Appendix G12

2016 Noise Monitoring Program

AGNICO EAGLE

MEADOWBANK GOLD PROJECT

2016 Noise Monitoring Report

In Accordance with NIRB Project Certificate No.004

Prepared by:
Agnico-Eagle Mines Limited – Meadowbank Division

March, 2017

EXECUTIVE SUMMARY

The 2016 noise monitoring program at Meadowbank was conducted according to the Noise Monitoring and Abatement Plan (AEM, 2014). The objective of this program is to measure noise levels at five previously determined monitoring locations around the Meadowbank site, over at least two 24 h periods. Since high winds in the area tend to substantially reduce the quantity of available valid data, Agnico Eagle aims to conduct a minimum of two monitoring rounds of 2-4 days per station. In 2016, over 30 days of noise monitoring were conducted, and the total usable amount of data for each station ranged from 39 - 80 hours. Daytime, night-time, 10-11pm, and 24 h L_{eq} values were calculated from recorded 1-min L_{eq} values for each monitoring event and location, and are shown in Table 1.

The daytime target sound level (55 dBA) was exceeded during one of three monitoring events at R5, with a recorded value of 58.1 dBA. This value is well within the range of those observed in previous years, and sound peaks were associated with helicopter activity, since this station is located within 500 m of the helicopter pad at the former exploration camp.

One value at R2 and one value at R5 slightly exceeded the night-time target sound level (45 dBA), with recorded $L_{eq,night}$ values of 45.7 dBA and 48.0 dBA, respectively. An examination of the data indicated that as in previous years, 1-h L_{eq} values only exceeded 45 dBA on a few occasions in the early morning hours (4 – 7 am). Sound recordings indicated peaks occurred as a result of helicopter start-up, take-off, landing, or fly-over, and generally occurred once or twice per hour, for 5 – 15 min.

Overall, since targets were exceeded only occasionally, during peak helicopter season, and by a maximum of 3.1 dB, significant impacts to wildlife beyond impact predictions are not anticipated. Furthermore, regular wildlife monitoring continues to indicate that monitoring thresholds related to site activity are not being exceeded (see 2016 Wildlife Summary Report).

Table 1. Daytime, night-time, 10-11 pm, and 24-h L_{eq} values for monitoring locations R1 – R5, and percentage of the corresponding time period for which valid data was available (% coverage). Day- and night-time periods with fewer than 3 hours of valid data are excluded (-), and those exceeding corresponding target sound levels are shaded grey.

Site	Dates (2016)	$L_{eq,\ day}$ 7am-11pm (dBA)	% coverage	$L_{eq,\ night}$ 11pm-7am (dBA)	% coverage	$L_{eq,\ 1\ h}$ 10-11pm (dBA)	$L_{eq,\ 24\ h}$ (dBA)	% coverage
R1	Jul. 1 – 2	-	6%	-	13%	-	43.3	8%
	Aug. 31 – Sept. 3	42.6	100%	32.8	100%	28.3	41.0	100%
R2	Jul. 4 – 7	43.7	94%	33.1	100%	27.8	42.0	96%
	Jul. 24 – 26	37.5	94%	45.7	88%	32.2	42.0	92%
R3	Jul. 8 – 10	31.9	100%	35.5	100%	34.3	33.4	100%
	Aug. 7 – 10	32.3	56%	-	0%	28.1	32.3	38%
R4	Jul. 12 – 14	34.2	44%	44.2	88%	-	41.6	58%
	Aug. 15 - 17	-	13%	34.9	50%	38.0	35.9	25%
	Sept. 16 - 18	-	0%	-	0%	-	-	0%
R5	Jul. 17 - 19	49.6	56%	48.0	38%	27.1	49.3	50%
	Aug. 12 - 14	58.1	56%	29.5	88%	25.2	55.6	67%
	Sept. 7 - 10	33.5	25%	-	0%	34.9	33.5	17%

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

SECTION 1 • INTRODUCTION

Since 2008, Agnico Eagle Mines Ltd. (Agnico Eagle) has conducted outdoor noise monitoring at the Meadowbank site, near Baker Lake, Nunavut, in accordance with 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 minesite, to inform the implementation of noise mitigation measures. Although no residential receptors are located nearby, Agnico Eagle 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 (night-time).

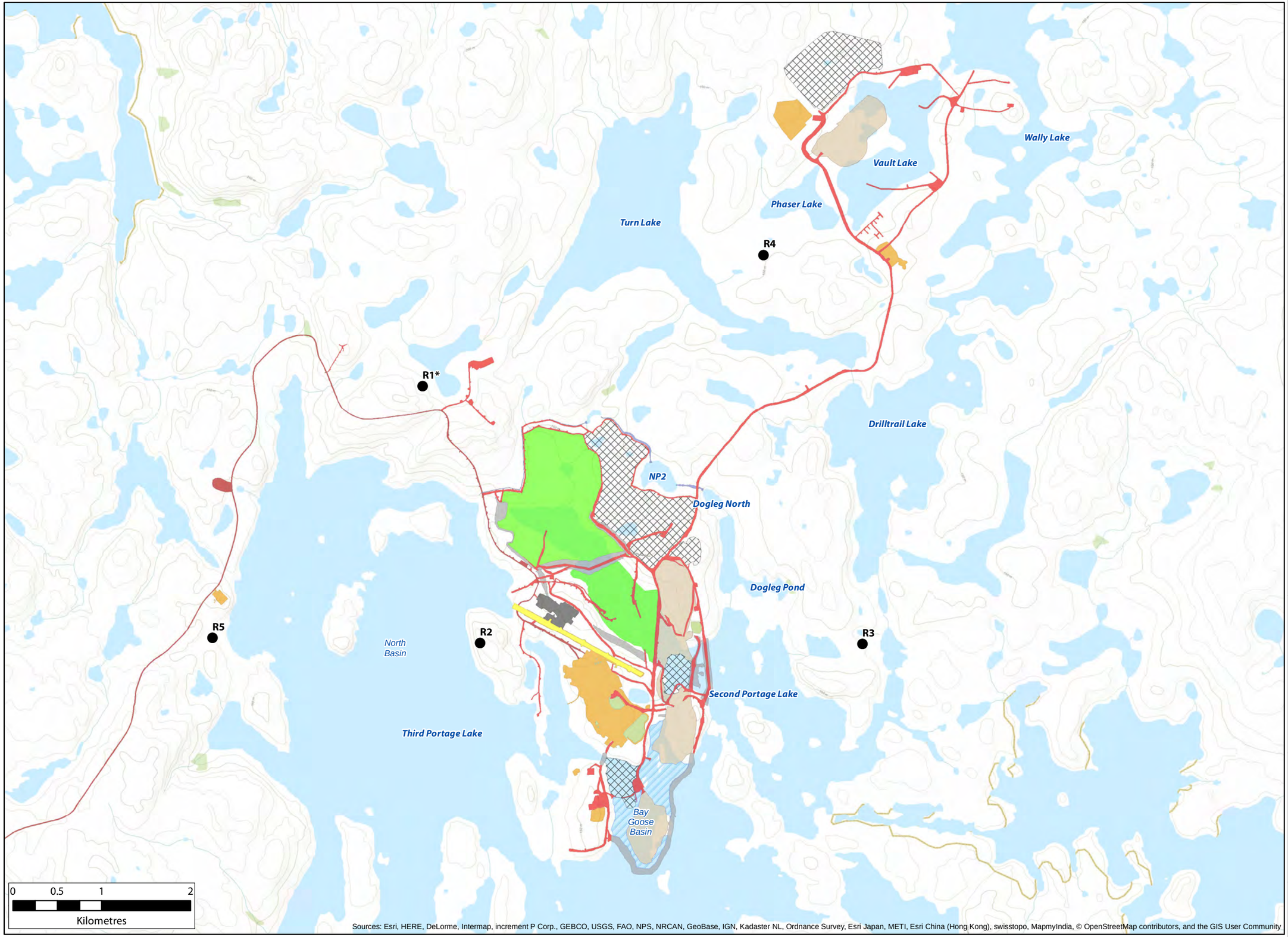
1.1 MONITORING LOCATIONS

To fulfill the monitoring objectives, the Noise Monitoring and Abatement Plan (AEM, 2014) indicates that at least two 24 h surveys of ambient outdoor noise will be conducted annually at five representative locations. However, due to a tendency towards sub-optimal weather conditions for noise monitoring (see Section 2.2), Agnico Eagle aims to conduct a minimum of two surveys for each location, with each survey lasting 2-4 days. In 2016, a total of 30 days of monitoring occurred, with 3 - 7 days of data collected for each site. One survey (July 1 - 2 at R1) lasted less than 24 h due to an instrument malfunction, and data was not properly recorded for the second survey at this location (July 20 - 23). For the remainder of sites, all monitoring events were successful.

Noise monitoring locations have not changed since 2014, 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 1 – 2
			July 20 – 23 (data not recovered)
			August 31 – September 3
R2	636795	7214435	July 4 – 7
			July 24 – 26
R3	641104	7214427	July 8 – 10
			August 7 – 10
R4	639990	7218810	July 12 – 14
			August 15 – 17
			September 16 – 18
R5	633781	7214493	July 17 – 19
			August 12 – 14
			September 7 – 10



Legend

- Noise Monitoring Location
  ** new 2014 location*

Mine Plan (2015)

- Quarry
- AWPAR Quarry
- Dewatered Lake
- Tailings Storage Facility
- Roads
- AWPAR
- Dikes
- Diversion Ditch
- Stockpiles
- Pits
- Facility
- Airstrip
- Waste Dump

Noise Monitoring Locations

DOUGAN & ASSOCIATES
ECOLOGICAL CONSULTING & DESIGN
77 Wyndham Street South • Guelph ON N1E 5R7
T 519.822.1609 • F 519.822.5389 • www.dougan.ca

PROJECT: DA11-062-06

CLIENT: Agnico-Eagle Mines Ltd., Meadowbank Div.

N / W / E / S
UTM Zone 14 NAD83

DATE: MARCH 2016

SCALE: 1:40,000

DRAWN BY: LC

CHECKED BY:

FIGURE:

1

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, in 2014 Agnico Eagle moved this station approximately 700 m northwest of the explosives storage area to better represent the originally intended orientation.

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 2016, Agnico Eagle technicians 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.

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 included:

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

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. Based on these guidelines, noise monitoring data was filtered to remove measurements collected outside of conditions where wind speed exceeded 15 km/h (4.17 m/s) or relative humidity exceeded 90% (assuming precipitation occurred) prior to data analysis. In 2016, as in all previous years, wind speeds commonly exceeded preferred levels, so the available data was significantly reduced.

