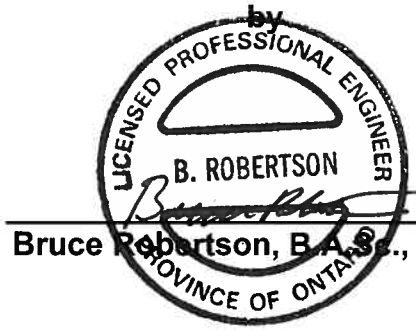
# AN ASSESSMENT OF THE POTENTIAL NOISE ASSOCIATED WITH AGGREGATE EXTRACTION & PROCESSING AT THE PROPOSED CODRINGTON PIT

## PART LOTS 32-34, CONCESSION 6 MUNICIPALITY OF BRIGHTON, COUNTY OF NORTHUMBERLAND

**A Study Prepared for CBM Aggregates (St. Marys Cement Inc.)**

by

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**File 05259**

**May 14, 2009**

## SUMMARY

CBM Aggregates has submitted an application for a Class A, Category 3 license under the Aggregate Resources Act for +/- 105 hectares on Part of Lots 32-34, Concession 6, in the Municipality of Brighton (geographic township of Brighton), County of Northumberland. Noise control has been one of the basic parameters in planning the operations in the proposed Codrington Pit. Aercoustics Engineering Limited was asked to advise upon the measures that should be incorporated into the site and operating plans to ensure that the noise associated with the pit will be in compliance with the Ministry of Environment guidelines.

The Codrington Pit is located on the north side of Ferguson Hill Road, 400 metres north of Old Wooler Road and approximately 1 kilometre east of Highway 30. The site is located on an elevated plateau of essentially flat or gently rolling terrain. The lands in the vicinity of the site are zoned Rural or Agricultural. The ambient acoustical environment at all residences in the surrounding area with the exception of those along Highway 30 is Class 3 (Rural). The residences along Highway 30 have a Class 2 (Urban) ambient acoustical environment as there is significant traffic on this road.

The proposed operations in the pit are outlined on the site plans prepared by MHBC Planning Ltd. Aggregate will be extracted from above the water table using front end loaders and processed using portable crushing, screening and washing equipment. The processing equipment may be fed directly by the extraction loaders, or conveyors or haulage trucks may be used as required to transport the material from the working face to the processing area. Front end loaders will load highway trucks with finished aggregate products for transport to market. The shipping truck traffic will likely enter and exit at the northwest corner of the pit from an access lane off Highway 30 to the west. The proposed hours of operation for the Codrington Pit are 24 hours, weekdays and Saturdays. The extraction operations are restricted to the daytime hours (07:00-19:00). Shipping is restricted to 06:00-19:00.

To ensure compatibility with the existing acoustic environments at the nearest sensitive points of reception, suitable noise limits have been established for the operations in the proposed pit. Noise control measures designed to ensure that the sound levels from the pit will comply with these limits have been incorporated in the site and operating plans. The recommended noise control measures include:

- Restrictions on the numbers and types of extraction and processing equipment, the noise emissions of the equipment, and the areas of operation.
- Berming and local shielding requirements.
- Restrictions on the hours of operation.

Incorporation of the recommended noise control measures will ensure that the proposed Codrington Pit will operate in compliance with the Ministry of Environment noise guidelines.

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## 1. INTRODUCTION

CBM Aggregates has applied for a Class A Category 3 license for +/- 105 hectares on Part of Lots 32-34, Concession 6, in the Municipality of Brighton, County of Northumberland. CBM Aggregates has recognized noise control as one of the basic parameters in designing the proposed operation. Aercoustics Engineering Limited was retained to assist in the design process with responsibility for advising on appropriate noise limits and methodology for compliance.

The existing noise environment was evaluated and the noise criteria for the operations were defined based on the Ministry of Environment guidelines. Operational methods, equipment, site plans and scheduling were considered and modified as necessary to achieve compliance with the noise objectives.

## 2. DESCRIPTION OF THE SITE AND SURROUNDING AREA

Figure 1 shows the proposed Codrington Pit and surrounding area. The site is located along the north side of Ferguson Hill Road, on a plateau to the north of Old Wooler Road. The site consists of flat or gently rolling terrain. The lands surrounding the site are zoned Rural or Agricultural. Representative receptors in the vicinity of the proposed pit are indicated on Figure 1 as R1-R15. Receptor R15 is a residential apartment(s) located above a restaurant. The remaining receptors are detached residences.

## 3. EXISTING NOISE ENVIRONMENT

Receptors R1-R13 have an ambient acoustical environment consistent with the Class 3 (Rural) classification as defined by the MOE Publication NPC-232, *Sound Level Limits for Stationary Sources in Class 3 Areas (Rural)*. In a Class 3 (Rural) area, the prevailing acoustical environment is generally defined by natural sounds and infrequent human activity. The ambient acoustical environment at the residences to the west of the site along County Road 30 as represented by receptors R14 and R15 is Class 2 (Urban) as defined by the MOE Publication NPC-205, *Sound Level Limits for Stationary Sources in Class 1 & 2 Areas (Urban)*. In a Class 2 area, the background sound levels during the daytime (07:00-19:00) are defined by man-made sources and in the evening and nighttime periods, natural sounds are typically dominant. The sound of road traffic will define the background sound levels at these residences.

## 4. CRITERIA FOR ACCEPTABILITY OF NOISE FROM A STATIONARY SOURCE

The relevant guidelines for the acceptability of noise from a stationary source such as the proposed gravel pit are outlined in the MOE Publications NPC-205 and NPC-232. The equivalent sound level ($L_{EQ}$) of a stationary source at a sensitive receptor should

not in any hour exceed the levels specified in Table 1. The $L_{EQ}$, a form of average sound level, is the sound level that contains the same amount of acoustic energy over a specified time period as the prevailing (variable) sound level.

**Table 1**
**Stationary Source Sound Level Limits - Class 2 (Urban) and Class 3 (Rural) Areas**

| Time of Day | Sound Level Limit One Hour $L_{EQ}$ (dBA) | |
|---|---|---|
| | Class 2 | Class 3 |
| 07:00-19:00 (daytime) | 50* | 45 |
| 19:00-07:00 (evening/nighttime) | 45* | 40 |

* or the background sound level, whichever is higher

It can be concluded that at all representative receptors surrounding the Codrington Pit with the exception of R15, the ambient sound levels will typically be low enough that the exclusion limits indicated in the above table will define the maximum allowable noise impacts from the operation. At receptor R15, the typical sound levels from Highway 30 road traffic will be in the range of 52-60 dBA during the time period 06:00-19:00. The traffic data and the traffic noise impact predictions are included as Appendix A.

## 5. OPERATIONS

The site plans outline the phasing of extraction, and the sequence and direction of operations in each phase. In general terms, the types of work consist of site preparation, extraction and processing, shipment off-site, and site rehabilitation.

Site preparation includes the construction of the berms and visual screens specified on the site plan. Topsoil and overburden will be removed and berms constructed as required. This work will be done primarily with bulldozers, scrapers, trucks, loaders and excavators. Rehabilitation phases will involve similar equipment in establishing the final grading for the site.

Aggregate will be extracted from above the water table using 1-3 front end loaders and processed using portable crushing, screening and washing equipment. The loader may feed the plant directly or conveyors or haulage trucks may be used to transport the material from the working face to the processing area. One or two shipping loaders will be used to load highway trucks with finished aggregate products for transport to market.

There will be no extraction below the water table. The maximum annual production for the proposed Codrington Pit is 750,000 Tonnes. The hours of extraction operations will be weekdays 07:00-19:00 and Saturdays 07:00-15:00. The hours of shipping operations will be weekdays 06:00-19:00 and Saturdays 07:00-15:00. Processing operations may occur 24 hours a day, weekdays and Saturdays.

There are several options available for shipping truck access to the site. At this stage, it is anticipated that the site access will be from Highway 30 at a location approximately 600 metres north of Old Wooler Road, opposite Receptor R15. The initial 800 metres of the site access lane will utilize the lane to an existing pit. The remainder of the site access lane will be of new construction, located between the existing pit and the northwest corner of the proposed Codrington Pit. The access lane to the Codrington Pit will lie outside the license boundary.

## 6. RECOMMENDED NOISE CONTROLS/ PREDICTED NOISE LEVELS

### Site Preparation/ Rehabilitation:

During site preparation for the Codrington Pit, equipment working at or near the surface will receive minimal acoustical shielding. A similar scenario may occur during rehabilitation. In order to minimize the noise associated with these activities, it is recommended that:

- All equipment should comply with the MOE guidelines in Publication NPC-115 "Construction Equipment" which define the maximum noise levels which construction equipment may omit.
- Property line berms should be constructed as soon as possible during site preparation so as to provide the surrounding residences with some acoustical shielding of the remaining overburden stripping operations.

By defining a maximum permissible noise emission for construction equipment rather than directly limiting the noise levels at a sensitive point of reception, the MOE is recognizing that construction is a temporary and largely unavoidable source of noise.

