

Appendix G9

2015 Noise Monitoring Program



MEADOWBANK GOLD PROJECT

2015 Noise Monitoring Report

In Accordance with NIRB Project Certificate No.004

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EXECUTIVE SUMMARY

The 2015 noise monitoring program at Meadowbank was conducted in support of the Noise Monitoring and Abatement Plan (AEM, 2014). The objective of the program is to measure noise levels at five previously determined monitoring locations around the Meadowbank site, over at least two 24 h periods.

In 2015 AEM's objective was to increase noise monitoring to include two monitoring rounds of 3-4 days per station, since high winds in the area tend to substantially reduce the quantity of available valid data (see previous reports). While monitoring was conducted for a total of 21 days, total usable hours of data for each station ranged from 8 - 36 hours.

Since noise levels vary constantly over time, Meadowbank's noise monitoring instruments measure acoustical energy near-continuously and report a single number for each minute, representing the "equivalent sound level" (L_{eq}). Daytime, nighttime, 10-11pm and 24 h L_{eq} values are shown for each monitoring location in Table 1.

Two L_{eq} values exceeded the daytime target sound level of 55 dBA. Both were at station R5, with recorded values of 55.4 and 61.7 dBA. These values are well within the range of those observed in previous years, and are likely a result of increased helicopter activity associated with exploration projects during the monitoring time period, since this station is close to the helicopter pad at the exploration camp. One value at R5 exceeded the nighttime target sound level (45 dBA), with a recorded L_{eq} -night value of 51.6 dBA. An examination of the data for the nighttime period indicated that the 1-h L_{eq} only exceeded 45 dBA for the 6 am – 7 am hour, likely as a result of the morning helicopter shift beginning at 6 am. While station R5 is located near a known caribou migration route, helicopter activity during the caribou migration time period is minimized compared to the summer monitoring months, so sound levels are expected to be lower at the time of year when caribou are migrating in the area. Further, noise levels recorded at this station for all time periods were within the range of those observed historically. Nevertheless, a reminder of AEM's wildlife policy regarding helicopter use (Cumberland, 2005) was sent to the Exploration group during the migration to help ensure minimal impacts on wildlife.

AEM will continue to monitor noise levels around site and particularly at the R5 location in 2016, and will ensure two noise meters are available to reduce the potential for sampling delays related to instrument malfunction.

Table 1. Daytime, nighttime, 10-11 pm and 24-h L_{eq} values for each monitoring location and total hours used to calculate each L_{eq} . Time periods with fewer than 3 hours of valid data are excluded (-), and those exceeding corresponding target sound levels are shaded grey. Na = period not monitored.

Site	Dates (2015)	$L_{eq, day}$ 7am-11pm (dBA)	Total Hours	$L_{eq, night}$ 11pm-7am (dBA)	Total Hours	$L_{eq, 1 h}$ 10pm-11pm (dBA)	$L_{eq, 24 h}$ (dBA)	Total Hours
R1	04/07	49.1	7	37.0	8	36.7	48.5	8
	05/07	54.8	5	40.2	4	-	51.1	12
	06/07	49.5	12	-	0	-	48.5	16
	07/07	-	0	-	0	-	-	0
	08/07	-	0	na	na	na	-	0
R1	19/09	-	0	-	0	-	-	0
	20/09	-	0	-	0	-	-	0
	21/09	-	0	-	0	-	-	0
	22/09	-	0	-	0	-	-	0
R2	08/07 09/07	Instrument malfunction – no data						
	10/07 11/07 12/07	Instrument malfunction – no data						
R2	16/09	-	0	-	0	-	-	0
	17/09	-	0	-	0	-	-	0
	18/09	39.3	11	36.8	8	30.9	38.9	12
	19/09	39.3	6	na	na	na	39.3	9
R3	31/08	-	0	-	0	-	-	0
	01/09	-	0	-	0	-	-	0
	02/09	22.2	3	38.2	3	18.9	21.8	4
	03/09	-	2	na	na	na	44.3	4
R4	04/09	40.2	12	44	8	45.2	40.9	13
	05/09	37.7	6	na	na	na	41.9	13
R5	05/09	55.4	3	51.6	7	-	55.4	5
	06/09	61.7	15	31.2	8	31.1	60.0	23
	07/09	-	2	na	na	na	55.1	9

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SECTION 1 • INTRODUCTION

Since 2008, Agnico Eagle Mines Ltd. (AEM) has conducted outdoor noise monitoring at the Meadowbank site, near Baker Lake, Nunavut, in support of the Noise Monitoring and Abatement Plan (AEM, 2014). The objective of this monitoring program is to measure representative noise levels at the perimeter of the mine, and to inform the implementation of noise mitigation measures. Although no residential receptors are nearby, AEM aims to meet target sound levels identified in Environment Canada's "Environmental Code of Practice for Metal Mines" (2009). These values are 55 dBA (daytime) and 45 dBA (nighttime).

To fulfill these objectives, AEM's objective is to conduct at least two 24 h surveys of ambient outdoor noise each year at five representative locations.

1.1 MONITORING LOCATIONS

In 2015, a total of 21 days of monitoring occurred, with 1 – 8 days of data collected for each site.

All locations in 2015 were the same as the previous year, and were located as recommended in the Noise Monitoring and Abatement Plan (2014). UTM coordinates are provided in Table 2, and are shown in relation to mine site features in Figure 1. Photos of the monitoring locations are provided in Appendix A.

Table 2. UTM coordinates and dates of measurement for the Meadowbank noise monitoring locations.

Monitoring Location	Easting	Northing	Dates
R1	636149	7217332	July 4 - 8 September 19 - 23
R2	636795	7214435	July 8 - 12 September 16 - 19
R3	641104	7214427	August 31 – September 3
R4	639990	7218810	September 4 - 5
R5	633781	7214493	September 5 - 7

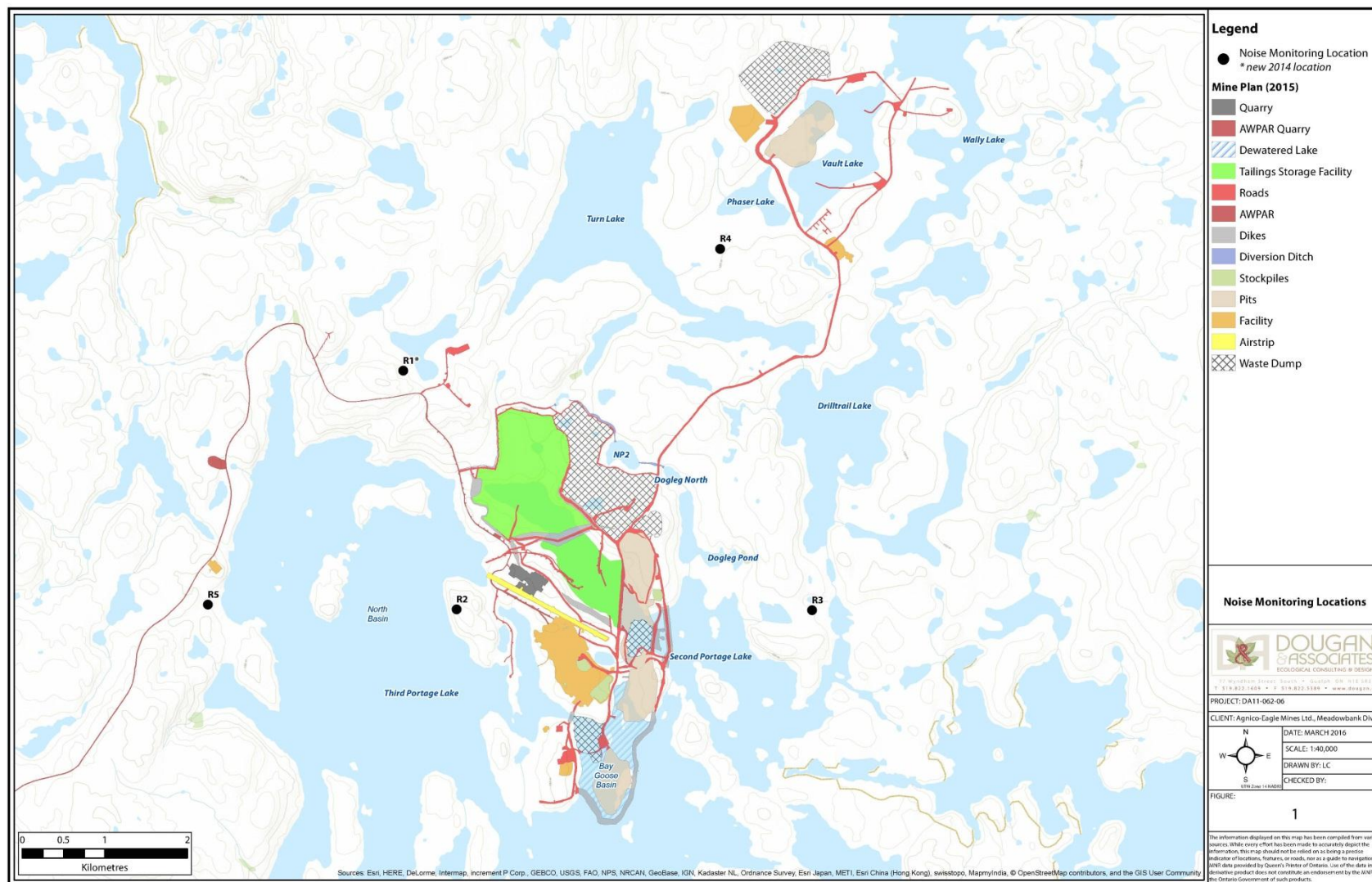


Figure 1. Noise monitoring locations at the Meadowbank site.

1.1.1 R1

Location R1 was formerly approximately 700 m south of the explosive storage area, and 400 m northeast of the all-weather access road. A spur road and a storage area were constructed within 100 m of this location in 2011. As a result, AEM proposed to move this station approximately 700 m northwest of the explosives storage area to better represent the originally intended orientation. The specific location was confirmed during 2014 field season, and is shown on Figure 1.

1.1.2 R2

Location R2 is approximately 600 m west of the airstrip. Third Portage Lake is to the west and southwest and surrounding terrain is vegetated tundra with rocky outcrops.

1.1.3 R3

Location R3 is approximately 1,800 m east of the East Dike. Second Portage Lake is to the west and east, and surrounding terrain is vegetated tundra with rocky outcrops.

1.1.4 R4

Location R4 is approximately 1,500 m southwest of the future location of Vault Pit, and less than 1 km from the Vault Haul Road. Turn Lake is to the west, and surrounding terrain is vegetated tundra with rocky outcrops.

1.1.5 R5

Location R5 is approximately 500 m south of the exploration camp and 300 m east of the all-weather access road. Third Portage Lake is immediately to the east, and surrounding terrain away from the shoreline is vegetated tundra with rocky outcrops. This location is situated on a known caribou migration route.

SECTION 2 • METHODS

In 2015, AEM field staff conducted noise surveys at each of the locations described in Section 1.1. These surveys provide data on average noise levels during a typical day, as well as variability of noise levels within the day. Since wind speeds in the area tend to exceed preferred levels for noise monitoring (see Section 2.4), two surveys for each location were planned to last 3 – 4 days each to obtain data for a minimum of 2 monitoring periods per site.

However, a malfunction of AEM's noise meter resulted in the need to rent another, causing sampling delays and a reduced sampling time at some stations. However, at least one round of acceptable data for all sampling periods was obtained for each station.

2.1 SOUND LEVEL METER

For all stations a Bruel and Kjaer Model 2250 integrating sound level meter was used to conduct the noise survey. As in the past, the noise level logging rate was set at one-minute intervals, and sound was recorded in 10 minute intervals.

The parameters logged each minute were:

- Integrated average sound level, in dBA – L_{eq}
- Absolute maximum sound level, in dBA – L_{max}
- Absolute minimum sound level, in dBA – L_{min}
- Peak sound level, in dBZ - LZ_{peak}

Calibration of the instrument was performed before and after each monitoring event using a Bruel and Kjaer Type 4231 Calibrator, to ensure variance was within 0.5 dB (see field notes, Appendix B). Estimated uncertainty of the calibrator is ± 0.12 dB at a 99% confidence level.

2.2 WEATHER DATA

Weather data for the noise monitoring periods was collected using the mine site's permanent weather station. Hourly data for wind, temperature and relative humidity was available from this station.

The Alberta Energy Resource Conservation Board (ERCB, 2007) has published preferred weather conditions for data to be used in noise complaint investigations because wind and precipitation can affect noise levels. High winds can obscure noises at a distance, but can also cause elevated readings due to interference with the microphone. Based on these guidelines, noise monitoring data was filtered to remove measurements collected outside of conditions where wind speed > 4.17 m/s or relative humidity $> 90\%$ (assuming precipitation occurred) prior to data analysis. In 2015, wind speeds commonly exceeded preferred levels, so the available data was significantly reduced as a result of this filtering.

2.3 FIELD NOTES

A pocket weather meter (Kestrel 3000) was used by field staff to record wind speed, direction and temperature at the beginning and end of each monitoring period. Other observations included precipitation, cloud cover and observed noises during instrument set-up and take-down.

2.4 DATA ANALYSIS

Since noise levels constantly vary over time, the monitoring instrument used at Meadowbank measures continuously and reports a single-number value for each minute, representing the “equivalent sound level” (L_{eq}). This value is the average sound level occurring over the specified time period (i.e. one minute). Alternatively, it is the sound level that would produce the same total amount of acoustical energy in the specified time period as the measured sound levels did.

All datapoints associated with the first and last hour of measurement were filtered out to remove noise from technicians, and to ensure more than 30 min of data contributed to hourly averages.

One-minute L_{eq} values produced by the instrument were used to calculate hourly, daytime (7am-11pm), nighttime (11pm-7am) and 24 h L_{eq} values, as previously. L_{eq} values for each time period were calculated as the geometric mean of filtered one-minute L_{eq} values.

SECTION 3 • RESULTS

3.1 R1

One-minute filtered and unfiltered L_{eq} , maximum (L_{max}) and minimum (L_{min}) values over the monitoring periods at R1 are shown in Figure 2 and Figure 3. Filtered one-minute L_{eq} values exclude data collected in the first and last hour to remove technician interference, and data collected under non-optimal weather conditions (wind speed > 4.17 m/s, relative humidity > 90%). Filtered values were used in subsequent analyses, but unfiltered values are provided for reference. For station R1, despite 190 h of monitoring, a total of 36 h of data was available after filtering.

Hourly L_{eq} values were calculated for all data as described in Section 2.4, and are shown in Table 3 and Table 4, and the hours filtered out for subsequent analyses are identified.

Weather data for noise monitoring dates at R1 is shown in Table 5 and Table 6. Hourly average wind speeds exceeded 4.17 m/s for the entire second monitoring period, with gusts up to 22.38 m/s.

Audible noises noted in the field log at this location include exploration helicopter noise, construction activities at the emulsion plant, AWAR traffic, insects and birds.