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. All field observations are provided in Appendix B.

2.4 DATA ANALYSIS

Since noise levels constantly vary over time, the monitoring instrument used at Meadowbank measures continuously and records a single-number value for each minute, representing the equivalent sound level (L_{eq}).

All datapoints associated with the first hour of measurement were filtered out to remove noise from technicians, and to ensure more than 30 min of data contributed to hourly averages. Since noise monitors were left in the field until the battery ran out, records from the last hour were only filtered out if less than 30 min of data were recorded.

Recorded one-minute L_{eq} values were then used to calculate hourly equivalent noise levels ($L_{eq,\ 1h}$). After further filtering based on weather considerations (Section 2.2), valid hourly L_{eq} values were energy-averaged across calendar days within a monitoring event (2 – 4 sequential days) and average values for each hour were used to calculate daytime (7am-11pm), night-time (11pm-7am) and 24 h L_{eq} values for each event. This approach was taken in 2016 due to the frequency of high-wind conditions, in order to maximize the utility of the available data, and produce day- and night-time L_{eq} values with the greatest possible recorded coverage of their respective time periods, resulting in more representative measurements. However, for consistency, L_{eq} values for each 24-h period were also calculated as in previous years, and are presented in Appendix C. No differences in exceedances of target sound levels occurred between the two methods.

SECTION 3 • RESULTS

3.1 R1

One-minute filtered and unfiltered L_{eq} value, maximum sound levels (L_{max}), and minimum sound levels (L_{min}) over the two available monitoring events at R1 are shown in Figure 2 and 3. Filtered one-minute L_{eq} values exclude data collected in the first hour to remove technician interference, and data collected under non-optimal weather conditions (wind speed > 15 km/h, relative humidity > 90%). Filtered values were used in subsequent analyses, but unfiltered values are provided for reference. For station R1, a total of 49 h of data was available after filtering 92 h of recorded sound levels. The duration of the first monitoring event (July 1 – 2) was shortened (<24 h) due to an instrument malfunction.

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

Weather data for noise monitoring dates at R1 is shown in Table 3. Hourly average wind speeds in excess of 4.17 m/s as well as probable precipitation occurred for most of event 1, and approximately half of event 2.

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.

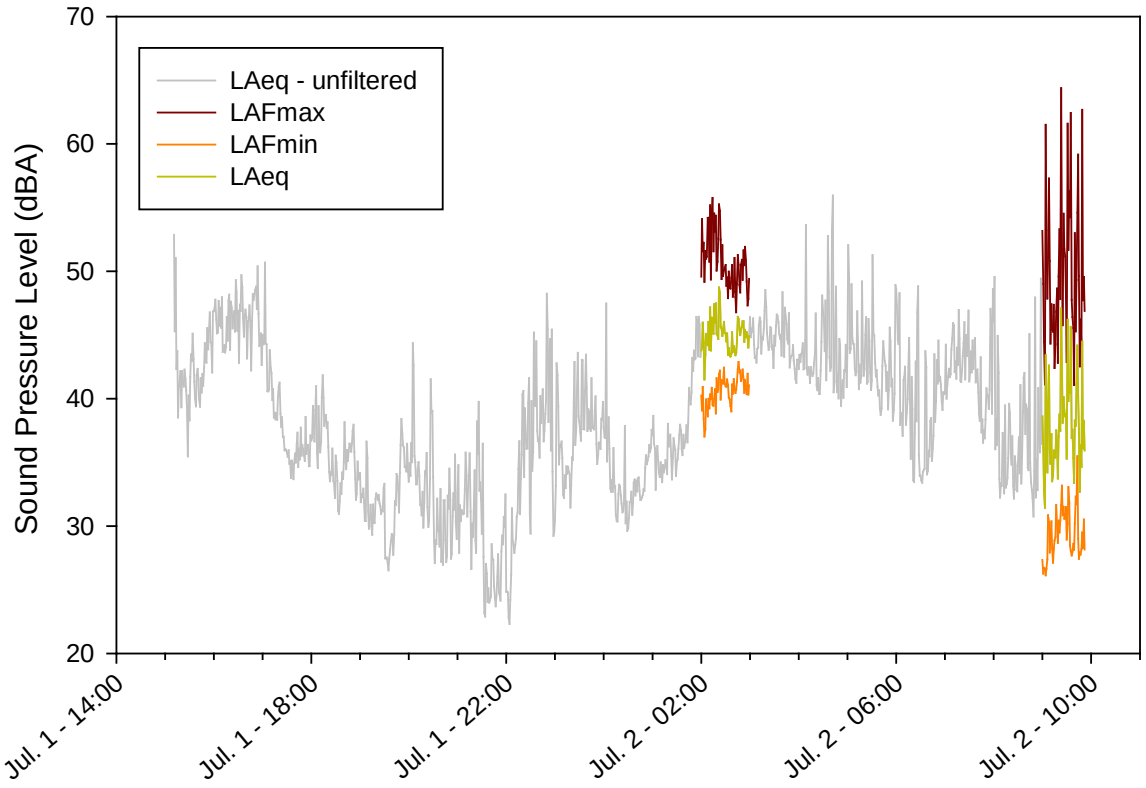


Figure 2. One-minute L_{eq}, L_{max} and L_{min} values recorded at monitoring station R1 at the Meadowbank site during monitoring event 1. Filtered data excludes those measurements taken outside of optimal conditions (set-up, take-down, wind > 15 km/h, RH > 90%).

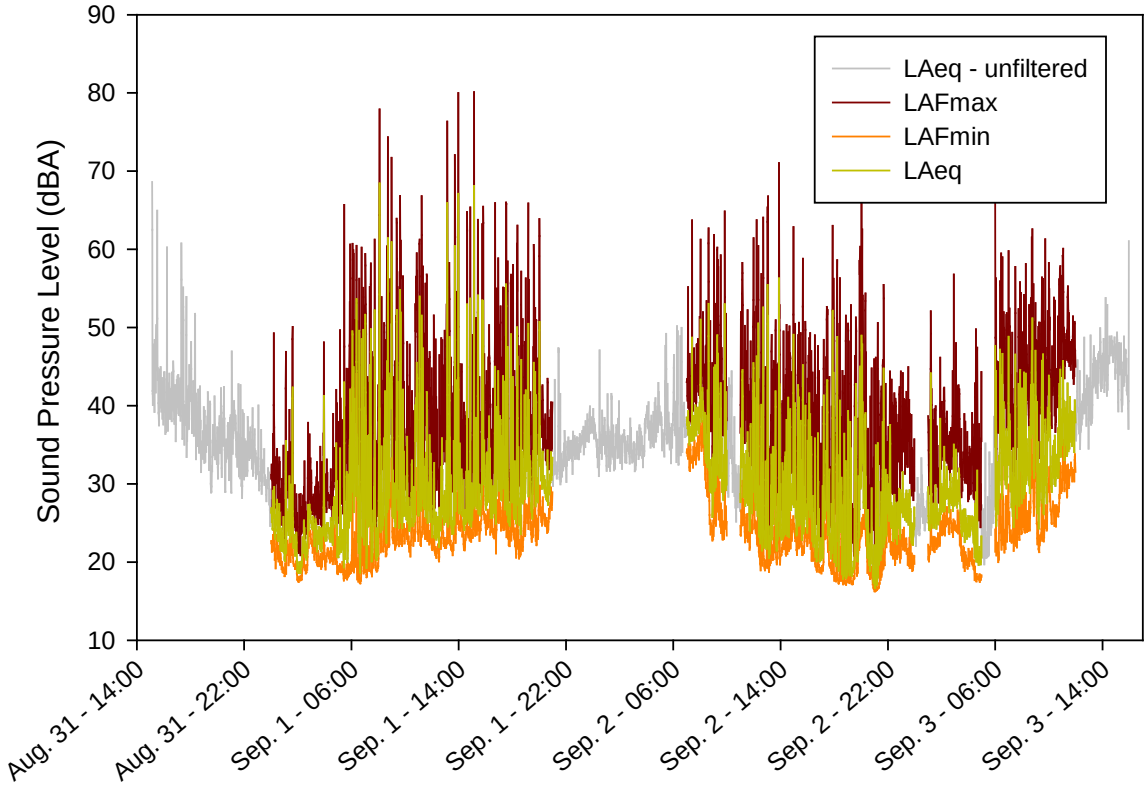


Figure 3. One-minute L_{eq}, L_{max} and L_{min} values recorded at monitoring station R1 at the Meadowbank site during monitoring event 2. Filtered data excludes those measurements taken outside of optimal conditions (set-up, take-down, wind > 15 km/h, RH > 90%).

Table 3. Hourly L_{eq} values and weather data for monitoring station R1 at the Meadowbank site (monitoring events 1 and 2). Hours filtered out due to set-up, take-down or non-optimal weather conditions are shaded grey.

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max Wind Speed (m/s)
7/01/16	3:00:00 PM	43.80	20.71	46.21	3.78	6.57
	4:00:00 PM	46.64	19.57	59.13	6.70	9.64
	5:00:00 PM	40.00	16.78	82.20	8.36	11.13
	6:00:00 PM	36.49	14.15	96.80	6.32	8.96
	7:00:00 PM	32.78	13.30	100.00	4.52	7.72
	8:00:00 PM	34.54	12.79	100.00	3.68	5.96
	9:00:00 PM	31.50	12.01	100.00	3.87	5.94
	10:00:00 PM	39.03	11.39	100.00	2.94	5.04