### Extraction and Processing:

In order to ensure that the noise levels from the extraction and processing of aggregate will comply with the guidelines set forth by the MOE, noise control measures must be incorporated into the operation. The recommended noise controls, outlined in Appendix B, are incorporated into the site and operating plans. The operation shall be consistent with the site and operating plans in terms of:

- Restrictions on the numbers and types of extraction and processing equipment, the noise emissions of the equipment, and the areas of operation.

- Berming and local shielding requirements.
- Restrictions on the hours of operation.

Any proposed changes to the aspects of the extraction and processing operations dealt with above as relating to noise control should be reviewed by a qualified acoustical consultant for compliance with the relevant noise criteria.

The noise levels of the proposed extraction, processing and shipping operations have been predicted at the representative residences in the surrounding area assuming incorporation of the recommended noise control measures. A summary of the noise prediction methodology and sample predictions are contained in Appendix C. The predicted noise levels are based on the scenarios that are expected to produce maximum noise impact. The majority of the time, the work would be occurring in other areas of the site resulting in lower noise levels. The predicted worst-case noise levels from extraction, processing and shipping operations at representative receptors are listed in the following table and compared to the allowable levels based on MOE guidelines. The predicted noise levels at receptors R14 and R15 include the noise from shipping truck movements on the site access lane. Maximum shipping truck traffic of 20 trucks per hour (40 passbys per hour) has been modeled as the design case.

**Table 2**
**Predicted Worst-Case Pit Noise Levels - One Hour $L_{EQ}$ (dBA)**

| Receptor | 06:00-07:00 Processing and Shipping | | 07:00-19:00 Extraction, Processing, Shipping | | 19:00-06:00 Processing Only | |
|---|---|---|---|---|---|---|
| | Pred. | Allow. | Pred. | Allow. | Pred. | Allow. |
| R1 | 40 | 40 | 45 | 45 | 38 | 40 |
| R2 | 40 | 40 | 45 | 45 | 37 | 40 |
| R6 | 40 | 40 | 45 | 45 | 39 | 40 |
| R8 | 39 | 40 | 45 | 45 | 39 | 40 |
| R9 | 40 | 40 | 45 | 45 | 39 | 40 |
| R10 | 34 | 40 | 44 | 45 | 33 | 40 |
| R11 | 39 | 40 | 40 | 45 | 39 | 40 |
| R12 | 40 | 40 | 41 | 45 | 40 | 40 |
| R13 | 40 | 40 | 41 | 45 | 40 | 40 |
| R14 | 45 | 45 | 45 | 50 | 42 | 45 |
| R15 | 50 | 52* | 50 | 52* | 42 | 45 |

* Conservative estimate of background sound level based on Highway 30 road traffic (see Appendix A)

For all of the representative residences surrounding the site, the predicted worst-case noise levels (one-hour $L_{EQ}$) are in compliance with the MOE limits.

**Shipping:**

The Ministry of Environment does not have guidelines relating to the noise associated with truck traffic on public roads. However, it is recommended that the potential noise from shipping truck traffic should be recognized when selecting external haul routes. The majority of the aggregate from the Codrington Pit will be shipped south along County Road No. 30 to markets along Highway 401. It has been conservatively estimated that the maximum truck traffic associated with the site will be 20 trucks (40 passbys) per hour. The addition of this truck traffic to the typical (average) hour truck traffic based on 2008 counts provided by the County will result in a 4 dB increase in road traffic sound levels along this roadway. A road traffic sound level increase of 3-5 dB is noticeable but it is not considered to represent a significant noise impact. The traffic count information and road traffic noise predictions are included in Appendix A.

## 7. CONCLUSIONS

With the incorporation of the recommended noise control measures, the aggregate extraction, processing and shipping operations in the proposed Codrington Pit will comply with the Ministry of the Environment guidelines for noise from stationary sources.

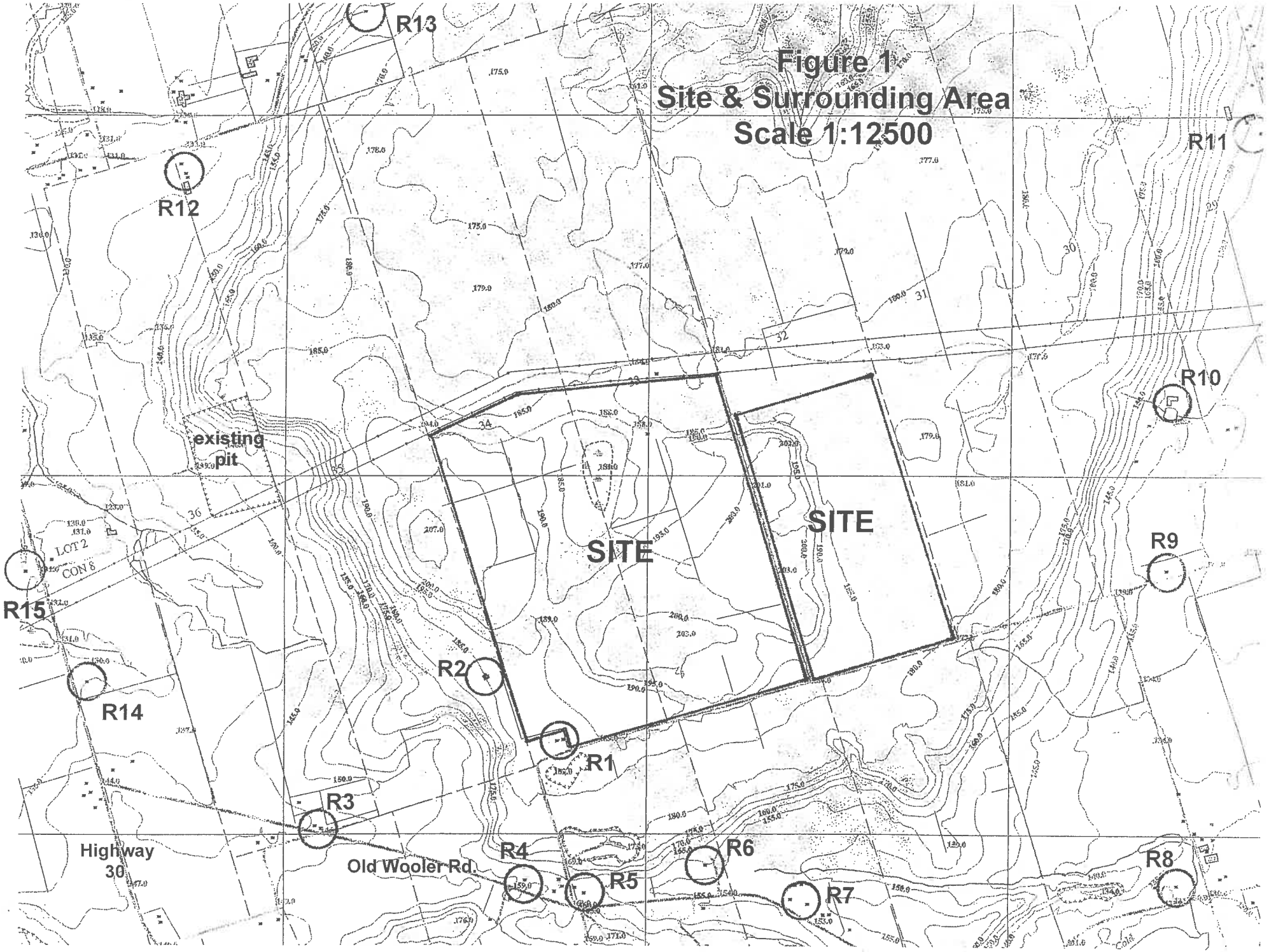


Figure 1
Site & Surrounding Area
Scale 1:12500
R13
R12
R11
R10
R9
R15
R14
R2
R1
R3
R4
R5
R6
R7
R8
existing pit
SITE
SITE
LOT 2
CON 8
Highway 30
Old Wooler Rd

## Appendix A
## County Road No. 30 Traffic Data and Sound Level Predictions

The County indicates that at Station 213002 (County Road No. 30, 7.2 km north of Highway 401), the 2003 AADT (annual average daily traffic) was 4100 vehicles. The County has the following 2008 traffic count data for Station 213002.

| Date | Time | Lane 1 | Date | Time | Lane 1 |
|---|---|---|---|---|---|
| 04/22/08 | 00:00 | 34 | 04/22/08 | 12:00 | 264 |
| 04/22/08 | 01:00 | 18 | 04/22/08 | 13:00 | 234 |
| 04/22/08 | 02:00 | 9 | 04/22/08 | 14:00 | 300 |
| 04/22/08 | 03:00 | 11 | 04/22/08 | 15:00 | 370 |
| 04/22/08 | 04:00 | 36 | 04/22/08 | 16:00 | 354 |
| 04/22/08 | 05:00 | 72 | 04/22/08 | 17:00 | 297 |
| 04/22/08 | 06:00 | 179 | 04/22/08 | 18:00 | 196 |
| 04/22/08 | 07:00 | 354 | 04/22/08 | 19:00 | 112 |
| 04/22/08 | 08:00 | 262 | 04/22/08 | 20:00 | 114 |
| 04/22/08 | 09:00 | 281 | 04/22/08 | 21:00 | 83 |
| 04/22/08 | 10:00 | 279 | 04/22/08 | 22:00 | 64 |
| 04/22/08 | 11:00 | 254 | 04/22/08 | 23:00 | 40 |
| | | | total vehicles | | 4,217 |