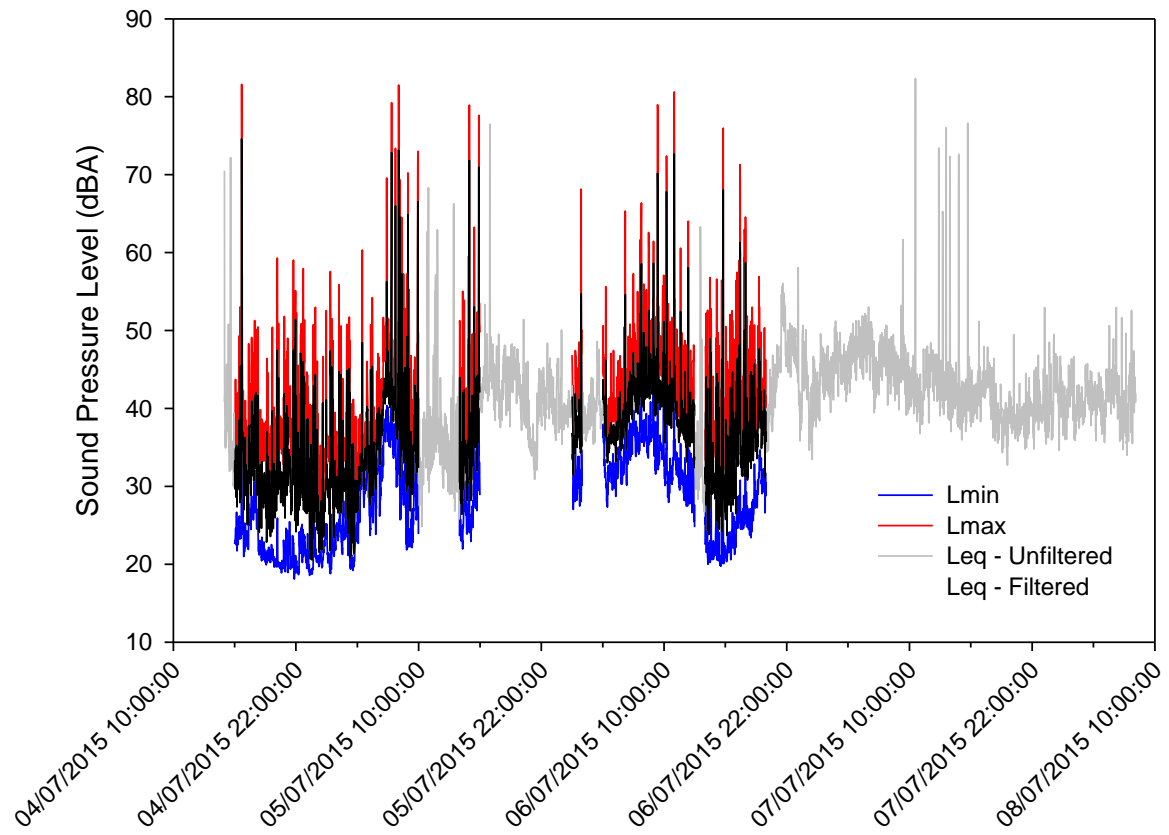


Figure 2. One-minute L_{eq} , L_{max} and L_{min} values recorded at monitoring station R1 at the Meadowbank site during monitoring period 1. Filtered data excludes those measurements taken outside of optimal conditions (set-up, take-down, wind > 4.17 m/s, RH > 90%).

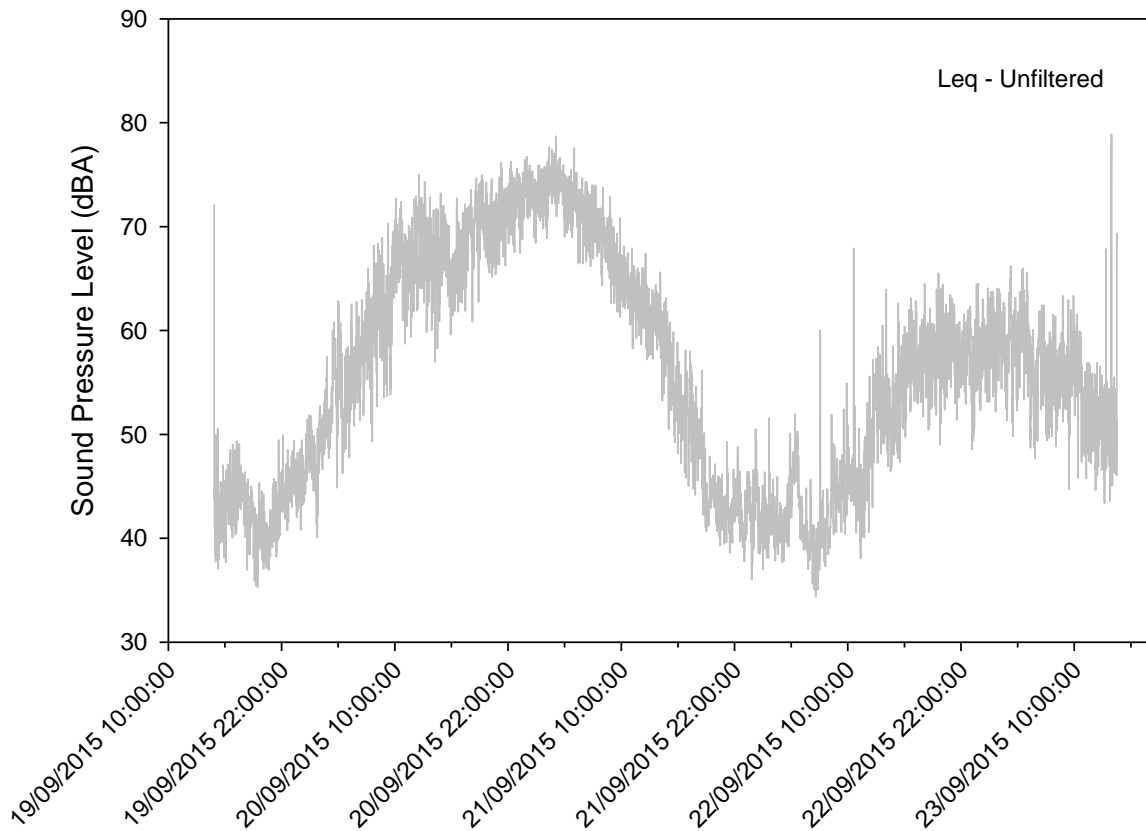


Figure 3. One-minute L_{eq} , L_{max} and L_{min} values recorded at monitoring station R1 at the Meadowbank site during monitoring period 2. Filtered data excludes those measurements taken outside of optimal conditions (set-up, take-down, wind > 4.17 m/s, RH > 90%). At R1 during this second monitoring period, all data was filtered out due to non-optimal weather conditions.

Table 3. Hourly L_{eq} values for monitoring station R1 at the Meadowbank site and hours filtered out due to set-up, take-down or non-optimal weather conditions (monitoring period 1).

Date	Start time	L_{eq} -1h	Filtered
04/07/2015	2:00:00 PM	70.51	yes-set up
	3:00:00 PM	56.68	yes-set up
	4:00:00 PM	57.35	
	5:00:00 PM	34.22	
	6:00:00 PM	33.32	
	7:00:00 PM	30.13	
	8:00:00 PM	35.49	
	9:00:00 PM	39.43	
	10:00:00 PM	36.66	
	11:00:00 PM	33.97	

Date	Start time	L _{eq} -1h	Filtered
05/07/2015	12:00:00 AM	30.24	
	1:00:00 AM	36.57	
	2:00:00 AM	34.83	
	3:00:00 AM	33.09	
	4:00:00 AM	35.39	
	5:00:00 AM	35.46	
	6:00:00 AM	42.97	
	7:00:00 AM	56.23	
	8:00:00 AM	57.11	
	9:00:00 AM	49.89	
	10:00:00 AM	52.12	y
	11:00:00 AM	48.50	y
	12:00:00 PM	36.26	y
	1:00:00 PM	51.06	y
	2:00:00 PM	54.19	
	3:00:00 PM	53.53	
	4:00:00 PM	58.88	y
	5:00:00 PM	44.36	y
	6:00:00 PM	43.98	y
	7:00:00 PM	45.14	y
	8:00:00 PM	41.52	y
	9:00:00 PM	38.49	y
	10:00:00 PM	42.97	y
	11:00:00 PM	42.41	y
06/07/2015	12:00:00 AM	39.61	y
	1:00:00 AM	40.78	
	2:00:00 AM	39.06	y
	3:00:00 AM	42.20	y
	4:00:00 AM	38.29	
	5:00:00 AM	37.78	
	6:00:00 AM	42.28	
	7:00:00 AM	46.00	
	8:00:00 AM	47.25	
	9:00:00 AM	54.84	
	10:00:00 AM	51.15	
	11:00:00 AM	55.19	
	12:00:00 PM	42.46	
	1:00:00 PM	47.88	y
	2:00:00 PM	36.93	
	3:00:00 PM	50.42	
	4:00:00 PM	34.41	
	5:00:00 PM	48.13	
	6:00:00 PM	39.32	
	7:00:00 PM	40.62	

Date	Start time	L _{eq} -1h	Filtered
	8:00:00 PM	41.31	y
	9:00:00 PM	50.58	y
	10:00:00 PM	47.86	y
	11:00:00 PM	46.68	y
07/07/2015	12:00:00 AM	41.63	y
	1:00:00 AM	44.78	y
	2:00:00 AM	46.49	y
	3:00:00 AM	45.79	y
	4:00:00 AM	47.67	y
	5:00:00 AM	49.03	y
	6:00:00 AM	47.06	y
	7:00:00 AM	47.35	y
	8:00:00 AM	46.04	y
	9:00:00 AM	48.98	y
	10:00:00 AM	64.61	y
	11:00:00 AM	43.72	y
	12:00:00 PM	56.30	y
	1:00:00 PM	60.63	y
	2:00:00 PM	56.24	y
	3:00:00 PM	59.00	y
	4:00:00 PM	42.49	y
	5:00:00 PM	44.03	y
	6:00:00 PM	40.50	y
	7:00:00 PM	38.85	y
	8:00:00 PM	39.32	y
	9:00:00 PM	39.59	y
	10:00:00 PM	40.93	y
	11:00:00 PM	42.43	y
08/07/2015	12:00:00 AM	43.84	y
	1:00:00 AM	41.81	y
	2:00:00 AM	40.49	y
	3:00:00 AM	42.24	y
	4:00:00 AM	41.12	y
	5:00:00 AM	43.46	y
	6:00:00 AM	42.73	y
	7:00:00 AM	42.43	y
	8:00:00 AM	42.20	y

Table 4. Hourly L_{eq} values for monitoring station R1 at the Meadowbank site and hours filtered out due to set-up, take-down or non-optimal weather conditions (monitoring period 2).

Date	Start time	L _{eq} -1h	Filtered
09/19/2015	2:00:00 PM	62.69	y
	3:00:00 PM	43.71	y
	4:00:00 PM	44.69	y

Date	Start time	L _{eq} -1h	Filtered
	5:00:00 PM	45.07	y
	6:00:00 PM	43.04	y
	7:00:00 PM	40.69	y
	8:00:00 PM	40.36	y
	9:00:00 PM	43.35	y
	10:00:00 PM	44.70	y
	11:00:00 PM	45.90	y
09/20/2015	12:00:00 AM	47.37	y
	1:00:00 AM	47.74	y
	2:00:00 AM	51.72	y
	3:00:00 AM	55.25	y
	4:00:00 AM	56.15	y
	5:00:00 AM	56.77	y
	6:00:00 AM	58.52	y
	7:00:00 AM	61.69	y
	8:00:00 AM	63.13	y
	9:00:00 AM	64.56	y
	10:00:00 AM	68.47	y
	11:00:00 AM	66.48	y
	12:00:00 PM	69.98	y
	1:00:00 PM	68.85	y
	2:00:00 PM	68.14	y
	3:00:00 PM	67.73	y
	4:00:00 PM	66.74	y
	5:00:00 PM	68.92	y
	6:00:00 PM	70.83	y
	7:00:00 PM	71.24	y
	8:00:00 PM	69.94	y
	9:00:00 PM	72.09	y
	10:00:00 PM	72.89	y
	11:00:00 PM	73.50	y
09/21/2015	12:00:00 AM	73.29	y
	1:00:00 AM	73.46	y
	2:00:00 AM	74.53	y
	3:00:00 AM	74.52	y
	4:00:00 AM	72.75	y
	5:00:00 AM	72.52	y
	6:00:00 AM	71.27	y
	7:00:00 AM	70.28	y
	8:00:00 AM	69.57	y
	9:00:00 AM	66.63	y
	10:00:00 AM	64.92	y
	11:00:00 AM	63.46	y
	12:00:00 PM	62.66	y

Date	Start time	L _{eq} -1h	Filtered
	1:00:00 PM	61.21	y
	2:00:00 PM	60.36	y
	3:00:00 PM	55.64	y
	4:00:00 PM	52.90	y
	5:00:00 PM	51.90	y
	6:00:00 PM	48.50	y
	7:00:00 PM	44.39	y
	8:00:00 PM	42.89	y
	9:00:00 PM	42.92	y
	10:00:00 PM	42.95	y
	11:00:00 PM	43.14	y
09/22/2015	12:00:00 AM	43.67	y
	1:00:00 AM	42.46	y
	2:00:00 AM	41.81	y
	3:00:00 AM	43.53	y
	4:00:00 AM	46.60	y
	5:00:00 AM	40.59	y
	6:00:00 AM	39.11	y
	7:00:00 AM	45.58	y
	8:00:00 AM	44.77	y
	9:00:00 AM	45.84	y
	10:00:00 AM	51.59	y
	11:00:00 AM	45.18	y
	12:00:00 PM	51.04	y
	1:00:00 PM	53.87	y
	2:00:00 PM	53.07	y
	3:00:00 PM	55.52	y
	4:00:00 PM	57.76	y
	5:00:00 PM	57.77	y
	6:00:00 PM	58.02	y
	7:00:00 PM	59.32	y
	8:00:00 PM	59.54	y
	9:00:00 PM	59.06	y
	10:00:00 PM	58.43	y
	11:00:00 PM	58.11	y
09/23/2015	12:00:00 AM	58.89	y
	1:00:00 AM	59.60	y
	2:00:00 AM	59.49	y
	3:00:00 AM	60.46	y
	4:00:00 AM	61.36	y
	5:00:00 AM	57.03	y
	6:00:00 AM	58.41	y
	7:00:00 AM	56.20	y
	8:00:00 AM	56.57	y

Date	Start time	L _{eq} -1h	Filtered
	9:00:00 AM	57.38	y
	10:00:00 AM	56.54	y
	11:00:00 AM	52.86	y
	12:00:00 PM	51.85	y
	1:00:00 PM	62.40	y
	2:00:00 PM	57.68	y

Table 5. Weather conditions for monitoring station R1 at the Meadowbank site. Hours for which average wind speed >4.17 m/s or relative humidity > 90% are indicated in grey (monitoring period 1).