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max Wind Speed (m/s)
	11:00:00 PM	38.50	10.47	100.00	3.89	5.49
7/02/16	12:00:00 AM	35.35	9.67	94.40	4.19	6.70
	1:00:00 AM	39.54	9.38	93.40	3.94	6.02
	2:00:00 AM	45.25	9.08	87.10	3.67	6.68
	3:00:00 AM	45.04	8.30	87.80	4.97	7.72
	4:00:00 AM	45.89	7.30	91.80	6.36	8.64
	5:00:00 AM	44.49	6.90	90.00	5.18	7.47
	6:00:00 AM	41.66	6.79	89.30	4.75	6.82
	7:00:00 AM	43.14	7.52	84.20	4.64	6.63
	8:00:00 AM	40.02	8.47	81.90	4.52	6.37
	9:00:00 AM	39.74	9.74	72.32	4.07	5.88
8/31/16	3:00:00 PM	54.13	7.25	83.60	6.77	9.66
	4:00:00 PM	44.85	6.77	82.40	6.55	9.33
	5:00:00 PM	47.40	6.16	76.10	6.09	8.19
	6:00:00 PM	41.28	5.74	80.40	6.18	8.68
	7:00:00 PM	36.46	5.20	76.88	5.62	8.17
	8:00:00 PM	36.43	5.09	70.83	5.42	8.15
	9:00:00 PM	37.21	5.00	72.59	4.99	7.08
	10:00:00 PM	34.50	4.68	75.10	4.79	7.23
	11:00:00 PM	31.56	4.07	75.06	4.85	7.96
9/01/16	12:00:00 AM	25.18	3.59	74.66	3.47	5.29
	1:00:00 AM	29.17	3.59	75.71	2.71	4.78
	2:00:00 AM	22.98	3.55	72.49	2.20	4.10
	3:00:00 AM	26.88	3.63	75.98	2.34	3.35
	4:00:00 AM	25.55	3.65	78.55	2.53	3.67
	5:00:00 AM	30.43	3.49	80.40	2.79	4.33
	6:00:00 AM	41.86	3.24	82.00	2.43	3.70
	7:00:00 AM	40.51	3.10	83.70	1.94	3.10
	8:00:00 AM	51.69	3.17	83.10	1.80	2.78
	9:00:00 AM	45.67	3.39	79.33	2.51	4.61
	10:00:00 AM	34.72	3.48	79.53	3.01	5.57
	11:00:00 AM	40.39	3.82	76.96	2.42	4.06
	12:00:00 PM	27.14	4.41	74.01	2.13	3.74
	1:00:00 PM	52.40	4.97	70.07	2.20	4.45
	2:00:00 PM	39.20	5.56	64.95	2.19	4.78
	3:00:00 PM	50.91	6.05	64.60	1.97	5.98
	4:00:00 PM	34.66	6.58	58.52	1.92	4.21
	5:00:00 PM	41.59	7.18	56.38	1.97	4.21

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max Wind Speed (m/s)
	6:00:00 PM	37.37	7.58	55.63	2.61	5.16
	7:00:00 PM	37.60	7.50	62.98	3.17	5.63
	8:00:00 PM	36.97	6.46	67.47	3.97	7.06
	9:00:00 PM	36.88	5.64	70.56	4.52	6.21
	10:00:00 PM	34.38	4.97	75.98	4.51	6.74
	11:00:00 PM	36.59	4.46	76.45	4.36	6.45
9/02/16	12:00:00 AM	36.90	4.08	77.91	4.54	7.13
	1:00:00 AM	36.05	3.76	80.50	5.19	7.41
	2:00:00 AM	34.83	3.41	81.60	5.08	7.15
	3:00:00 AM	35.26	3.05	84.70	4.59	6.53
	4:00:00 AM	38.24	2.81	89.70	4.39	6.17
	5:00:00 AM	38.96	2.56	88.60	4.33	5.84
	6:00:00 AM	41.44	2.44	88.50	4.41	5.74
	7:00:00 AM	38.35	2.39	89.60	4.02	5.49
	8:00:00 AM	40.83	2.85	87.30	3.71	5.10
	9:00:00 AM	40.76	3.83	81.20	3.76	5.45
	10:00:00 AM	34.98	4.73	75.53	4.31	6.06
	11:00:00 AM	36.30	5.16	73.90	3.91	5.63
	12:00:00 PM	39.36	5.87	67.43	3.25	5.45
	1:00:00 PM	42.88	6.46	63.96	2.56	4.72
	2:00:00 PM	34.76	6.99	62.94	2.42	4.55
	3:00:00 PM	34.45	7.44	61.93	2.78	4.68
	4:00:00 PM	31.40	7.94	59.22	2.83	4.72
	5:00:00 PM	37.30	8.76	55.15	2.22	3.90
	6:00:00 PM	34.98	9.13	52.92	2.32	3.86
	7:00:00 PM	34.60	9.08	56.92	2.09	3.80
	8:00:00 PM	36.98	8.35	60.69	2.65	3.90
	9:00:00 PM	30.60	7.95	67.57	1.27	2.43
	10:00:00 PM	28.27	7.28	69.81	1.02	1.90
	11:00:00 PM	26.50	6.95	71.26	1.68	3.47
9/03/16	12:00:00 AM	26.94	7.22	63.37	4.30	5.47
	1:00:00 AM	30.67	6.70	70.65	3.82	5.27
	2:00:00 AM	29.58	6.28	75.63	2.87	4.08
	3:00:00 AM	27.28	5.99	77.26	3.32	4.80
	4:00:00 AM	24.00	5.94	87.00	3.69	5.49
	5:00:00 AM	28.64	5.71	86.50	4.35	5.49
	6:00:00 AM	38.17	5.61	84.20	3.87	5.25
	7:00:00 AM	36.99	5.49	89.00	3.96	5.00

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max Wind Speed (m/s)
	8:00:00 AM	39.37	5.48	89.70	3.93	5.23
	9:00:00 AM	37.10	5.09	86.10	4.12	5.61
	10:00:00 AM	36.56	4.79	88.40	3.43	5.41
	11:00:00 AM	38.38	4.61	89.80	4.00	5.86
	12:00:00 PM	40.57	4.46	90.50	4.51	7.15
	1:00:00 PM	44.42	3.97	92.90	5.82	7.78
	2:00:00 PM	46.82	3.73	93.50	6.83	9.19
	3:00:00 PM	47.33	3.68	92.80	6.93	9.35

3.2 R2

One-minute filtered and unfiltered L_{eq} value, maximum sound levels (L_{max}), and minimum sound levels (L_{min}) over the two monitoring events at R2 are shown in Figure 4 and 5.

Hourly L_{eq} values were calculated as described in Section 2.4, and are shown in Table 4, and data points filtered out from subsequent calculations are indicated.

Weather data for noise monitoring dates at R2 is shown in Table 4. Wind exceeded 4.17 m/s for a relatively small proportion of the monitoring events at this site. Monitoring was conducted for a total of 125 h, and 80 h were available after filtering.

Audible noises noted in the field log at this location include road traffic and helicopters.

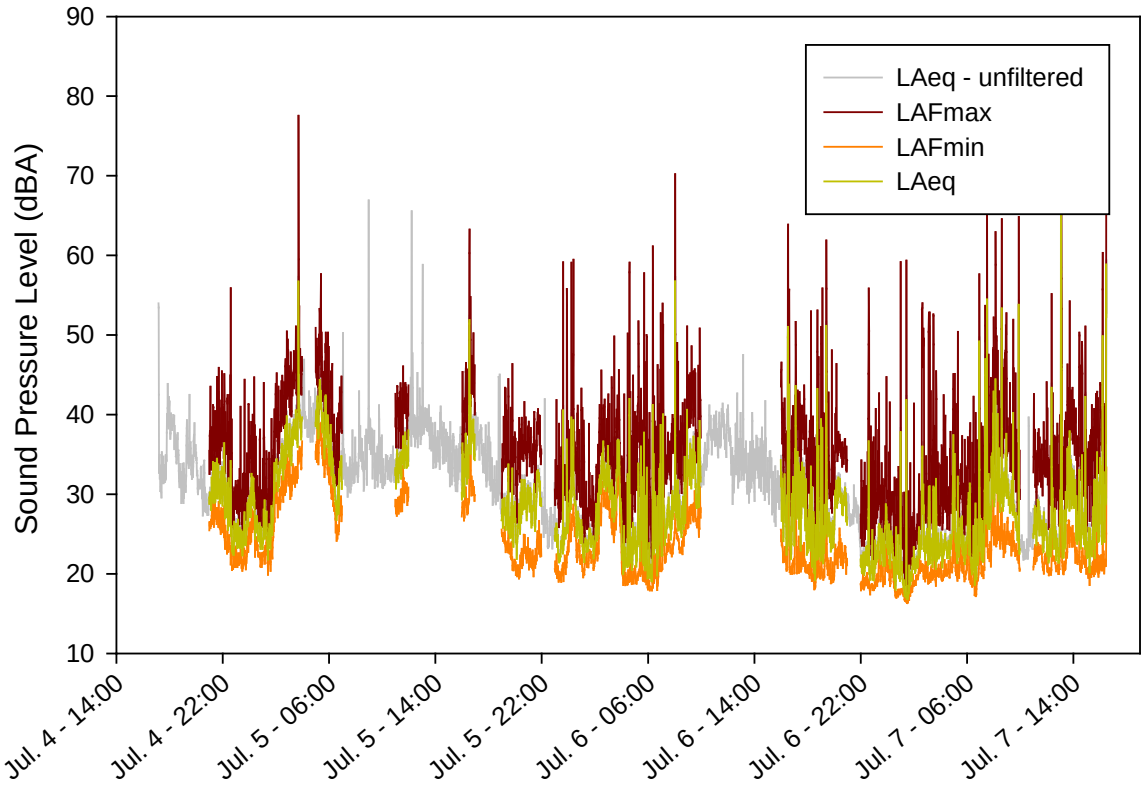


Figure 4. One-minute L_{eq}, L_{max} and L_{min} values recorded at monitoring station R2 at the Meadowbank site during monitoring event 1. Filtered data excludes those measurements taken outside of optimal conditions (set-up, take-down, wind > 4.17 m/s, RH > 90%).

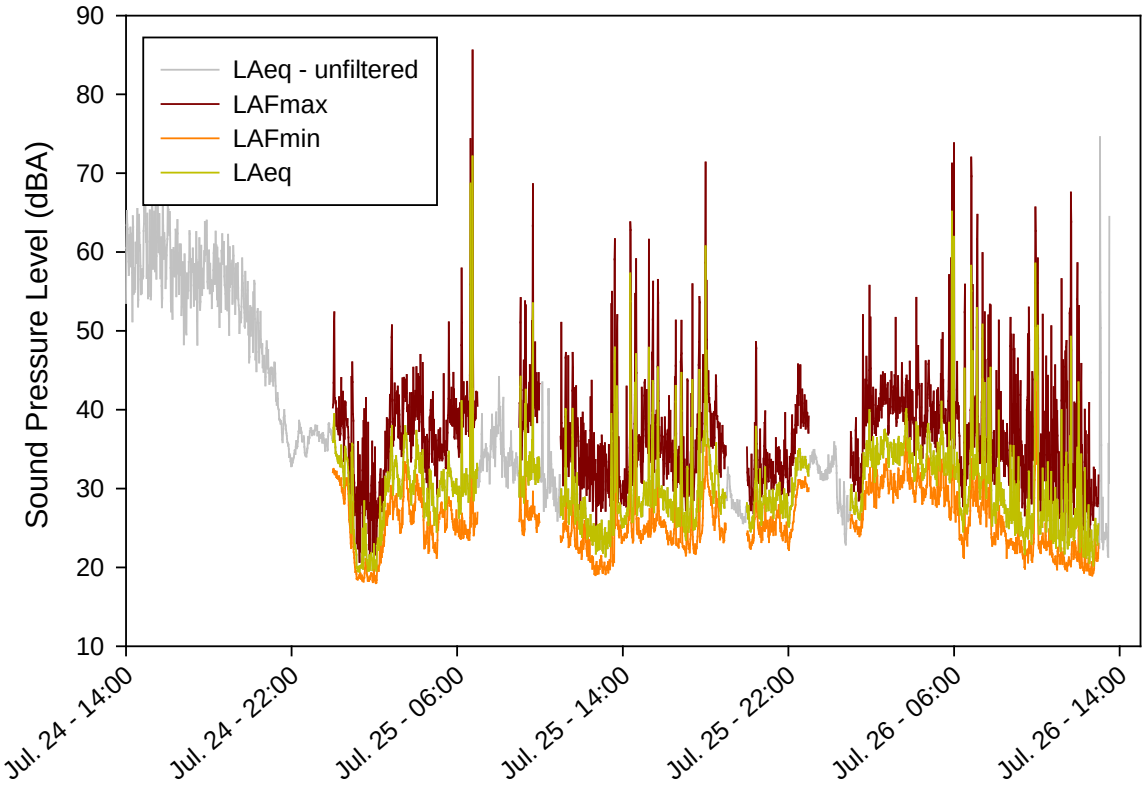


Figure 5. One-minute L_{eq}, L_{max} and L_{min} values recorded at monitoring station R2 at the Meadowbank site during monitoring event 2. Filtered data excludes those measurements taken outside of optimal conditions (set-up, take-down, wind > 4.17 m/s, RH > 90%).

