FINAL
REPORT ON

BASELINE NOISE SURVEY FOR THE PROPOSED NICO PROJECT

Submitted to:

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1 INTRODUCTION

Fortune Minerals Limited (Fortune) is proposing to develop the NICO Cobalt-Gold-Bismuth-Copper Project (Project) approximately 160 kilometres (km) northwest of Yellowknife in the Northwest Territories (NWT). This baseline noise study is one component of a comprehensive environmental and socio-economic baseline program to collect information about the natural and socio-economic environment in the vicinity of the Project. It has been prepared in support of a future permit application for the construction, operation, and decommissioning of the Project.

The Project will affect existing noise levels in the Project area; therefore, a baseline noise study was undertaken to define the existing acoustic environment in the Project area prior to development. The Project is considered to be in a remote location where the existing noise will be comprised of the natural sounds of a wilderness area that generally lacks any human activity. Consequently, the approach taken to determine the baseline noise levels was to exclude any exploration camp or related activity from the measurements to reflect the natural environment.

The preliminary baseline noise study outlined in this report focuses on the collection of representative data at four noise monitoring sites located within the Project area. Surveys to collect representative acoustic baseline data at the four monitoring locations within the Project area were conducted from 8 September to 10 September 2008. Data collected throughout the program included sound levels, sound recordings, temperature, wind direction and speed, relative humidity, location, and monitoring site photographs. The surveys were then reviewed along with other available data to establish baseline noise conditions at noise sensitive receptors subsequently identified for the environmental impact assessment

The following provides an overview of the baseline noise report organization:

- Section 1 describes the study objectives, study area, and identifies the noise sensitive receptors and noise monitoring locations;
- Section 2 outlines the methods used for measuring the ambient noise;
- Section 3 presents the ambient noise results;
- Section 4 discusses the baseline noise levels for the noise sensitive receptors and noise monitoring locations; and
- Section 5 summarizes the baseline noise study.

An introduction to the concepts and theories used in noise measurements and assessment is provided in Appendix A to aid the non-technical reader.

1.1 STUDY OBJECTIVE

The objective of the baseline noise study was to evaluate the existing noise levels at selected noise monitoring locations based on methods outlined in the Alberta Energy Resources Conservation Board (ERCB) Directive 038: *Noise Control* (ERCB 2007) and Health Canada guidelines as presented in the Noise Impact Assessment Orientation Document for Projects Triggering CEAA (Health Canada 2005). These documents are the guidance typically cited by Northwest Territory regulators.

1.2 STUDY AREAS

The on-site monitoring locations for the Project were selected to be representative of the entire Project area. The intent was to represent the spatial extent of the site, the various proposed infrastructure locations, and changes in terrain or potential habitat (e.g., rocky terrain versus heavy vegetation) within the limitations presented by site access. Locations were selected a sufficient distance from the camp activity to prevent Project-related influences. Table 1-1 lists the coordinates for the noise monitoring locations selected.

Table 1-1 Noise Monitoring Locations, NICO Project

Receptor Location	Easting[a]	Northing[a]
R1	514055	7046309
R2	513237	7046991
R3	512426	7046316
R4	513475	7045961

[a] Universal Transverse Mercator (UTM) Zone 11 Datum: NAD83.

The assessment and regulation of noise is conducted from a receptor perspective. Noise sensitive receptors according to the ERCB guidance are considered to be any permanent residences or seasonally occupied dwellings used outside the plant or project boundary that may be affected by the Project. In addition, for the NWT locations of local importance may be selected as noise sensitive receptors. The potential noise sensitive receptors were identified by reviewing maps of the area near the Project boundary, learning with locals on traditional land use practices (e.g., Hislop Lake and Marian River) and information from the wildlife disciplines. In the noise assessment, the Project boundary is defined by the facility and mine footprint.

For the assessment of the noise resulting from the Project, 3 noise sensitive receptors were identified: the Hislop Lake Cabin, the Įdaà Trail Portage and the Įdaà Trail. These receptors are located closest to the Project activities (i.e., haul truck) and the Project boundary. Due to spatial considerations, 4 locations along the Įdaà Trail were considered. The resulting 6 noise sensitive receptor locations for the environmental impact assessment are provided in Table 1-2.

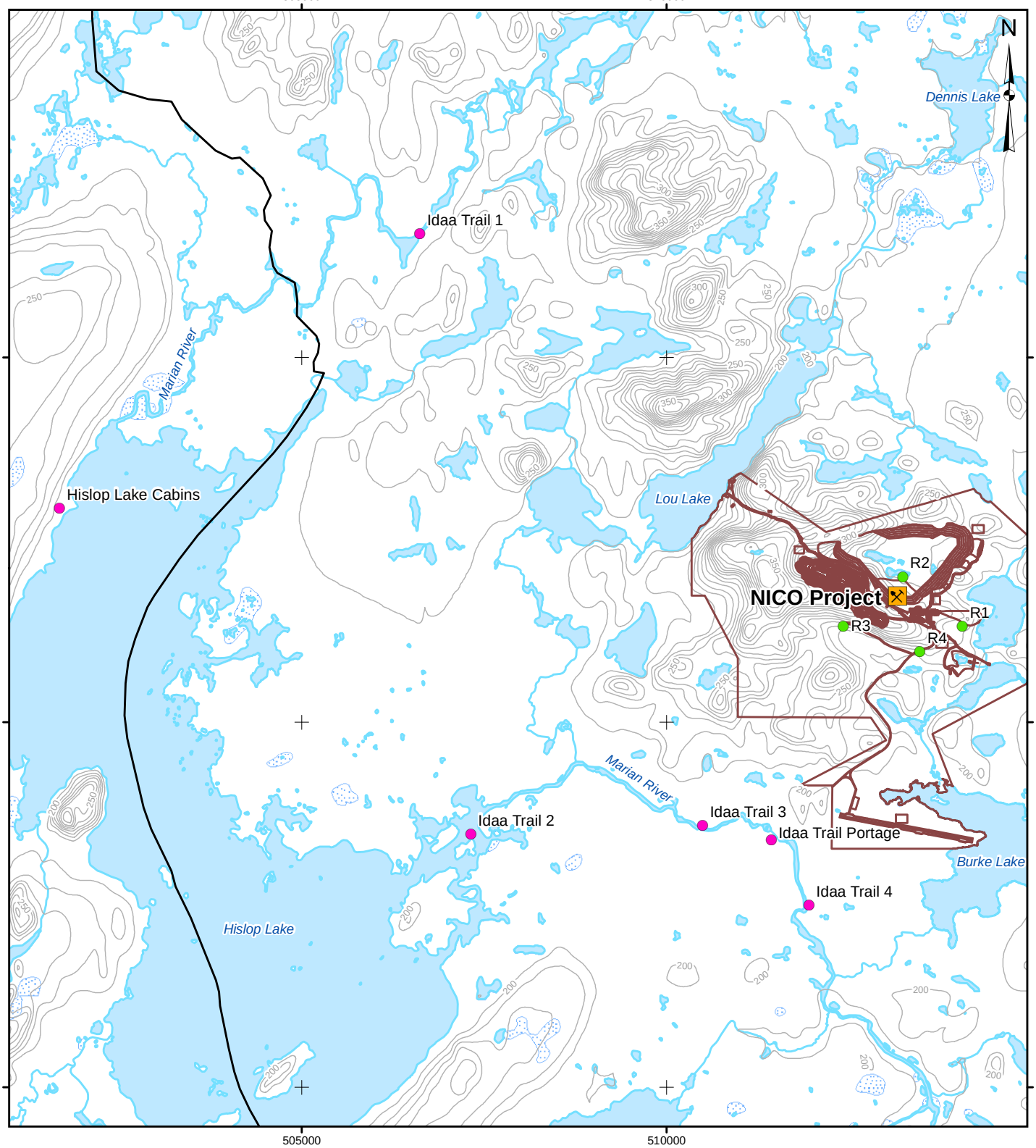
Table 1-2 Noise Sensitive Receptor Locations, NICO Project

Receptor Location	Easting[a]	Northing[a]	Distance From Project Boundary (km)
Hislop Lake Cabin	501681	7047930	9.0
Įdaà Trail Portage[b]	511438	7043393	0.8
Įdaà Trail 1[b]	506620	7051690	5.3
Įdaà Trail 2[b]	507320	7043469	4.0
Įdaà Trail 3[b]	510494	7043581	1.4
Įdaà Trail 4[b]	511955	7042492	0.8

[a] Universal Transverse Mercator (UTM) Zone 11 Datum: NAD83.

[b] The Įdaà Trail is a water route used for traditional land use practices. The locations were selected based on the potential noise sensitivity to noise from NICO and the access road.

Figure 1-1 shows the proposed Project development, the selected noise monitoring locations as well as the noise sensitive receptors. Photos of each monitoring location set-up are provided in Appendix B.



