

November 1, 2017

VIA E-MAIL: stephanie.thibeault@goldcorp.com

Stephanie Thibeault
Senior Environmental Coordinator
Goldcorp Canada Ltd.
4315 Gold Mine Road,
South Porcupine, P0N 1H0

Re: Acoustic Audit of the Goldcorp Canada Ltd., Porcupine Gold Mines Hollinger Pit
4315 Gold Mine Road, South Porcupine, ON

Dear Ms. Thibeault,

HGC Engineering was retained to undertake an Acoustic Audit of the Goldcorp Canada Ltd., Porcupine Gold Mines Hollinger Pit in Timmins, Ontario, following the implementation of Environmental Control Berm (“ECB”). The Audit was required to satisfy an Agreement with the City of Timmins, in accordance with Environmental Compliance Approval (“ECA”) number 9699-8QWSNZ, granted to the facility by the Ontario Ministry of the Environment and Climate Change (“MOECC”) on November 14, 2013. The Acoustic Assessment of the facility was prepared by Valcoustics Canada, issued June 5, 2013, which recommended the ECB in order to reduce the sound levels of the facility.

HGC Engineering visited the facility and surrounding area on September 27th and 28th, 2017, to conduct a site tour and to perform acoustical audit measurements of the pit activities. Sound levels at the most potentially impacted points of reception neighbouring the facility were measured by HGC Engineering during the early morning hours of September 28th, 2017.

The acoustic measurements and analysis indicate that the sound emissions of the facility are within the applicable limits of the MOECC at all of the neighbouring residences. Details of the acoustical measurements, analysis and results are presented in the following sections.

DESCRIPTION OF FACILITY & SURROUNDING AREA

The subject facility is located to the south of Highway 101 (Algonquin Boulevard East), to the east of Railway Street, and to the north of Moneta Avenue, in the City of Timmins, Ontario. Figure 1, appended, shows a scaled satellite photo of the facility and surrounding area.

The Hollinger Pit operations consist of mining gold-bearing ore from an open pit, using in-pit drills for setting the explosive charges, pit excavators, loaders and shovels for loading the haul trucks, as well as dozers and graders for maintaining the pit floor and access routes within the pit, and to aid the backfilling operations. Haul trucks for transporting ore and mine rock travel along a transportation corridor, which runs to the east and south of the Hollinger Pit, to the ore processing

areas (which are separate from the pit operations). The facility can operate at full capacity during all hours of the day, evening and night.

Sound sensitive points of reception exist to the north, east, south and west of the facility. The assessment locations in this Audit Report generally follow those of the AAR, with the exception of one modified location, as described, below.

NOISE CONTROL MEASURES

The ECB is a recently completed earthen berm surrounding the pit, which was specified in the original AAR, to shield the neighbouring points of reception from the pit activities and haul trucks. HGC Engineering personnel toured the facility on the afternoon of September 27th, 2017 to inspect the berm, which was found to meet the specifications provided in the AAR.

POINTS OF RECEPTION

Fourteen key assessment locations were chosen for the purposes of this audit, which are the closest and most exposed to the subject facility, shown as POR1 through POR14 in Figure 1. Thirteen of the fourteen chosen locations were originally identified in the AAR; the original point of reception represented by POR2 was a long-term care facility, purchased by Goldcorp after completion of the AAR, and later demolished, therefore this location now represents a dwelling in the adjacent residential neighbourhood. A brief description of all points of reception is outlined below.

- POR01 – Two-storey residential dwelling located at approximately 50 Vipond Rd.
- POR02 – Two-storey residential dwelling located at Dwyer Ave. & Hollinger Ln.
- POR03 – Nine-storey apartment building located at 585 Algonquin Blvd.
- POR04 – Two-storey residential dwelling located at approximately 216 Laidlaw St.
- POR05 – Two-storey residential dwelling located at approximately 359 Dale Ave.
- POR06 – Single-storey trailer located at approximately 111 Bogey Dr.
- POR07 – Single-storey trailer located at approximately 41 Eagle Cr.
- POR08 – Two-storey residential dwelling located at approximately 800 Gold Mine Rd
- POR09 – Two-storey residential dwelling located at approximately 45 Cook Rd.
- POR10 – Vacant land along Brundy Ave., southeast of Delost St.
- POR11 – Two-storey residential dwelling located at approximately 19 Prospector’s St.
- POR12 – Two-storey residential dwelling located at approximately 6 Quebec Ave.
- POR13 – Two-storey residential dwelling located at approximately 10 Dunn Ave.
- POR14 – Two-storey Comfort Inn, located at 939 Algonquin Blvd.