Date	Start Time	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max Wind Speed (m/s)
04/07/2015	3:00:00 PM	12.33	54.80	2.61	4.84
04/07/2015	4:00:00 PM	12.95	52.10	2.31	4.14
04/07/2015	5:00:00 PM	12.97	55.14	2.45	5.08
04/07/2015	6:00:00 PM	13.26	53.62	2.44	4.53
04/07/2015	7:00:00 PM	13.77	51.52	2.33	4.04
04/07/2015	8:00:00 PM	14.10	48.58	2.35	4.37
04/07/2015	9:00:00 PM	14.05	48.31	2.58	4.25
04/07/2015	10:00:00 PM	13.84	51.52	2.77	4.08
04/07/2015	11:00:00 PM	12.87	58.46	2.69	3.29
05/07/2015	12:00:00 AM	10.37	65.99	1.42	2.71
05/07/2015	1:00:00 AM	9.48	72.34	1.05	2.18
05/07/2015	2:00:00 AM	7.27	79.26	0.47	1.76
05/07/2015	3:00:00 AM	7.31	78.79	0.59	1.08
05/07/2015	4:00:00 AM	6.03	83.00	1.16	1.76
05/07/2015	5:00:00 AM	6.90	75.37	1.14	1.84
05/07/2015	6:00:00 AM	7.97	77.45	0.99	1.73
05/07/2015	7:00:00 AM	8.81	71.91	2.19	3.12
05/07/2015	8:00:00 AM	10.42	64.90	2.71	3.98
05/07/2015	9:00:00 AM	11.87	59.34	3.66	4.65
05/07/2015	10:00:00 AM	12.66	56.33	4.65	5.78
05/07/2015	11:00:00 AM	13.16	57.65	4.85	5.84
05/07/2015	12:00:00 PM	14.32	52.12	4.78	6.10
05/07/2015	1:00:00 PM	14.01	57.70	4.18	5.96
05/07/2015	2:00:00 PM	12.64	60.86	3.31	5.59
05/07/2015	3:00:00 PM	12.39	65.39	2.92	5.14
05/07/2015	4:00:00 PM	12.37	65.26	4.81	6.59
05/07/2015	5:00:00 PM	14.57	59.81	6.69	8.55
05/07/2015	6:00:00 PM	14.78	59.73	7.24	9.25
05/07/2015	7:00:00 PM	14.21	59.00	7.14	9.09

Date	Start Time	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max Wind Speed (m/s)
05/07/2015	8:00:00 PM	14.04	60.86	7.27	9.51
05/07/2015	9:00:00 PM	12.85	63.94	5.55	6.68
05/07/2015	10:00:00 PM	11.65	68.35	4.55	7.12
05/07/2015	11:00:00 PM	12.42	64.83	6.48	9.09
06/07/2015	12:00:00 AM	11.41	66.33	6.45	8.31
06/07/2015	1:00:00 AM	10.62	70.39	3.01	7.08
06/07/2015	2:00:00 AM	9.51	79.73	4.36	6.78
06/07/2015	3:00:00 AM	8.86	79.76	5.02	6.84
06/07/2015	4:00:00 AM	8.13	78.94	3.99	6.21
06/07/2015	5:00:00 AM	8.25	78.77	2.07	4.02
06/07/2015	6:00:00 AM	8.55	81.90	1.84	2.90
06/07/2015	7:00:00 AM	8.51	84.40	2.34	4.06
06/07/2015	8:00:00 AM	9.07	88.00	2.35	4.02
06/07/2015	9:00:00 AM	8.69	89.40	2.92	4.45
06/07/2015	10:00:00 AM	9.03	86.50	2.89	4.78
06/07/2015	11:00:00 AM	9.20	88.70	3.92	5.57
06/07/2015	12:00:00 PM	9.08	90.00	3.71	5.10
06/07/2015	1:00:00 PM	10.07	86.10	4.26	5.74
06/07/2015	2:00:00 PM	11.51	83.00	2.28	3.94
06/07/2015	3:00:00 PM	12.50	88.40	2.47	3.59
06/07/2015	4:00:00 PM	13.45	74.15	2.02	3.04
06/07/2015	5:00:00 PM	14.86	67.87	1.77	3.06
06/07/2015	6:00:00 PM	14.33	76.74	2.33	4.27
06/07/2015	7:00:00 PM	13.27	87.70	4.16	5.84
06/07/2015	8:00:00 PM	11.43	92.60	4.60	5.84
06/07/2015	9:00:00 PM	10.79	90.10	5.12	8.27
06/07/2015	10:00:00 PM	8.77	97.30	6.35	8.68
06/07/2015	11:00:00 PM	7.10	99.20	6.66	8.15
07/07/2015	12:00:00 AM	6.69	98.90	5.55	7.47
07/07/2015	1:00:00 AM	6.48	100.00	5.64	8.06
07/07/2015	2:00:00 AM	5.98	100.00	6.72	8.94
07/07/2015	3:00:00 AM	5.60	100.00	7.39	9.84
07/07/2015	4:00:00 AM	5.01	100.00	6.70	10.19
07/07/2015	5:00:00 AM	4.60	100.00	6.82	9.58
07/07/2015	6:00:00 AM	4.45	100.00	6.84	9.39
07/07/2015	7:00:00 AM	4.49	100.00	7.01	9.86
07/07/2015	8:00:00 AM	4.44	100.00	7.06	9.98
07/07/2015	9:00:00 AM	4.46	100.00	7.83	9.70

Date	Start Time	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max Wind Speed (m/s)
07/07/2015	10:00:00 AM	5.09	94.90	7.00	8.94
07/07/2015	11:00:00 AM	5.97	89.40	6.61	8.39
07/07/2015	12:00:00 PM	6.58	84.10	6.31	8.96
07/07/2015	1:00:00 PM	7.42	85.40	6.82	8.84
07/07/2015	2:00:00 PM	7.25	83.80	6.18	8.58
07/07/2015	3:00:00 PM	7.43	81.80	6.38	8.98
07/07/2015	4:00:00 PM	7.42	88.00	6.21	8.09
07/07/2015	5:00:00 PM	7.09	96.70	5.99	7.96
07/07/2015	6:00:00 PM	6.70	99.10	6.40	8.17
07/07/2015	7:00:00 PM	6.53	100.00	5.40	7.47
07/07/2015	8:00:00 PM	6.94	100.00	4.24	6.88
07/07/2015	9:00:00 PM	7.71	99.70	5.49	7.35
07/07/2015	10:00:00 PM	7.66	100.00	5.00	6.90
07/07/2015	11:00:00 PM	7.56	100.00	5.48	7.70
08/07/2015	12:00:00 AM	7.32	100.00	5.53	7.88
08/07/2015	1:00:00 AM	6.54	100.00	5.85	8.45
08/07/2015	2:00:00 AM	6.83	100.00	5.89	7.45
08/07/2015	3:00:00 AM	7.06	100.00	5.50	7.15
08/07/2015	4:00:00 AM	7.01	100.00	6.25	8.35
08/07/2015	5:00:00 AM	6.81	100.00	5.96	7.43
08/07/2015	6:00:00 AM	6.75	100.00	6.11	8.68
08/07/2015	7:00:00 AM	6.68	100.00	5.76	8.13
08/07/2015	8:00:00 AM	6.94	100.00	6.09	8.27

Table 6. Weather conditions for monitoring station R1 at the Meadowbank site. Hours for which average wind speed > 4.17 m/s or relative humidity > 90% are indicated in grey (monitoring period 2).

Date	Start Time	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max Wind Speed (m/s)
19/09/2015	2:00:00 PM	4.56	66.09	5.38	8.23
19/09/2015	3:00:00 PM	4.86	60.34	5.34	8.76
19/09/2015	4:00:00 PM	5.19	58.71	5.07	7.51
19/09/2015	5:00:00 PM	5.82	47.13	5.39	7.35
19/09/2015	6:00:00 PM	5.73	54.92	5.79	7.86
19/09/2015	7:00:00 PM	5.31	59.59	5.51	7.90
19/09/2015	8:00:00 PM	4.82	60.82	5.17	7.90
19/09/2015	9:00:00 PM	4.38	63.81	4.74	7.12
19/09/2015	10:00:00 PM	3.88	68.92	4.98	7.76
19/09/2015	11:00:00 PM	3.34	73.56	4.56	6.94

Date	Start Time	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max Wind Speed (m/s)
20/09/2015	12:00:00 AM	3.11	77.97	5.18	8.70
20/09/2015	1:00:00 AM	2.89	83.00	5.79	10.00
20/09/2015	2:00:00 AM	2.00	89.80	5.72	8.33
20/09/2015	3:00:00 AM	1.64	92.10	6.18	9.31
20/09/2015	4:00:00 AM	1.58	86.40	7.20	11.62
20/09/2015	5:00:00 AM	1.48	85.70	7.69	12.27
20/09/2015	6:00:00 AM	1.40	89.00	9.10	13.97
20/09/2015	7:00:00 AM	1.48	84.70	9.89	13.94
20/09/2015	8:00:00 AM	1.57	87.30	10.09	15.35
20/09/2015	9:00:00 AM	1.98	82.20	11.46	17.03
20/09/2015	10:00:00 AM	2.47	80.90	11.63	17.23
20/09/2015	11:00:00 AM	2.74	79.93	12.60	18.74
20/09/2015	12:00:00 PM	2.95	81.00	12.79	18.27
20/09/2015	1:00:00 PM	2.88	79.63	14.09	18.42
20/09/2015	2:00:00 PM	2.87	78.41	13.09	17.78
20/09/2015	3:00:00 PM	2.97	81.80	12.04	17.48
20/09/2015	4:00:00 PM	2.24	98.20	13.15	18.58
20/09/2015	5:00:00 PM	1.51	100.00	13.32	17.68
20/09/2015	6:00:00 PM	0.99	100.00	12.91	18.48
20/09/2015	7:00:00 PM	0.48	100.00	12.83	18.97
20/09/2015	8:00:00 PM	0.43	100.00	13.06	19.46
20/09/2015	9:00:00 PM	0.27	100.00	13.44	21.03
20/09/2015	10:00:00 PM	0.15	100.00	13.41	20.15
20/09/2015	11:00:00 PM	0.22	100.00	13.92	21.25
21/09/2015	12:00:00 AM	0.36	100.00	14.62	20.27
21/09/2015	1:00:00 AM	0.77	100.00	15.91	22.38
21/09/2015	2:00:00 AM	0.85	100.00	15.61	21.99
21/09/2015	3:00:00 AM	0.58	100.00	14.63	21.21
21/09/2015	4:00:00 AM	0.64	100.00	14.71	21.07
21/09/2015	5:00:00 AM	0.70	100.00	15.77	21.78
21/09/2015	6:00:00 AM	0.66	100.00	15.19	19.38
21/09/2015	7:00:00 AM	0.70	100.00	15.47	19.89
21/09/2015	8:00:00 AM	0.72	100.00	14.99	20.46
21/09/2015	9:00:00 AM	0.90	100.00	14.14	19.68
21/09/2015	10:00:00 AM	1.15	100.00	14.07	19.48
21/09/2015	11:00:00 AM	0.86	100.00	12.42	18.35
21/09/2015	12:00:00 PM	0.81	100.00	11.55	16.80
21/09/2015	1:00:00 PM	1.29	94.20	11.37	16.48

Date	Start Time	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max Wind Speed (m/s)
21/09/2015	2:00:00 PM	1.56	96.90	9.93	15.54
21/09/2015	3:00:00 PM	1.60	93.50	8.81	13.05
21/09/2015	4:00:00 PM	2.25	88.10	8.75	14.19
21/09/2015	5:00:00 PM	2.38	86.70	7.75	11.72
21/09/2015	6:00:00 PM	2.24	85.00	7.50	11.90
21/09/2015	7:00:00 PM	2.01	89.10	6.76	10.70
21/09/2015	8:00:00 PM	1.93	88.70	6.32	9.17
21/09/2015	9:00:00 PM	1.88	93.20	5.78	8.70
21/09/2015	10:00:00 PM	1.82	92.10	5.92	8.31
21/09/2015	11:00:00 PM	1.76	87.80	6.17	8.76
22/09/2015	12:00:00 AM	1.54	87.90	5.84	9.15
22/09/2015	1:00:00 AM	1.25	87.80	5.65	8.60
22/09/2015	2:00:00 AM	0.92	87.60	5.52	8.27
22/09/2015	3:00:00 AM	0.68	88.90	5.71	8.19
22/09/2015	4:00:00 AM	0.41	86.80	5.14	8.39
22/09/2015	5:00:00 AM	0.14	85.50	6.96	9.72
22/09/2015	6:00:00 AM	-0.26	90.90	5.24	8.94
22/09/2015	7:00:00 AM	-0.58	90.70	5.07	8.47
22/09/2015	8:00:00 AM	-0.52	90.60	5.29	7.88
22/09/2015	9:00:00 AM	-0.33	91.60	5.91	8.25
22/09/2015	10:00:00 AM	-0.14	88.50	5.60	7.78
22/09/2015	11:00:00 AM	0.32	83.60	5.95	8.13
22/09/2015	12:00:00 PM	0.75	88.00	5.78	8.29
22/09/2015	1:00:00 PM	1.19	82.00	7.50	10.33
22/09/2015	2:00:00 PM	1.06	81.30	8.08	10.88
22/09/2015	3:00:00 PM	1.20	79.20	8.15	12.66
22/09/2015	4:00:00 PM	1.89	76.41	8.63	13.05
22/09/2015	5:00:00 PM	2.07	79.80	9.27	12.86
22/09/2015	6:00:00 PM	1.78	81.90	9.25	12.80
22/09/2015	7:00:00 PM	1.65	86.20	9.54	13.92
22/09/2015	8:00:00 PM	1.59	86.00	9.48	13.66
22/09/2015	9:00:00 PM	1.10	89.60	10.49	14.05
22/09/2015	10:00:00 PM	0.50	95.50	9.82	14.56
22/09/2015	11:00:00 PM	0.28	89.30	9.75	13.48
23/09/2015	12:00:00 AM	0.16	85.80	10.40	14.33
23/09/2015	1:00:00 AM	-0.07	86.60	9.81	14.29
23/09/2015	2:00:00 AM	-0.17	87.10	10.70	14.92
23/09/2015	3:00:00 AM	-0.49	89.90	10.54	14.70

Date	Start Time	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max Wind Speed (m/s)
23/09/2015	4:00:00 AM	-0.46	87.90	9.42	13.56
23/09/2015	5:00:00 AM	-0.49	87.30	9.98	14.11
23/09/2015	6:00:00 AM	-0.54	94.10	10.57	14.23
23/09/2015	7:00:00 AM	-1.14	87.70	10.17	13.99
23/09/2015	8:00:00 AM	-1.93	87.40	10.65	13.35
23/09/2015	9:00:00 AM	-1.82	85.50	10.34	13.86
23/09/2015	10:00:00 AM	-1.71	80.70	10.47	13.78
23/09/2015	11:00:00 AM	-1.64	87.30	9.64	12.39
23/09/2015	12:00:00 PM	-1.44	83.90	9.69	12.80
23/09/2015	1:00:00 PM	-1.89	76.84	9.07	12.50
23/09/2015	2:00:00 PM	-1.76	76.74	9.04	13.70

3.2 R2

One-minute L_{eq} , maximum (L_{max}) and minimum (L_{min}) values over the monitoring period are shown in Figure 4.

Hourly L_{eq} values were calculated as described in Section 2.4, and are shown in Table 7, and data points filtered out from subsequent calculations are indicated.

Weather data for noise monitoring dates at R2 is shown in Table 8. Wind exceeded 4.17 m/s for more than half of the monitoring period, with gusts up to 12.87 m/s. Although monitoring was continued for 169 h, one entire monitoring period (94 h; June 8 - 12) could not be used due to an instrument recording error, and a further 55 h of data were filtered out due to weather conditions. Therefore a total of 21 h of data were available for this site.

Audible noises noted in the field log at this location include airplanes, helicopters, and birds. Activities contributing to noise at this location included regular camp activities and increased helicopter traffic due to exploration activities (landing nearby).

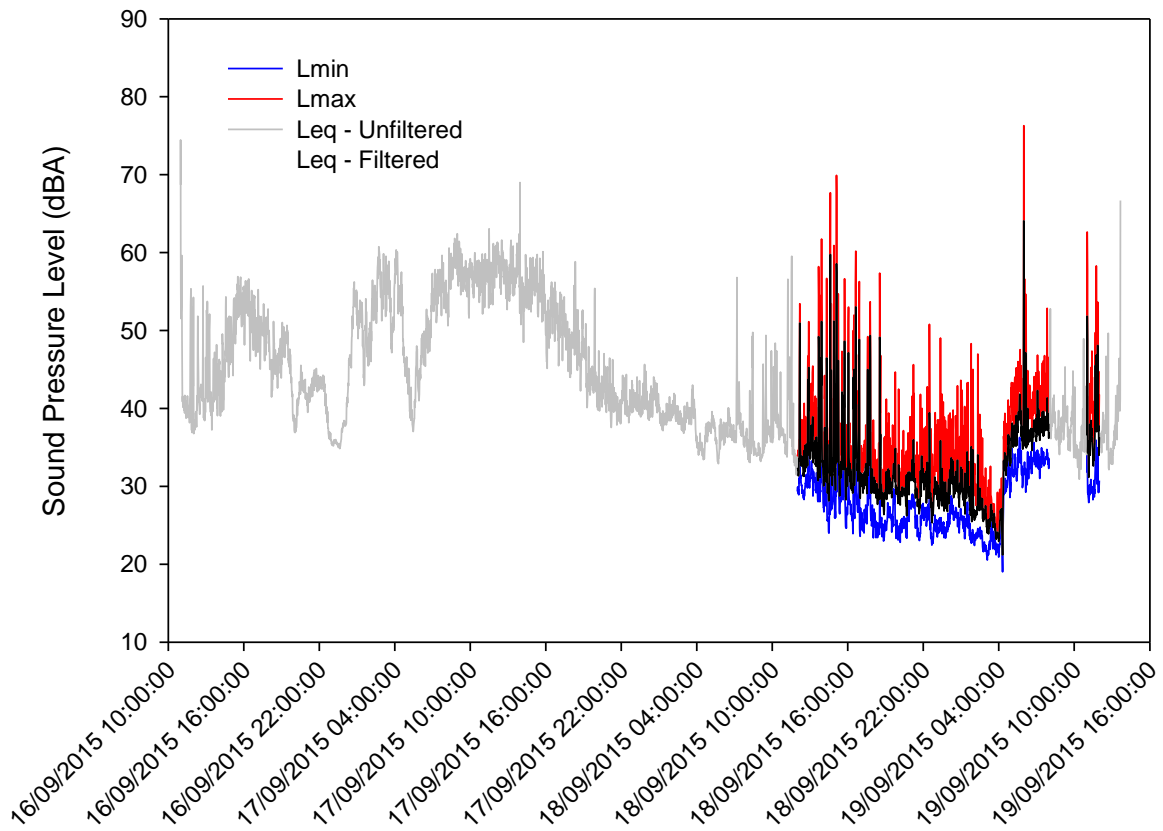


Figure 4. One-minute L_{eq} , L_{max} and L_{min} values recorded at monitoring station R2 at the Meadowbank site. Filtered data excludes those measurements taken outside of optimal conditions (set-up, take-down, wind > 4.17 m/s, RH > 90%).