LEGEND

- MONITORING LOCATIONS
- NOISE SENSITIVE RECEPTOR
- NICO PROJECT
- CONTOUR (10 METRE INTERVAL)
- EXISTING WINTER ROAD
- PROPOSED FORTUNE MINERALS ROAD
- PROPOSED ALL-LAND WINTER ROAD
- WATERCOURSE
- WATERBODY
- WETLAND
- PROPOSED NICO MINE SITE

REFERENCE

Base data obtained from GeoGratis.
Projection: UTM Zone 11 Datum: NAD 83

2.5 0 2.5
SCALE 1:75,000 KILOMETRES

PROJECT
FORTUNE MINERALS LIMITED
NICO DEVELOPERS ASSESSMENT REPORT

TITLE
BASELINE NOISE MONITORING LOCATIONS

Golder Associates
Edmonton, Alberta

FILE No. B-Noise-001-GIS			
PROJECT No. 08-1373-0017		SCALE AS SHOWN	REV. 0
DESIGN	JC	19 Jul. 2010	
GIS	CW	19 Jul. 2010	
CHECK	LY	17 Nov. 2010	
REVIEW	GA	17 Nov. 2010	

FIGURE: 1-1

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2 METHOD

2.1 SOUND LEVEL MEASUREMENTS

The baseline noise measurement methods used were consistent with ERCB Directive 038 (ERCB 2007). One 24-hour survey was conducted at each of the 4 monitoring locations described in Section 1.2. Surveys of this type and duration provide information on daily variability in noise levels, as well as provide an expected typical or average daily condition.

A model 2250 Brüel and Kjær Type I integrating sound level meter was used to collect the measurements and sound recordings at each site. The meter logs noise levels and records audible sound over a set monitoring period selected by the user. The effective measurement range of the instrument is 20-140 dBA to ±1 dBA accuracy. The logging rate was set for one minute and the monitoring period was set for 24 hours (sound recordings were saved every 10 minutes).

Data parameters logged every minute for each survey period included the following:

- integrated average equivalent noise level (L_{eq}) in dBA;
- maximum noise level (L_{max}) in dBA;
- minimum noise level (L_{min}) in dBA; and
- 1/3 octave band values in dB.

A Brüel and Kjær Type 4231 Calibrator was used for calibrating the meters before and after each 24-hour monitoring period. The calibrator has an estimated uncertainty for sound pressure level of ±0.12 dB at a 99% confidence level. Calibration was performed before and after each 24-hour monitoring period to ensure the noise meter variance was within 0.5 dB.

Data were downloaded to a computer for analysis with the Brüel and Kjær 7820 Evaluator® software program. The data were Quality Assurance/Quality Control (QA/QC) reviewed to identify sources of noise from the sound recordings and filter out invalid data, such as noise from technician activities, and wildlife interference with measurement equipment (e.g., small mammals investigating microphone). During analysis of the data, sound sources were identified mainly by sound recordings, although sounds heard by field crews were also used. Daily and nightly values were calculated as per Health Canada guidelines; daytime was defined as 7:00 AM to 11:00 PM and nighttime as 11:00

PM to 7:00 AM. The 24-hour and 10:00 PM. 1-hour value were also determined. All times are referenced to by the local time zone. For the noise baseline study, all times reported are Mountain Daylight Time (MDT).

Field crews recorded precipitation, cloud cover, wind direction, and observed audible noise sources. Weather conditions were also documented and are discussed in the following section.

2.2 ENVIRONMENTAL CONDITIONS AT THE TIME OF MEASUREMENT

ERCB Directive 038 and Health Canada require that a baseline noise study be conducted under weather conditions acceptable for noise measurement. Requirements include wind speeds of less than 15 km/h and no precipitation. Temperatures must be within manufacturer's tolerances for instrument operation. Weather data collected included hourly wind speed and direction, temperature, precipitation, and relative humidity.

For this noise study, representative weather conditions were observed by the field crew. The weather data from the on-site permanent weather station will be available once the on-site detailed weather data is analyzed.

2.3 DATA ANALYSIS APPROACH

Data were downloaded to a computer for analysis with the Brüel and Kjaer 7820 Evaluator® software program. The data was reviewed to identify sources of noise from the sound recordings and filter out invalid data such as technician activities, wind, rain, and helicopter noise. Hourly values were then calculated for the 4, 24-hour measurements from the valid 1-minute data. Daily and nightly values were calculated as per Health Canada; daytime being defined as 7:00 AM to 11:00 PM and nighttime as 11:00 PM to 7:00 AM.

During analysis of the data, noise sources were identified mainly by sound recordings. Other indicators used to identify sources of noise were time of day and field observations.

2.4 DETERMINATION OF AMBIENT SOUND LEVELS

Ambient sound levels at the sensitive noise receptors for use in the environmental impact assessment were determined by comparing the conditions at each receptor site with conditions at the four measurement locations. Professional judgement was used to determine whether the 2008 measurements best represented the conditions at the receptors. Where the measurement data was not considered representative of the acoustic environment, measurement data in the public realm that was considered more representative was referenced.

3 MEASUREMENT RESULTS

The 24-hour measurement data collected for the study are summarized in this section. Noise sources that were not representative of expected, typical ambient conditions (e.g., technician activity, animal interference, and weather conditions such as precipitation, thunder, or high wind) were excluded from the calculated hourly, daytime, or nighttime results. All "hourly" L_{eq} values were based on at least 30 minutes of data. Measured hourly L_{eq}, L_{max}, and L_{min} values for the noise monitoring locations are shown in the following sections. The grey scaled cells within the tables represent the nighttime period.

3.1 MONITORING LOCATION R1

Hourly L_{max}, L_{min}, and L_{eq} results recorded at monitoring location R1 are presented in Table 3-1. Noise sources identified were predominantly technician activity, wind induced interference with the microphone of the noise meter, and the use of a generator and an excavator on the Project site.

The lowest hourly value recorded at monitoring location R1 was below 20 dBA. The lower calibration limit of the noise meter is 20 dBA, which corresponds to the lower limit of human hearing. Values less than 20 dBA measured by the meter are not considered valid since they fall outside the calibration range.

One-minute noise levels are shown graphically in Figure 3-1. The figure illustrates sources of isolated peaks.

The 1/3 octave band frequency L_{eq} data for the daytime and nighttime periods at this location are provided in Appendix C, Figure C-1. The spectrum L_{eq} is based on the logarithmic average of daytime or nighttime period. Non-representative noise events shown in Table 3-1 were not included in the spectrum L_{eq}. The graph shows that the background noise in the area is predominantly wind induced noise, which primarily influences the low frequencies (less than 125 Hz).

Table 3-1 Hourly Sound Levels at Monitoring Location R1 (8 to 9 September 2008)

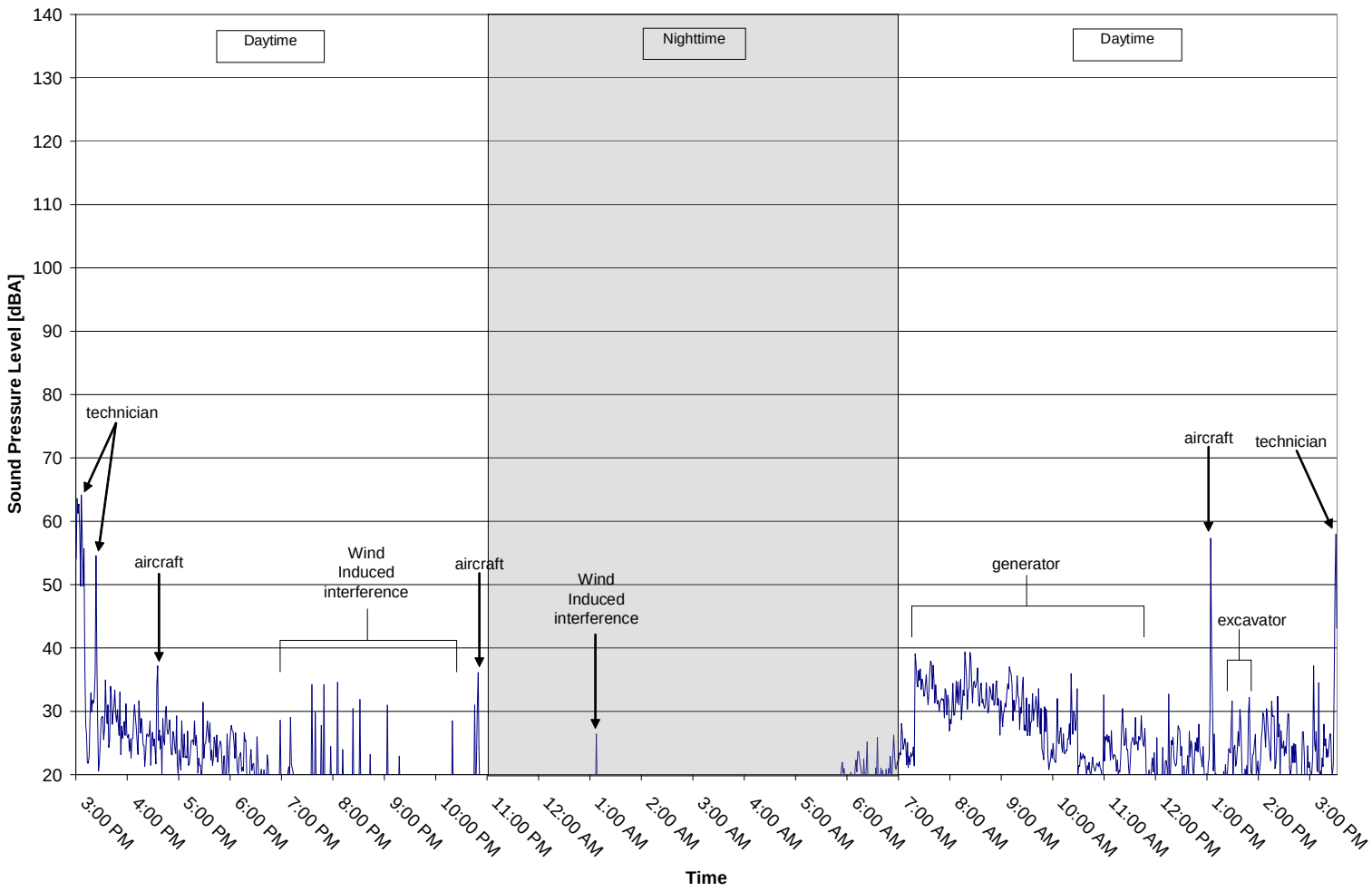
Date	Hour[a]	L_{eq} [dBA]	L_{max} [dBA]	L_{min} [dBA]
8 September 2008	3:00 PM	29[b]	41[b]	25[b]
8 September 2008	4:00 PM	28	36	23
8 September 2008	5:00 PM	25	34	21
8 September 2008	6:00 PM	22[b]	29[b]	20[b]
8 September 2008	7:00 PM	20[b]	33[b]	<20[b,c]
8 September 2008	8:00 PM	<20[b,c]	24[b]	<20[b,c]
8 September 2008	9:00 PM	<20[b,c]	<20[b,c]	<20[b,c]
8 September 2008	10:00 PM	22[b]	27[b]	<20[b,c]
8 September 2008	11:00 PM	<20[c]	<20[c]	<20[c]
9 September 2008	12:00 AM	<20[c]	<20[c]	<20[c]
9 September 2008	1:00 AM	<20[b,c]	<20[b,c]	<20[b,c]
9 September 2008	2:00 AM	<20[c]	<20[c]	<20[c]
9 September 2008	3:00 AM	<20[c]	20	<20[c]
9 September 2008	4:00 AM	<20[c]	<20[c]	<20[c]
9 September 2008	5:00 AM	<20[c]	<20[c]	<20[c]
9 September 2008	6:00 AM	21	27	<20[c]
9 September 2008	7:00 AM	--[d]	--[d]	--[d]
9 September 2008	8:00 AM	--[d]	--[d]	--[d]
9 September 2008	9:00 AM	--[d]	--[d]	--[d]
9 September 2008	10:00 AM	22[b]	27[b]	<20[b,c]
9 September 2008	11:00 AM	--[d]	--[d]	--[d]
9 September 2008	12:00 PM	24	35	20
9 September 2008	1:00 PM	40[b]	47[b]	20[b]
9 September 2008	2:00 PM	26	37	21
9 September 2008	3:00 PM	--[d]	--[d]	--[d]