Brief counts conducted by Aercoustics Engineering Ltd. for County Rd. No. 30 north of Old Wooler Road on May 9, 2008 yielded the following results:

| Time Period | Cars | Medium Trucks | Heavy Trucks |
|---|---|---|---|
| 11:07 – 11:37 | 114 | 14 | 9 |
| 13:23 – 13:53 | 125 | 9 | 5 |

Traffic data provided by Grant A. Bacchus Limited for County Rd. No. 30 north of Old Wooler Road can be summarized as follows:

| Date/ Time Period | Passenger Vehicles* | Heavy Trucks | Buses |
|---|---|---|---|
| September 21, 2006<br>07:30-12:00 & 12:30-18:00 | 3270 | 213 | 22 |
| June 11, 2007<br>07:30-12:00 & 12:30-18:00 | 2886 | 181 | 14 |

* includes medium trucks

## APPENDIX B - Recommended Noise Control Measures

1. Except where further restrictions apply as outlined below, the extraction and processing equipment operating in the pit shall not exceed 3 extraction loaders, one crushing/screening/washing plant, 2 shipping loaders, and the pit trucks (or highway trucks) or conveyors required to haul the material from the working face to the processing area. The reference sound levels of the equipment shall not exceed those listed in the table below.

| Equipment | Sound Level Limit (dBA) One hour $L_{EQ}$ @ 30 metres |
|---|---|
| loader (each) | 74 |
| loader (quiet) | 69 |
| crushing/screening/wash plant | 87 |
| pit truck (each) | 74 |

2. Extraction operations in the pit shall be restricted to the daytime hours (07:00-19:00). Shipping operations are restricted to the hours 06:00-19:00. Only one shipping loader shall operate prior to 07:00. Aggregate processing may occur 24 hours. Only one loader shall be used to feed material to the processing plant during the evening/nighttime period (19:00-07:00).

3. The property line berming requirements are specified on the noise control figure. The berms along the west and south property lines (Phases 1 & 3) shielding receptors R1 and R2 shall be constructed prior to commencement of extraction and processing operations at the site. The remainder of the berming along the south perimeter of Phases 1 & 3 shall be constructed prior to extraction operations within 200 metres of the south perimeter of the site.

4. The 1st and subsequent lifts shall be of a minimum depth of +/- 8 metres where the depth of the resource makes this possible.

5. The direction of extraction is specified on the figure for those areas where shielding of the extraction equipment by the working face is a noise control requirement. In the areas where the direction of extraction is specified, the loader(s) shall remain within +/- 20 metres of the working face while loading the haul trucks. Where there is not sufficient deposit to meet the minimum 8 m high face requirement, the lifts shall be extracted in close succession such that the total (combined) face height is at least 8 metres.

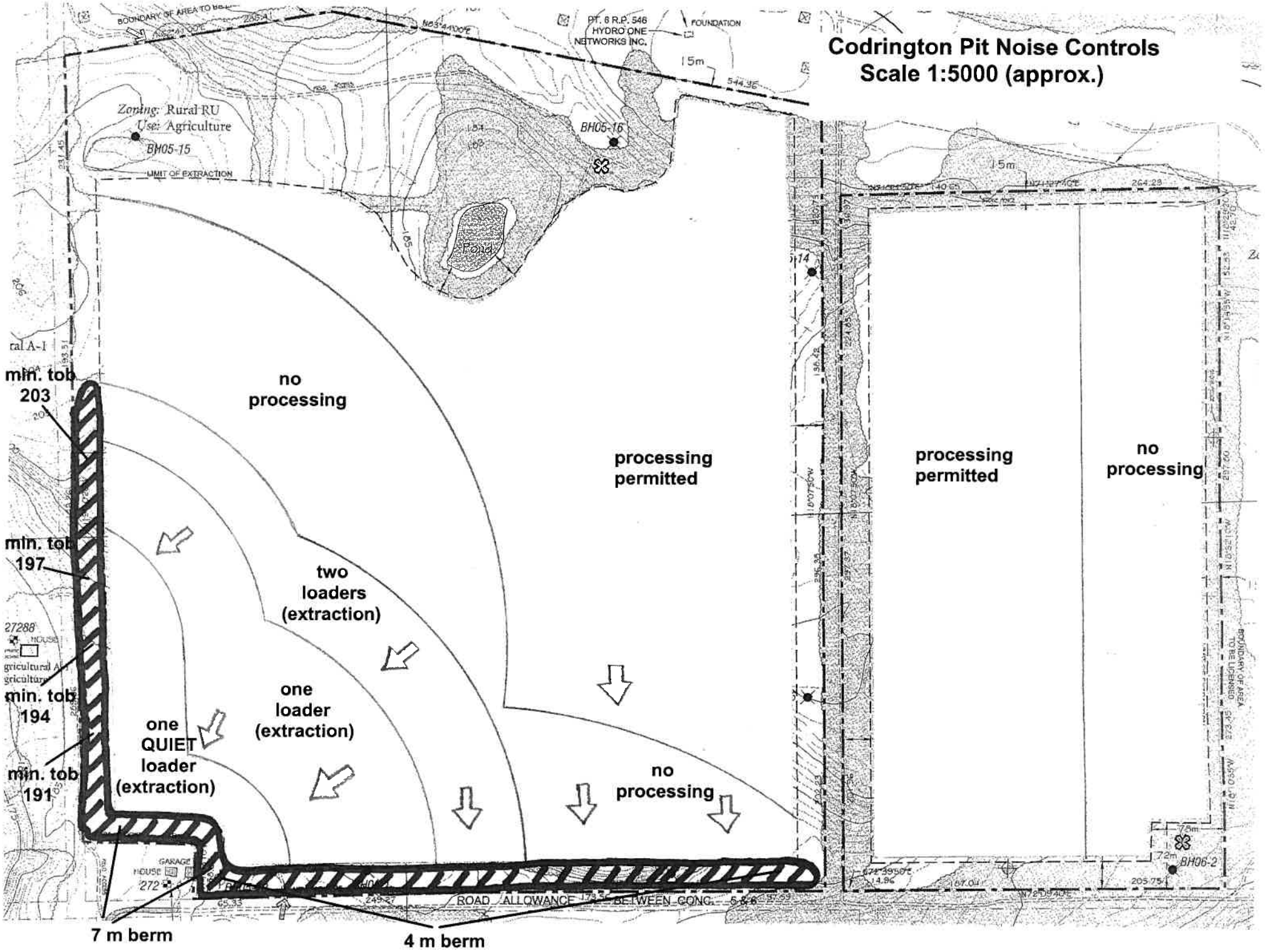
6. Only one or two extraction loaders shall operate in the southwest areas of the site as specified on the figure. The single extraction loader is further restricted to a "quiet" loader in proximity to residences R1 and R2. The material extracted from the area where the quiet loader is required shall be transported to the processing plant using highway trucks rather than pit trucks. When extracting within one of the specified areas where there is a restriction on the number of extraction loaders, there shall be no concurrent extraction elsewhere in Phases 1 or 3. Two shipping loaders are permitted to operate at the stockpiles located in the area of the processing equipment.

7. Operation of the processing equipment (plant) is permitted only in the areas indicated on the figure. The plant must in general be shielded from the surrounding residences with a local barrier. The local plant barrier requirements with respect to each receptor, in terms of the minimum barrier height (relative to the equipment ground elevation) and the maximum distance from the acoustic center of the processing equipment to the top of the barrier, are defined in the following table for both the daytime and nighttime cases. Local barrier requirements vs. setback from the receptor are indicated. The local plant barrier should consist of the working face augmented by a berm as required. The barrier shall be continuous through the arc required to shield the specified residences. Alternative noise control measures may also be employed to effectively mitigate the noise from the processing equipment. If the noise emissions of the processing equipment are reduced through source controls or equipment selection, the local barrier around the processing area could be reduced in height or located a greater distance from the equipment. The local plant barrier is only required for residences R1 and R2 when the plant is operating in Phases 1 & 3. The local plant barrier is only required for residences R9 and R10 when the plant is operating in Phase 2. The plant need not be shielded with a local barrier from the remainder of the residences if the plant is setback greater than 1500 metres from the residence (or 1000 metres for the case of daytime processing only).

| Receptor | Processing Plant Local Shielding Requirements | |
|---|---|---|
| | Daytime Operation | Nighttime Operation |
| R1 | 10 m high @ 30 m<br>(8 m high @ 50 m if SB >500 m) | 12 m high @ 30 m<br>(8 m high @ 50 m if SB >650 m) |
| R2 | 10 m high @ 30 m<br>(8 m high @ 50 m if SB >600 m) | 11 m high @ 30 m<br>(8 m high @ 50 m if SB >700 m) |
| R4-R7 | 9 m high @ 50 m<br>(8 m high @ 50 m if SB >650 m) | 11 m high @ 50 m<br>(8 m high @ 50 m if SB >950 m) |
| R8 | - | 10 m high @ 50 m<br>(8 m high @ 50 m if SB >1200 m) |
| R9-R10 | - | 10 m high @ 50 m<br>(8 m high @ 50 m if SB >800 m) |

8. The sound emissions of all construction equipment involved in site preparation and rehabilitation activities shall comply with the sound level limits specified in MOE publication NPC-115 "Construction Equipment".