Table 7. Hourly L_{eq} values for monitoring station R2 at the Meadowbank site and hours filtered out due to set-up, take-down or non-optimal weather conditions.

Date	Start time	L_{eq} -1h	Filtered
9/16/15	10:00:00 AM	72.46	y
	11:00:00 AM	48.54	y
	12:00:00 PM	44.69	y
	1:00:00 PM	45.91	y
	2:00:00 PM	47.37	y
	3:00:00 PM	53.05	y
	4:00:00 PM	53.02	y
	5:00:00 PM	50.38	y
	6:00:00 PM	46.32	y
	7:00:00 PM	47.29	y
	8:00:00 PM	41.78	y

Date	Start time	L _{eq} -1h	Filtered
	9:00:00 PM	42.81	y
	10:00:00 PM	41.32	y
	11:00:00 PM	36.09	y
9/17/15	12:00:00 AM	50.18	y
	1:00:00 AM	50.51	y
	2:00:00 AM	55.45	y
	3:00:00 AM	55.18	y
	4:00:00 AM	54.85	y
	5:00:00 AM	42.74	y
	6:00:00 AM	50.02	y
	7:00:00 AM	55.57	y
	8:00:00 AM	58.14	y
	9:00:00 AM	57.50	y
	10:00:00 AM	57.33	y
	11:00:00 AM	57.61	y
	12:00:00 PM	58.53	y
	1:00:00 PM	58.55	y
	2:00:00 PM	55.74	y
	3:00:00 PM	55.95	y
	4:00:00 PM	52.24	y
	5:00:00 PM	50.80	y
	6:00:00 PM	49.81	y
	7:00:00 PM	46.11	y
	8:00:00 PM	42.41	y
	9:00:00 PM	41.15	y
	10:00:00 PM	41.19	y
	11:00:00 PM	41.42	y
9/18/15	12:00:00 AM	40.94	y
	1:00:00 AM	39.08	y
	2:00:00 AM	39.13	y
	3:00:00 AM	39.53	y
	4:00:00 AM	35.86	y
	5:00:00 AM	36.86	y
	6:00:00 AM	37.40	y
	7:00:00 AM	41.79	y
	8:00:00 AM	38.97	y
	9:00:00 AM	38.98	y
	10:00:00 AM	40.52	y
	11:00:00 AM	46.19	y
	12:00:00 PM	38.35	
	1:00:00 PM	39.90	
	2:00:00 PM	43.93	
	3:00:00 PM	44.28	
	4:00:00 PM	40.45	

Date	Start time	L _{eq} -1h	Filtered
	5:00:00 PM	37.45	
	6:00:00 PM	35.52	
	7:00:00 PM	30.57	
	8:00:00 PM	29.71	
	9:00:00 PM	30.67	
	10:00:00 PM	30.86	
	11:00:00 PM	29.08	
9/19/15	12:00:00 AM	30.58	
	1:00:00 AM	29.65	
	2:00:00 AM	27.39	
	3:00:00 AM	25.21	
	4:00:00 AM	32.26	
	5:00:00 AM	46.85	
	6:00:00 AM	38.59	
	7:00:00 AM	38.02	
	8:00:00 AM	39.71	y
	9:00:00 AM	38.73	y
	10:00:00 AM	38.29	y
	11:00:00 AM	40.30	
	12:00:00 PM	38.53	y
	1:00:00 PM	50.88	y

Table 8. Weather conditions for monitoring station R2 at the Meadowbank site. Hours for which average wind speed > 4.17 m/s or relative humidity > 90% are indicated in grey.

Date	Start Time	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max Wind Speed (m/s)
16/09/2015	10:00:00 AM	3.69	79.72	5.72	7.15
16/09/2015	11:00:00 AM	4.86	74.25	5.56	7.17
16/09/2015	12:00:00 PM	6.11	70.01	4.96	6.35
16/09/2015	1:00:00 PM	7.14	68.92	5.12	7.04
16/09/2015	2:00:00 PM	8.01	60.07	5.37	6.86
16/09/2015	3:00:00 PM	8.85	53.74	5.89	7.86
16/09/2015	4:00:00 PM	9.18	50.19	7.03	10.07
16/09/2015	5:00:00 PM	9.19	52.25	6.80	9.37
16/09/2015	6:00:00 PM	8.93	55.30	6.80	9.27
16/09/2015	7:00:00 PM	8.32	59.17	6.25	8.15
16/09/2015	8:00:00 PM	7.08	69.60	5.91	8.19
16/09/2015	9:00:00 PM	5.36	76.79	5.95	7.37
16/09/2015	10:00:00 PM	4.49	79.38	5.62	6.94
16/09/2015	11:00:00 PM	3.98	82.20	4.69	6.47
17/09/2015	12:00:00 AM	3.81	87.70	4.46	6.70

Date	Start Time	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max Wind Speed (m/s)
17/09/2015	1:00:00 AM	3.44	86.20	5.61	8.06
17/09/2015	2:00:00 AM	2.73	88.90	5.78	8.09
17/09/2015	3:00:00 AM	2.52	89.60	6.84	10.64
17/09/2015	4:00:00 AM	2.19	91.50	6.63	8.96
17/09/2015	5:00:00 AM	1.85	89.70	6.32	8.72
17/09/2015	6:00:00 AM	2.02	93.00	5.79	8.31
17/09/2015	7:00:00 AM	1.66	98.60	7.81	10.09
17/09/2015	8:00:00 AM	1.23	99.70	8.98	11.15
17/09/2015	9:00:00 AM	1.11	99.50	9.01	11.43
17/09/2015	10:00:00 AM	1.33	93.40	9.28	12.66
17/09/2015	11:00:00 AM	1.60	89.70	10.30	12.76
17/09/2015	12:00:00 PM	2.02	86.50	9.43	12.41
17/09/2015	1:00:00 PM	2.77	81.70	9.88	12.80
17/09/2015	2:00:00 PM	3.48	78.71	9.68	12.64
17/09/2015	3:00:00 PM	3.84	75.82	9.65	12.03
17/09/2015	4:00:00 PM	3.96	79.65	9.52	12.60
17/09/2015	5:00:00 PM	4.16	74.64	8.31	10.64
17/09/2015	6:00:00 PM	4.24	76.26	7.89	10.60
17/09/2015	7:00:00 PM	4.01	79.11	7.60	10.25
17/09/2015	8:00:00 PM	3.91	79.18	6.36	8.74
17/09/2015	9:00:00 PM	3.62	86.50	5.64	7.74
17/09/2015	10:00:00 PM	3.17	88.70	5.48	7.96
17/09/2015	11:00:00 PM	2.75	93.60	5.65	7.57
18/09/2015	12:00:00 AM	2.77	92.70	5.80	7.78
18/09/2015	1:00:00 AM	2.85	93.50	5.60	7.94
18/09/2015	2:00:00 AM	2.88	95.20	5.33	7.17
18/09/2015	3:00:00 AM	2.81	96.80	5.29	6.68
18/09/2015	4:00:00 AM	2.64	98.00	4.91	6.72
18/09/2015	5:00:00 AM	2.49	98.40	4.54	6.29
18/09/2015	6:00:00 AM	2.32	97.70	4.76	6.51
18/09/2015	7:00:00 AM	2.18	98.00	4.80	6.33
18/09/2015	8:00:00 AM	2.06	97.10	4.10	5.66
18/09/2015	9:00:00 AM	2.37	96.30	3.79	5.17
18/09/2015	10:00:00 AM	2.54	92.60	4.10	5.98
18/09/2015	11:00:00 AM	2.79	85.90	4.64	6.08
18/09/2015	12:00:00 PM	3.23	78.64	4.01	6.06
18/09/2015	1:00:00 PM	3.52	71.25	4.12	6.35
18/09/2015	2:00:00 PM	3.86	67.92	3.89	7.21

Date	Start Time	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max Wind Speed (m/s)
18/09/2015	3:00:00 PM	4.45	65.68	3.75	6.21
18/09/2015	4:00:00 PM	5.24	61.82	3.84	5.96
18/09/2015	5:00:00 PM	5.36	64.70	3.33	5.21
18/09/2015	6:00:00 PM	5.31	66.12	3.19	5.45
18/09/2015	7:00:00 PM	5.30	63.69	2.67	4.14
18/09/2015	8:00:00 PM	4.62	76.85	1.71	3.57
18/09/2015	9:00:00 PM	3.66	82.10	0.54	1.78
18/09/2015	10:00:00 PM	3.29	83.80	1.13	2.47
18/09/2015	11:00:00 PM	3.14	88.40	1.43	3.12
19/09/2015	12:00:00 AM	2.91	85.40	1.23	2.35
19/09/2015	1:00:00 AM	2.81	85.20	1.55	2.98
19/09/2015	2:00:00 AM	3.10	86.60	1.55	2.59
19/09/2015	3:00:00 AM	3.33	86.60	0.84	1.73
19/09/2015	4:00:00 AM	3.29	83.70	0.30	1.10
19/09/2015	5:00:00 AM	3.04	89.60	1.58	2.86
19/09/2015	6:00:00 AM	2.95	86.80	2.35	3.23
19/09/2015	7:00:00 AM	2.72	89.90	2.50	3.61
19/09/2015	8:00:00 AM	2.41	91.40	2.38	3.59
19/09/2015	9:00:00 AM	2.22	94.40	3.19	4.78
19/09/2015	10:00:00 AM	2.54	92.10	3.89	5.86
19/09/2015	11:00:00 AM	3.15	88.90	4.00	6.17
19/09/2015	12:00:00 PM	3.78	85.80	4.78	6.64
19/09/2015	1:00:00 PM	4.09	80.00	4.78	7.19

3.3 R3

One-minute L_{eq} , maximum (L_{max}) and minimum (L_{min}) values over the monitoring period are shown in Figure 4.

Hourly L_{eq} values were calculated as described in Section 2.4, and are shown in Table 9.

Weather data for noise monitoring dates at R3 is shown in Table 10. Wind speeds exceeded 4.17 m/s for the majority of the monitoring period, with gusts up to 14.62 m/s, and rain occurred for a substantial portion as well. A total of 8 out of 76 h of data collected were usable.

Audible noises noted in the field log at this location include birds, insects, traffic and pit noise. Activities contributing to the acoustic environment at this location include Vault road traffic and increased helicopter activity due to exploration works.

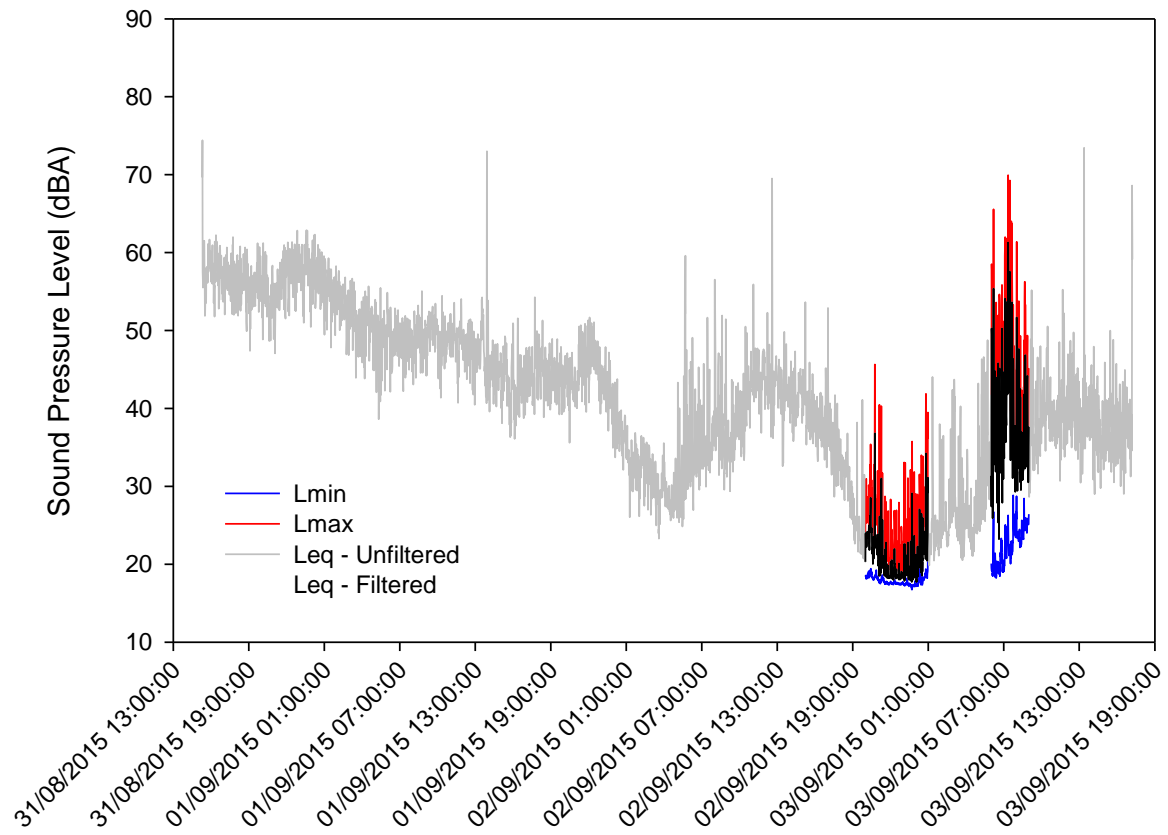


Figure 5. One-minute L_{eq} , L_{max} and L_{min} values recorded at monitoring station R3 at the Meadowbank site. Filtered data excludes those measurements taken outside of optimal conditions (set-up, take-down, wind > 4.17 m/s, RH > 90%).

Table 9. Hourly L_{eq} values for monitoring station R3 at the Meadowbank site and hours filtered out due to set-up, take-down or non-optimal weather conditions.