[a] Measurement start hour. (Mountain Daylight Time)

[b] Measurement has noise due to technician activity, wind induced interference, or the use of machinery on-site excluded, thereby creating a value based on less than 60 minutes but more than 30 minutes of recorded data.

[c] Measured sound levels are less than the 20 dBA calibration limit of the sound level meter.

[d] Data filtering resulted in less than 30 minutes of recorded data.



NOTE

LABELS INDICATE DATA FILTERED FROM PERIOD AVERAGES.

PROJECT

FORTUNE MINERALS LIMITED
NICO DEVELOPERS ASSESSMENT REPORT

TITLE

ONE-MINUTE INTERVAL NOISE LEVELS MONITORING LOCATION R1

Golder Associates
Edmonton, Alberta

FILE No: B-Noise-002-CAD				
PROJECT	08-1373-0017		SCALE AS SHOWN	REV. 1
DESIGN	RB	09/01/09		
CADD	RFM	11/02/09		
CHECK	TD	11/02/09		
REVIEW	GA	11/02/09		

FIGURE: 3-1

3.2 MONITORING LOCATION R2

Hourly L_{max}, L_{min}, and L_{eq} results recorded at monitoring location R2 are presented in Table 3-2. General noise sources identified were technician activity, direct interaction between the sound level meter and local wildlife, and the operation of a generator and an excavator on the Project site.

The lowest hourly value recorded at monitoring location R2 was below 20 dBA. The lower calibration limit of the noise meter is 20 dBA, which corresponds to the lower limit of human hearing. Values less than 20 dBA measured by the meter are not considered valid since they fall outside the calibration range.

Table 3-2 Hourly Sound Levels at Monitoring Location R2 (8 to 9 September 2008)

Date	Hour[a]	L_{eq} [dBA]	L_{max} [dBA]	L_{min} [dBA]
8 September 2008	1:00 PM	-- [b]	-- [b]	-- [b]
8 September 2008	2:00 PM	35[c]	42[c]	25[c]
8 September 2008	3:00 PM	31	35	25
8 September 2008	4:00 PM	31	38	23
8 September 2008	5:00 PM	29	33	24
8 September 2008	6:00 PM	23	28	20
8 September 2008	7:00 PM	<20[c,d]	22[c]	<20[c,d]
8 September 2008	8:00 PM	<20[d]	21	<20[d]
8 September 2008	9:00 PM	<20[d]	20	<20[d]
8 September 2008	10:00 PM	22[c]	26[c]	<20[c,d]
8 September 2008	11:00 PM	<20[d]	<20[d]	<20[d]
9 September 2008	12:00 AM	<20[d]	22	<20[d]
9 September 2008	1:00 AM	<20[d]	<20[d]	<20[d]
9 September 2008	2:00 AM	<20[d]	<20[d]	<20[d]
9 September 2008	3:00 AM	<20[d]	20	<20[d]
9 September 2008	4:00 AM	<20[d]	21	<20[d]
9 September 2008	5:00 AM	20	22	<20[d]
9 September 2008	6:00 AM	23	28	21
9 September 2008	7:00 AM	-- [b]	-- [b]	-- [b]
9 September 2008	8:00 AM	-- [b]	-- [b]	-- [b]
9 September 2008	9:00 AM	-- [b]	-- [b]	-- [b]
9 September 2008	10:00 AM	-- [b]	-- [b]	-- [b]
9 September 2008	11:00 AM	-- [b]	-- [b]	-- [b]
9 September 2008	12:00 PM	25	33	20
9 September 2008	1:00 PM	39[c]	46[c]	23[c]

[a] Measurement start hour. (Mountain Daylight Time)

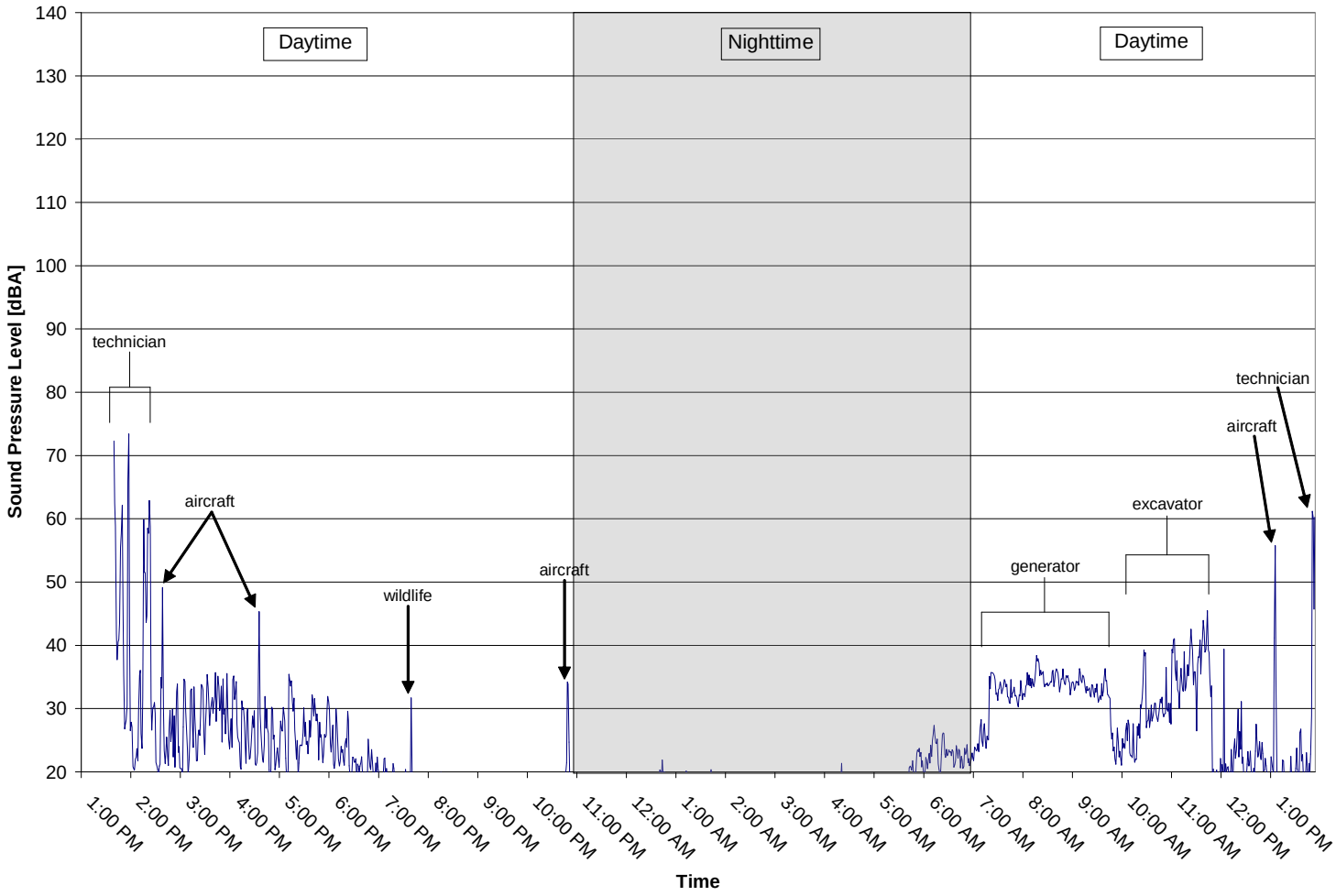
[b] Data filtering resulted in less than 30 minutes of recorded data.

