Primary crusher 1 ", ID: "!E02!PP_PC"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2502	577322.46	4853282.26	401.33	0	D	A	96.6	2.7	0.0	0.0	0.0	66.6	2.3	2.2	0.0	0.0	15.5	0.0	0.0	12.7
2712	577323.46	4853282.67	401.33	0	D	A	96.6	2.8	0.0	0.0	0.0	66.6	2.3	2.2	0.0	0.0	15.3	0.0	0.0	13.0

Point Source, ISO 9613, Name: "Loader extraction 2 L350H", ID: "!P01!PS000"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2820	577509.67	4853929.54	398.88	0	D	A	110.0	0.0	-3.0	0.0	0.0	72.6	2.8	2.0	0.0	0.0	5.8	0.0	0.0	23.8

Area Source, ISO 9613, Name: "Primary crusher 2", ID: "!E02!PP_PC"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2862	577330.69	4853282.34	401.34	0	D	A	96.6	4.4	0.0	0.0	0.0	66.7	2.4	2.2	0.0	0.0	13.8	0.0	0.0	16.0
2991	577331.31	4853283.33	401.34	0	D	A	96.6	4.4	0.0	0.0	0.0	66.7	2.4	2.1	0.0	0.0	13.7	0.0	0.0	16.1

vert. Area Source, ISO 9613, Name: "Secondary crusher 3", ID: "!E02!PP_SC3"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
5313	577338.63	4853268.73	401.59	0	D	A	90.7	4.3	0.0	3.0	0.0	66.7	2.9	1.2	0.0	0.0	16.4	0.0	0.0	10.8

Line Source, ISO 9613, Name: "Haul truck Volvo ", ID: "!P01!LS001"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
27818	577508.53	4853550.90	401.68	0	D	A	77.3	12.2	0.0	0.0	0.0	70.2	3.3	1.9	0.0	0.0	3.3	0.0	0.0	10.8
27834	577507.36	4853588.03	401.83	0	D	A	77.3	17.6	0.0	0.0	0.0	70.5	3.4	1.8	0.0	0.0	3.2	0.0	0.0	16.0
29047	577492.92	4853429.88	399.89	0	D	A	77.3	13.4	0.0	0.0	0.0	69.4	3.1	2.0	0.0	0.0	4.8	0.0	0.0	11.5
29063	577500.78	4853455.17	400.57	0	D	A	77.3	14.9	0.0	0.0	0.0	69.6	3.2	1.9	0.0	0.0	4.2	0.0	0.0	13.4
29724	577514.57	4853442.07	400.65	0	D	A	77.3	13.6	0.0	0.0	0.0	69.6	3.2	1.9	0.0	0.0	4.2	0.0	0.0	12.0
30783	577527.85	4853543.54	401.62	0	D	A	77.3	13.6	0.0	0.0	0.0	70.3	3.4	1.9	0.0	0.0	3.2	0.0	0.0	12.2
30802	577528.90	4853523.83	401.53	0	D	A	77.3	12.2	0.0	0.0	0.0	70.2	3.3	1.9	0.0	0.0	3.2	0.0	0.0	10.9
31200	577522.06	4853652.05	402.08	0	D	A	77.3	14.1	0.0	0.0	0.0	71.0	3.5	1.8	0.0	0.0	3.0	0.0	0.0	12.1
31296	577509.28	4853527.23	401.58	0	D	A	77.3	13.5	0.0	0.0	0.0	70.1	3.3	1.9	0.0	0.0	3.3	0.0	0.0	12.3
31348	577519.89	4853692.82	402.25	0	D	A	77.3	15.6	0.0	0.0	0.0	71.2	3.6	1.9	0.0	0.0	2.9	0.0	0.0	13.3
31366	577503.19	4853719.79	402.39	0	D	A	77.3	14.8	0.0	0.0	0.0	71.3	3.6	2.3	0.0	0.0	2.8	0.0	0.0	12.2
31395	577504.44	4853680.41	402.22	0	D	A	77.3	14.3	0.0	0.0	0.0	71.1	3.5	1.8	0.0	0.0	3.0	0.0	0.0	12.3
31619	577530.17	4853500.05	401.35	0	D	A	77.3	13.0	0.0	0.0	0.0	70.1	3.3	1.9	0.0	0.0	3.3	0.0	0.0	11.8
31770	577525.34	4853590.52	401.81	0	D	A	77.3	14.4	0.0	0.0	0.0	70.6	3.4	1.8	0.0	0.0	3.1	0.0	0.0	12.7
31816	577510.11	4853501.01	401.43	0	D	A	77.3	11.5	0.0	0.0	0.0	69.9	3.3	1.9	0.0	0.0	3.4	0.0	0.0	10.4
31836	577505.78	4853638.02	402.04	0	D	A	77.3	13.0	0.0	0.0	0.0	70.8	3.5	1.8	0.0	0.0	3.1	0.0	0.0	11.1
31873	577523.98	4853616.06	401.92	0	D	A	77.3	13.7	0.0	0.0	0.0	70.8	3.5	1.8	0.0	0.0	3.1	0.0	0.0	11.9
32179	577517.55	4853736.58	402.44	0	D	A	77.3	12.9	0.0	0.0	0.0	71.5	3.6	2.4	0.0	0.0	2.7	0.0	0.0	10.0

APPENDIX F

Curriculum Vitaes

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 – PROJECT WITH PORTS

Cement Plant
Picton, Ontario, Canada

Responsible for preparing and overseeing a noise study of a cement manufacturing plant in Picton, Ontario that included a port facility. Golder was responsible for source-specific noise measurements and short-term noise monitoring. The assessment included the quantification of noise emissions associated with a port. The assessment required the development of a multi-year, multi-phase, Noise Abatement Action Plan for the facility to be able to achieve MECP noise 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.