Table 4. Hourly L_{eq} values for monitoring station R2 at the Meadowbank site. Data points filtered out of subsequent analyses due to set-up or non-optimal weather conditions are shaded grey.

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max. Wind Speed (m/s)
7/04/16	5:00:00 PM	41.47	15.75	49.58	3.96	6.15
	6:00:00 PM	36.82	15.47	61.75	4.67	9.00
	7:00:00 PM	35.08	14.21	56.87	4.47	7.86
	8:00:00 PM	31.12	13.89	64.11	4.79	7.72
	9:00:00 PM	31.69	13.24	61.40	3.76	5.88
	10:00:00 PM	29.62	13.03	59.20	3.51	4.96
	11:00:00 PM	25.92	12.88	58.80	1.74	3.23
7/05/16	12:00:00 AM	28.57	12.94	61.71	0.88	1.59
	1:00:00 AM	28.16	11.61	66.06	1.11	2.53

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max. Wind Speed (m/s)
	2:00:00 AM	35.66	11.55	67.44	1.97	3.33
	3:00:00 AM	42.26	11.93	63.21	3.50	5.80
	4:00:00 AM	40.06	11.55	70.76	4.54	6.47
	5:00:00 AM	40.65	10.97	69.95	3.53	4.94
	6:00:00 AM	33.52	11.11	65.35	2.98	4.78
	7:00:00 AM	36.11	11.68	61.85	4.21	6.63
	8:00:00 AM	49.36	11.67	61.31	4.85	6.45
	9:00:00 AM	36.09	11.84	60.42	5.19	7.23
	10:00:00 AM	33.28	12.68	59.61	5.08	6.80
	11:00:00 AM	35.08	13.76	57.17	4.08	5.96
	12:00:00 PM	48.48	15.12	51.27	4.52	6.76
	1:00:00 PM	43.30	16.08	47.58	4.85	7.45
	2:00:00 PM	36.67	16.74	41.93	5.04	7.64
	3:00:00 PM	34.69	17.43	42.10	5.13	7.88
	4:00:00 PM	40.18	18.02	36.58	4.11	7.21
	5:00:00 PM	36.44	18.65	28.26	4.36	7.21
	6:00:00 PM	35.23	18.69	29.21	4.50	7.12
	7:00:00 PM	28.48	18.75	29.48	3.70	6.31
	8:00:00 PM	28.99	18.63	33.33	3.50	5.61
	9:00:00 PM	30.52	16.97	44.81	4.05	7.04
	10:00:00 PM	28.67	13.48	54.09	4.61	6.39
	11:00:00 PM	28.22	12.42	59.01	3.05	4.31
7/06/16	12:00:00 AM	30.74	11.82	65.41	1.78	2.80
	1:00:00 AM	24.60	10.02	70.24	2.07	3.18
	2:00:00 AM	32.16	9.45	69.26	1.28	2.45
	3:00:00 AM	32.32	10.17	62.09	1.08	1.98
	4:00:00 AM	28.86	10.43	70.41	2.26	3.31
	5:00:00 AM	28.28	10.29	65.26	2.76	3.63
	6:00:00 AM	29.88	10.99	61.39	1.95	3.31
	7:00:00 AM	29.84	12.47	58.33	2.74	4.72
	8:00:00 AM	40.18	13.80	50.61	3.73	5.49
	9:00:00 AM	33.87	14.89	45.80	4.10	6.02
	10:00:00 AM	36.70	15.15	50.46	4.89	7.21
	11:00:00 AM	38.43	15.02	56.00	5.77	7.94
	12:00:00 PM	36.43	15.14	48.19	5.31	7.78
	1:00:00 PM	35.74	15.34	48.39	4.66	7.12
	2:00:00 PM	34.58	16.16	45.52	4.45	6.59
	3:00:00 PM	31.63	16.77	42.20	4.41	6.96

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max. Wind Speed (m/s)
	4:00:00 PM	37.75	17.49	40.07	3.80	6.49
	5:00:00 PM	32.81	18.13	37.36	3.20	5.16
	6:00:00 PM	30.55	18.71	33.54	3.02	5.14
	7:00:00 PM	36.16	18.98	33.94	2.27	4.68
	8:00:00 PM	30.19	18.07	40.80	3.41	5.14
	9:00:00 PM	27.75	16.50	44.17	4.69	5.47
	10:00:00 PM	24.41	15.18	49.49	4.12	5.51
	11:00:00 PM	24.89	14.10	54.40	2.26	3.92
7/07/16	12:00:00 AM	23.08	13.21	51.36	0.93	1.90
	1:00:00 AM	27.11	12.95	52.93	1.03	2.39
	2:00:00 AM	26.57	12.97	50.25	2.25	2.86
	3:00:00 AM	26.00	11.75	62.50	2.80	3.35
	4:00:00 AM	26.78	11.10	59.83	2.22	2.61
	5:00:00 AM	26.76	11.52	62.67	2.03	2.61
	6:00:00 AM	33.08	11.53	62.91	1.98	2.67
	7:00:00 AM	39.65	12.56	55.62	1.95	2.78
	8:00:00 AM	38.69	14.07	49.86	2.71	3.59
	9:00:00 AM	37.62	15.90	41.39	3.80	6.45
	10:00:00 AM	27.44	17.47	41.60	4.27	5.80
	11:00:00 AM	27.08	19.11	37.25	3.76	5.80
	12:00:00 PM	29.33	20.46	31.78	3.68	6.47
	1:00:00 PM	54.78	21.64	26.36	2.57	5.78
	2:00:00 PM	30.63	22.18	24.37	3.62	6.27
	3:00:00 PM	27.96	22.30	26.90	2.95	5.65
	4:00:00 PM	46.18	22.79	24.84	2.61	5.37
7/24/16	9:00:00 AM	56.31	8.88	61.05	5.82	9.88
	10:00:00 AM	58.08	9.66	45.38	7.44	10.58
	11:00:00 AM	60.72	10.19	45.07	8.09	11.00
	12:00:00 PM	59.73	10.92	42.66	8.86	12.27
	1:00:00 PM	61.37	11.83	44.79	8.91	12.49
	2:00:00 PM	61.51	12.13	37.52	7.61	10.04
	3:00:00 PM	61.98	12.99	35.08	8.93	13.60
	4:00:00 PM	59.77	13.21	34.30	8.87	13.86
	5:00:00 PM	58.55	13.68	36.94	8.66	12.56
	6:00:00 PM	57.75	13.95	38.73	8.23	11.49
	7:00:00 PM	55.60	13.93	36.74	8.64	12.66
	8:00:00 PM	49.70	13.95	42.35	7.40	10.66
	9:00:00 PM	40.91	13.35	47.23	6.76	9.64

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max. Wind Speed (m/s)
	10:00:00 PM	36.00	12.24	59.68	5.57	7.57
	11:00:00 PM	36.86	10.81	68.62	4.61	5.66
7/25/16	12:00:00 AM	33.86	9.45	70.19	4.10	5.49
	1:00:00 AM	21.72	9.03	73.52	2.71	4.41
	2:00:00 AM	29.94	9.24	75.56	2.01	3.78
	3:00:00 AM	32.83	8.39	81.10	1.68	2.33
	4:00:00 AM	31.39	8.56	79.14	1.98	2.74
	5:00:00 AM	30.61	7.96	77.59	1.83	3.04
	6:00:00 AM	55.99	7.76	77.42	3.26	4.98
	7:00:00 AM	35.31	7.52	81.00	4.25	5.70
	8:00:00 AM	35.72	7.70	76.91	5.05	6.82
	9:00:00 AM	39.53	8.33	76.40	4.08	6.47
	10:00:00 AM	33.70	8.81	69.72	4.17	5.94
	11:00:00 AM	31.00	10.01	64.83	3.53	5.33
	12:00:00 PM	25.29	10.75	63.03	3.36	4.84
	1:00:00 PM	35.04	11.51	61.16	2.76	4.14
	2:00:00 PM	41.78	11.81	70.53	2.42	3.74
	3:00:00 PM	35.76	12.56	69.20	2.54	4.53
	4:00:00 PM	33.31	13.08	69.46	3.32	5.43
	5:00:00 PM	34.27	13.25	66.18	2.97	5.41
	6:00:00 PM	43.53	13.54	75.89	3.41	6.21
	7:00:00 PM	28.36	12.69	77.28	4.25	6.90
	8:00:00 PM	29.14	12.10	76.69	3.84	5.57
	9:00:00 PM	28.44	11.66	81.60	3.41	5.37
	10:00:00 PM	32.19	11.93	57.28	2.65	4.61
	11:00:00 PM	32.83	11.86	61.04	4.89	6.57
7/26/16	12:00:00 AM	30.69	10.53	65.65	4.72	6.17
	1:00:00 AM	31.96	9.67	69.72	3.44	5.49
	2:00:00 AM	34.98	9.03	71.70	2.92	4.14
	3:00:00 AM	35.54	8.88	72.98	2.83	3.86
	4:00:00 AM	34.50	8.38	74.37	2.93	3.82
	5:00:00 AM	47.71	8.21	72.17	3.02	4.00
	6:00:00 AM	46.57	8.63	70.00	3.31	4.23
	7:00:00 AM	40.06	9.93	60.17	2.70	4.31
	8:00:00 AM	29.69	11.00	58.36	2.59	3.84
	9:00:00 AM	42.45	11.83	52.23	2.91	3.92
	10:00:00 AM	36.86	12.74	49.46	2.39	3.94
	11:00:00 AM	34.96	13.56	48.29	2.47	4.84

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max. Wind Speed (m/s)
	12:00:00 PM	29.57	14.11	47.01	2.79	5.53
	1:00:00 PM	60.12	14.28	46.60	2.61	5.14

3.3 R3

One-minute filtered and unfiltered L_{eq} value, maximum sound levels (L_{max}), and minimum sound levels (L_{min}) over the two monitoring events at R3 are shown in Figure 6 and 7.