[c] Measurement has noise due to technician activity, noise due to the wilderness, or use of machinery on-site excluded, thereby creating a value based on less than 60 minutes but more than 30 minutes of recorded data.

[d] Measured sound levels are less than the 20 dBA calibration limit of the sound level meter.

One-minute noise levels are shown graphically in Figure 3-2. The figure illustrates sources of isolated peaks.

The 1/3 octave band frequency L_{eq} data for the daytime and nighttime periods at this location are provided in Appendix C, Figure C-2. The spectrum L_{eq} is based on the logarithmic average of daytime or nighttime period. Non-representative noise events shown in Table 3-2 were not included in the spectrum L_{eq}. The graph shows that the background noise in the area is predominantly wind induced noise, which primarily influences the low frequencies (less than 125 Hz).



NOTE
LABELS INDICATE DATA FILTERED FROM PERIOD AVERAGES.

PROJECT
FORTUNE MINERALS LIMITED
NICO DEVELOPERS ASSESSMENT REPORT

TITLE
ONE-MINUTE INTERVAL NOISE LEVELS MONITORING LOCATION R2

Golder Associates
Edmonton, Alberta

FILE No: B-Noise-003-CAD				
PROJECT	08-1373-0017		SCALE AS SHOWN	REV. 1
DESIGN	RB	09/01/09		
CADD	RFM	11/02/09		
CHECK	TD	11/02/09		
REVIEW	GA	11/02/09		

FIGURE: 3-2

3.3 MONITORING LOCATION R3

Hourly L_{max}, L_{min}, and L_{eq} results, recorded at monitoring location R3 are presented in Table 3-3. Noise sources identified were predominantly precipitation descending on the microphone of the noise meter, technician activity, and wind induced interference with the microphone of the noise meter.

The lowest hourly value recorded at monitoring location R3 was below 20 dBA. The lower calibration limit of the noise meter is 20 dBA, which corresponds to the lower limit of human hearing. Values less than 20 dBA measured by the meter are not considered valid since they fall outside the calibration range.

Table 3-3 Hourly Sound Levels at Monitoring Location R3 (9 to 10 September 2008)

Date	Hour[a]	L_{eq} [dBA]	L_{max} [dBA]	L_{min} [dBA]
9 September 2008	6:00 PM	20[b]	24[b]	<20[b,c]
9 September 2008	7:00 PM	20	27	<20[c]
9 September 2008	8:00 PM	<20[b,c]	26	<20[b,c]
9 September 2008	9:00 PM	<20[b,c]	<20[b,c]	<20[b,c]
9 September 2008	10:00 PM	<20[c]	<20[c]	<20[c]
9 September 2008	11:00 PM	<20[c]	<20[c]	<20[c]
10 September 2008	12:00 AM	<20[b,c]	<20[b,c]	<20[b,c]
10 September 2008	1:00 AM	<20[c]	<20[c]	<20[c]
10 September 2008	2:00 AM	<20[c]	<20[c]	<20[c]
10 September 2008	3:00 AM	<20[c]	<20[c]	<20[c]
10 September 2008	4:00 AM	<20[c]	<20[c]	<20[c]
10 September 2008	5:00 AM	<20[c]	<20[c]	<20[c]
10 September 2008	6:00 AM	<20[c]	22	<20[c]
10 September 2008	7:00 AM	20	29	<20[c]
10 September 2008	8:00 AM	<20[c]	25	<20[c]
10 September 2008	9:00 AM	-- [d]	-- [d]	-- [d]
10 September 2008	10:00 AM	<20[b,c]	27[(b)]	<20[b,c]
10 September 2008	11:00 AM	21	30	<20[c]
10 September 2008	12:00 PM	23[b]	29[b]	<20[b,c]
10 September 2008	1:00 PM	20	28	<20[c]
10 September 2008	2:00 PM	21	28	<20[c]
10 September 2008	3:00 PM	<20[c]	24	<20[c]
10 September 2008	4:00 PM	-- [d]	-- [d]	-- [d]

[a] Measurement start hour. (Mountain Daylight Time)

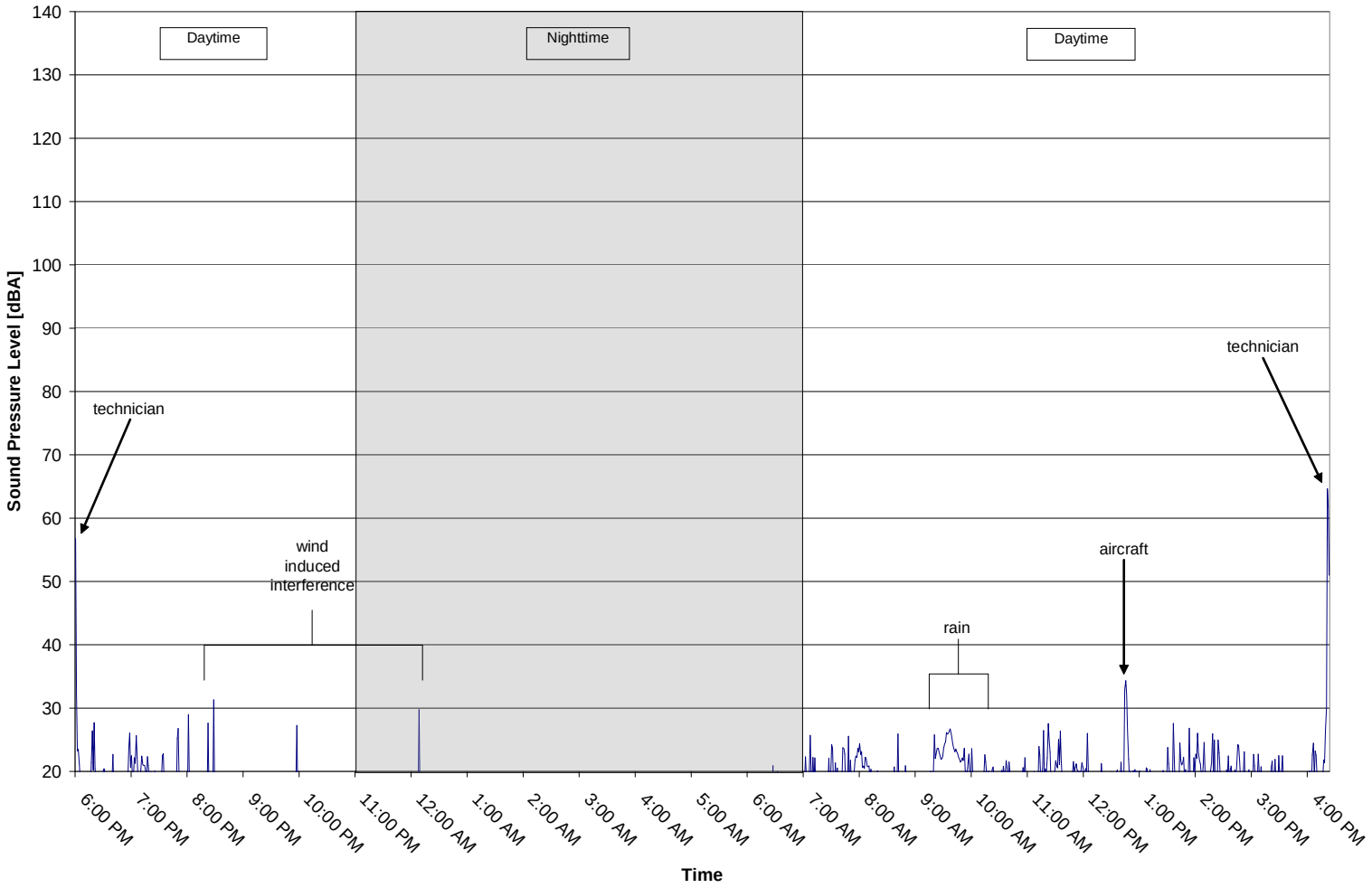
[b] Measurement has noise due to technician activity, precipitation, or wind induced interference excluded, thereby creating a value based on less than 60 minutes but more than 30 minutes of recorded data.

[c] Measured sound levels are less than the 20 dBA calibration limit of the sound level meter.

[d] Data filtering resulted in less than 30 minutes of recorded data.

One-minute noise levels are shown graphically in Figure 3-3. The figure illustrates sources of isolated peaks.

The 1/3 octave band frequency L_{eq} data for the daytime and nighttime periods at this location are provided in Appendix C, Figure C-3. The spectrum L_{eq} is based on the logarithmic average of daytime or nighttime period. Non-representative noise events shown in Table 3-3 were not included in the spectrum L_{eq}. The graph shows that the background noise in the area is predominantly wind induced noise, which primarily influences the low frequencies (less than 125 Hz).