Date	Start time	L_{eq} -1 hr	Filtered
08/31/2015	3:00:00 PM	61.63	y
	4:00:00 PM	58.12	y
	5:00:00 PM	57.39	y
	6:00:00 PM	57.20	y
	7:00:00 PM	56.54	y
	8:00:00 PM	55.37	y
	9:00:00 PM	56.42	y
	10:00:00 PM	58.24	y
	11:00:00 PM	58.67	y
1/09/15	12:00:00 AM	58.26	y

Date	Start time	L _{eq} -1 hr	Filtered
	1:00:00 AM	55.68	y
	2:00:00 AM	54.04	y
	3:00:00 AM	52.57	y
	4:00:00 AM	51.17	y
	5:00:00 AM	49.11	y
	6:00:00 AM	49.87	y
	7:00:00 AM	48.72	y
	8:00:00 AM	49.50	y
	9:00:00 AM	50.39	y
	10:00:00 AM	49.02	y
	11:00:00 AM	49.40	y
	12:00:00 PM	47.91	y
	1:00:00 PM	56.19	y
	2:00:00 PM	45.79	y
	3:00:00 PM	44.71	y
	4:00:00 PM	44.08	y
	5:00:00 PM	45.98	y
	6:00:00 PM	45.30	y
	7:00:00 PM	44.38	y
	8:00:00 PM	43.92	y
	9:00:00 PM	46.64	y
	10:00:00 PM	47.24	y
	11:00:00 PM	43.04	y
2/09/15	12:00:00 AM	38.33	y
	1:00:00 AM	33.58	y
	2:00:00 AM	32.72	y
	3:00:00 AM	30.31	y
	4:00:00 AM	29.10	y
	5:00:00 AM	44.79	y
	6:00:00 AM	39.02	y
	7:00:00 AM	39.29	y
	8:00:00 AM	43.69	y
	9:00:00 AM	38.05	y
	10:00:00 AM	42.43	y
	11:00:00 AM	45.61	y
	12:00:00 PM	54.43	y
	1:00:00 PM	42.84	y
	2:00:00 PM	42.41	y
	3:00:00 PM	41.89	y
	4:00:00 PM	39.26	y
	5:00:00 PM	39.03	y
	6:00:00 PM	31.80	y
	7:00:00 PM	28.13	y
	8:00:00 PM	24.76	

Date	Start time	L _{eq} -1 hr	Filtered
	9:00:00 PM	21.05	
	10:00:00 PM	18.85	
	11:00:00 PM	19.97	
3/09/15	12:00:00 AM	24.02	
	1:00:00 AM	29.28	y
	2:00:00 AM	29.70	y
	3:00:00 AM	32.28	y
	4:00:00 AM	28.82	y
	5:00:00 AM	39.25	y
	6:00:00 AM	42.86	
	7:00:00 AM	48.91	
	8:00:00 AM	39.80	
	9:00:00 AM	41.68	y
	10:00:00 AM	41.28	y
	11:00:00 AM	42.58	y
	12:00:00 PM	42.60	y
	1:00:00 PM	55.79	y
	2:00:00 PM	39.08	y
	3:00:00 PM	40.47	y
	4:00:00 PM	38.66	y
	5:00:00 PM	57.65	y

Table 10. Weather conditions for monitoring station R3 at the Meadowbank site. Data for which wind speed > 4.17 m/s or relative humidity > 90% are indicated in grey.

Date	Start Time	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max Wind Speed (m/s)
31/08/2015	3:00:00 PM	8.38	73.45	9.55	13.33
31/08/2015	4:00:00 PM	8.39	74.88	9.45	13.29
31/08/2015	5:00:00 PM	7.93	82.60	9.25	13.43
31/08/2015	6:00:00 PM	7.23	87.40	9.29	14.23
31/08/2015	7:00:00 PM	7.01	90.00	9.42	14.62
31/08/2015	8:00:00 PM	7.07	86.40	9.11	12.78
31/08/2015	9:00:00 PM	6.95	91.30	9.31	12.94
31/08/2015	10:00:00 PM	6.46	94.40	9.20	12.78
31/08/2015	11:00:00 PM	6.33	93.10	9.27	13.47
01/09/2015	12:00:00 AM	6.16	95.10	9.80	13.50
01/09/2015	1:00:00 AM	5.96	95.90	9.26	13.19
01/09/2015	2:00:00 AM	5.88	94.90	8.62	11.62
01/09/2015	3:00:00 AM	5.92	96.10	7.94	11.39
01/09/2015	4:00:00 AM	5.76	96.30	7.85	11.17

Date	Start Time	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max Wind Speed (m/s)
01/09/2015	5:00:00 AM	5.92	93.80	7.43	11.29
01/09/2015	6:00:00 AM	5.92	94.10	7.05	10.49
01/09/2015	7:00:00 AM	5.83	92.90	7.16	10.35
01/09/2015	8:00:00 AM	5.97	93.40	7.09	10.00
01/09/2015	9:00:00 AM	6.10	90.50	7.32	10.11
01/09/2015	10:00:00 AM	6.16	88.30	7.80	10.88
01/09/2015	11:00:00 AM	6.19	89.40	7.23	10.47
01/09/2015	12:00:00 PM	6.46	90.70	7.05	10.19
01/09/2015	1:00:00 PM	6.76	83.90	6.97	10.04
01/09/2015	2:00:00 PM	7.11	88.70	6.51	9.55
01/09/2015	3:00:00 PM	7.30	91.40	6.58	9.04
01/09/2015	4:00:00 PM	7.08	94.40	6.09	9.43
01/09/2015	5:00:00 PM	7.43	90.40	5.94	9.17
01/09/2015	6:00:00 PM	7.67	91.50	6.41	9.02
01/09/2015	7:00:00 PM	7.27	94.70	6.21	9.64
01/09/2015	8:00:00 PM	7.13	95.70	6.30	9.23
01/09/2015	9:00:00 PM	7.01	96.40	6.29	8.64
01/09/2015	10:00:00 PM	6.63	98.90	6.60	9.51
01/09/2015	11:00:00 PM	6.47	96.70	6.59	9.35
02/09/2015	12:00:00 AM	6.46	95.60	5.67	8.47
02/09/2015	1:00:00 AM	6.38	96.90	5.12	7.21
02/09/2015	2:00:00 AM	6.32	96.50	4.33	6.02
02/09/2015	3:00:00 AM	6.27	95.90	4.63	6.35
02/09/2015	4:00:00 AM	6.18	94.80	4.68	6.49
02/09/2015	5:00:00 AM	6.09	95.00	4.16	5.78
02/09/2015	6:00:00 AM	6.00	95.30	4.48	6.12
02/09/2015	7:00:00 AM	5.97	96.60	4.46	6.49
02/09/2015	8:00:00 AM	6.16	97.20	4.95	6.57
02/09/2015	9:00:00 AM	6.45	95.30	5.04	7.13
02/09/2015	10:00:00 AM	6.59	95.60	5.15	7.43
02/09/2015	11:00:00 AM	6.87	92.80	6.14	8.08
02/09/2015	12:00:00 PM	7.41	87.90	6.61	8.78
02/09/2015	1:00:00 PM	7.75	87.60	6.67	8.82
02/09/2015	2:00:00 PM	7.87	87.60	6.46	8.72
02/09/2015	3:00:00 PM	8.20	85.20	6.37	9.09
02/09/2015	4:00:00 PM	8.59	80.40	6.00	8.04
02/09/2015	5:00:00 PM	8.75	80.20	5.53	7.66
02/09/2015	6:00:00 PM	8.82	78.20	5.11	7.53

Date	Start Time	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max Wind Speed (m/s)
02/09/2015	7:00:00 PM	8.81	78.19	4.80	6.88
02/09/2015	8:00:00 PM	8.65	81.50	3.88	6.27
02/09/2015	9:00:00 PM	8.37	81.20	3.51	5.35
02/09/2015	10:00:00 PM	8.08	81.10	3.32	4.86
02/09/2015	11:00:00 PM	7.68	84.80	2.63	4.14
03/09/2015	12:00:00 AM	7.46	86.10	1.93	3.33
03/09/2015	1:00:00 AM	7.26	91.70	2.40	4.10
03/09/2015	2:00:00 AM	6.55	90.10	3.31	4.98
03/09/2015	3:00:00 AM	6.06	91.60	3.83	5.35
03/09/2015	4:00:00 AM	5.86	92.40	3.81	5.47
03/09/2015	5:00:00 AM	5.67	91.90	3.39	5.27
03/09/2015	6:00:00 AM	5.69	87.20	2.35	4.10
03/09/2015	7:00:00 AM	5.76	83.80	2.62	3.82
03/09/2015	8:00:00 AM	5.97	84.50	2.53	3.67
03/09/2015	9:00:00 AM	5.63	90.80	2.72	5.65
03/09/2015	10:00:00 AM	6.24	85.00	4.27	6.31
03/09/2015	11:00:00 AM	7.14	71.32	5.11	7.29
03/09/2015	12:00:00 PM	8.02	65.15	5.36	7.82
03/09/2015	1:00:00 PM	8.75	55.97	5.42	9.25
03/09/2015	2:00:00 PM	9.43	49.67	5.09	7.59
03/09/2015	3:00:00 PM	9.98	42.56	5.12	8.25
03/09/2015	4:00:00 PM	10.28	37.32	5.35	7.90
03/09/2015	5:00:00 PM	10.52	37.90	4.91	7.70

3.4 R4

One-minute L_{eq} , maximum (L_{max}) and minimum (L_{min}) values over the monitoring period are shown in Figure 6.

Hourly L_{eq} values were calculated as described in Section 2.4, and are shown in Table 11, along with data filtered out for subsequent calculations.

Weather data for noise monitoring dates at R4 is shown in Table 12. Average hourly wind speeds did not exceed 4.17 m/s, but gusts were up to 6.86 m/s. Only one hour of the 29 recorded was filtered out, due to potential rain (humidity > 90%).

Noises noted in the field log include increased Vault pit activities, Vault road traffic, birds and insects.

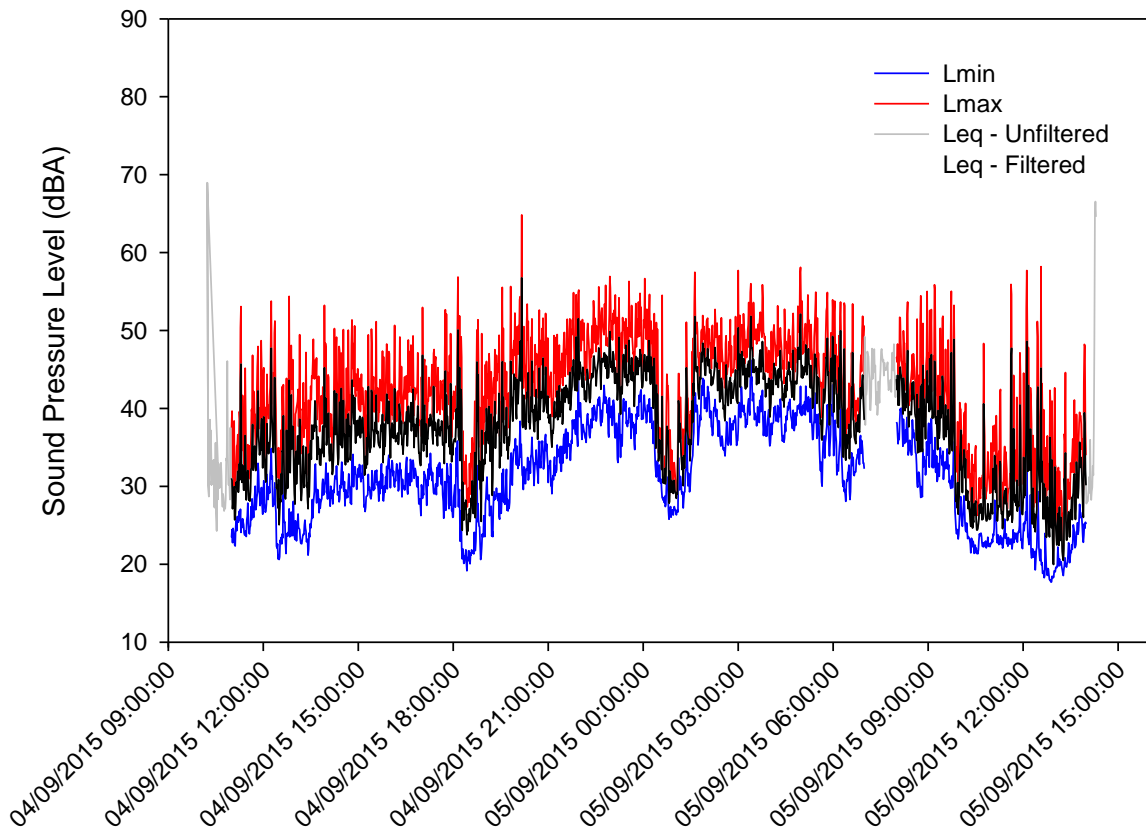


Figure 6. One-minute L_{eq} , L_{max} and L_{min} values recorded at monitoring station R4 at the Meadowbank site. Filtered data excludes those measurements taken outside of optimal conditions (set-up, take-down, wind > 4.17 m/s, RH > 90%).

Table 11. Hourly L_{eq} values for monitoring station R4 at the Meadowbank site and hours filtered out due to set-up, take-down or non-optimal weather conditions.

Date	Start time	L_{eq} -1 h	Filtered
4/09/15	10:00:00 AM	52.42	yes-set up
	11:00:00 AM	35.07	
	12:00:00 PM	37.08	
	1:00:00 PM	36.07	
	2:00:00 PM	37.86	
	3:00:00 PM	37.72	
	4:00:00 PM	37.76	
	5:00:00 PM	38.57	
	6:00:00 PM	37.76	
	7:00:00 PM	39.20	

Date	Start time	L _{eq} -1 h	Filtered
	8:00:00 PM	43.57	
	9:00:00 PM	42.70	
	10:00:00 PM	45.15	
	11:00:00 PM	45.08	
5/09/15	12:00:00 AM	41.96	
	1:00:00 AM	42.97	
	2:00:00 AM	43.73	
	3:00:00 AM	45.76	
	4:00:00 AM	44.60	
	5:00:00 AM	44.34	
	6:00:00 AM	41.90	
	7:00:00 AM	44.75	y
	8:00:00 AM	41.72	
	9:00:00 AM	40.63	
	10:00:00 AM	30.22	
	11:00:00 AM	34.45	
	12:00:00 PM	35.96	
	1:00:00 PM	30.20	
	2:00:00 PM	57.48	yes-take down

Table 12. Weather conditions for monitoring station R4 at the Meadowbank site. Hours for which average wind speed > 4.17 m/s or relative humidity > 90% are indicated in grey.

Date	Start Time	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max Wind Speed (m/s)
04/09/2015	10:00:00 AM	5.55	58.33	2.21	3.86
04/09/2015	11:00:00 AM	6.50	51.45	1.27	2.49
04/09/2015	12:00:00 PM	7.53	41.76	2.28	4.45
04/09/2015	1:00:00 PM	8.36	43.11	3.39	5.78
04/09/2015	2:00:00 PM	8.82	41.69	3.75	6.47
04/09/2015	3:00:00 PM	9.28	36.48	3.42	6.12
04/09/2015	4:00:00 PM	9.67	36.41	3.63	6.86
04/09/2015	5:00:00 PM	9.61	38.71	3.09	5.33
04/09/2015	6:00:00 PM	9.61	41.29	2.93	5.80
04/09/2015	7:00:00 PM	9.62	41.56	2.78	4.68
04/09/2015	8:00:00 PM	9.27	47.36	2.16	3.55
04/09/2015	9:00:00 PM	8.00	54.98	1.90	2.69
04/09/2015	10:00:00 PM	7.05	61.96	2.48	3.10
04/09/2015	11:00:00 PM	6.60	60.00	2.47	3.47
05/09/2015	12:00:00 AM	6.09	68.94	2.55	3.37
05/09/2015	1:00:00 AM	5.02	71.99	1.53	2.71
05/09/2015	2:00:00 AM	4.71	79.83	1.21	1.94

Date	Start Time	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max Wind Speed (m/s)
05/09/2015	3:00:00 AM	4.27	84.30	0.72	1.65
05/09/2015	4:00:00 AM	4.22	85.60	0.69	1.20
05/09/2015	5:00:00 AM	4.14	86.10	0.72	1.65
05/09/2015	6:00:00 AM	3.55	89.70	0.43	1.45
05/09/2015	7:00:00 AM	3.56	91.10	0.50	1.24
05/09/2015	8:00:00 AM	3.97	88.30	0.37	1.37
05/09/2015	9:00:00 AM	5.79	84.40	0.53	1.25
05/09/2015	10:00:00 AM	6.95	68.48	0.90	3.43
05/09/2015	11:00:00 AM	7.59	56.06	2.58	3.45
05/09/2015	12:00:00 PM	8.64	53.40	2.72	3.47
05/09/2015	1:00:00 PM	9.58	45.00	2.12	3.70
05/09/2015	2:00:00 PM	9.81	42.36	2.48	4.47

3.5 R5

One-minute L_{eq} , maximum (L_{max}) and minimum (L_{min}) values over the monitoring period are shown in Figure 7.