SOUND LEVEL CRITERIA

The MOECC noise assessment guidelines draw a distinction between sound produced by traffic on municipal roads and that produced by industrial or commercial activities, which are classified as *stationary sources of sound*. Vehicles operating within the bounds of an industrial site are considered part of the stationary source. In general, the acceptability limits for stationary sources are site dependent, and the sound from the stationary sources is evaluated against (i.e. compared to) the typical background sound at any potentially impacted, sound-sensitive points of reception (e.g., residences). Background sound is considered to include road traffic sound and other typical sounds,



but excludes the sound of the facility under assessment.

At all points of reception, background sound included traffic from surrounding roadways, unaffiliated industrial facilities, and natural sounds. The area surrounding the facility is best categorized as a Class 2 acoustical environment under MOECC guidelines.

As stipulated in the ECA, the appropriate document for determining the applicable assessment criteria is MOECC publication NPC-205, “Sound Level Limits for Stationary Sources in Class 1 & 2 Areas (Urban)”. Publication NPC-205 stipulates that the sound level limit for a stationary source which operates during both daytime and nighttime hours in a Class 2 environment is the greater of the minimum one-hour energy-equivalent (L_{EQ}) background sound level, or the exclusionary minimum limits of 50 dBA during daytime hours (07:00 to 19:00), and 45 dBA during evening and nighttime hours (19:00 to 07:00). The MOECC guidelines also stipulate that the noise assessment shall consider a *predictable worst-case hour*, which is defined as an hour when typically busy operation of the stationary sources under consideration could coincide with an hour of low background sound.

At locations POR3 and POR14, the criteria are based on long-term automated monitoring of background conducted in February of 2012 as part of the original AAR, and at all other locations, criteria are the exclusionary limits of 50/45 dBA during daytime and evening/nighttime hours, respectively. The observations conducted by HGC Engineering during the site visits on September 27th and 28th confirmed the dominance of traffic sound at POR 3 and POR14. Accordingly, the previously established limits were adopted for the purposes of this Audit. Table 1, below, lists the applicable sound level criteria established as part of the original AAR.

Table I: Applicable Sound Level Limits, L_{EQ} [dBA]

Location	Daytime (07:00 – 19:00)	Evening & Nighttime (19:00 – 07:00)
POR3	58	51
POR14	53	45
All Other POR's	50	45

MEASUREMENT METHOD & RESULTS

Acoustic Audit measurements were conducted at locations POR1 through POR14, on September 28, 2017. Because the facility operates at full capacity during both day and night, measurements were only conducted during nighttime hours, between 12:30 and 04:30, when the background sound levels were the lowest. The facility was confirmed by Goldcorp personnel to be operating normally at the time.

Location POR3 is the upper storey window of a nine-storey apartment building. Accordingly, a sound level meter was hoisted using a 32-metre boom lift. At all other locations, attended measurements were conducted by HGC Engineering personnel. All measurements were conducted using Norsonic Integrating Sound Level Meters, model N140, each configured to measure L_{EQ} sound levels, one-third octave band sound levels, and record audio in the case of POR3. The measurements

were conducted in accordance with the methods in MOECC procedural guideline NPC-103. Because the upper storey windows of the existing points of reception are the most impacted, as they experience a lesser degree of acoustical shielding than the first storey, the measurements were conducted by elevating the microphones using extension poles. All instrumentation was within its annual laboratory calibration period and correct calibration was field-verified using a Brüel & Kjær model 4231 acoustic calibrator. The meteorological conditions during the measurements were suitable for outdoor acoustical measurements, with cloudy skies and calm to moderate winds.