NOTE
LABELS INDICATE DATA FILTERED FROM PERIOD AVERAGES.

PROJECT
FORTUNE MINERALS LIMITED
NICO DEVELOPERS ASSESSMENT REPORT

TITLE
ONE-MINUTE INTERVAL NOISE LEVELS MONITORING LOCATION R3

Golder Associates
Edmonton, Alberta

FILE No: B-Noise-004-CAD

PROJECT	08-1373-0017		SCALE AS SHOWN	REV. 1
DESIGN	RB	09/01/09		
CADD	RFM	11/02/09		
CHECK	TD	11/02/09		
REVIEW	GA	11/02/09		

FIGURE: 3-3

3.4 MONITORING LOCATION R4

Hourly L_{max}, L_{min}, and L_{eq} results recorded at monitoring location R4 are presented in Table 3-4. Noise generated at R4 was predominantly due to technician activity, precipitation descending on the noise meter microphone, direct interaction between a bird and the microphone of the noise meter, and operational use of an all terrain vehicle (ATV) on the Project site.

The lowest hourly value recorded at monitoring location R4 was below 20 dBA. The lower calibration limit of the noise meter is 20 dBA, which corresponds to the lower limit of human hearing. Values less than 20 dBA measured by the meter are not considered valid since they fall outside the calibration range.

One-minute noise levels are shown graphically in Figure 3-4. The figure illustrates sources of isolated peaks.

The 1/3 octave band frequency L_{eq} data for the day and night periods at this location are provided in Appendix C, Figure C-4. The spectrum L_{eq} is based on the logarithmic average of daytime or nighttime period. Non-representative noise events shown in Table 3-4 were not included in the spectrum L_{eq}. The graph shows that the background noise in the area is predominantly wind induced noise as shown in the low frequencies (less than 125 Hz).

Table 3-4 Hourly Sound Levels at Monitoring Location R4 (9 to 10 September 2008)

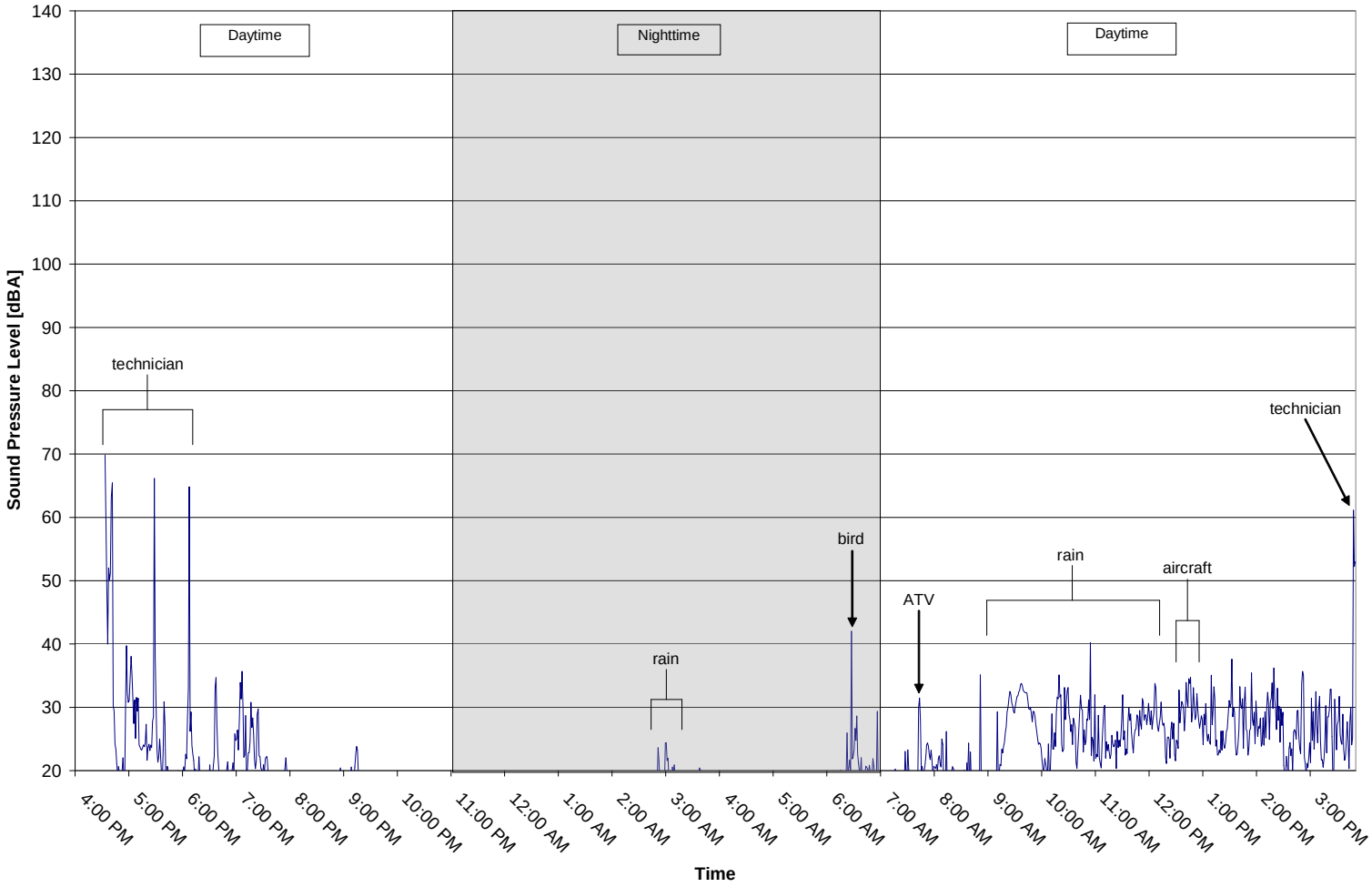
Date	Hour[a]	L_{eq} [dBA]	L_{max} [dBA]	L_{min} [dBA]
9 September 2008	4:00 PM	--[b]	--[b]	--[b]
9 September 2008	5:00 PM	27[c]	34[c]	22[c]
9 September 2008	6:00 PM	23[c]	29[c]	20[c]
9 September 2008	7:00 PM	25	31	21
9 September 2008	8:00 PM	<20[d]	22	<20[d]
9 September 2008	9:00 PM	<20[d]	23	<20[d]
9 September 2008	10:00 PM	<20[d]	<20[d]	<20[d]
9 September 2008	11:00 PM	<20[d]	<20[d]	<20[d]
10 September 2008	12:00 AM	<20[d]	<20[d]	<20[d]
10 September 2008	1:00 AM	<20[d]	<20[d]	<20[d]
10 September 2008	2:00 AM	<20[c,d]	<20[c,d]	<20[c,d]
10 September 2008	3:00 AM	<20[c,d]	<20[c,d]	<20[c,d]
10 September 2008	4:00 AM	<20[d]	<20[d]	<20[d]
10 September 2008	5:00 AM	<20[d]	<20[d]	<20[d]
10 September 2008	6:00 AM	21[c]	29[c]	<20[c,d]
10 September 2008	7:00 AM	20[c]	25[c]	<20[c,d]
10 September 2008	8:00 AM	22	32	<20[d]
10 September 2008	9:00 AM	--[b]	--[b]	--[b]
10 September 2008	10:00 AM	30[c]	40[c]	22[c]
10 September 2008	11:00 AM	25[c]	30[c]	21[c]
10 September 2008	12:00 PM	29[c]	34[c]	252[c]
10 September 2008	1:00 PM	29	35	24
10 September 2008	2:00 PM	29	36	23
10 September 2008	3:00 PM	28[c]	32[c]	23[c]

[a] Measurement start hour. (Mountain Daylight Time)

[b] Data filtering resulted in less than 30 minutes of recorded data.

[c] Measurement has noise due to technician activity, precipitation, interaction between birds and noise meter, or noise generated from ATV excluded, thereby creating a value based on less than 60 minutes but more than 30 minutes of recorded data.

[d] Measured sound levels are less than the 20 dBA calibration limit of the sound level meter.



NOTE
LABELS INDICATE DATA FILTERED FROM PERIOD AVERAGES.

PROJECT
FORTUNE MINERALS LIMITED
NICO DEVELOPERS ASSESSMENT REPORT

TITLE
ONE-MINUTE INTERVAL NOISE LEVELS MONITORING LOCATION R4

Golder Associates
Edmonton, Alberta

FILE No: B-Noise-005-CAD

PROJECT	08-1373-0017		SCALE AS SHOWN	REV. 1
DESIGN	RB	09/01/09		
CADD	RFM	11/02/09		
CHECK	TD	11/02/09		
REVIEW	GA	11/02/09		

FIGURE: 3-4

3.5 WEATHER OBSERVATIONS

This section summarizes available weather data. The weather conditions observed by the field crew from 8 to 9 September 2008 were considered favourable for the measurements. Mild temperatures, no precipitation, and low wind conditions were consistent through the measurement period.

On 10 September 2008, mild temperatures and low wind conditions were observed; however, the sound of rain was audible in the noise meter sound recordings for the following time periods:

- 9:00 AM to 11:00 AM at monitoring location R3;
- 2:00 AM to 4:00 AM at monitoring location R4; and
- 9:00 AM to 11:00 AM at monitoring location R4.