Hourly L_{eq} values were calculated as described in Section 2.4, and are shown in Table 13, along with data filtered out for subsequent calculations. With 41 h of monitoring, 35 h of data were available.

Weather data for noise monitoring dates at R5 is shown in Table 14. Average wind speeds exceeded 4.17 m/s for 3 out of 40 monitoring hours, with gusts up to 7.98 m/s.

Audible noises noted in the field log at this location include birds, insects, helicopters and exploration camp activities. Increased exploration activities in 2015 resulted in higher helicopter traffic throughout the summer months.

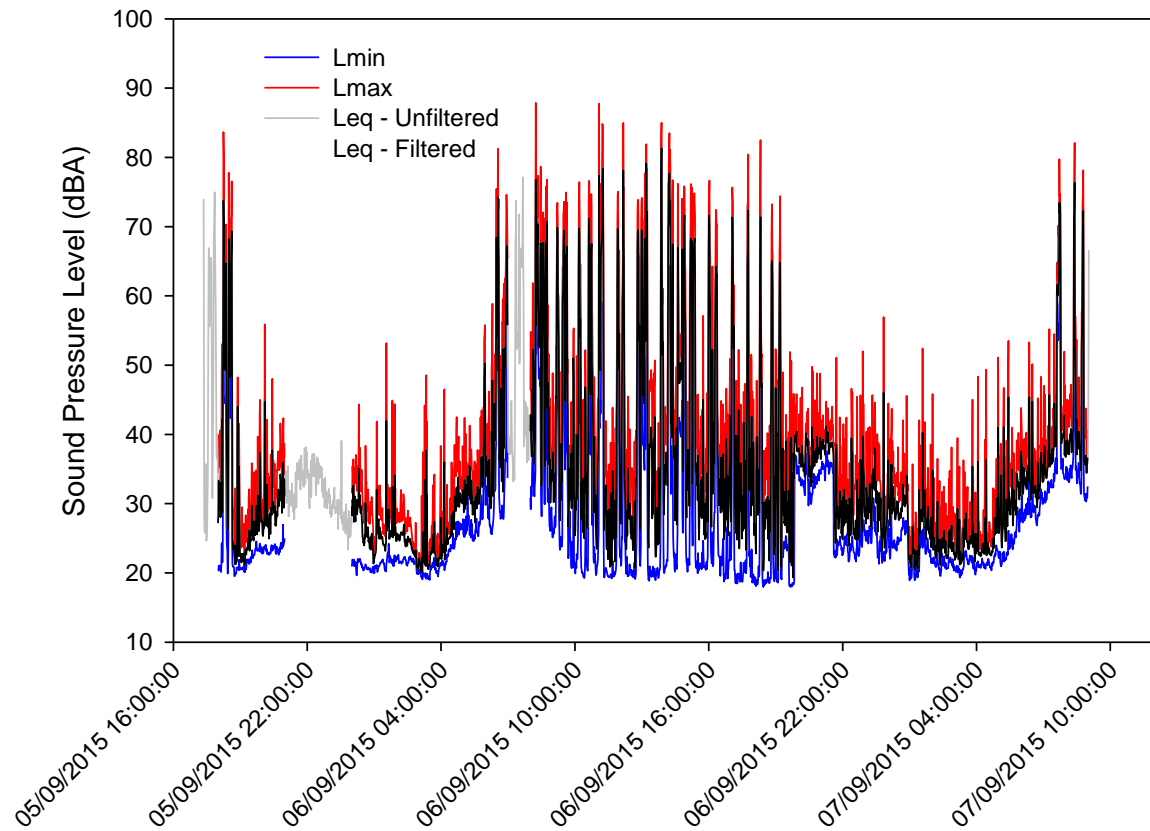


Figure 7. One-minute L_{eq} , L_{max} and L_{min} values recorded at monitoring station R5 at the Meadowbank site. Filtered data excludes those measurements taken outside of optimal conditions (set-up, take-down, wind > 4.17 m/s, RH > 90%).

Table 13. Hourly L_{eq} values for monitoring station R5 at the Meadowbank site and hours filtered out due to set-up, take-down or non-optimal weather conditions.

Date	Start time	L_{eq} -1 h	Filtered
05/09/2015	5:00:00 PM	64.45	Yes-set-up
	6:00:00 PM	60.18	
	7:00:00 PM	27.19	
	8:00:00 PM	31.90	
	9:00:00 PM	33.69	y
	10:00:00 PM	33.98	y
	11:00:00 PM	29.36	y
06/09/2015	12:00:00 AM	28.19	
	1:00:00 AM	28.45	
	2:00:00 AM	24.35	
	3:00:00 AM	25.16	

	4:00:00 AM	29.02	
	5:00:00 AM	37.85	
	6:00:00 AM	59.98	
	7:00:00 AM	63.67	y
	8:00:00 AM	63.38	
	9:00:00 AM	60.25	
	10:00:00 AM	60.29	
	11:00:00 AM	65.71	
	12:00:00 PM	62.77	
	1:00:00 PM	67.43	
	2:00:00 PM	65.59	
	3:00:00 PM	59.08	
	4:00:00 PM	58.42	
	5:00:00 PM	59.87	
	6:00:00 PM	56.32	
	7:00:00 PM	50.89	
	8:00:00 PM	37.05	
	9:00:00 PM	36.80	
	10:00:00 PM	31.06	
	11:00:00 PM	32.51	
07/09/2015	12:00:00 AM	30.45	
	1:00:00 AM	28.36	
	2:00:00 AM	24.96	
	3:00:00 AM	25.23	
	4:00:00 AM	27.99	
	5:00:00 AM	32.86	
	6:00:00 AM	35.88	
	7:00:00 AM	60.72	
	8:00:00 AM	62.40	
	9:00:00 AM	61.87	Yes-take-down

Table 14. Weather conditions for monitoring station R5 at the Meadowbank site. Hours for which average wind speed > 4.17 m/s or relative humidity > 90% are indicated in grey.

Date	Start Time	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max Wind Speed (m/s)
05/09/2015	5:00:00 PM	10.51	38.13	1.21	2.92
05/09/2015	6:00:00 PM	10.18	44.20	1.50	3.43
05/09/2015	7:00:00 PM	10.33	42.00	1.93	5.65
05/09/2015	8:00:00 PM	9.23	56.25	3.11	4.80
05/09/2015	9:00:00 PM	8.33	62.83	4.48	5.74
05/09/2015	10:00:00 PM	8.00	71.05	5.13	6.82
05/09/2015	11:00:00 PM	7.69	71.22	6.04	7.98
06/09/2015	12:00:00 AM	7.22	72.41	3.96	6.04

Date	Start Time	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max Wind Speed (m/s)
06/09/2015	1:00:00 AM	7.05	71.02	2.58	4.21
06/09/2015	2:00:00 AM	6.81	72.08	3.17	4.88
06/09/2015	3:00:00 AM	6.48	71.54	1.67	3.70
06/09/2015	4:00:00 AM	6.18	80.30	0.69	1.76
06/09/2015	5:00:00 AM	5.68	80.50	1.36	2.22
06/09/2015	6:00:00 AM	5.10	88.30	1.97	2.53
06/09/2015	7:00:00 AM	4.68	90.20	1.40	2.08
06/09/2015	8:00:00 AM	5.07	89.10	1.47	2.06
06/09/2015	9:00:00 AM	5.72	84.90	1.48	2.06
06/09/2015	10:00:00 AM	7.01	67.03	1.75	2.80
06/09/2015	11:00:00 AM	8.64	50.76	1.87	2.74
06/09/2015	12:00:00 PM	9.49	48.05	1.95	4.06
06/09/2015	1:00:00 PM	10.33	43.27	1.82	4.10
06/09/2015	2:00:00 PM	10.47	42.66	1.94	3.78
06/09/2015	3:00:00 PM	10.55	45.40	2.96	5.19
06/09/2015	4:00:00 PM	10.55	44.49	3.22	5.17
06/09/2015	5:00:00 PM	10.86	38.30	2.57	4.67
06/09/2015	6:00:00 PM	11.07	39.72	2.70	4.78
06/09/2015	7:00:00 PM	10.97	40.47	2.18	4.08
06/09/2015	8:00:00 PM	10.68	51.13	1.61	3.61
06/09/2015	9:00:00 PM	9.37	52.67	1.82	2.72
06/09/2015	10:00:00 PM	8.28	53.55	1.63	2.10
06/09/2015	11:00:00 PM	7.31	73.07	1.07	1.74
07/09/2015	12:00:00 AM	6.21	81.80	0.54	1.31
07/09/2015	1:00:00 AM	5.91	70.69	1.25	2.88
07/09/2015	2:00:00 AM	5.51	73.83	1.81	2.45
07/09/2015	3:00:00 AM	5.10	78.68	1.83	2.53
07/09/2015	4:00:00 AM	5.13	75.87	1.21	2.27
07/09/2015	5:00:00 AM	4.36	78.21	0.15	1.22
07/09/2015	6:00:00 AM	3.82	72.49	0.64	1.47
07/09/2015	7:00:00 AM	3.69	75.00	0.69	1.24
07/09/2015	8:00:00 AM	5.00	68.61	0.32	0.82

SECTION 4 • SUMMARY

4.1 DAYTIME, NIGHTTIME AND 24 H L_{eq}

L_{eq} values were calculated for daytime (7am-11pm), nighttime (11pm-7am), 1 h (10pm-11pm) and 24 h time periods as in previous years, based on Health Canada recommendations (as described in Golder, 2012). These L_{eq} values and the total hours of filtered data available for the calculations are shown in Table 15. Alberta ERCB guidance (ERCB 2007) indicates that 3 hours of valid data are required to contribute to daytime and nighttime averages, so time periods with fewer valid hours are excluded. Time periods for which insufficient data was collected due to start/stop of monitoring, or due to weather conditions are indicated with a dash ("-").

Two monitoring periods at R5 exceeded the daytime target sound level (55 dBA), with recorded values of 55.4 and 61.7 dBA. These values are well within the range of those observed in previous years, and are likely a result of increased helicopter activity associated with exploration projects during the monitoring time period, since this station is close to the helicopter pad at the exploration camp. One value at R5 exceeded the nighttime target sound level (45 dBA), with a recorded L_{eq} -night value of 51.6 dBA. An examination of the data for the nighttime period indicated that the 1-h L_{eq} only exceeded 45 dBA for the 6 am – 7 am hour, likely as a result of the morning helicopter shift beginning at 6 am. While station R5 is located near a known caribou migration route, helicopter activity during the caribou migration time period is minimized compared to the summer months when noise monitoring occurred, so sound levels are expected to be lower at the time of year when caribou are migrating in the area. Nevertheless, a reminder of AEM's wildlife policy regarding helicopter use (Cumberland, 2005) was sent to the Exploration group during the caribou migration.

Table 15. Daytime, nighttime, 10-11 pm and 24-h L_{eq} values for each monitoring location and total hours used to calculate each L_{eq} . Time periods with fewer than 3 hours of valid data are excluded (-), and those exceeding corresponding target sound levels are shaded grey. Na = period not monitored.

Site	Dates (2015)	$L_{eq, day}$ 7am-11pm (dBA)	Total Hours	$L_{eq, night}$ 11pm-7am (dBA)	Total Hours	$L_{eq, 1 h}$ 10pm-11pm (dBA)	$L_{eq, 24 h}$ (dBA)	Total Hours
R1	04/07	49.1	7	37.0	8	36.7	48.5	8
	05/07	54.8	5	40.2	4	-	51.1	12
	06/07	49.5	12	-	0	-	48.5	16
	07/07	-	0	-	0	-	-	0
	08/07	-	0	na	na	na	-	0
R1	19/09	-	0	-	0	-	-	0
	20/09	-	0	-	0	-	-	0
	21/09	-	0	-	0	-	-	0
	22/09	-	0	-	0	-	-	0
R2	08/07	Instrument malfunction – no data						
	09/07							
	10/07							
	11/07							
	12/07							
R2	16/09	-	0	-	0	-	-	0

Site	Dates (2015)	$L_{eq, day}$ 7am-11pm (dBA)	Total Hours	$L_{eq, night}$ 11pm-7am (dBA)	Total Hours	$L_{eq, 1 h}$ 10pm-11pm (dBA)	$L_{eq, 24 h}$ (dBA)	Total Hours
R2	17/09	-	0	-	0	-	-	0
	18/09	39.3	11	36.8	8	30.9	38.9	12
	19/09	39.3	6	na	na	na	39.3	9
R3	31/08	-	0	-	0	-	-	0
	01/09	-	0	-	0	-	-	0
	02/09	22.2	3	38.2	3	18.9	21.8	4
	03/09	-	2	na	na	na	44.3	4
R4	04/09	40.2	12	44	8	45.2	40.9	13
	05/09	37.7	6	na	na	na	41.9	13
R5	05/09	55.4	3	51.6	7	-	55.4	5
	06/09	61.7	15	31.2	8	31.1	60.0	23
	07/09	-	2	na	na	na	55.1	9

4.2 HISTORICAL COMPARISON

4.2.1 Interannual Comparison

L_{eq} measurements for all valid time periods from 2009 - 2015 are shown in Figure 8. With the exception of the one overnight time period available at R4, all L_{eq} values in 2015 were lower than or very similar to those recorded previously. Sound files from R4 demonstrated audible construction noises throughout the nighttime period. Overnight noises may be increasing in this area due to mining activities at the nearby Vault Pit. However, recorded values were still below the overnight target sound levels of 45 dBA.

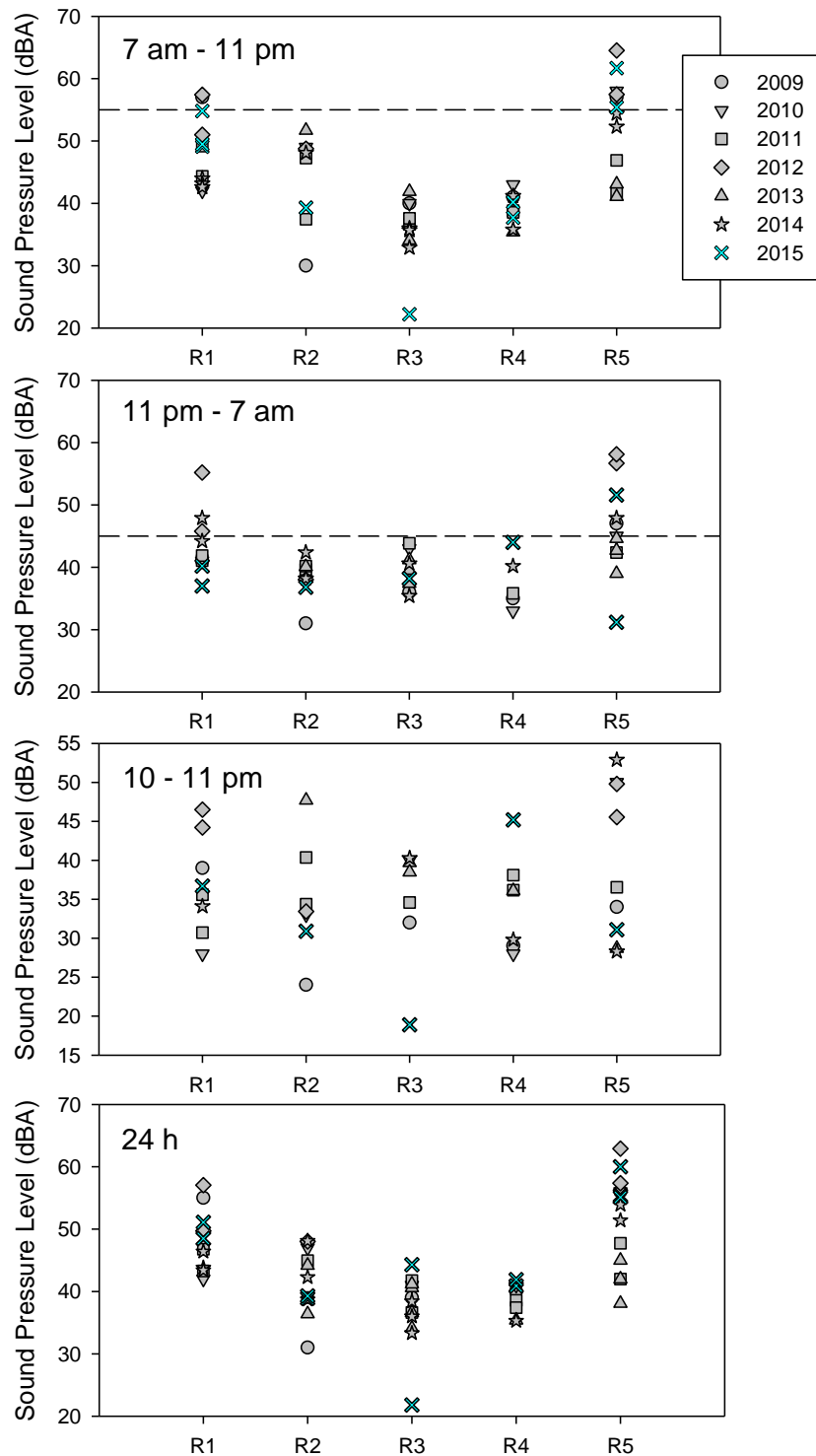


Figure 8. L_{eq} values calculated from filtered data for various time periods at locations R1 – R5 on the Meadowbank site in 24-h surveys from 2009 - 2015. Dashed lines indicate target sound levels (daytime and nighttime only).