9. Any proposed changes to the aspects of the extraction and processing operations dealt with above as relating to noise control shall be reviewed by a qualified acoustical consultant for compliance with the relevant noise criteria.


Codrington Pit Noise Controls
Scale 1:5000 (approx.)
Zoning: Rural RU
Use: Agriculture
BH05-15
BH05-16
BH06-2
LIMIT OF EXTRACTION
PT. 6 R.P. 546
HYDRO ONE NETWORKS INC.
FOUNDATION
15m
Pond
min. tob 203
min. tob 197
min. tob 194
min. tob 191
no processing
processing permitted
two loaders (extraction)
one loader (extraction)
one QUIET loader (extraction)
processing permitted
no processing
no processing
7 m berm
4 m berm
ROAD ALLOWANCE BETWEEN CONC. 5 & 6
GARAGE
HOUSE
BOUNDARY OF AREA TO BE LICENSED

## APPENDIX C
## Noise Prediction Methodology

The relevant noise sources were identified and a one-hour $L_{EQ}$ was defined for each, as outlined in Appendix B. Noise levels for the work cycles were taken as continuous throughout the design hour.

Worst-case scenarios were defined on the basis of maximum noise impact at each of the representative points of reception. Propagation paths were defined in terms of topography, distances and elevations. Noise levels were predicted using the methodology of the International Standard ISO/DIS 9613-2 *Acoustics - Attenuation of Sound During Propagation Outdoors.*

Standard point-source distance attenuation was applied to all pit noise sources. Barrier attenuation was calculated using standard diffraction theory. Single barrier attenuation was limited to 20 dB while double barrier attenuation was limited to 25 dB. Attenuation from air absorption and ground effect was included in the predictions. Noise levels were predicted under conditions of downwind propagation. It is under these conditions that the noise impact will typically be at a maximum.

Predictions of extraction and processing noise impact at the sensitive receptors are included to illustrate the methodology.

Aercoustics Engineering Ltd: POINT SOURCE IMPACT PER ISO 9613-2 PART 2

| Proj. # | Receptor | Period | Date | |
|---|---|---|---|---|
| | R1 | day | 5/28/2008 | 7 m high property line berm (depth of 1st lift minimum 8 metres) |
| Case # | | | | one extr. ldr only @20 m face - extr. towards residence - min. setback (face) 100 m |
| | | Scenario 1 | | processing equipment setback min. 400 m (local barrier 10 m high @ 30 m) |
| | | 1st lift | | pit trucks hauling to proc. area, 2 ship loaders w/ -3 dB corr. for stockpile shielding |

| Freq | **Front3** | **PitTrucks** | **CBMParisPP** | **Front3(2)** | **HwyTruck** | |
|---|---|---|---|---|---|---|
| 63 | 25.7 | 27.1 | 22.0 | 21.3 | 5.9 | 30.7 dBA |
| 125 | 27.4 | 33.0 | 27.3 | 26.0 | 25.3 | 35.8 dBA |
| 250 | 27.7 | 36.3 | 31.5 | 28.9 | 25.7 | 38.7 dBA |
| 500 | 28.0 | 35.0 | 35.3 | 31.2 | 24.3 | 39.4 dBA |
| 1000 | 31.0 | 32.1 | 34.4 | 35.5 | 24.9 | 39.8 dBA |
| 2000 | 29.5 | 27.9 | 28.4 | 30.7 | 20.4 | 35.4 dBA |
| 4000 | 22.5 | 11.6 | 14.2 | 15.1 | -1.7 | 24.1 dBA |
| 8000 | 9.3 | -21.5 | -28.5 | -24.2 | -43.3 | 10.6 dBA |
| | **36.5** | **40.9** | **39.5** | **38.7** | **31.5** | |
| | | | | | **TOTAL SPL @ RECEPTOR** | **45.4** dBA |
| Ref. LEQ (dBA) | 74.3 | 74.0 | 87.0 | 77.3 | 67.3 | **TARGET** 45.0 dBA |
| Ref. Dist. (m) | 30 | 30 | 30 | 30 | 30 | |
| Src Height | 2.5 | 2.5 | 3.5 | 2.5 | 2.5 | |
| Src Elev | 179 | 179 | 192 | 192 | 179 | |
| Rec Height | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | |
| Rec Elev | 188 | 188 | 188 | 188 | 188 | |
| Dist: S to R | 120 | 250 | 400 | 400 | 400 | |
| Barr 1 Ht | 8 | 8 | 10 | 0 | 0 | |
| Base 1 Elev | 179 | 179 | 192 | 192 | 179 | |
| Dist: S to B1 | 20 | 120 | 30 | 30 | 30 | |
| Barr 2 Ht | 7 | 7 | 7 | 7 | 7 | |
| Base 2 Elev | 188 | 188 | 188 | 188 | 188 | |
| Dist: S to B2 | 70 | 200 | 350 | 350 | 350 | |
| G source | 0 | 0 | 0 | 0 | 0 | |
| G receiver | 1 | 1 | 1 | 1 | 1 | |
| G middle | 1 | 1 | 1 | 1 | 1 | |
| Penalty/Adjust. | 0 | 0 | 0 | -3 | 0 | |
| % Downwind | 100 | 100 | 100 | 100 | 100 | |
| Barrier Status | Double | SingleB2 | Double | SingleB2 | SingleB2 | |

Aercoustics Engineering Ltd: POINT SOURCE IMPACT PER ISO 9613-2 PART 2

| Proj. # | Receptor | Period | Date | |
|---|---|---|---|---|
| | R2 | day | 5/28/2008 | 7 m high property line berm (depth of 1st lift minimum 8 metres) |
| Case # | | | | one extraction loader only - minimum setback 100 m (no face shielding) |
| | | Scenario 1 | | processing equipment setback min. 500 m (local barrier 10 m high @ 30 m) |
| | | 1st lift | | pit trucks hauling to proc. area, 2 ship loaders w/ -3 dB corr. for stockpile shielding |

| Freq | Front3 | PitTrucks | CBMParisPP | Front3(2) | HwyTruck | |
|---|---|---|---|---|---|---|
| 63 | 28.9 | 26.6 | 19.4 | 19.1 | 5.9 | 31.5 dBA |
| 125 | 31.8 | 32.3 | 24.6 | 23.6 | 25.3 | 36.1 dBA |
| 250 | 32.7 | 35.3 | 28.7 | 26.1 | 25.7 | 38.3 dBA |
| 500 | 33.3 | 33.8 | 32.4 | 27.9 | 24.4 | 38.6 dBA |
| 1000 | 37.1 | 30.8 | 31.3 | 31.5 | 24.9 | 39.7 dBA |
| 2000 | 36.3 | 26.5 | 25.5 | 25.6 | 20.4 | 37.4 dBA |
| 4000 | 29.8 | 11.6 | 9.0 | 7.3 | -1.6 | 29.9 dBA |
| 8000 | 18.2 | -21.5 | -42.1 | -40.6 | -43.2 | 18.4 dBA |
| | **42.2** | **39.8** | **36.6** | **34.9** | **31.5** | |
| | | | | | **TOTAL SPL @ RECEPTOR** | **45.5** dBA |
| Ref. LEQ (dBA) | 74.3 | 74.0 | 87.0 | 77.3 | 67.3 | **TARGET** 45.0 dBA |
| Ref. Dist. (m) | 30 | 30 | 30 | 30 | 30 | |
| Src Height | 2.5 | 2.5 | 3.5 | 2.5 | 2.5 | |
| Src Elev | 180 | 181 | 192 | 192 | 192 | |
| Rec Height | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | |
| Rec Elev | 185 | 185 | 185 | 185 | 185 | |
| Dist: S to R | 100 | 250 | 500 | 500 | 400 | |
| Barr 1 Ht | 0 | 0 | 10 | 0 | 0 | |
| Base 1 Elev | 180 | 179 | 192 | 192 | 192 | |
| Dist: S to B1 | 20 | 120 | 30 | 30 | 30 | |
| Barr 2 Ht | 7 | 7 | 7 | 7 | 7 | |
| Base 2 Elev | 187 | 187 | 187 | 187 | 187 | |
| Dist: S to B2 | 50 | 200 | 450 | 450 | 350 | |
| G source | 0 | 0 | 0 | 0 | 0 | |
| G receiver | 1 | 1 | 1 | 1 | 1 | |
| G middle | 1 | 1 | 1 | 1 | 1 | |
| Penalty/Adjust. | 0 | 0 | 0 | -3 | 0 | |
| % Downwind | 100 | 100 | 100 | 100 | 100 | |
| Barrier Status | SingleB2 | SingleB2 | Double | SingleB2 | SingleB2 | |