Noise Study - Peru
Melchorta, 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.

Ontario Trap Rock
Sault Ste. Marie, Canada

Noise task manager responsible for completing a noise assessment for an active quarry, which involved baseline monitoring, site specific noise measurements, and modelling in order to assess compliance with applicable noise limits. The assessment include the consideration of noise emissions associated with a port facility. Conceptual noise mitigation was provided and designed to ensure compliance.

Noise Impact Assessment
Manitoulin, 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 MNRF.

Algoma Steel
Sault Ste. Marie, Ontario

Retained to perform a facility wide noise survey for Algoma Steel as required for their ECA application. Long-term noise monitoring was used to establish the appropriate ambient noise levels for the surrounding residential receptors. The assessment included the quantification of noise emissions associated with a port.

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 Nosie 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 - 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.
Ontario Trap Rock Sault Ste. Marie, Canada	Noise task manager responsible for completing a noise assessment for an active quarry, which involved baseline monitoring, site specific noise measurements, and modelling in order to assess compliance with applicable noise limits. The assessment include the consideration of noise emissions associated with a port facility. Conceptual noise mitigation was provided and designed to ensure compliance.
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 pits, quarries, asphalt and ready-mix facilities across Ontario for many clients including; Lafarge, CBM, Walker, Karson, Tomlinson, and Vicdom. Projects involved site specific noise measurements and modelling in order to assess compliance with MECP Guidelines. Where required, noise mitigation was provided and designed to ensure compliance

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.

Lehigh
Picton, Ontario

Responsible for preparing and overseeing a noise study of a cement manufacturing plant in Picton, Ontario that included a port facility. Golder was responsible for source-specific noise measurements and short-term noise monitoring. The assessment included the quantification of noise emissions associated with a port. The assessment required the development of a multi-year, multi-phase, Noise Abatement Action Plan for the facility to be able to achieve MECP 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 Varios, 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 groved 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.

LPAT
Kawartha Lakes, Ontario

Was retained by an aggregate producer to support at an LPAT proceeding involving a proposed aggregate pit in Kawartha Lakes. Golder completed the noise assessment for the project which included the development of noise controls.

LPAT
Ottawa, Ontario

Was retained by a producer to support at an LPAT proceeding involving a proposed Ready-Mix plant pit in Ottawa. Golder completed the noise assessment for the project which included the development of noise controls.

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

Tomasz Nowak M.Sc., M.Eng.

Acoustics, Noise and Vibration Specialist

Education

Master of Science Mechanical Engineering, AGH University of Science and Technology, Krakow, Poland, 2001

Master of Engineering Materials Engineering, McGill University, 2007

Certifications

PROFESSIONAL SUMMARY

Tomasz is an acoustics scientist with a background in mechanical engineering, acoustics and noise control. His technical background allows him to successfully solve noise-related issues by understanding the nature of the technological processes, operational parameters and design characteristics of the mechanical equipment used in various industrial installations.
Recent experience includes working on noise impact assessments for mining, energy and oil and gas developments. His responsibilities include identification of the noise sources, calculation of noise emissions, development of acoustical models, proposing noise mitigation solutions and reporting the results.

EMPLOYMENT HISTORY

Golder Associates Ltd. – Calgary, Edmonton, Montreal, Canada

Acoustic Scientist (2012 to Present)

Involved in preparation of noise impact assessments for the energy and resources sector. Responsible for calculation of noise emissions from industrial facilities and development of computer acoustical models. Developing of suitable noise mitigation and control measures. Conducting field noise measurement.

Independent contractor – Montreal, Canada

Service engineer (2009 to 2010)

Performed inspections and maintenance on LNG cargo control system, assisting in testing and calibration of the control system components including temperature, level and pressure sensors.

McGill University – Montreal, Canada

Graduate Student (2004 to 2007)

Development and testing of a system to protect building ventilation systems against toxic airborne substances. Responsible for conducting research regarding monitoring and removal of hazardous substances from airstream.

RELEVANT EXPERIENCE

Confidential Client

Nunavut

Performing blasting induced vibrations in support of research project at a gold mine. Data analysis and reporting.

Confidential Client

Quebec

Conducting noise impact assessment of a quarry operations in support of regulatory permitting process. Noise modelling and reporting.

Confidential Client
Ghana

Performing field baseline noise measurements in support of regulatory permitting process for a gold mine. Data analysis and reporting.

DeBeers – Victor Mine
Ontario

Performing field baseline noise measurements in support of regulatory permitting process for a diamond mine. Data analysis and reporting.

Suncor McKay River, Firebag
Alberta

Performing in-plant noise measurements to update and develop computer model of processing facilities. Data analysis and reporting.

Suncor McKay River, Firebag
Alberta

Performing in-plant noise measurements to update and develop computer model of processing facilities. Data analysis and reporting.

Confidential Client
Nunavut

Performing field baseline noise measurements in support of regulatory permitting process for a gold mine. Data analysis and reporting.

Confidential Client
Northwest Territories

Performing field baseline noise measurements in support of regulatory permitting process for a diamond mine. Data analysis and reporting.

Suncor Fort Hills
Alberta

Development of detailed indoor noise models for facility processing buildings. Performing model calculation and presenting the results.

BluEarth Bull Creek Wind Energy Project
Alberta

Performing field noise measurements of the third-party facilities located in the project area. Data analysis and reporting.

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