4 DISCUSSION

Table 4-1 summarizes the logarithmic average of hourly L_{eq} results for both the daytime (7:00 AM to 11:00 PM) and nighttime (11:00 PM to 7:00 AM) periods, the hourly L_{eq} value from 10:00 PM to 11:00 PM, and a 24-hour time-average sound level L_{eq} value based on Health Canada time period guidelines for the 4 monitoring locations identified for the Project.

Table 4-1 Summary of Baseline Measurements for R1 to R4, NICO Project

Monitoring Location	Baseline L_{eq} Measurements (dBA)			
	Daytime 7:00 AM to 11:00 PM	Nighttime 11:00 PM to 7:00 AM	24-hour Measurement	1-hour 10:00 PM to 11:00 PM
R1	30	<20[a]	28[b]	22[a]
R2	31	<20[a]	28[b]	22[a]
R3	20	<20[a]	<20[a,b]	<20[a]
R4	26	<20[a]	24[b]	<20[a]

[a] measured sound level is less than the calibrated limit of 20 dBA of the sound level meter.

[b] less than 24 hours of noise measurements.

The average noise levels recorded at all 4 monitoring locations were low during the nighttime period. Most of the values recorded were below 20 dBA, which is the lower calibration limit of the noise meter and also corresponds to the lower limit of human hearing. The ambient noise level at all 4 locations was comprised of sounds from birds, other wildlife, and the surrounding forest. Only noise levels generated by direct interaction between wildlife and the equipment were filtered from the measurements. The sound level meter at R2 was located near the lakeshore and the sound recordings shows that the waves from the water are audible.

At monitoring location R3, the summarized value for the daytime, nighttime, 24-hour, and 1-hour from 10:00 PM to 11:00 PM periods were all below the 20 dBA. This was due to the location of R3 being in an isolated area with clear surroundings, reducing the noise contribution from birds and other wildlife. Less than 24 hours of measurements were recorded due to the filtering of invalid data.

The measured baseline sound levels in Table 4-1 (background noise level) are useful for establishing the ambient noise levels at sensitive receptors prior to project activities.

The ambient environment at the Hislop Lake Cabin noise sensitive receptor, is similar to R2 as both sites are situated close to a lake. However, the baseline

level referenced at the monitored location R2 does not include any noise from the presence of human domestic activities from a cabin.

The Įdaà Traıl Portage and Įdaà Traıl is a water route commonly used for traditional land use practices. The noise environment for the Įdaà Traıl receptors should be similar to the ambient sound levels measured beside a river in a rural environment without other human activities. The 4 locations monitored within the Project area in 2008 were not located near a watercourse. However, a baseline measurement was performed and reported in the *Total Joslyn North Environmental Assessment Update 2010* (Total 2010). The measurement result from this report is considered as more representative of the ambient noise environment for the Įdaà Traıl receptors than the 2008 measurement as it included water movement from the nearby river (50 m from monitoring site). The average daytime and nighttime ambient noise level measured at this location was 35 dBA for both periods. This is shown in Table 4-2.

Table 4-2 Ambient Sound Level Summary

Location	Ambient Sound Level [dBA]	
	Daytime (7:00 AM to 11:00 PM)	Nighttime (11:00 PM to 7:00 AM)
Hislop Lake Cabin	31	<20[a]
Įdaà Traıl Portage	35	35
Įdaà Traıl 1	35	35
Įdaà Traıl 2	35	35
Įdaà Traıl 3	35	35
Įdaà Traıl 4	35	35

[a] measured sound level is less than the calibrated limit of 20 dBA of the sound level meter.

5 SUMMARY

The baseline noise study is one component of a comprehensive environmental and socio-economic baseline program to collect information about the natural and socio-economic environment in the vicinity of the Project. The objective is to provide existing sound levels representative of the noise sensitive receptors near the Project area.

A monitoring program consisting of 4 monitoring locations (identified as R1 through R4) was conducted from 7 September to 10 September 2008. The program was conducted based on Health Canada and Alberta Energy Resources Conservation Board methods for ambient noise measurement. This includes determining average noise levels during specific times of day.

Noise sensitive receptors for the environmental impact assessment were also identified near the Project area. Existing monitoring results and also results from other remote area measurements were used to determine the daytime and nighttime ambient sound levels for 6 noise sensitive receptor locations. Table 5-1 summarizes the daytime and nighttime ambient sound levels for the 4 noise monitoring locations and 6 noise sensitive receptors.

Table 5-1 Ambient Sound Level Summary

Location	Ambient Sound Level [dBA]	
	Daytime (7:00 AM to 11:00 PM)	Nighttime (11:00 PM to 7:00 AM)
R1	30	<20[a]
R2	31	<20[a]
R3	20	<20[a]
R4	26	<20[a]
Hislop Lake Cabin	31	<20[a]
Įdaà Traıl Portage	35	35
Įdaà Traıl 1	35	35
Įdaà Traıl 2	35	35
Įdaà Traıl 3	35	35
Įdaà Traıl 4	35	35

[a] measured sound level is less than the calibrated limit of 20 dBA of the sound level meter.

The minimum L_{eq} measurement of 20 dBA used in this report is the lower calibration limit of the noise meter, which also corresponds to the lower limit of human hearing. All measured sound levels lower than 20 dBA were considered invalid and filtered.

The L_{eq} measurements were presented with all anomalous data or noise events that were not considered part of normal background for the area were excluded (such as direct interference between wildlife and the noise meter, precipitation, and technician interference).

6 REFERENCE

ERCB (Energy Resources and Conservation Board). 2007. Directive 038: Noise Control Directive - user guide. Revised Edition, 16 February 2007. (Referenced by AUC [Alberta Utilities Commission], Rule 012: Noise Control).

Health Canada. 2005. Noise impact assessment orientation document for projects triggering CEAA. Prepared by the Healthy Environments and Consumer Safety Branch, Health Canada. May 2005.

Total E&P Joslyn Ltd. 2010. Ambient Noise Environmental Baseline Study Interim Report for the Joslyn Mine Expansion Project. Prepared by Golder Associates Ltd. February 2009.

7 GLOSSARY OF TERMS

7.1 ACRONYMS

AEUB	Alberta Energy and Utilities Board
ATV	All terrain vehicle
ERCB	Energy Resources Conservation Board
LFN	Low frequency noise
MDT	Mountain daylight time
NWT	Northwest Territories
QA/QC	Quality assurance/quality control
UTM	Universal Transverse Mercator

7.2 UNITS OF MEASURE

%	Percent
dB	Decibels
dBA	A-weighted filtering of the decibel (dB) sound pressure levels
dBC	C-weighted filtering of the decibel (dB) sound pressure levels
Hz	Hertz
Km	Kilometre
km/hr	Kilometres per hour
L_{eq}	Equivalent continuous sound level
L_{max}	Maximum noise level
L_{min}	Minimum noise level

APPENDIX A

NOISE TERMINOLOGY

NOISE TERMINOLOGY

Since the concepts and theories used in the assessment of outdoor acoustics are not intuitive, the following description of key concepts and definitions used in this evaluation are provided to guide the reader. The following lists some of the key terminology that is used in the noise assessment:

- "Sound" or "sound emissions" refer to the acoustic energy generated by natural or man-made sources.
- "Noise" or "noise levels" refer to the levels that can be heard or measured at a receptor.
- A noise "receptor" is a location where measurements or predictions of noise levels are made.
- The "volume" of a sound or noise is expressed on a logarithmic scale, in units called decibels (dB). Since the scale is logarithmic, a sound or noise that is twice as loud as another will only be 3 dB higher. A sound or noise with double the number of decibels is much more than twice as loud.
- Sound emissions and noise levels also have a "frequency." The human ear does not respond to all frequencies in the same way. Mid-range frequencies are most readily detected by the human ear, while low and high frequencies are harder to hear. Environmental noise levels are usually presented as dBA, which incorporates the frequency response of the human ear.
- While low frequency noise may not be "heard," it can often be felt. A "C-weighted" decibel (or dBC) is a frequency-weighting in which the low frequencies are included more than with A-weighting, making this unit useful in determining potential for low frequency noise impacts.
- Low frequency noise (LFN) is the portion of sound below a defined spectrum band. As per Energy Resources Conservation Board (ERCB) Directive 038 (AEUB 2007), LFN is defined as either a clear tone present below a frequency of 250 Hz or where the overall dBC minus dBA value exceeds 20 dB.
- Outdoor or environmental noise levels are typically not steady or continuous. To account for the time-varying nature of environmental noise, levels are usually expressed as energy equivalent sound levels, or L_{eq}. The L_{eq} is defined as the continuous sound level that has the same acoustic energy as the varying sound for a given time period. This is expressed as a logarithmic average of the measured or predicted noise levels over a given period of time. For constant sources of noise, the sound level and L_{eq} are the same. The noise levels discussed in the assessment represent equivalent sound levels (L_{eq}).

- "Sound power level" or L_w is the level of sound power, expressed in decibels (dB) relative to a stated reference value of 1×10^{-12} Watt (dB re 10^{-12} Watts).
- "Sound pressure level" or L_p is the difference between the instantaneous pressure at a fixed point in a sound field, and the pressure at the same point with the sound absent. It is quantified by the following equation:

$$L_p = 10 \log_{10}(p_{rms}/p_{ref})^2$$

Where p_{rms} is the root mean square sound pressure and p_{ref} is the reference root mean square sound pressure of 20×10^{-6} Pascal.