Aercoustics Engineering Ltd: POINT SOURCE IMPACT PER ISO 9613-2 PART 2

| Proj. # | Receptor | Period | Date | |
|---|---|---|---|---|
| | R6 | day | 8/16/2006 | 4 m high property line berm (depth of 1st lift minimum 8 metres) |
| Case # | | | | 3 extraction loaders w/ face shielding - extraction to south to limit |
| | Scenario 1L3b | | | processing equipment setback min. 600 m (local barrier 8 m high @ 50 m) |
| | 1st lift | | | pit trucks hauling to proc. area, 2 ship loaders w/ -3 dB corr. for stockpile shielding |

| Freq | **Front3** | **PitTrucks** | **CBMParisPP** | **Front3(2)** | **HwyTruck** | |
|---|---|---|---|---|---|---|
| 63 | 23.3 | 24.2 | 22.1 | 17.8 | 2.8 | 28.5 dBA |
| 125 | 26.7 | 30.9 | 28.3 | 22.6 | 22.6 | 34.4 dBA |
| 250 | 27.8 | 35.2 | 33.1 | 25.2 | 23.2 | 38.1 dBA |
| 500 | 28.4 | 35.0 | 37.2 | 28.0 | 23.0 | 40.0 dBA |
| 1000 | 31.1 | 33.0 | 36.2 | 32.3 | 24.3 | 39.7 dBA |
| 2000 | 25.5 | 28.4 | 28.2 | 26.8 | 19.8 | 33.6 dBA |
| 4000 | 11.5 | 6.8 | 6.5 | 7.0 | -6.0 | 15.0 dBA |
| 8000 | -27.4 | -49.8 | -55.4 | -48.8 | -63.8 | 4.8 dBA |
| | **35.6** | **40.3** | **41.1** | **35.3** | **29.8** | |
| | | | | | **TOTAL SPL @ RECEPTOR** | **45.0** dBA |
| Ref. LEQ (dBA) | 74.3 | 74.0 | 87.0 | 77.3 | 67.3 | **TARGET** 45.0 dBA |
| Ref. Dist. (m) | 30 | 30 | 30 | 30 | 30 | |
| Src Height | 2.5 | 2.5 | 3.5 | 2.5 | 2.5 | |
| Src Elev | 189 | 189 | 189 | 189 | 189 | |
| Rec Height | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | |
| Rec Elev | 160 | 160 | 160 | 160 | 160 | |
| Dist: S to R | 425 | 500 | 600 | 600 | 600 | |
| Barr 1 Ht | 8 | 0 | 8 | 0 | 0 | |
| Base 1 Elev | 189 | 189 | 189 | 189 | 189 | |
| Dist: S to B1 | 20 | 20 | 50 | 20 | 20 | |
| Barr 2 Ht | 4 | 4 | 4 | 4 | 4 | |
| Base 2 Elev | 190 | 190 | 190 | 190 | 190 | |
| Dist: S to B2 | 25 | 100 | 200 | 200 | 200 | |
| G source | 0 | 0 | 0 | 0 | 0 | |
| G receiver | 1 | 1 | 1 | 1 | 1 | |
| G middle | 1 | 1 | 1 | 1 | 1 | |
| Penalty/Adjust. | 5 | 2 | 0 | -3 | 0 | |
| % Downwind | 100 | 100 | 100 | 100 | 100 | |
| Barrier Status | SingleB1 | SingleB2 | Double | SingleB2 | SingleB2 | |

Aercoustics Engineering Ltd: POINT SOURCE IMPACT PER ISO 9613-2 PART 2

| Proj. # | Receptor | Period | Date | |
|---|---|---|---|---|
| | R8 | day | 8/16/2006 | 3 m high property line berm (depth of 1st lift minimum 8 metres) |
| Case # | | | | 3 extraction loaders in wc location - extraction to east (no face-shielding in wc loc.) |
| | | Scenario 1 | | processing equipment setback min. 1000 m - no local barrier |
| | | 1st lift | | pit trucks hauling to proc. area, 2 ship loaders w/ -3 dB corr. for stockpile shielding |

| Freq | **Front3** | **PitTrucks** | **CBMParisPP** | **Front3(2)** | **HwyTruck** | |
|---|---|---|---|---|---|---|
| 63 | 18.4 | 18.3 | 19.7 | 13.4 | -1.6 | 24.1 dBA |
| 125 | 23.2 | 25.0 | 27.3 | 18.2 | 18.2 | 30.8 dBA |
| 250 | 25.4 | 28.7 | 33.1 | 20.4 | 18.4 | 35.2 dBA |
| 500 | 28.3 | 29.2 | 39.8 | 23.3 | 18.3 | 40.5 dBA |
| 1000 | 32.4 | 27.1 | 40.5 | 27.4 | 19.4 | 41.5 dBA |
| 2000 | 25.0 | 20.5 | 32.6 | 20.0 | 13.0 | 33.8 dBA |
| 4000 | -3.2 | -11.5 | 3.9 | -8.2 | -21.2 | 7.9 dBA |
| 8000 | -91.9 | -109.1 | -90.3 | -96.9 | -111.9 | 4.8 dBA |
| | **35.3** | **34.1** | **44.0** | **30.3** | **24.9** | |
| | | | | | **TOTAL SPL @ RECEPTOR** | **45.1** dBA |
| Ref. LEQ (dBA) | 74.3 | 74.0 | 87.0 | 77.3 | 67.3 | **TARGET** 45.0 dBA |
| Ref. Dist. (m) | 30 | 30 | 30 | 30 | 30 | |
| Src Height | 2.5 | 2.5 | 3.5 | 2.5 | 2.5 | |
| Src Elev | 174 | 174 | 174 | 174 | 174 | |
| Rec Height | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | |
| Rec Elev | 135 | 135 | 135 | 135 | 135 | |
| Dist: S to R | 1000 | 1000 | 1000 | 1000 | 1000 | |
| Barr 1 Ht | 0 | 0 | 0 | 0 | 0 | |
| Base 1 Elev | 174 | 174 | 174 | 174 | 174 | |
| Dist: S to B1 | 20 | 20 | 100 | 50 | 50 | |
| Barr 2 Ht | 3 | 3 | 3 | 3 | 3 | |
| Base 2 Elev | 180 | 180 | 180 | 180 | 180 | |
| Dist: S to B2 | 100 | 100 | 100 | 100 | 100 | |
| G source | 0 | 0 | 0 | 0 | 0 | |
| G receiver | 1 | 1 | 1 | 1 | 1 | |
| G middle | 1 | 1 | 1 | 1 | 1 | |
| Penalty/Adjust. | 5 | 2 | 0 | -3 | 0 | |
| % Downwind | 100 | 100 | 100 | 100 | 100 | |
| Barrier Status | SingleB2 | SingleB2 | SingleB2 | SingleB2 | SingleB2 | |

Aercoustics Engineering Ltd: POINT SOURCE IMPACT PER ISO 9613-2 PART 2

| Proj. # | Receptor | Period | Date | |
|---|---|---|---|---|
| | R9 | day | 5/14/2009 | no property line berm (depth of 1st lift minimum 8 metres) |
| Case # | | | | extraction to south or east - 3 extraction ldrs - no face shielding |
| | | Scenario 1 | | processing equipment setback min. 750 m (1 dB stockpile shielding) |
| | | 1st lift | | pit trucks hauling to proc. area, 2 ship loaders w/ -3 dB corr. for stockpile shielding |

| Freq | Front3 | PitTrucks | CBMParisPP | Front3(2) | HwyTruck | |
|---|---|---|---|---|---|---|
| 63 | 20.6 | 20.5 | 21.0 | 15.6 | 0.6 | 26.0 dBA |
| 125 | 25.1 | 26.9 | 28.4 | 20.1 | 20.1 | 32.3 dBA |
| 250 | 27.5 | 30.8 | 34.5 | 22.5 | 20.5 | 36.9 dBA |
| 500 | 29.2 | 30.1 | 40.0 | 24.2 | 19.2 | 40.9 dBA |
| 1000 | 32.5 | 27.2 | 40.0 | 27.5 | 19.5 | 41.1 dBA |
| 2000 | 25.1 | 20.6 | 32.2 | 20.1 | 13.1 | 33.5 dBA |
| 4000 | 1.2 | -7.1 | 7.6 | -3.8 | -16.8 | 10.3 dBA |
| 8000 | -67.8 | -85.0 | -67.2 | -72.8 | -87.8 | 4.8 dBA |
| | **35.9** | **35.4** | **44.0** | **30.9** | **26.1** | |
| | | | | | **TOTAL SPL @ RECEPTOR** | **45.4** dBA |
| Ref. LEQ (dBA) | 74.3 | 74.0 | 87.0 | 77.3 | 67.3 | **TARGET** 45.0 dBA |
| Ref. Dist. (m) | 30 | 30 | 30 | 30 | 30 | |
| Src Height | 2.5 | 2.5 | 3.5 | 2.5 | 2.5 | |
| Src Elev | 175 | 175 | 175 | 175 | 175 | |
| Rec Height | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | |
| Rec Elev | 135 | 135 | 135 | 135 | 135 | |
| Dist: S to R | 750 | 750 | 750 | 750 | 750 | |
| Barr 1 Ht | 0 | 0 | 0 | 0 | 0 | |
| Base 1 Elev | 180 | 180 | 180 | 180 | 180 | |
| Dist: S to B1 | 150 | 150 | 150 | 150 | 150 | |
| Barr 2 Ht | 0 | 0 | 0 | 0 | 0 | |
| Base 2 Elev | 175 | 175 | 175 | 175 | 175 | |
| Dist: S to B2 | 300 | 300 | 300 | 300 | 300 | |
| G source | 0 | 0 | 0 | 0 | 0 | |
| G receiver | 1 | 1 | 1 | 1 | 1 | |
| G middle | 1 | 1 | 1 | 1 | 1 | |
| Penalty/Adjust. | 5 | 2 | -1 | -3 | 0 | |
| % Downwind | 100 | 100 | 100 | 100 | 100 | |
| Barrier Status | Double | Double | Double | Double | Double | |