Hourly L_{eq} values were calculated as described in Section 2.4, and are shown in Table 5.

Weather data for noise monitoring dates at R3 is shown in Table 5. Wind speeds were low during the first event, but exceeded 4.17 m/s for the majority of the second monitoring period. Between the two events, a total of 65 out of 123 h of data collected were usable.

Audible noises noted in the field log at this location include boats, 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.

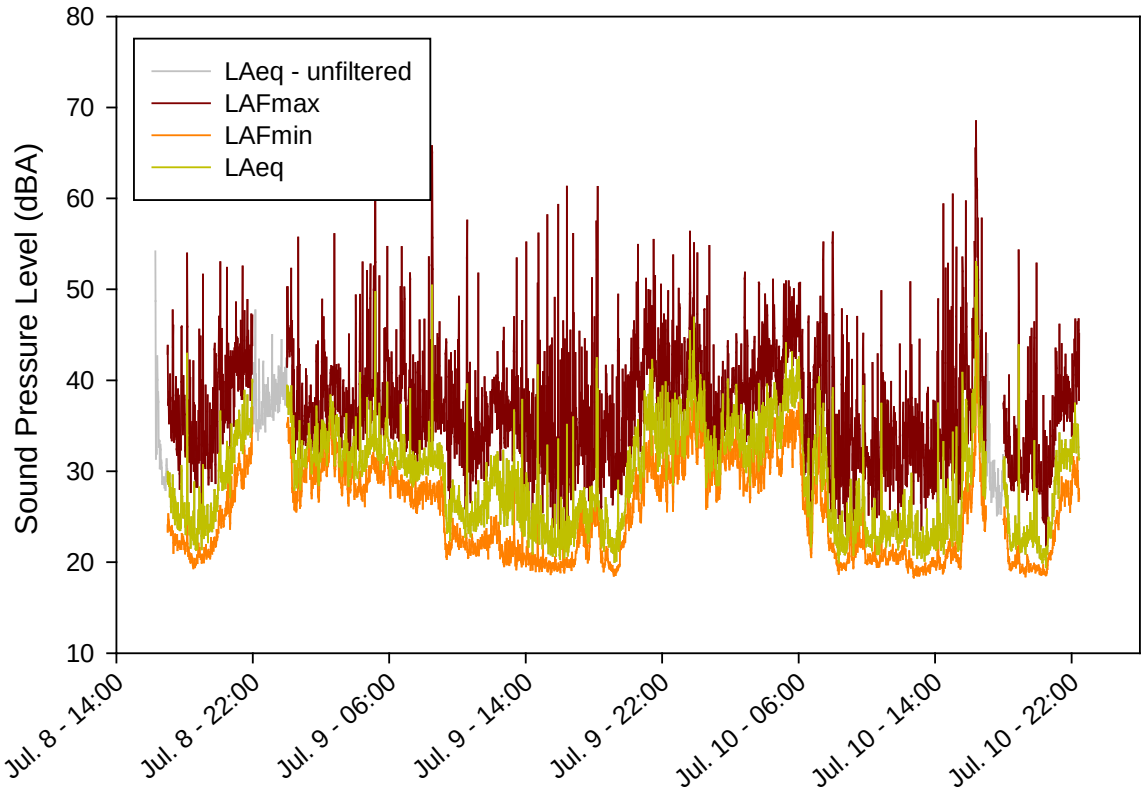


Figure 6. One-minute L_{eq}, L_{max} and L_{min} values recorded at monitoring station R3 at the Meadowbank site during monitoring event 1. Filtered data excludes those measurements taken outside of optimal conditions (set-up, take-down, wind > 4.17 m/s, RH > 90%).

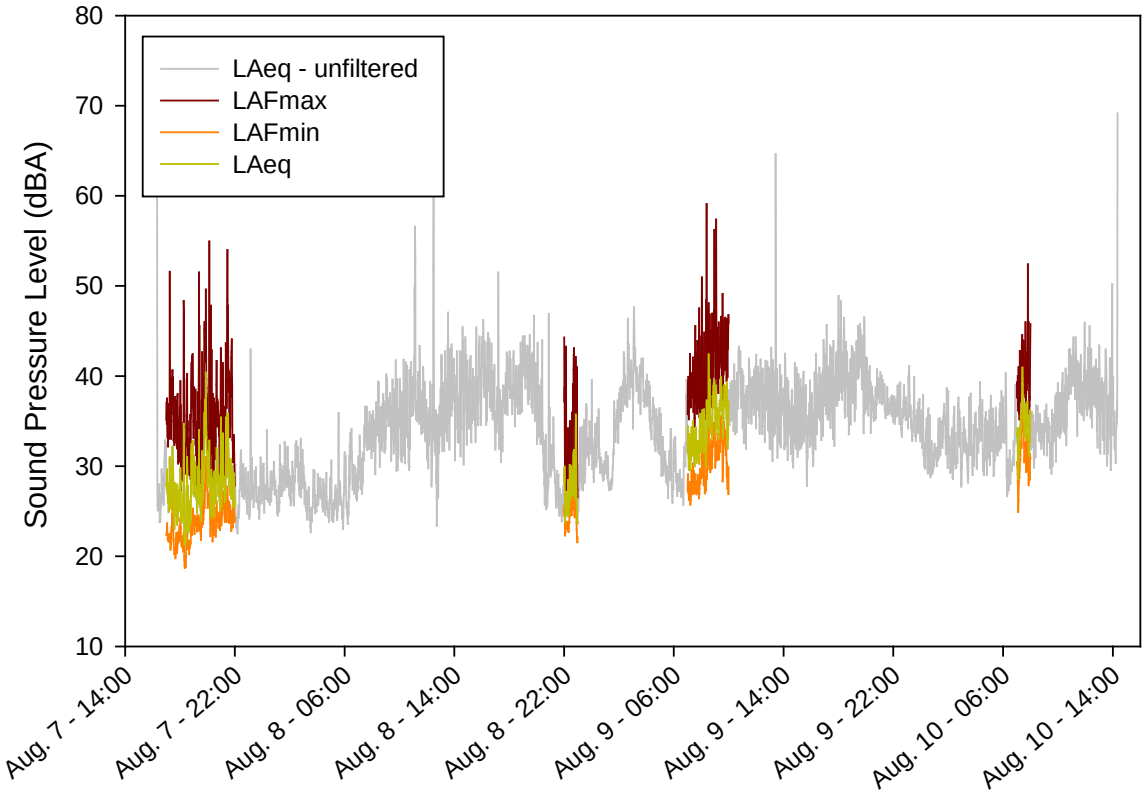


Figure 7. One-minute L_{eq}, L_{max} and L_{min} values recorded at monitoring station R3 at the Meadowbank site during monitoring event 2. Filtered data excludes those measurements taken outside of optimal conditions (set-up, take-down, wind > 4.17 m/s, RH > 90%).

Table 5. Hourly L_{eq} values for monitoring station R3 at the Meadowbank site. Data points filtered out of subsequent analyses due to set-up or non-optimal weather conditions are shaded grey.

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max. Wind Speed (m/s)
7/08/16	4:00:00 PM	40.01	24.96	21.49	2.18	3.53
	5:00:00 PM	26.92	25.13	20.47	1.84	2.96
	6:00:00 PM	28.02	25.51	21.22	1.91	3.31
	7:00:00 PM	25.31	25.47	22.06	1.59	2.80
	8:00:00 PM	31.25	24.53	26.56	2.40	3.72
	9:00:00 PM	35.32	23.82	32.68	2.11	3.31
	10:00:00 PM	38.23	22.14	32.99	4.99	6.64
	11:00:00 PM	39.24	20.99	37.66	4.48	5.59
7/09/16	12:00:00 AM	34.55	18.83	44.49	3.47	6.15
	1:00:00 AM	32.42	17.40	52.42	3.17	4.41

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max. Wind Speed (m/s)
	2:00:00 AM	34.63	16.57	53.50	2.53	3.31
	3:00:00 AM	32.02	16.87	66.35	1.72	3.20
	4:00:00 AM	32.64	16.88	50.39	2.44	4.57
	5:00:00 AM	35.97	17.10	54.75	2.85	4.63
	6:00:00 AM	31.87	17.56	49.92	3.16	5.41
	7:00:00 AM	30.90	17.89	52.30	3.86	5.59
	8:00:00 AM	36.06	18.69	45.17	2.73	4.90
	9:00:00 AM	27.92	20.09	43.27	3.90	5.57
	10:00:00 AM	26.92	20.46	42.25	3.42	4.59
	11:00:00 AM	26.94	21.17	37.18	3.11	4.47
	12:00:00 PM	28.84	22.55	33.90	3.60	5.00
	1:00:00 PM	28.92	23.68	31.05	3.90	6.06
	2:00:00 PM	27.59	24.29	27.17	4.04	6.19
	3:00:00 PM	24.14	24.86	23.92	3.23	5.41
	4:00:00 PM	25.21	25.43	22.91	1.92	4.27
	5:00:00 PM	26.16	24.98	26.01	1.58	3.43
	6:00:00 PM	29.75	24.20	27.57	1.30	2.86
	7:00:00 PM	24.84	24.12	34.80	1.78	3.33
	8:00:00 PM	31.87	23.21	33.59	1.69	4.27
	9:00:00 PM	36.27	21.57	39.38	2.75	4.37
	10:00:00 PM	34.77	20.14	42.80	1.76	3.53
	11:00:00 PM	38.54	19.96	39.66	1.78	3.10
7/10/16	12:00:00 AM	35.48	19.08	39.38	0.87	3.53
	1:00:00 AM	33.76	17.22	69.29	0.86	2.82
	2:00:00 AM	34.65	16.79	55.43	0.58	1.76
	3:00:00 AM	34.02	14.83	62.75	0.78	1.61
	4:00:00 AM	36.23	14.95	59.00	0.75	2.14
	5:00:00 AM	39.15	15.88	67.73	0.79	2.80
	6:00:00 AM	33.84	13.64	79.97	1.09	2.53
	7:00:00 AM	33.28	14.78	67.42	1.27	2.74
	8:00:00 AM	26.07	16.53	60.26	1.41	2.16
	9:00:00 AM	27.12	18.65	44.39	0.99	1.92
	10:00:00 AM	25.05	21.21	42.38	0.87	2.14
	11:00:00 AM	23.74	21.82	35.75	1.44	3.16
	12:00:00 PM	24.22	22.85	31.86	1.31	3.18
	1:00:00 PM	22.31	23.65	32.16	1.61	3.86
	2:00:00 PM	26.46	23.91	31.59	2.53	3.88
	3:00:00 PM	31.62	24.38	26.45	2.19	3.37