APPENDIX B

FIELD PHOTOGRAPHS

Photo 1 **R1 Monitoring Station within Close Proximity to the Proposed Construction Camp**

Photo 2 **R2 Monitoring Station within the Vicinity of the Proposed Co-Disposal Facility**

Photo 3 **R3 Monitoring Station within the Vicinity of the Proposed Open Pit**

Photo 4 **R4 Monitoring Station within close Proximity to the Proposed Topsoil Stockpile and the Sedimentation Pond**

APPENDIX C

1/3 OCTAVE BAND SOUND MEASUREMENTS

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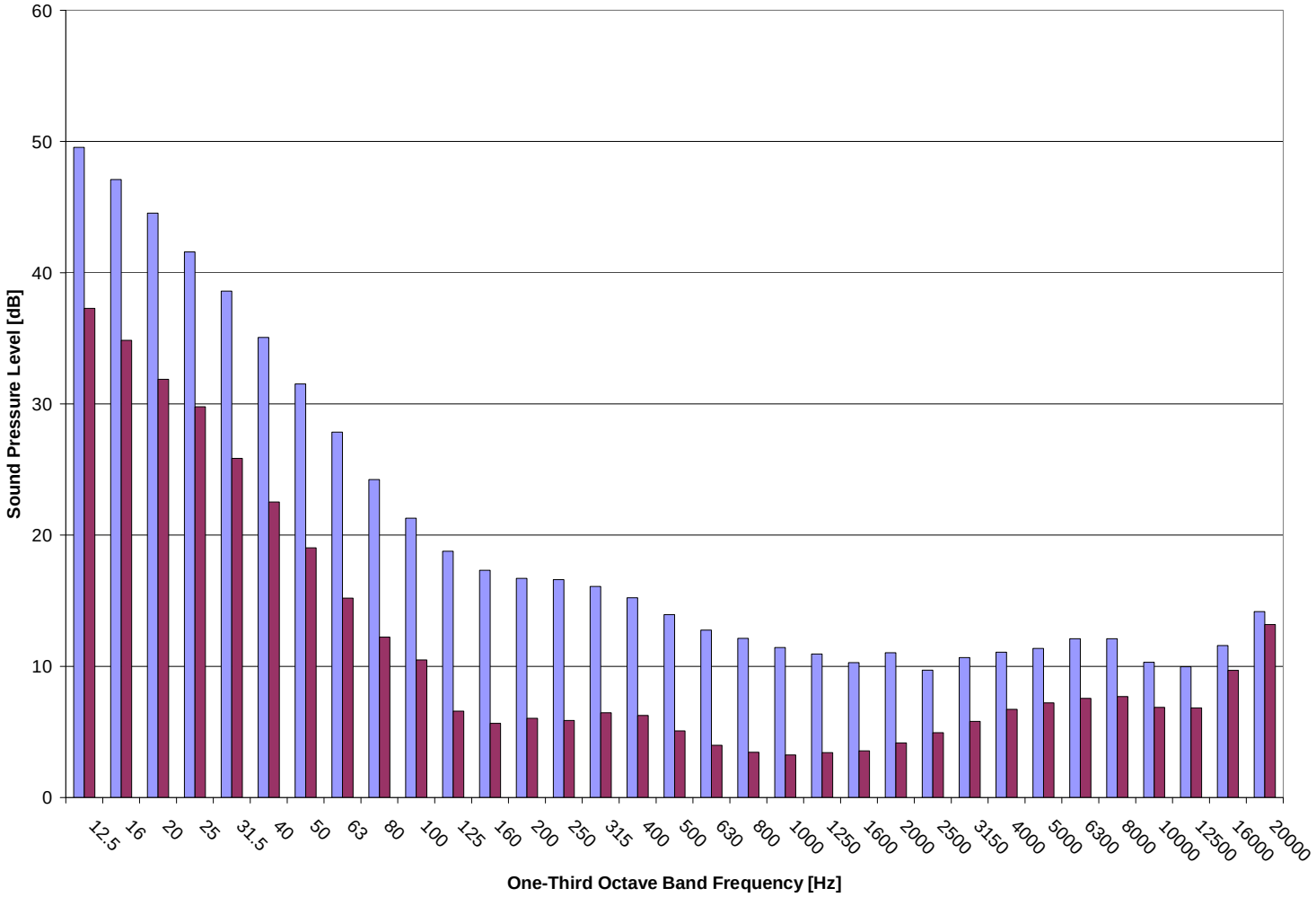


LEGEND

DAYTIME PERIOD

NIGHTTIME PERIOD

PROJECT

FORTUNE MINERALS LIMITED
NICO DEVELOPERS ASSESSMENT REPORT

TITLE

1/3 OCTAVE BAND SOUND MEASUREMENTS, MONITORING LOCATION R1

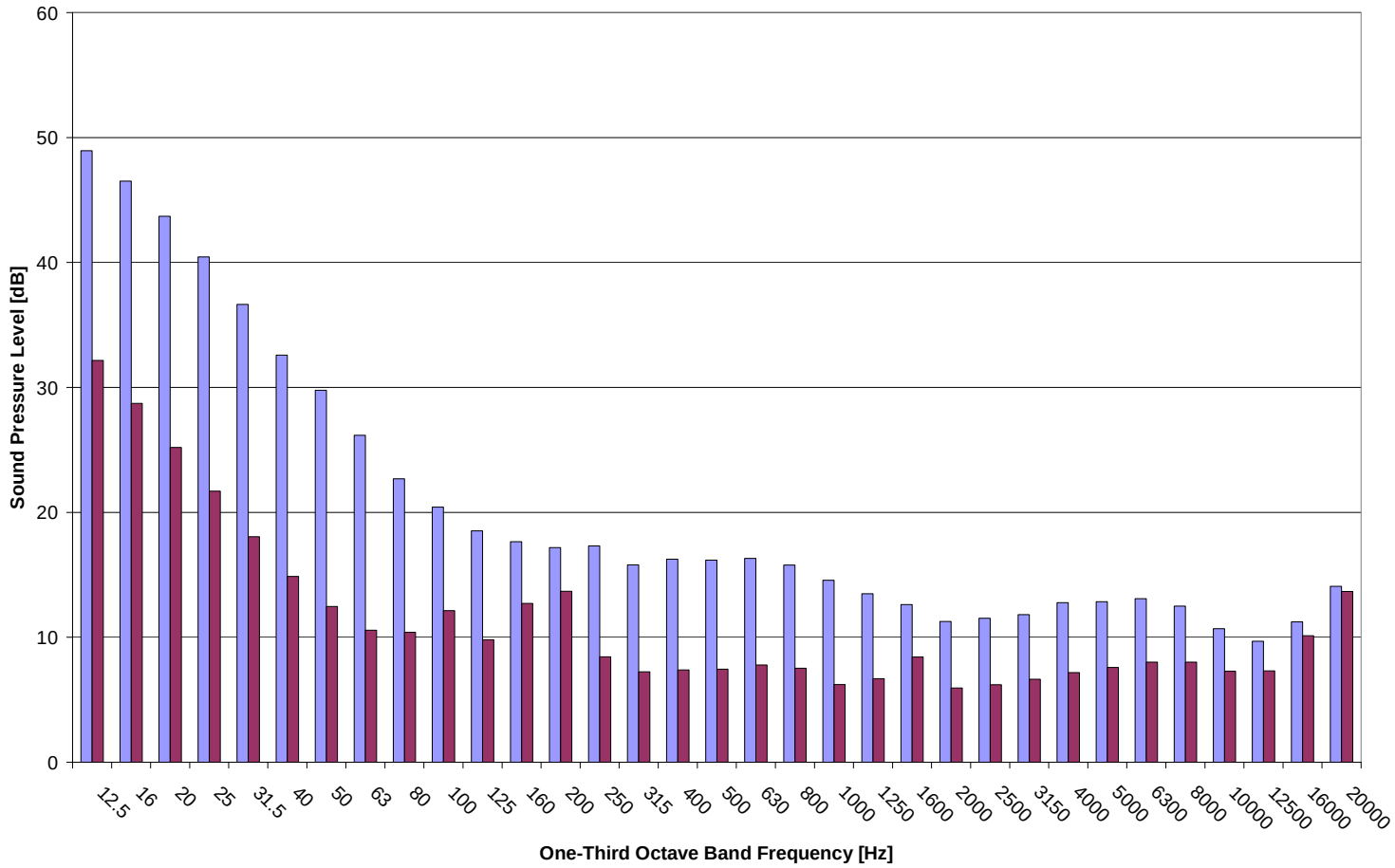
Golder Associates
Edmonton, Alberta

FILE No: B-Noise-006-CAD

PROJECT	08-1373-0017		SCALE AS SHOWN	REV. 1
DESIGN	RB	09/01/09		
CADD	RFM	11/02/09		
CHECK	TD	11/02/09		
REVIEW	GA	11/02/09		