Aercoustics Engineering Ltd: POINT SOURCE IMPACT PER ISO 9613-2 PART 2

| Proj. # | Receptor | Period | Date | |
|---|---|---|---|---|
| | R10 | day | 5/14/2009 | no property line berm (depth of 1st lift minimum 8 metres) |
| Case # | | | | extraction to south or east - 3 extraction ldrs - no face shielding |
| | | Scenario 1 | | processing equipment (no local barrier ) |
| | | 1st lift | | pit trucks hauling to proc. area, 2 ship loaders w/ -3 dB corr. for stockpile shielding |

| Freq | Front3 | PitTrucks | CBMParisPP | Front3(2) | HwyTruck | |
|---|---|---|---|---|---|---|
| 63 | 18.3 | 18.2 | 19.6 | 13.3 | -1.7 | 24.0 dBA |
| 125 | 23.0 | 24.8 | 27.1 | 18.0 | 18.0 | 30.6 dBA |
| 250 | 25.4 | 28.7 | 33.1 | 20.4 | 18.4 | 35.2 dBA |
| 500 | 27.7 | 28.6 | 39.1 | 22.7 | 17.7 | 39.8 dBA |
| 1000 | 31.3 | 26.0 | 39.2 | 26.3 | 18.3 | 40.3 dBA |
| 2000 | 23.3 | 18.8 | 30.5 | 18.3 | 11.3 | 31.8 dBA |
| 4000 | -5.7 | -14.0 | 0.7 | -10.7 | -23.7 | 6.6 dBA |
| 8000 | -95.2 | -112.4 | -94.6 | -100.2 | -115.2 | 4.8 dBA |
| | **34.4** | **33.6** | **43.1** | **29.4** | **24.4** | |
| | | | | | **TOTAL SPL @ RECEPTOR** | **44.2** dBA |
| Ref. LEQ (dBA) | 74.3 | 74.0 | 87.0 | 77.3 | 67.3 | **TARGET** 45.0 dBA |
| Ref. Dist. (m) | 30 | 30 | 30 | 30 | 30 | |
| Src Height | 2.5 | 2.5 | 3.5 | 2.5 | 2.5 | |
| Src Elev | 190 | 190 | 190 | 190 | 190 | |
| Rec Height | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | |
| Rec Elev | 140 | 140 | 140 | 140 | 140 | |
| Dist: S to R | 1000 | 1000 | 1000 | 1000 | 1000 | |
| Barr 1 Ht | 0 | 0 | 0 | 0 | 0 | |
| Base 1 Elev | 180 | 180 | 180 | 180 | 180 | |
| Dist: S to B1 | 250 | 250 | 250 | 250 | 250 | |
| Barr 2 Ht | 0 | 0 | 0 | 0 | 0 | |
| Base 2 Elev | 175 | 175 | 175 | 175 | 175 | |
| Dist: S to B2 | 775 | 775 | 775 | 775 | 775 | |
| G source | 0 | 0 | 0 | 0 | 0 | |
| G receiver | 1 | 1 | 1 | 1 | 1 | |
| G middle | 1 | 1 | 1 | 1 | 1 | |
| Penalty/Adjust. | 5 | 2 | 0 | -3 | 0 | |
| % Downwind | 100 | 100 | 100 | 100 | 100 | |
| Barrier Status | SingleB2 | SingleB2 | SingleB2 | SingleB2 | SingleB2 | |

Aercoustics Engineering Ltd: POINT SOURCE IMPACT PER ISO 9613-2 PART 2

| Proj. # | Receptor | Period | Date | |
|---|---|---|---|---|
| | R11 | day | 5/14/2009 | no property line berm (depth of 1st lift minimum 8 metres) |
| Case # | | | | 3 extraction loaders in worst-case location |
| | | Scenario 1 | | processing equipment setback min. 1400 m - no local barrier |
| | | 1st lift | | pit trucks hauling to proc. area, 2 ship loaders w/ -3 dB corr. for stockpile shielding |

| Freq | Front3 | PitTrucks | CBMParisPP | Front3(2) | HwyTruck | |
|---|---|---|---|---|---|---|
| 63 | 14.3 | 14.2 | 15.6 | 9.3 | -5.7 | 20.1 dBA |
| 125 | 18.9 | 20.7 | 23.0 | 13.9 | 13.9 | 26.5 dBA |
| 250 | 20.7 | 24.0 | 28.4 | 15.7 | 13.7 | 30.5 dBA |
| 500 | 23.4 | 24.3 | 34.7 | 18.4 | 13.4 | 35.5 dBA |
| 1000 | 26.8 | 21.5 | 34.6 | 21.8 | 13.8 | 35.6 dBA |
| 2000 | 16.4 | 11.9 | 23.5 | 11.4 | 4.4 | 24.8 dBA |
| 4000 | -24.8 | -33.1 | -18.5 | -29.8 | -42.8 | 4.8 dBA |
| 8000 | -162.7 | -179.9 | -162.2 | -167.7 | -182.7 | 4.8 dBA |
| | **29.8** | **29.2** | **38.4** | **24.8** | **19.9** | |
| | | | | | **TOTAL SPL @ RECEPTOR** | **39.6** dBA |
| Ref. LEQ (dBA) | 74.3 | 74.0 | 87.0 | 77.3 | 67.3 | **TARGET** 45.0 dBA |
| Ref. Dist. (m) | 30 | 30 | 30 | 30 | 30 | |
| Src Height | 2.5 | 2.5 | 3.5 | 2.5 | 2.5 | |
| Src Elev | 190 | 190 | 190 | 190 | 190 | |
| Rec Height | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | |
| Rec Elev | 135 | 135 | 135 | 135 | 135 | |
| Dist: S to R | 1600 | 1600 | 1600 | 1600 | 1600 | |
| Barr 1 Ht | 0 | 0 | 0 | 0 | 0 | |
| Base 1 Elev | 180 | 180 | 180 | 180 | 180 | |
| Dist: S to B1 | 300 | 300 | 300 | 300 | 300 | |
| Barr 2 Ht | 0 | 0 | 0 | 0 | 0 | |
| Base 2 Elev | 175 | 175 | 175 | 175 | 175 | |
| Dist: S to B2 | 1200 | 1200 | 1200 | 1200 | 1200 | |
| G source | 0 | 0 | 0 | 0 | 0 | |
| G receiver | 1 | 1 | 1 | 1 | 1 | |
| G middle | 1 | 1 | 1 | 1 | 1 | |
| Penalty/Adjust. | 5 | 2 | 0 | -3 | 0 | |
| % Downwind | 100 | 100 | 100 | 100 | 100 | |
| Barrier Status | SingleB2 | SingleB2 | SingleB2 | SingleB2 | SingleB2 | |

Aercoustics Engineering Ltd:

POINT SOURCE IMPACT PER ISO 9613-2 PART 2

| Proj. # | Receptor | Period | Date | |
|---|---|---|---|---|
| | R12 | day | 5/23/2008 | no property line berm (depth of 1st lift minimum 8 metres) - face/topo shielding |
| Case # | | | | 3 extraction loaders - all equipment in worst-case location |
| | | Scenario 1 | | no processing equipment setback restrictions - no local barrier |
| | | 1st lift | | pit trucks hauling to proc. area, 2 ship loaders w/ -3 dB corr. for stockpile shielding |

| Freq | Front3 | PitTrucks | CBMParisPP | Front3(2) | HwyTruck | |
|---|---|---|---|---|---|---|
| 63 | 15.7 | 15.6 | 17.0 | 10.7 | -4.3 | 21.5 dBA |
| 125 | 20.3 | 22.1 | 24.5 | 15.3 | 15.3 | 27.9 dBA |
| 250 | 22.5 | 25.8 | 30.2 | 17.5 | 15.5 | 32.3 dBA |
| 500 | 24.7 | 25.6 | 36.1 | 19.7 | 14.7 | 36.9 dBA |
| 1000 | 27.8 | 22.5 | 35.9 | 22.8 | 14.8 | 36.9 dBA |
| 2000 | 17.9 | 13.4 | 25.5 | 12.9 | 5.9 | 26.7 dBA |
| 4000 | -19.0 | -27.3 | -12.0 | -24.0 | -37.0 | 4.9 dBA |
| 8000 | -137.8 | -155.0 | -136.5 | -142.8 | -157.8 | 4.8 dBA |
| | **31.1** | **30.6** | **39.9** | **26.1** | **21.2** | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | **TOTAL SPL @ RECEPTOR** | **41.0** dBA |
| Ref. LEQ (dBA) | 74.3 | 74.0 | 87.0 | 77.3 | 67.3 | **TARGET** | 45.0 dBA |
| Ref. Dist. (m) | 30 | 30 | 30 | 30 | 30 | | |
| Src Height | 2.5 | 2.5 | 3.5 | 2.5 | 2.5 | | |
| Src Elev | 190 | 190 | 190 | 190 | 190 | | |
| Rec Height | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | | |
| Rec Elev | 135 | 135 | 135 | 135 | 135 | | |
| Dist: S to R | 1350 | 1350 | 1350 | 1350 | 1350 | | |
| Barr 1 Ht | 8 | 8 | 8 | 8 | 8 | | |
| Base 1 Elev | 190 | 190 | 190 | 190 | 190 | | |
| Dist: S to B1 | 200 | 200 | 200 | 200 | 200 | | |
| Barr 2 Ht | 0 | 0 | 0 | 0 | 0 | | |
| Base 2 Elev | 185 | 185 | 185 | 185 | 185 | | |
| Dist: S to B2 | 700 | 700 | 700 | 700 | 700 | | |
| G source | 0 | 0 | 0 | 0 | 0 | | |
| G receiver | 1 | 1 | 1 | 1 | 1 | | |
| G middle | 1 | 1 | 1 | 1 | 1 | | |
| Penalty/Adjust. | 5 | 2 | 0 | -3 | 0 | | |
| % Downwind | 100 | 100 | 100 | 100 | 100 | | |
| Barrier Status | Double | Double | Double | Double | Double | | |

Aercoustics Engineering Ltd: POINT SOURCE IMPACT PER ISO 9613-2 PART 2

| Proj. # | Receptor | Period | Date | |
|---|---|---|---|---|
| | R13 | day | 5/22/2008 | no property line berm (depth of 1st lift minimum 8 metres) - topo shielding only |
| Case # | | | | 3 extraction loaders in worst-case location |
| | | Scenario 1 | | no processing equipment setback restrictions - no local barrier |
| | | 1st lift | | pit trucks hauling to proc. area, 2 ship loaders w/ -3 dB corr. for stockpile shielding |

| Freq | Front3 | PitTrucks | CBMParisPP | Front3(2) | HwyTruck | |
|---|---|---|---|---|---|---|
| 63 | 15.5 | 15.4 | 16.8 | 10.5 | -4.5 | 21.2 dBA |
| 125 | 20.2 | 22.0 | 24.3 | 15.2 | 15.2 | 27.8 dBA |
| 250 | 22.1 | 25.4 | 29.8 | 17.1 | 15.1 | 31.9 dBA |
| 500 | 25.0 | 25.9 | 36.3 | 20.0 | 15.0 | 37.1 dBA |
| 1000 | 28.7 | 23.4 | 36.5 | 23.7 | 15.7 | 37.5 dBA |
| 2000 | 19.5 | 15.0 | 26.6 | 14.5 | 7.5 | 27.9 dBA |
| 4000 | -17.1 | -25.4 | -10.8 | -22.1 | -35.1 | 4.9 dBA |
| 8000 | -138.1 | -155.3 | -137.7 | -143.1 | -158.1 | 4.8 dBA |
| | **31.6** | **30.7** | **40.2** | **26.6** | **21.5** | |
| | | | | | **TOTAL SPL @ RECEPTOR** | **41.3** dBA |
| Ref. LEQ (dBA) | 74.3 | 74.0 | 87.0 | 77.3 | 67.3 | **TARGET** 45.0 dBA |
| Ref. Dist. (m) | 30 | 30 | 30 | 30 | 30 | |
| Src Height | 2.5 | 2.5 | 3.5 | 2.5 | 2.5 | |
| Src Elev | 190 | 190 | 190 | 190 | 190 | |
| Rec Height | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | |
| Rec Elev | 163 | 163 | 163 | 163 | 163 | |
| Dist: S to R | 1400 | 1400 | 1400 | 1400 | 1400 | |
| Barr 1 Ht | 0 | 0 | 0 | 0 | 0 | |
| Base 1 Elev | 180 | 180 | 180 | 180 | 180 | |
| Dist: S to B1 | 400 | 400 | 400 | 400 | 400 | |
| Barr 2 Ht | 0 | 0 | 0 | 0 | 0 | |
| Base 2 Elev | 170 | 170 | 170 | 170 | 170 | |
| Dist: S to B2 | 1300 | 1300 | 1300 | 1300 | 1300 | |
| G source | 0 | 0 | 0 | 0 | 0 | |
| G receiver | 1 | 1 | 1 | 1 | 1 | |
| G middle | 1 | 1 | 1 | 1 | 1 | |
| Penalty/Adjust. | 5 | 2 | 0 | -3 | 0 | |
| % Downwind | 100 | 100 | 100 | 100 | 100 | |
| Barrier Status | SingleB2 | SingleB2 | SingleB2 | SingleB2 | SingleB2 | |

Aercoustics Engineering Ltd: POINT SOURCE IMPACT PER ISO 9613-2 PART 2

| Proj. # | Receptor | Period | Date | |
|---|---|---|---|---|
| | R14 | day | 8/13/2008 | no property line berm (depth of 1st lift minimum 8 metres) - topo shielding only |
| Case # | | | | 3 extraction loaders - all equipment in worst-case location |
| | | Scenario 1 | | processing equipment in NW corner pit - no local barrier |
| | | 1st lift | | pit trucks hauling to proc. area, 2 ship loaders w/ -3 dB corr. for stockpile shielding |

| Freq | **Front3** | **PitTrucks** | **CBMParisPP** | **Front3(2)** | **HwyTruck** | | |
|---|---|---|---|---|---|---|---|
| 63 | 17.0 | 16.9 | 18.3 | 12.0 | -3.0 | | 22.7 dBA |
| 125 | 21.7 | 23.5 | 25.9 | 16.7 | 16.7 | | 29.3 dBA |
| 250 | 23.8 | 27.1 | 31.5 | 18.8 | 16.8 | | 33.6 dBA |
| 500 | 26.7 | 27.6 | 38.1 | 21.7 | 16.7 | | 38.8 dBA |
| 1000 | 30.5 | 25.2 | 38.5 | 25.5 | 17.5 | | 39.5 dBA |
| 2000 | 22.2 | 17.7 | 29.7 | 17.2 | 10.2 | | 30.9 dBA |
| 4000 | -10.0 | -18.3 | -2.9 | -15.0 | -28.0 | | 5.6 dBA |
| 8000 | -113.3 | -130.5 | -111.6 | -118.3 | -133.3 | | 4.8 dBA |
| | **33.4** | **32.4** | **42.2** | **28.4** | **23.2** | | |
| | | | | | | **TOTAL SPL @ RECEPTOR** | **43.3** dBA |
| Ref. LEQ (dBA) | 74.3 | 74.0 | 87.0 | 77.3 | 67.3 | **TARGET** | 50.0 dBA |
| Ref. Dist. (m) | 30 | 30 | 30 | 30 | 30 | | |
| Src Height | 2.5 | 2.5 | 3.5 | 2.5 | 2.5 | | |
| Src Elev | 192 | 192 | 192 | 192 | 192 | | |
| Rec Height | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | | |
| Rec Elev | 135 | 135 | 135 | 135 | 135 | | |
| Dist: S to R | 1175 | 1175 | 1175 | 1175 | 1175 | | |
| Barr 1 Ht | 0 | 0 | 0 | 0 | 0 | | |
| Base 1 Elev | 192 | 192 | 192 | 192 | 192 | | |
| Dist: S to B1 | 25 | 25 | 25 | 25 | 25 | | |
| Barr 2 Ht | 0 | 0 | 0 | 0 | 0 | | |
| Base 2 Elev | 200 | 200 | 200 | 200 | 200 | | |
| Dist: S to B2 | 75 | 75 | 75 | 75 | 75 | | |
| G source | 0 | 0 | 0 | 0 | 0 | | |
| G receiver | 1 | 1 | 1 | 1 | 1 | | |
| G middle | 1 | 1 | 1 | 1 | 1 | | |
| Penalty/Adjust. | 5 | 2 | 0 | -3 | 0 | | |
| % Downwind | 100 | 100 | 100 | 100 | 100 | | |
| Barrier Status | SingleB2 | SingleB2 | SingleB2 | SingleB2 | SingleB2 | | |