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max. Wind Speed (m/s)
	4:00:00 PM	42.33	24.98	26.01	2.25	3.72
	5:00:00 PM	31.43	22.78	37.96	4.66	8.29
	6:00:00 PM	29.25	22.45	34.74	2.14	4.49
	7:00:00 PM	23.83	23.24	32.72	1.02	2.12
	8:00:00 PM	22.79	24.25	29.77	1.39	2.29
	9:00:00 PM	31.34	23.50	34.13	1.40	2.33
	10:00:00 PM	33.82	22.66	48.60	1.60	2.47
8/07/16	4:00:00 PM	57.34	8.82	65.17	3.53	6.12
	5:00:00 PM	27.00	9.28	61.58	3.40	6.25
	6:00:00 PM	27.41	9.57	58.64	2.69	5.94
	7:00:00 PM	31.02	9.77	57.39	3.26	5.96
	8:00:00 PM	28.77	9.75	66.46	4.04	7.27
	9:00:00 PM	30.17	9.18	66.63	3.37	6.31
	10:00:00 PM	27.74	8.64	85.10	4.40	8.23
	11:00:00 PM	29.40	8.11	93.80	3.62	6.49
8/08/16	12:00:00 AM	28.16	7.48	100.00	4.13	6.19
	1:00:00 AM	28.63	7.41	100.00	4.56	6.70
	2:00:00 AM	29.51	6.95	100.00	4.50	6.45
	3:00:00 AM	26.45	6.92	100.00	4.49	6.57
	4:00:00 AM	26.59	6.79	100.00	4.20	6.06
	5:00:00 AM	27.01	6.91	100.00	4.25	6.33
	6:00:00 AM	29.17	7.00	100.00	4.05	6.19
	7:00:00 AM	32.78	6.98	100.00	4.85	7.39
	8:00:00 AM	34.89	7.03	100.00	4.65	7.21
	9:00:00 AM	36.15	7.53	99.20	4.86	7.27
	10:00:00 AM	37.13	8.14	95.20	4.86	7.80
	11:00:00 AM	42.81	8.56	96.80	5.04	7.78
	12:00:00 PM	51.23	9.24	87.60	5.29	7.66
	1:00:00 PM	39.46	10.23	74.51	5.09	7.55
	2:00:00 PM	39.25	11.45	60.76	5.69	8.82
	3:00:00 PM	39.19	12.20	60.32	5.82	8.92
	4:00:00 PM	40.57	12.67	64.48	5.97	10.02
	5:00:00 PM	39.19	12.65	71.68	6.11	9.58
	6:00:00 PM	39.64	12.67	76.93	5.66	8.53
	7:00:00 PM	41.25	12.53	74.29	6.70	9.49
	8:00:00 PM	35.98	12.61	73.48	6.74	9.35
	9:00:00 PM	28.82	12.63	77.64	4.77	7.72
	10:00:00 PM	28.08	12.23	80.90	3.21	5.37

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max. Wind Speed (m/s)
	11:00:00 PM	32.02	11.34	90.90	3.38	5.00
8/09/16	12:00:00 AM	31.96	10.06	92.90	4.10	5.88
	1:00:00 AM	32.25	10.06	88.10	4.81	6.90
	2:00:00 AM	39.71	9.98	91.10	5.11	6.59
	3:00:00 AM	40.51	9.58	92.30	4.42	7.00
	4:00:00 AM	35.85	8.91	94.20	3.39	5.45
	5:00:00 AM	30.40	9.04	93.40	5.02	7.29
	6:00:00 AM	31.32	8.86	86.50	4.29	6.43
	7:00:00 AM	32.42	9.30	85.50	3.52	5.16
	8:00:00 AM	35.72	9.63	81.40	3.33	4.49
	9:00:00 AM	36.43	10.56	76.80	3.69	5.00
	10:00:00 AM	38.66	11.84	65.76	4.74	7.23
	11:00:00 AM	38.06	12.99	60.59	5.87	8.17
	12:00:00 PM	38.49	14.07	46.77	5.79	8.51
	1:00:00 PM	48.06	14.81	42.20	4.99	8.57
	2:00:00 PM	36.53	15.45	38.01	5.48	8.09
	3:00:00 PM	36.10	16.06	37.91	5.64	8.82
	4:00:00 PM	37.90	16.60	40.98	5.92	8.74
	5:00:00 PM	39.84	16.94	40.97	6.29	9.51
	6:00:00 PM	41.71	17.09	41.92	6.79	9.98
	7:00:00 PM	41.76	16.96	44.93	7.68	10.54
	8:00:00 PM	38.00	16.44	50.79	7.16	9.84
	9:00:00 PM	37.40	15.35	55.06	7.13	9.49
	10:00:00 PM	36.36	13.57	64.68	6.16	8.37
	11:00:00 PM	35.89	12.05	71.99	6.03	7.70
8/10/16	12:00:00 AM	32.49	11.39	79.78	5.52	7.25
	1:00:00 AM	33.61	10.73	86.90	4.71	6.84
	2:00:00 AM	32.63	10.17	88.30	4.49	6.39
	3:00:00 AM	33.02	10.08	86.40	5.14	6.76
	4:00:00 AM	33.61	10.01	85.40	5.06	6.49
	5:00:00 AM	33.91	9.48	88.90	4.56	6.00
	6:00:00 AM	33.45	9.34	88.30	4.57	6.66
	7:00:00 AM	35.13	9.83	88.60	3.66	5.00
	8:00:00 AM	34.02	10.17	86.50	4.23	7.29
	9:00:00 AM	34.30	11.24	81.50	5.49	7.53
	10:00:00 AM	38.49	12.46	74.42	6.06	8.08
	11:00:00 AM	40.26	13.36	64.75	6.10	8.78
	12:00:00 PM	39.18	14.31	52.79	6.30	9.13

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max. Wind Speed (m/s)
	1:00:00 PM	39.47	15.13	44.98	6.29	9.15
	2:00:00 PM	55.88	16.14	38.28	5.53	8.49

3.4 R4

One-minute filtered and unfiltered L_{eq} value, maximum sound levels (L_{max}), and minimum sound levels (L_{min}) over the three monitoring events at R4 are shown in Figure 8, 9, and 10.

Hourly L_{eq} values were calculated as described in Section 2.4, and are shown in Table 6, along with data filtered out for subsequent calculations.

Weather data for noise monitoring dates at R4 is shown in Table 6. After 142 h of monitoring, 70 h were available for analysis after filtering data. Less than half of events one and two were recorded under acceptable wind speeds, and precipitation as well as high winds occurred throughout the entirety of the third event.

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

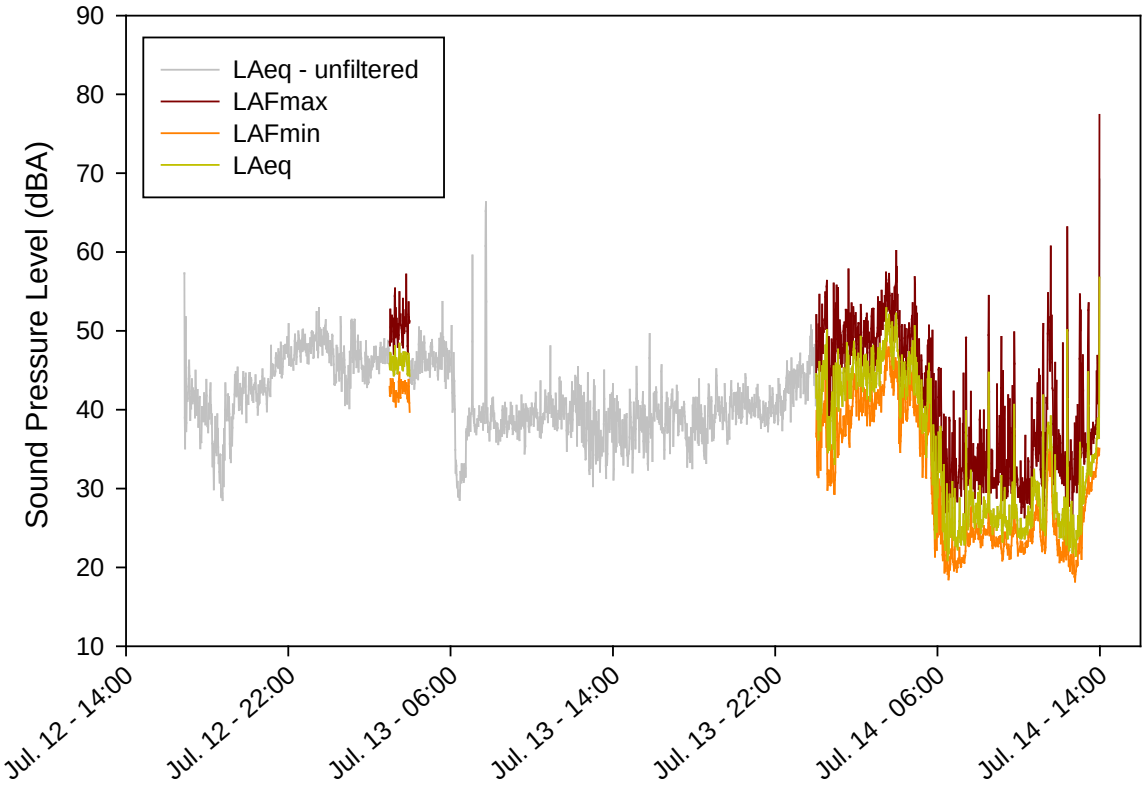


Figure 8. One-minute L_{eq}, L_{max} and L_{min} values recorded at monitoring station R4 at the Meadowbank site during monitoring event 1. Filtered data excludes those measurements taken outside of optimal conditions (set-up, wind > 4.17 m/s, RH > 90%).