FIGURE: C-1

R2



LEGEND

DAYTIME PERIOD

NIGHTTIME PERIOD

PROJECT

FORTUNE MINERALS LIMITED
NICO DEVELOPERS ASSESSMENT REPORT

TITLE

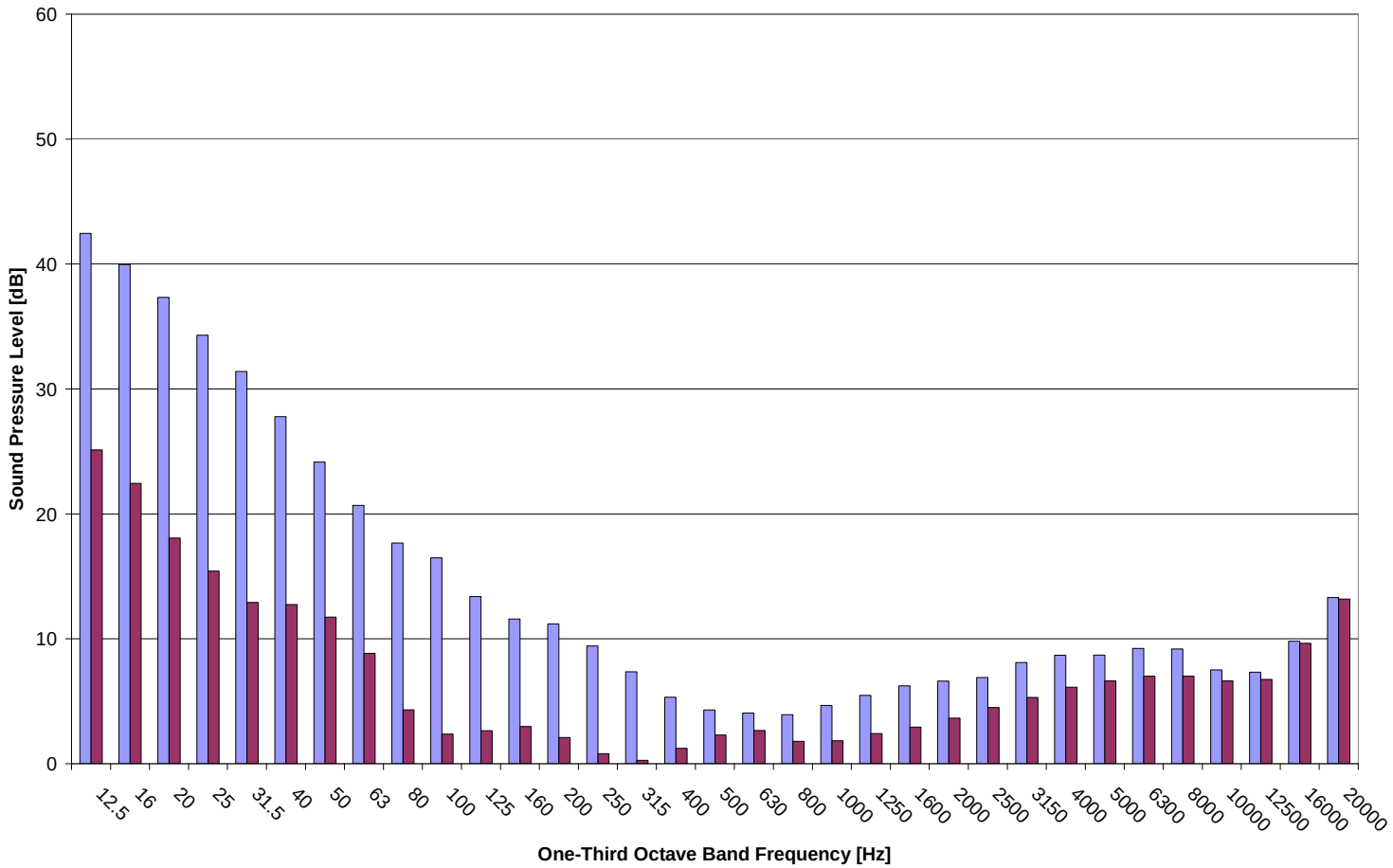
1/3 OCTAVE BAND SOUND MEASUREMENTS, MONITORING LOCATION R2

Golder Associates
Edmonton, Alberta

FILE No: B-Noise-007-CAD				
PROJECT	08-1373-0017		SCALE AS SHOWN	REV. 1
DESIGN	RB	09/01/09		
CADD	RFM	11/02/09		
CHECK	TD	11/02/09		
REVIEW	GA	11/02/09		

FIGURE: C-2

R3



LEGEND

DAYTIME PERIOD

NIGHTTIME PERIOD

PROJECT

FORTUNE MINERALS LIMITED
NICO DEVELOPERS ASSESSMENT REPORT

TITLE

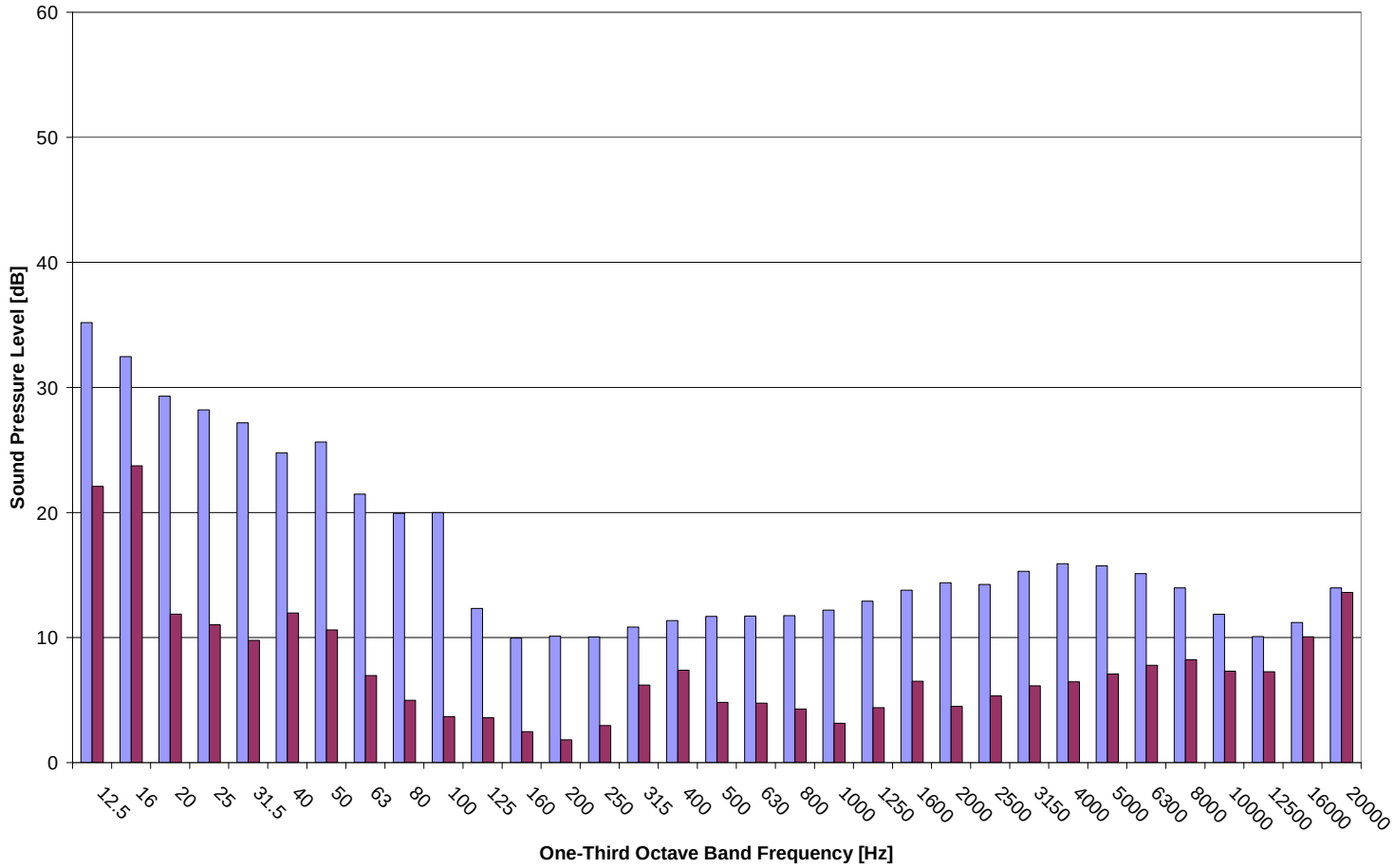
1/3 OCTAVE BAND SOUND MEASUREMENTS, MONITORING LOCATION R3

Golder Associates
Edmonton, Alberta

FILE No: B-Noise-008-CAD				
PROJECT	08-1373-0017		SCALE AS SHOWN	REV. 1
DESIGN	RB	09/01/09		
CADD	RFM	11/02/09		
CHECK	TD	11/02/09		
REVIEW	GA	11/02/09		

FIGURE: C-3

R4



LEGEND

DAYTIME PERIOD

NIGHTTIME PERIOD

PROJECT

FORTUNE MINERALS LIMITED
NICO DEVELOPERS ASSESSMENT REPORT

TITLE

1/3 OCTAVE BAND SOUND MEASUREMENTS, MONITORING LOCATION R4

Golder Associates
Edmonton, Alberta

FILE No: B-Noise-009-CAD				
PROJECT	08-1373-0017	SCALE	AS SHOWN	REV. 1
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CADD	RFM	11/02/09		
CHECK	TD	11/02/09		
REVIEW	GA	11/02/09		

FIGURE: C-4