with 39.5 dBA noise from shipping trucks on access lane = 44.8 dBA

Aercoustics Engineering Ltd: POINT SOURCE IMPACT PER ISO 9613-2 PART 2

| Proj. # | Receptor | Period | Date | |
|---|---|---|---|---|
| | R15 | day | 8/13/2008 | no property line berm (depth of 1st lift minimum 8 metres) - topo shielding only |
| Case # | | | | 3 extraction loaders - all equipment in worst-case location |
| | | Scenario 1 | | processing equipment in NW corner pit - no local barrier |
| | | 1st lift | | pit trucks hauling to proc. area, 2 ship loaders w/ -3 dB corr. for stockpile shielding |

| Freq | **Front3** | **PitTrucks** | **CBMParisPP** | **Front3(2)** | **HwyTruck** | | |
|---|---|---|---|---|---|---|---|
| 63 | 17.0 | 16.9 | 18.3 | 12.0 | -3.0 | | 22.7 dBA |
| 125 | 21.7 | 23.5 | 25.9 | 16.7 | 16.7 | | 29.3 dBA |
| 250 | 24.5 | 27.8 | 32.2 | 19.5 | 17.5 | | 34.3 dBA |
| 500 | 26.7 | 27.6 | 38.1 | 21.7 | 16.7 | | 38.9 dBA |
| 1000 | 30.5 | 25.2 | 38.6 | 25.5 | 17.5 | | 39.6 dBA |
| 2000 | 22.3 | 17.8 | 29.8 | 17.3 | 10.3 | | 31.0 dBA |
| 4000 | -9.8 | -18.1 | -2.7 | -14.8 | -27.8 | | 5.7 dBA |
| 8000 | -113.0 | -130.2 | -111.4 | -118.0 | -133.0 | | 4.8 dBA |
| | **33.5** | **32.7** | **42.2** | **28.5** | **23.4** | | |
| | | | | | | **TOTAL SPL @ RECEPTOR** | **43.4** dBA |
| Ref. LEQ (dBA) | 74.3 | 74.0 | 87.0 | 77.3 | 67.3 | **TARGET** | 50.0 dBA |
| Ref. Dist. (m) | 30 | 30 | 30 | 30 | 30 | | |
| Src Height | 2.5 | 2.5 | 3.5 | 2.5 | 2.5 | | |
| Src Elev | 192 | 192 | 192 | 192 | 192 | | |
| Rec Height | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | |
| Rec Elev | 135 | 135 | 135 | 135 | 135 | | |
| Dist: S to R | 1175 | 1175 | 1175 | 1175 | 1175 | | |
| Barr 1 Ht | 0 | 0 | 0 | 0 | 0 | | |
| Base 1 Elev | 192 | 192 | 192 | 192 | 192 | | |
| Dist: S to B1 | 25 | 25 | 25 | 25 | 25 | | |
| Barr 2 Ht | 0 | 0 | 0 | 0 | 0 | | |
| Base 2 Elev | 200 | 200 | 200 | 200 | 200 | | |
| Dist: S to B2 | 75 | 75 | 75 | 75 | 75 | | |
| G source | 0 | 0 | 0 | 0 | 0 | | |
| G receiver | 1 | 1 | 1 | 1 | 1 | | |
| G middle | 1 | 1 | 1 | 1 | 1 | | |
| Penalty/Adjust. | 5 | 2 | 0 | -3 | 0 | | |
| % Downwind | 100 | 100 | 100 | 100 | 100 | | |
| Barrier Status | SingleB2 | SingleB2 | SingleB2 | SingleB2 | SingleB2 | | |

with 49.5 dBA noise
from shipping trucks
on access lane = 50.4 dBA

Codrington Pit Truck Traffic noise (site access lane) at residential apartments opposite site entrance -based on worst-case shipping truck traffic of 20 trucks (40 passbys) per hour

STAMSON 5.0 SUMMARY REPORT
MINISTRY OF ENVIRONMENT / NOISE ASSESSMENT

Filename: 05259hrc.te Time Period: 1 hours

Road data, segment # 1: Segment 1
---
Car traffic volume : 0 veh/TimePeriod
Medium truck volume : 0 veh/TimePeriod
Heavy truck volume : 40 veh/TimePeriod
Posted speed limit : 40 km/h
Road gradient : 13 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Segment 1
---
Angle1 Angle2 : 78.00 deg 84.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface: 1 (Absorptive ground surface)
Receiver source distance : 130.00 m
Receiver height : 4.50 m
Topography: 1 (Flat/gentle slope; no barrier)

Road data, segment # 2: Segment 2
---
Car traffic volume : 0 veh/TimePeriod
Medium truck volume : 0 veh/TimePeriod
Heavy truck volume : 40 veh/TimePeriod
Posted speed limit : 40 km/h
Road gradient : 4 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Segment 2
---
Angle1 Angle2 : 65.00 deg 78.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface: 1 (Absorptive ground surface)
Receiver source distance : 130.00 m
Receiver height : 4.50 m
Topography: 1 (Flat/gentle slope; no barrier)

Road data, segment # 3: Segment 3
---
Car traffic volume : 0 veh/TimePeriod
Medium truck volume : 0 veh/TimePeriod
Heavy truck volume : 40 veh/TimePeriod
Posted speed limit : 40 km/h
Road gradient : 5 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 3: Segment 3
---
Angle1 Angle2 : -43.00 deg -14.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface: 1 (Absorptive ground surface)
Receiver source distance : 225.00 m
Receiver height : 4.50 m
Topography: 1 (Flat/gentle slope; no barrier)

Road data, segment # 4: Segment 4
---
Car traffic volume : 0 veh/TimePeriod
Medium truck volume : 0 veh/TimePeriod
Heavy truck volume : 40 veh/TimePeriod
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 4: Segment 4
---
Angle1 Angle2 : -86.00 deg -65.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface: 1 (Absorptive ground surface)
Receiver source distance : 25.00 m
Receiver height : 4.50 m
Topography: 1 (Flat/gentle slope; no barrier)

Result summary
---

| | source height (m) | Road Leq (dBA) | Total Leq (dBA) |
|---|---|---|---|
| 1.Segment 1 | 2.40 | 34.04 | 34.04 |
| 2.Segment 2 | 2.40 | 37.02 | 37.02 |
| 3.Segment 3 | 2.40 | 40.02 | 40.02 |
| 4.Segment 4 | 2.40 | 48.54 | 48.54 |
| Total | | | 49.50 dBA |

TOTAL Leq FROM ALL SOURCES: 49.50

## APPENDIX D
## Qualifications of the Author of this Report

### PROFESSIONAL PROFILE
### BRUCE ROBERTSON, B.A.Sc., P.Eng.

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**EDUCATION**

B.A.Sc. University of Toronto (Engineering Science), 1983

**PROFESSIONAL MEMBERSHIPS**

Professional Engineers of Ontario

**PROFESSIONAL BACKGROUND**

In 1985, Mr. Robertson began his work as an acoustics and vibration consultant. He is recognized as an expert by the Ministry of Environment and has provided expert testimony in the forum of the Ontario Municipal Board Hearings.

In the field of environmental acoustics, Mr. Robertson has completed numerous successful projects involving the assessment and mitigation of noise impacts from stationary sources such as pits and quarries. These projects include noise studies for proposed industrial developments, studies addressing noise concerns for existing operations, and the peer review of similar studies. In the land use planning process, Mr. Robertson has completed many studies to investigate the potential noise impacts from roadways, railways, aircraft traffic and/or industries at proposed residential developments.

In the fields of industrial and architectural noise and vibration, Mr. Robertson has completed projects involving the assessment of noise and vibration from sources such as industrial machinery, sound systems, and railways.

## Partial Listing Of Representative Projects

### Pits and Quarries

Mast-Snyder Pit – CBM Aggregates
Laforme Quarry – Lafarge Canada
Cedar Street Pit - Blue Circle Aggregates
Milton Quarry - Dufferin Aggregates
Acton Quarry - United Aggregates
Sunderland Southwest Pit – Vicdom Sand & Gravel
Law Quarry Expansion – Hard Rock Paving
Barber Pit - AAROC Aggregates
McGuffin Pit – Demar Aggregates
Oliver Pit – Aecon Construction
Niagara Quarry – Hanson Brick
Vinemount Quarry #2 – Waterford Sand & Gravel
Putnam Pit - Thames Valley Aggregates
Greely Quarry – Cornwall Gravel
Caledon Pit – Graham Bros. Construction

### Industries and Other Stationary Sources

TransCanada Pipelines Compressor Stations
Boise Cascade Co-Gen. Plants
H. L. Blatchford Ltd.
Burnt River Off-Road Motorcycle Facility
Metal Koting Colour Coat
Gold Corp Red Lake Mine
Condura Ready Mix
Epcor Kingsbridge 1 Wind Farm
Nemak Aluminum
Queen Elizabeth Power Station
WellSpring Pharmaceutical

### Residential Developments

Briton House Retirement Residence
Penryn Park Estates
Harmony Horizons
Grand Niagara Resort
Meadowvale Village
Georgetown Estates