SECTION 5 • CONCLUSION

The objective of the noise monitoring program at Meadowbank is to measure noise levels at five previously determined monitoring locations over at least two 24 h periods. In 2015 AEM planned to conduct two monitoring rounds of 3-4 days per station, since high winds in the area tend to substantially reduce the quantity of available valid data. Although this objective could not be met due to malfunction of the noise meter, at least one valid dataset was available for each monitoring period (daytime, night time, 10-11 pm, 24 h) for each station.

Target sound levels (55 dBA daytime, 45 dBA nighttime) were met in all cases, with the exception of the two recorded daytime values and one of two nighttime values at station R5. However, noise levels recorded at this station for all time periods were within the range of those observed historically. Further, regular wildlife monitoring (see 2015 Wildlife Summary Report) indicates no exceedances of thresholds related to noise on the minesite (excluding the AWAR) for wildlife. Incidental observations by minesite employees continue to identify predatory mammals (foxes and wolverines) onsite, and small herds of caribou pass in close proximity to minesite infrastructure. Therefore, it is unlikely that the observed occasional exceedances of target sound levels at one monitoring station are significantly affecting wildlife beyond impact predictions.

AEM will continue to monitor noise levels around site and particularly at the R5 location in 2016, and will ensure two noise meters are available to reduce the potential for sampling delays related to instrument malfunction (as occurred in 2015).

SECTION 6 • ACTIONS

The following actions were identified in 2014, and AEM's responses in 2015 are indicated below each item.

- AEM will aim to train additional Environment Department technicians on use of the noise meter, so that two separate rounds of noise monitoring per year can be conducted in order to increase the amount of available data.
 - Completed

The following actions are planned for 2015:

- A second noise meter will be available onsite in 2016 to help prevent any delays in sampling due to instrument malfunctions.
- AEM will continue to monitor noise levels around site and particularly at the R5 location in 2016
- AEM will continue to monitor wildlife through various programs as described in the Terrestrial Ecosystem Management Plan (Cumberland, 2006) to determine any impacts of site activities (including noise)

SECTION 7 • REFERENCES

AEM, 2013. Noise Monitoring and Abatement Plan, Meadowbank Gold Project. Version 2. Prepared by Agnico Eagle Mines Ltd. January, 2014.

AEM, 2009. Noise Management and Abatement Plan. Meadowbank Gold Project. Version 1. Prepared by Agnico Eagle Mines Ltd. September, 2009.

Cumberland, 2006. Terrestrial Ecosystem Management Plan. Meadowbank Gold Project. Cumberland Resources Ltd. December, 2006.

Cumberland, 2005. Access and Air Traffic Management Plan. Meadowbank Gold Project. Cumberland Resources Ltd. October, 2005.

ERCB, 2007. Noise Control Directive 038. Alberta Energy Resources Conservation Board. Calgary, Alberta.

Golder Associates (Golder), 2012. 2011 Noise Monitoring, Meadowbank Division, Nunavut. Prepared for Agnico-Eagle Mines Ltd. February, 2012.

APPENDIX A

Site Photos



Figure -Apx 1: Monitoring location R1 in 2015

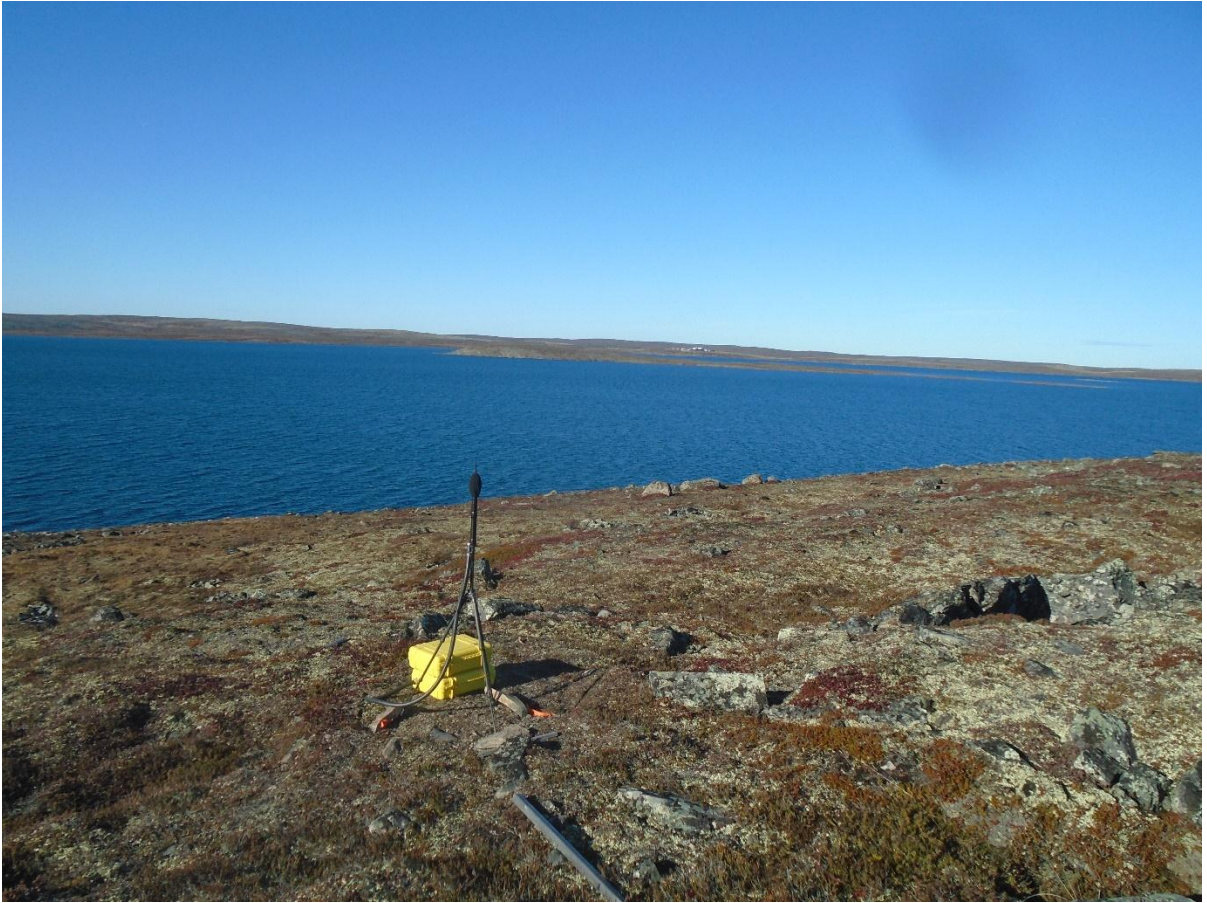


Figure -Apx 2: Monitoring location R2 in 2015

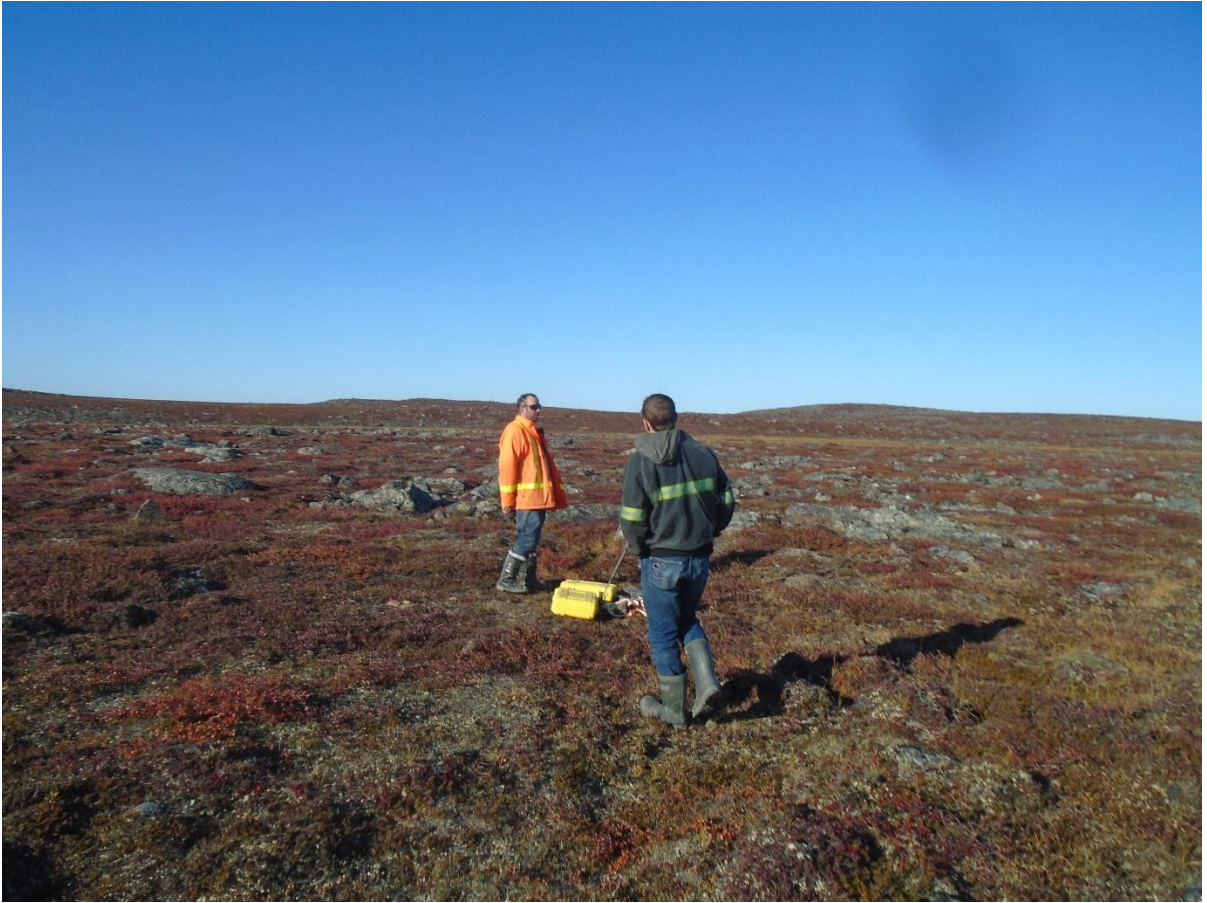


Figure -Apx 3: Monitoring location R3 in 2015

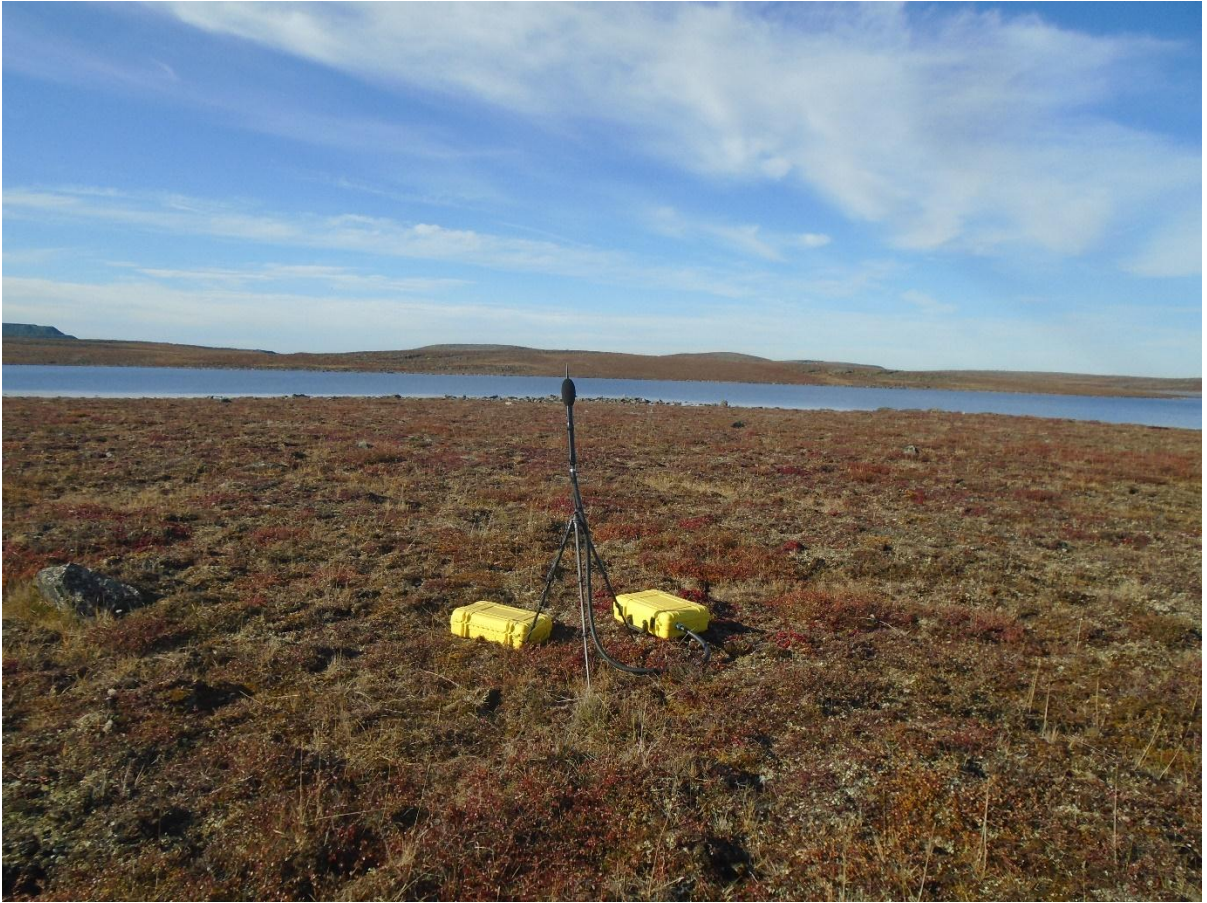


Figure -Apx 4: Monitoring location R4 in 2015



Figure -Apx 5: Monitoring location R5 in 2015

APPENDIX B

Field Logs

MONITORING STARTS			
Operator:	RA/MBA R1		
Location:			
Noise Meter Start Time:	2015/07/04 15:00		
Date:			
Calibration complete ?:	45.33		
Sensitivity	0.00		
Derivation			
Time of Calibration:	14:53		
Battery Power Check:	Good Poor		
Photographs of Setup (Y/N)			
Photographs of Surrounding (Y/N)			
Check available disk memory (Y/N)			
Cloud cover:	cloudy		
Height of cloud (feet):	0-10,000		
Air Temperature (C):	12.4°C		
Wind Speed (km/hr):			
Wind Direction:			
North wind (wind blows from North)	MAX: 3.9 m/s AVG: 2.8 m/s		
Barometric Pressure (kPa):	47.28		
Relative Humidity (%):	none		
Precipitation:	drizzle rain		
GENERAL SITE DESCRIPTION			
GPS Location	Latitude	Longitude	Altitude
	14W0636152	72H337	
Type of Ground Surface:			
Acoustic Environment:	THUNDER		
Traffic	AVAL, HELICOPTER, EMULSION		
Human activities	EMULSION		
Animal	BIRDS - INSECTS		
Other noise sources	INCREASE HELICOPTER TRAFFIC FOR AMARUQ.		
	MOVING C-CAUS ATEMULSION		
MONITORING ENDS			
Operator:	RA/MBA		
Record Data File Name:			
Total Monitoring Period	2015/07/08 17h40		
Noise Meter End Time:			
Date:			
Calibration complete ?:	45.54		
Sensitivity	0.04		
Derivation			
Time of Calibration:	17h52		
Check file size (GB)			
Battery Power Check:	Good Poor		
Cloud cover:	cloudy		
Height of cloud (feet):	0-10,000		
Air Temperature (C):	8.6°C		
Wind Speed (km/hr):			
Wind Direction:			
North wind (wind blows from North)	MAX: 5.9 m/s AVG: 4.6 m/s		
Barometric Pressure (kPa):	72.9%		
Relative Humidity (%):	72.9%		
Precipitation:	none		
Departure Time:	17h50		

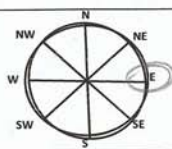

BATTERY DEAD ON ARRIVAL.
 SOME RAIN DURING SESSION.