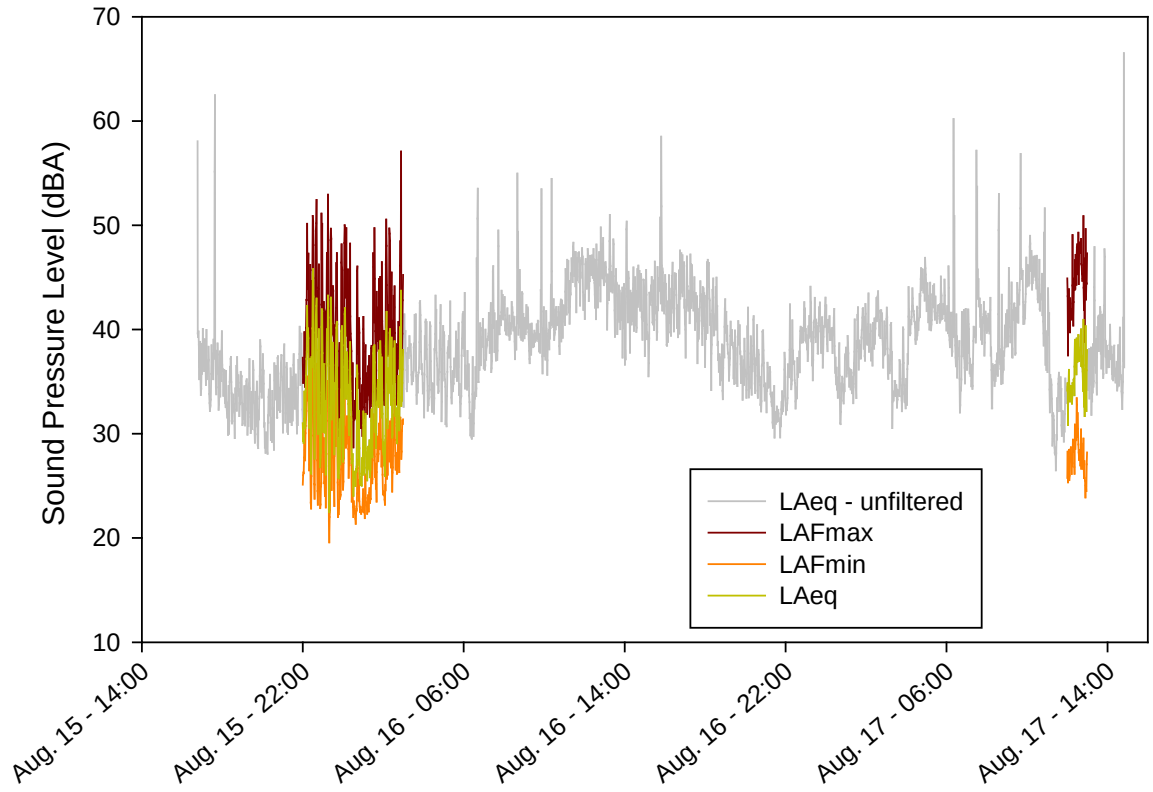


Figure 9. One-minute L_{eq}, L_{max} and L_{min} values recorded at monitoring station R4 at the Meadowbank site during monitoring event 2. Filtered data excludes those measurements taken outside of optimal conditions (set-up, wind > 4.17 m/s, RH > 90%).

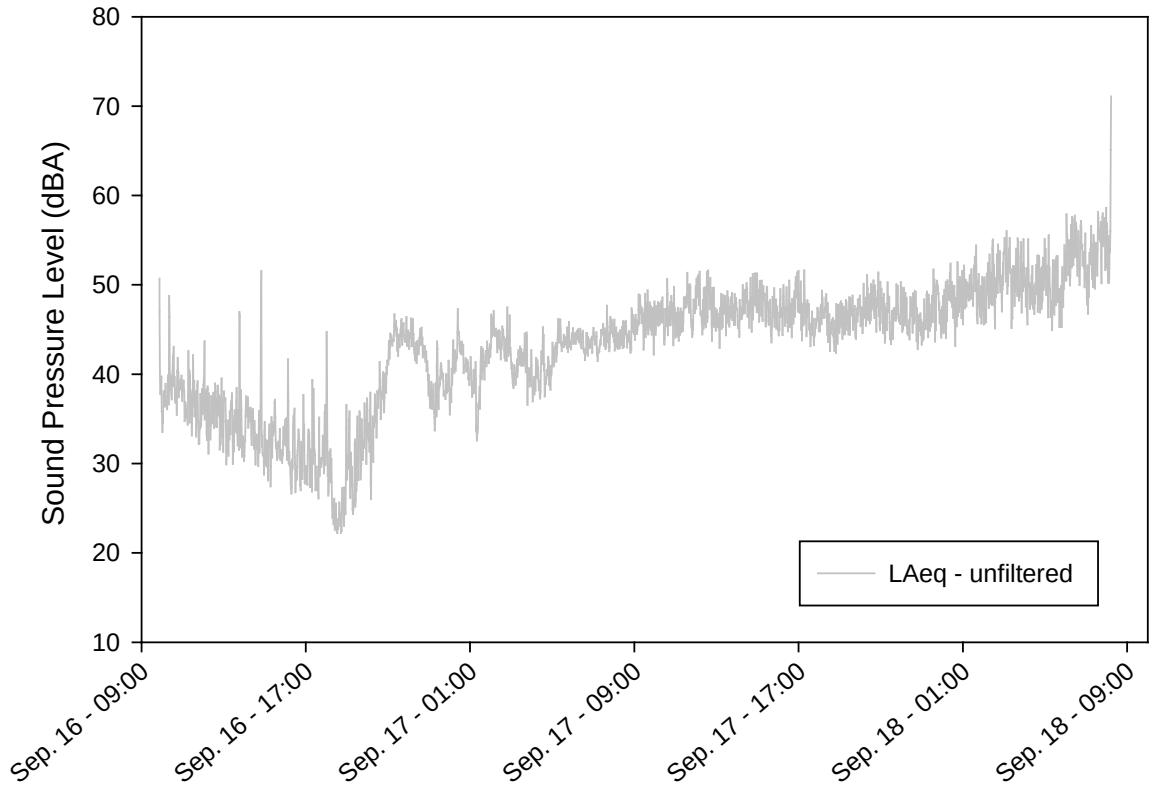


Figure 10. One-minute L_{eq}, L_{max} and L_{min} values recorded at monitoring station R4 at the Meadowbank site during monitoring event 3. Filtered data excludes those measurements taken outside of optimal conditions (set-up, wind > 4.17 m/s, RH > 90%).

Table 6. Hourly L_{eq} values for monitoring station R4 at the Meadowbank site. Data points filtered out of subsequent analyses due to set-up or non-optimal weather conditions are shaded grey.

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max. Wind Speed (m/s)
7/12/16	4:00:00 PM	52.07	22.08	29.54	4.91	7.86
	5:00:00 PM	41.33	22.43	31.56	5.26	9.41
	6:00:00 PM	37.56	22.27	29.27	5.02	8.78
	7:00:00 PM	41.67	22.07	27.98	5.43	8.96
	8:00:00 PM	42.63	21.83	30.08	5.81	9.13
	9:00:00 PM	46.08	21.17	28.46	6.21	9.62
	10:00:00 PM	47.75	20.36	33.30	5.75	8.09
	11:00:00 PM	49.06	19.30	37.93	5.32	8.80
7/13/16	12:00:00 AM	46.16	18.10	42.17	5.43	9.00
	1:00:00 AM	47.15	16.89	48.26	5.78	8.64

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max. Wind Speed (m/s)
	2:00:00 AM	46.74	15.70	54.59	4.66	6.98
	3:00:00 AM	46.11	14.03	60.49	3.55	5.70
	4:00:00 AM	46.39	13.38	65.93	4.55	6.00
	5:00:00 AM	47.22	13.03	68.20	4.24	5.63
	6:00:00 AM	39.93	12.73	69.28	4.51	6.08
	7:00:00 AM	52.39	13.20	68.27	4.80	7.39
	8:00:00 AM	38.60	13.85	61.37	5.20	7.00
	9:00:00 AM	38.63	14.66	56.21	4.58	6.35
	10:00:00 AM	40.30	15.27	53.03	4.42	6.82
	11:00:00 AM	40.00	16.48	45.11	4.23	7.35
	12:00:00 PM	40.04	16.91	43.81	5.10	8.02
	1:00:00 PM	38.30	17.32	39.69	5.66	8.98
	2:00:00 PM	37.99	17.69	37.73	5.54	8.53
	3:00:00 PM	39.90	18.21	36.04	5.23	8.43
	4:00:00 PM	40.07	18.63	30.16	4.85	8.21
	5:00:00 PM	38.73	19.03	29.75	5.34	8.86
	6:00:00 PM	39.00	19.57	31.71	5.84	8.84
	7:00:00 PM	40.50	19.23	34.14	7.20	9.82
	8:00:00 PM	40.88	18.66	35.97	7.12	9.86
	9:00:00 PM	40.21	17.90	39.38	6.81	9.35
	10:00:00 PM	42.53	16.94	42.61	5.24	7.41
	11:00:00 PM	45.48	15.85	50.46	4.18	5.55
7/14/16	12:00:00 AM	42.77	14.67	53.38	3.43	4.82
	1:00:00 AM	44.74	14.21	55.21	2.89	4.74
	2:00:00 AM	44.96	13.94	51.15	2.33	3.29
	3:00:00 AM	48.72	13.31	56.29	1.81	2.78
	4:00:00 AM	45.58	12.18	67.19	2.10	2.61
	5:00:00 AM	40.04	12.34	65.46	0.88	2.20
	6:00:00 AM	29.98	12.32	67.69	0.53	1.55
	7:00:00 AM	28.74	13.03	55.04	0.74	1.73
	8:00:00 AM	30.65	14.69	59.49	1.54	2.76
	9:00:00 AM	28.71	15.54	60.60	1.50	2.23
	10:00:00 AM	27.34	16.35	65.80	1.00	2.12
	11:00:00 AM	33.21	16.44	71.55	2.13	4.88
	12:00:00 PM	33.55	15.63	86.40	2.84	5.55
	1:00:00 PM	40.33	15.96	77.51	1.59	2.90
	2:00:00 PM	69.22	16.62	75.99	3.28	7.06
8/15/16	4:00:00 PM	47.09	20.47	49.01	5.71	9.49