At location POR11, haul truck activities within the subject property were clearly audible, and represented the overall sound levels of the facility. However, it was noted in post-measurement discussions with Goldcorp that, because the measurement at POR11 was conducted between 04:00 and 04:30 (i.e. when approximately half of the employees go on break) the proportion of haul trucks which occurred was not equal to the proportion that could occur in a predictable worst-case hour. Accordingly, the measured L_{EQ} at POR11 was increased, by logarithmically adding the ratio haul trucks observed during the measurement period with the number of trucks which would have occurred in a worst-case hour of operation.

Table II, below, summarizes the direct, unadjusted L_{EQ} sound levels measured at the fifteen locations.

Table II: Summary of Unadjusted Acoustic Audit Measurements [dBA]

Loc'n	Time	L_{EQ}	Notes
POR1	3:15	43	Rock trucks audible, backup "pulses", pit sources steady, distant traffic
POR2	2:05	48	Distant traffic / chimes / leaf noise dominant, pit steady, paused for local cars
POR3	3:20	57	Unaffiliated industrial facility dominant, local road traffic, mine not audible
POR4	2:50	45	Distant traffic & natural sound dominant, pit audible and steady
POR5	3:40	38	Mine steady and quiet, unaffiliated substation audible
POR6	2:40	42	Pit activities constant, unrelated substation audible, some leaf noise
POR7	2:50	42	Pit activities constant, unrelated substation audible, some leaf noise
POR8	2:05	43	Haul trucks audible, pit audible, distant traffic, paused for local traffic
POR9	2:00	45	Haul trucks audible, some leaf noise and distant traffic
POR10	12:45	40	Haul trucks audible, some distant traffic, leaf noise, unaffiliated substation
POR11	4:10	41	Haul trucks audible, some distant traffic
POR12	1:10	39	Pit operations steady and haul trucks audible, some distant traffic
POR13	1:00	46	Distant traffic & leaf noise dominant, mill rumble occasionally audible
POR14	2:10	45	Pit operations steady, some leaf noise, distant traffic, paused for local traffic

Table III, below, lists the sound levels, " L_{EQ}^* " adjusted appropriately for accurate representation of the subject facility, for comparison with the assessment criteria. Notes are provided regarding the adjustments made to each value.

Table III: Summary of Acoustic Audit Measurements [dBA]

Loc'n	L _{EQ} *	Sound Level Limits	Within Limits?	Note
POR1	43	50 / 45	Yes	1
POR2	44	50 / 45	Yes	2
POR3	57	57 / 51	Yes	3
POR4	45	50 / 45	Yes	4
POR5	36	50 / 45	Yes	4
POR6	42	50 / 45	Yes	4
POR7	42	50 / 45	Yes	4
POR8	43	50 / 45	Yes	1
POR9	45	50 / 45	Yes	1
POR10	40	50 / 45	Yes	1
POR11	44	50 / 45	Yes	5
POR12	39	50 / 45	Yes	1
POR13	40	50 / 45	Yes	2
POR14	45	53 / 45	Yes	1

Notes:

- 1) Unadjusted measured L_{EQ} utilized to represent facility
- 2) Spurious events not attributable to facility removed in post-measurement analysis, as per NPC-103
- 3) Measurements completely dominated by unaffiliated industrial sources; Hollinger Pit not audible
- 4) May be overestimate of the actual sound emissions of Pit due to background sound and unaffiliated sources
- 5) Measured L_{EQ} adjusted to represent 13 additional haul trucks, as during worst-case hour

CONCLUSIONS

The results of the Acoustic Audit measurements indicate that the sound emissions of the Hollinger Pit are within the daytime and evening/nighttime sound level limits as outlined in MOECC guideline NPC-205, at all sound sensitive points of reception.

We trust that this information satisfies your current requirements. If you have any questions or require further assistance, please do not hesitate to call.


Yours Truly,

Howe Gastmeier Chapnik Limited



Andrew Dobson, BSc, INCE

Reviewed by



Robert D Stevens, MASC, PEng

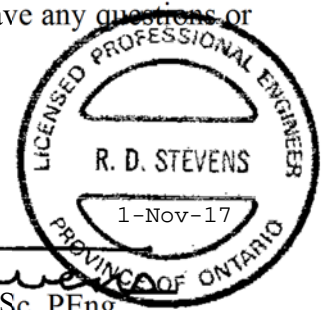




Figure 1: Aerial Image Showing Hollinger Pit and Measurement Positions / Neighbouring Points of Reception