MONITORING STARTS			
Operator:	PA/MBA PZ		
Location:			
Noise Meter Start Time:	2015/07/08 18h30		
Date:			
Calibration complete ?:	45.54 0.04 17h52		
Sensitivity			
Derivation			
Time of Calibration:			
Battery Power Check:	Good Poor		
Photographs of Setup (Y/N)			
Photographs of Surrounding (Y/N)			
Check available disk memory (Y/N)			
Cloud cover:	cloudy partly cloudy sunny		
Height of cloud (feet):	0-10,000 10,000-25,000 25,000 +		
Air Temperature (C):	11.4°C		
Wind Speed (km/hr):			
Wind Direction:			
North wind (wind blows from North)	MAX: 2.5 m/s AVG: 1.0 m/s		
Barometric Pressure (kPa):	91.2%		
Relative Humidity (%)			
Precipitation:	none drizzle rain		
GENERAL SITE DESCRIPTION			
GPS Location	Latitude	Longitude	Altitude
	HW 0636788	72144	
Type of Ground Surface:	TUNDRA		
Acoustic Environment:			
Traffic	AWE/AIR TRAFFIC		
Human activities	CAMP		
Animal	FLIES/BIRD		
Other noise sources	NORTH CELL DIESEL PUMP ED PUMPING TO SOUTH CELL		
	INCREASE HELICOPTER TRAFFIC -> AMARUQ		
MONITORING ENDS			
Operator:	PA/MBA		
Record Data File Name:			
Total Monitoring Period			
Noise Meter End Time:	2015/07/12 16h50		
Date:			
Calibration complete ?:	IMPOSSIBLE		
Sensitivity			
Derivation			
Time of Calibration:			
Check file size (GB)			
Battery Power Check:	Good Poor		
Cloud cover:	cloudy partly cloudy sunny		
Height of cloud (feet):	0-10,000 10,000-25,000 25,000 +		
Air Temperature (C):	12.8°C		
Wind Speed (km/hr):			
Wind Direction:			
North wind (wind blows from North)	MAX: 5.1 m/s AVG: 3.4 m/s		
Barometric Pressure (kPa):	69.8%		
Relative Humidity (%)			
Precipitation:	none drizzle rain		
Departure Time:	17h05		

SOME RAIN DURING MONITORING.

—> ON ARRIVAL METER WAS SHOWING —> "Could not load operating system"
 CALIBRATION NOT POSSIBLE.
 AFTER ANALYSING DATA: ONLY 2hrs OF MONITORING VALID.

MONITORING STARTS			
Operator: RA + TT			
Location: R3			
Noise Meter Start Time:			
Date: 2015-08-31			
Calibration complete ?:			
Sensitivity 49.89			
Derivation 0.04			
Time of Calibration: 13:16			
Battery Power Check:		<input checked="" type="radio"/> Good <input type="radio"/> Poor	
Photographs of Setup (Y/N)			
Photographs of Surrounding (Y/N)			
Check available disk memory (Y/N)			
Cloud cover:		<input checked="" type="radio"/> cloudy <input type="radio"/> partly cloudy <input type="radio"/> sunny	
Height of cloud (feet):		0-10,000 <input type="radio"/> 10,000-25,000 <input type="radio"/> 25,000 + <input type="radio"/>	
Air Temperature (C): 8.8			
Wind Speed (km/hr):			
Wind Direction:			
North wind (wind blows from North)			
Max 1.8 Avg 0.9			
Barometric Pressure (kPa):			
Relative Humidity (%): 64.8			
Precipitation:		<input checked="" type="radio"/> none <input type="radio"/> drizzle <input type="radio"/> rain	
GENERAL SITE DESCRIPTION			
GPS Location		Latitude Longitude Altitude	
14W 0641111 7214420			
Type of Ground Surface:			
Acoustic Environment:		Tundra	
Traffic		1/4 mile Road	
Human activities		Pet Activities	
Animal		Insects, Birds, Wildlife	
Other noise sources			
MONITORING ENDS			
Operator: TT, RA, RS			
Record Data File Name:			
Total Monitoring Period			
Noise Meter End Time: 17:10			
Date: 2015-09-03			
Calibration complete ?:			
Sensitivity 48.91			
Derivation 0			
Time of Calibration: 16:13			
Check file size (GB)			
Battery Power Check:		<input checked="" type="radio"/> Good <input type="radio"/> Poor	
Cloud cover:		<input type="radio"/> cloudy <input type="radio"/> partly cloudy <input checked="" type="radio"/> sunny	
Height of cloud (feet):		0-10,000 <input type="radio"/> 10,000-25,000 <input type="radio"/> 25,000 + <input type="radio"/>	
Air Temperature (C): 10.9			
Wind Speed (km/hr):			
Wind Direction:			
North wind (wind blows from North)			
Max 3.9 Avg 3.3			
Barometric Pressure (kPa):			
Relative Humidity (%): 51.4			
Precipitation:		<input checked="" type="radio"/> none <input type="radio"/> drizzle <input type="radio"/> rain	
Departure Time:		18:00	

MONITORING STARTS			
Operator: <u>RT, RS</u>			
Location: <u>R4</u>			
Noise Meter Start Time:			
Date: <u>2015-09-04</u>			
Calibration complete ?:			
Sensitivity <u>49.15</u>			
Deviation <u>0.04</u>			
Time of Calibration: <u>9.33</u>			
Battery Power Check:		<input checked="" type="radio"/> Good <input type="radio"/> Poor <input type="radio"/>	
Photographs of Setup (Y/N)			
Photographs of Surrounding (Y/N)			
Check available disk memory (Y/N)			
Cloud cover:	cloudy	partly cloudy	<u>sunny</u>
Height of cloud (feet):	0-10,000	10,000-25,000	25,000 +
Air Temperature (C):	<u>7.5</u>		
Wind Speed (km/hr):			
Wind Direction:			
North wind (wind blows from North)			
<u>Max - 2.6</u> <u>Aug - 1.7</u>			
Barometric Pressure (kPa):			
Relative Humidity (%): <u>66.7</u>			
Precipitation:	<u>none</u>	drizzle	rain
GENERAL SITE DESCRIPTION			
GPS Location	Latitude	Longitude	Altitude
<u>14W 0639409 7218677</u>			
Type of Ground Surface:			
Acoustic Environment:			
Traffic	<u>Traffic</u>		
Human activities	<u>Vault Pit Road</u>		
Animal	<u>Vault Pit</u>		
Other noise sources	<u>Birds / Insects</u>		
MONITORING ENDS			
Operator:			
Record Data File Name:			
Total Monitoring Period			
Noise Meter End Time:			
Date: <u>2015-09-04</u>			
Calibration complete ?:			
Sensitivity <u>49.28</u>			
Deviation <u>0.02</u>			
Time of Calibration: <u>17.16</u>			
Check file size (GB)			
Battery Power Check:		<input checked="" type="radio"/> Good <input type="radio"/> Poor <input type="radio"/>	
Cloud cover:	cloudy	partly cloudy	<u>sunny</u>
Height of cloud (feet):	0-10,000	10,000-25,000	25,000 +
Air Temperature (C):	<u>9.9</u>		
Wind Speed (km/hr):			
Wind Direction:			
North wind (wind blows from North)			
<u>Max - 1.7</u> <u>Aug - 1.1</u>			
Barometric Pressure (kPa):			
Relative Humidity (%): <u>48</u>			
Precipitation:	<u>none</u>	drizzle	rain
Departure Time: <u>14:30</u>			

MONITORING STARTS			
Operator: TT, RA, RS			
Location: R5			
Noise Meter Start Time:			
Date: 2015-09-05			
Calibration complete ?:			
Sensitivity 49.28			
Deviation 0.02			
Time of Calibration: 17:16			
Battery Power Check:		<input checked="" type="radio"/> Good <input type="radio"/> Poor	
Photographs of Setup (Y/N)			
Photographs of Surrounding (Y/N)			
Check available disk memory (Y/N)			
Cloud cover:		<input type="radio"/> cloudy <input type="radio"/> partly cloudy <input checked="" type="radio"/> sunny	
Height of cloud (feet):		0-10,000 10,000-25,000 25,000 +	
Air Temperature (C): 10.2			
Wind Speed (km/hr):			
Wind Direction:			
North wind (wind blows from North)			
Max - 2.0 Avg - 1.5			
Barometric Pressure (kPa):			
Relative Humidity (%): 44.6			
Precipitation:		<input checked="" type="radio"/> none <input type="radio"/> drizzle <input type="radio"/> rain	
GENERAL SITE DESCRIPTION			
GPS Location		Latitude Longitude Altitude	
14W 0633779 7214491			
Type of Ground Surface:			
Acoustic Environment:		Tundra	
Traffic:		AWK	
Human activities:		Explo Camp	
Animal:		Bird / Insect	
Other noise sources:		Explo camp used for Helicopter - Amargus work	
MONITORING ENDS			
Operator: TT			
Record Data File Name:			
Total Monitoring Period:			
Noise Meter End Time: 9:30			
Date: 2015-09-07			
Calibration complete ?:			
Sensitivity 49.00			
Deviation 0.05			
Time of Calibration: 2015-09-08 15:06			
Check file size (GiB):			
Battery Power Check:		<input checked="" type="radio"/> Good <input type="radio"/> Poor	
Cloud cover:		<input type="radio"/> cloudy <input type="radio"/> partly cloudy <input checked="" type="radio"/> sunny	
Height of cloud (feet):		0-10,000 10,000-25,000 25,000 +	
Air Temperature (C): 6.3			
Wind Speed (km/hr):			
Wind Direction:			
North wind (wind blows from North)			
Max - 1.1 Avg - 0.8			
Barometric Pressure (kPa):			
Relative Humidity (%): 66.7			
Precipitation:		<input checked="" type="radio"/> none <input type="radio"/> drizzle <input type="radio"/> rain	
Departure Time: 9:45			

MONITORING STARTS			
Operator: MT / JK			
Location: R-1			
Noise Meter Start Time: 14h50			
Date: 2015-09-19			
Calibration complete?: y			
Sensitivity: 49.60			
Derivation: 0.00			
Time of Calibration: 16h5			
Battery Power Check:		Good <input checked="" type="radio"/> Poor <input type="radio"/>	
Photographs of Setup (Y/N): y			
Photographs of Surrounding (Y/N): y			
Check available disk memory (Y/N): y			
Cloud cover:		cloudy partly cloudy sunny	
Height of cloud (feet):		0-10,000 10,000-25,000 25,000 +	
Air Temperature (C): 4.7			
Wind Speed (km/hr):			
Wind Direction: Max: 4.7 m/s Avg: 4.4 m/s 3.4			
North wind (wind blows from North)			
Barometric Pressure (kPa):			
Relative Humidity (%): 66.3%			
Precipitation:		none drizzle rain	
GENERAL SITE DESCRIPTION			
GPS Location: R-1		Latitude Longitude Altitude	
Type of Ground Surface: tundra			
Acoustic Environment:			
Traffic			
Human activities			
Animal			
Other noise sources			
MONITORING ENDS			
Operator: MT			
Record Data File Name: R-2 project 005			
Total Monitoring Period: 4 days			
Noise Meter End Time: 14h50			
Date: 2015-09-23			
Calibration complete?:			
Sensitivity: 49.82			
Derivation: 0.04			
Time of Calibration: 14h30			
Check file size (GB):			
Battery Power Check:		Good <input checked="" type="radio"/> Poor <input type="radio"/>	
Cloud cover:		cloudy partly cloudy sunny	
Height of cloud (feet):		0-10,000 10,000-25,000 25,000 +	
Air Temperature (C): -1.5			
Wind Speed (km/hr):			
Wind Direction: Max 7.1 Avg 4.4			
North wind (wind blows from North)			
Barometric Pressure (kPa):			
Relative Humidity (%): 75.1			
Precipitation:		none drizzle rain	
Departure Time: 14h40			

MONITORING STARTS			
Operator: <u>TT</u>			
Location: <u>R2</u>			
Noise Meter Start Time: <u>10h 56</u>			
Date: <u>2015-09-16</u>			
Calibration complete?:			
Sensitivity: <u>49.00</u>			
Derivation: <u>0.05</u>			
Time of Calibration: <u>15.06 2015-09-08</u>			
Battery Power Check: <u>4</u>		<input checked="" type="radio"/> Good <input type="radio"/> Poor	
Photographs of Setup (Y/N) <u>Y</u>			
Photographs of Surrounding (Y/N) <u>Y</u>			
Check available disk memory (Y/N)			
Cloud cover:		cloudy	partly cloudy
Height of cloud (feet):		0-10,000	10,000-25,000
Air Temperature (C):		sunny <u>25,000+</u>	
Wind Speed (km/hr): <u>max 5.2 m/s</u>			
Wind Direction: <u>Av. 23</u>			
North wind (wind blows from North)			
Barometric Pressure (kPa):			
Relative Humidity (%): <u>91.7</u>			
Precipitation:		none	drizzle
		rain	
GENERAL SITE DESCRIPTION			
GPS Location: <u>R2</u>	Latitude	Longitude	Altitude
Type of Ground Surface:	<u>Tundra</u>		
Acoustic Environment:			
Traffic:	<u>helico plane</u>		
Human activities:			
Animal:	<u>Bird / Hare</u>		
Other noise sources			
MONITORING ENDS			
Operator: <u>MT / JK</u>			
Record Data File Name:			
Total Monitoring Period:			
Noise Meter End Time: <u>2015-09-19 13h40</u>			
Date: <u>2015-09-19</u>			
Calibration complete?:			
Sensitivity: <u>49.57</u>			
Derivation: <u>-0.03</u>			
Time of Calibration:			
Check file size (GB)			
Battery Power Check:		<input checked="" type="radio"/> Good <input type="radio"/> Poor	
Cloud cover:		cloudy	partly cloudy
Height of cloud (feet):		0-10,000	10,000-25,000
Air Temperature (C): <u>5°</u>		sunny	
Wind Speed (km/hr): <u>max 3.3</u>			
Wind Direction: <u>av 22</u>			
North wind (wind blows from North)			
Barometric Pressure (kPa):			
Relative Humidity (%): <u>68.3</u>			
Precipitation:		none	drizzle
Departure Time:		rain	

49.73
0.13