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max. Wind Speed (m/s)
	5:00:00 PM	45.96	20.89	48.84	5.67	8.08
	6:00:00 PM	34.28	20.81	49.38	5.47	7.19
	7:00:00 PM	33.57	20.60	47.45	5.08	7.25
	8:00:00 PM	33.78	19.92	60.04	5.33	6.64
	9:00:00 PM	35.11	18.85	70.45	4.55	7.23
	10:00:00 PM	38.00	17.67	69.58	3.52	4.55
	11:00:00 PM	36.44	16.67	76.09	4.02	4.78
8/16/16	12:00:00 AM	33.39	15.95	83.00	3.88	5.31
	1:00:00 AM	32.96	14.87	86.70	3.16	4.63
	2:00:00 AM	35.80	14.99	89.40	4.01	5.59
	3:00:00 AM	37.85	14.68	91.50	4.71	6.00
	4:00:00 AM	37.59	13.78	94.70	4.20	5.90
	5:00:00 AM	37.19	13.38	96.20	4.39	6.06
	6:00:00 AM	40.43	12.91	97.20	4.70	6.08
	7:00:00 AM	41.14	13.02	98.60	4.92	6.64
	8:00:00 AM	42.82	13.68	95.90	4.86	6.74
	9:00:00 AM	41.23	14.44	92.70	5.17	7.06
	10:00:00 AM	42.16	15.55	88.30	6.26	7.59
	11:00:00 AM	45.40	16.57	83.60	6.35	7.92
	12:00:00 PM	45.73	17.00	81.20	7.82	10.11
	1:00:00 PM	44.43	17.13	79.89	7.98	9.90
	2:00:00 PM	43.50	18.01	74.78	7.57	10.70
	3:00:00 PM	45.42	19.12	65.58	7.32	9.98
	4:00:00 PM	43.68	20.05	63.28	7.21	9.62
	5:00:00 PM	42.89	20.71	58.00	7.45	11.47
	6:00:00 PM	41.39	20.45	63.71	7.19	10.00
	7:00:00 PM	38.33	19.98	67.99	6.39	8.45
	8:00:00 PM	37.02	19.76	66.09	5.78	7.74
	9:00:00 PM	33.51	19.23	71.33	5.33	6.78
	10:00:00 PM	37.73	18.10	74.25	5.05	7.00
	11:00:00 PM	40.11	17.13	77.54	5.99	7.80
8/17/16	12:00:00 AM	38.03	16.45	85.80	6.55	8.80
	1:00:00 AM	38.28	15.77	89.00	6.46	8.04
	2:00:00 AM	40.17	14.95	91.70	4.40	6.74
	3:00:00 AM	36.49	14.13	90.80	4.96	6.92
	4:00:00 AM	42.46	14.19	89.00	4.83	7.76
	5:00:00 AM	42.22	13.98	91.90	5.56	8.08
	6:00:00 AM	44.59	13.38	93.80	4.33	7.70

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max. Wind Speed (m/s)
	7:00:00 AM	43.75	13.23	95.20	3.60	6.00
	8:00:00 AM	40.67	13.24	92.60	4.65	6.43
	9:00:00 AM	44.47	14.39	92.20	4.80	6.92
	10:00:00 AM	45.14	14.74	94.50	6.01	8.08
	11:00:00 AM	34.78	15.34	95.90	6.35	8.80
	12:00:00 PM	36.52	16.30	86.80	4.13	6.15
	1:00:00 PM	39.83	17.05	83.20	5.66	8.17
	2:00:00 PM	49.66	17.32	81.70	5.49	8.09
9/16/16	9:00:00 AM	44.21	0.66	100.00	5.19	7.51
	10:00:00 AM	39.57	0.89	100.00	6.32	7.92
	11:00:00 AM	37.23	1.30	100.00	6.25	8.00
	12:00:00 PM	36.81	1.76	100.00	6.59	8.41
	1:00:00 PM	36.51	2.05	99.70	6.09	7.86
	2:00:00 PM	37.89	2.29	100.00	5.64	7.43
	3:00:00 PM	32.62	2.44	100.00	5.19	6.98
	4:00:00 PM	32.57	2.73	96.20	4.41	5.82
	5:00:00 PM	32.14	2.78	98.70	4.15	5.74
	6:00:00 PM	30.86	2.98	97.40	3.66	4.76
	7:00:00 PM	32.04	2.99	98.30	2.86	3.92
	8:00:00 PM	37.15	2.92	99.90	2.89	4.16
	9:00:00 PM	44.26	2.83	100.00	2.75	3.65
	10:00:00 PM	43.30	2.93	100.00	2.63	3.70
	11:00:00 PM	38.90	2.71	100.00	3.36	4.74
9/17/16	12:00:00 AM	41.93	2.78	100.00	3.49	5.10
	1:00:00 AM	40.52	2.89	100.00	3.89	5.59
	2:00:00 AM	44.34	2.88	100.00	3.63	5.53
	3:00:00 AM	41.28	2.90	100.00	4.36	6.53
	4:00:00 AM	40.39	2.83	100.00	4.48	6.66
	5:00:00 AM	43.75	2.47	100.00	4.58	6.70
	6:00:00 AM	43.81	2.15	100.00	5.17	8.23
	7:00:00 AM	44.31	1.56	100.00	5.74	8.45
	8:00:00 AM	44.53	1.25	100.00	6.59	9.25
	9:00:00 AM	46.39	1.81	100.00	6.93	10.15
	10:00:00 AM	46.76	2.35	100.00	8.04	11.45
	11:00:00 AM	47.23	2.90	100.00	6.70	9.84
	12:00:00 PM	48.33	3.59	100.00	7.42	10.13
	1:00:00 PM	47.08	4.37	100.00	7.71	11.62
	2:00:00 PM	48.14	4.69	100.00	7.45	11.39

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max. Wind Speed (m/s)
	3:00:00 PM	47.76	5.27	100.00	7.72	11.00
	4:00:00 PM	47.71	5.80	100.00	7.64	11.00
	5:00:00 PM	46.98	6.14	100.00	7.38	11.68
	6:00:00 PM	46.26	6.28	100.00	7.22	10.84
	7:00:00 PM	46.71	6.32	100.00	7.26	10.35
	8:00:00 PM	47.89	6.32	100.00	7.32	10.62
	9:00:00 PM	47.11	6.25	100.00	7.92	11.86
	10:00:00 PM	46.78	6.16	100.00	8.91	12.52
	11:00:00 PM	47.45	5.96	100.00	8.59	12.21
9/18/16	12:00:00 AM	48.83	5.93	100.00	8.91	11.90
	1:00:00 AM	49.69	5.87	100.00	9.26	13.35
	2:00:00 AM	50.75	5.70	100.00	8.96	12.29
	3:00:00 AM	52.15	5.40	100.00	9.77	14.41
	4:00:00 AM	50.55	5.42	100.00	10.48	14.35
	5:00:00 AM	50.63	5.45	100.00	9.10	13.84
	6:00:00 AM	54.41	5.34	100.00	8.46	13.21
	7:00:00 AM	54.45	5.30	100.00	8.97	15.37
	8:00:00 AM	61.38	5.16	100.00	8.99	13.80

3.5 R5

One-minute filtered and unfiltered L_{eq} values, maximum sound levels (L_{max}), and minimum sound levels (L_{min}) over the three monitoring events at R5 are shown in Figure 11, 12, and 13.

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

Weather data for noise monitoring dates at R5 is also shown in Table 7. Winds tended to be high during events 1 and 2, and precipitation occurred throughout most of the third event. Out of 172 monitoring hours, 39 were available for analysis after filtering the data.

Audible noises noted in the field log at this location include birds, insects, road traffic, helicopters and activities at the nearby former exploration camp. Increased exploration activities related to the Amaruq project since 2014 have resulted in higher helicopter traffic throughout the summer months.

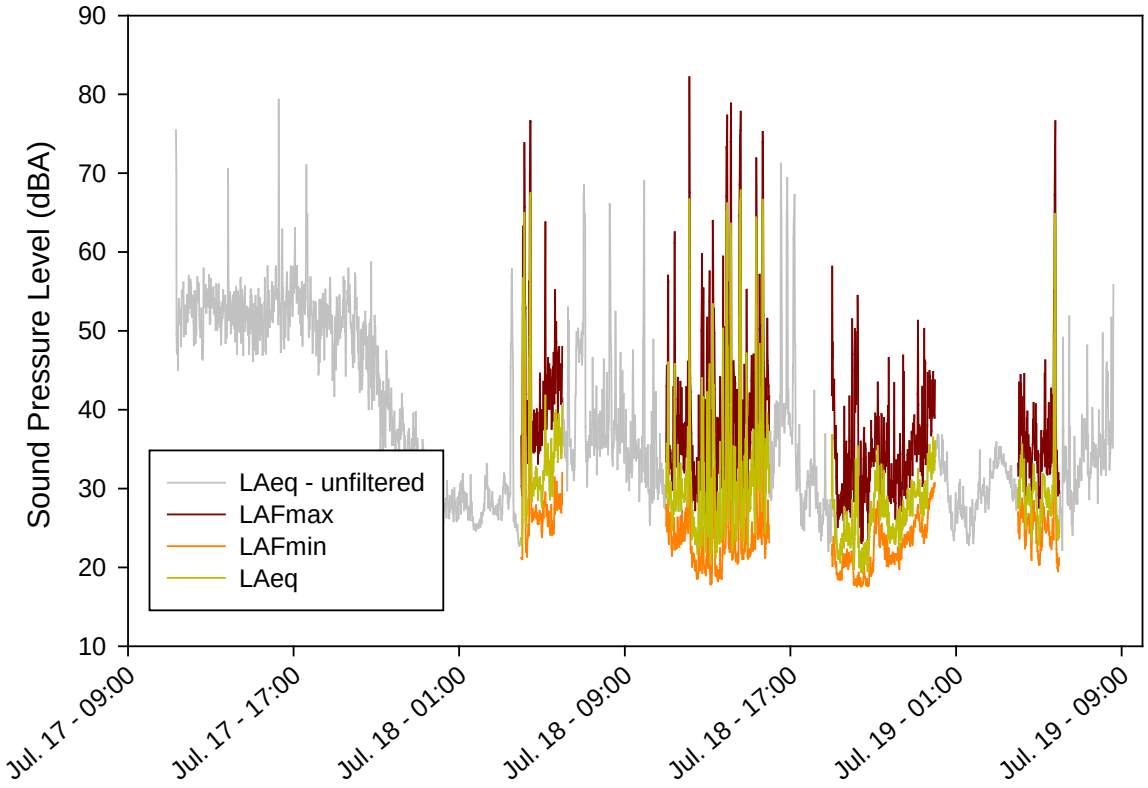


Figure 11. One-minute L_{eq}, L_{max} and L_{min} values recorded at monitoring station R5 at the Meadowbank site during monitoring event 1. Filtered data excludes those measurements taken outside of optimal conditions (set-up, wind > 4.17 m/s, RH > 90%).

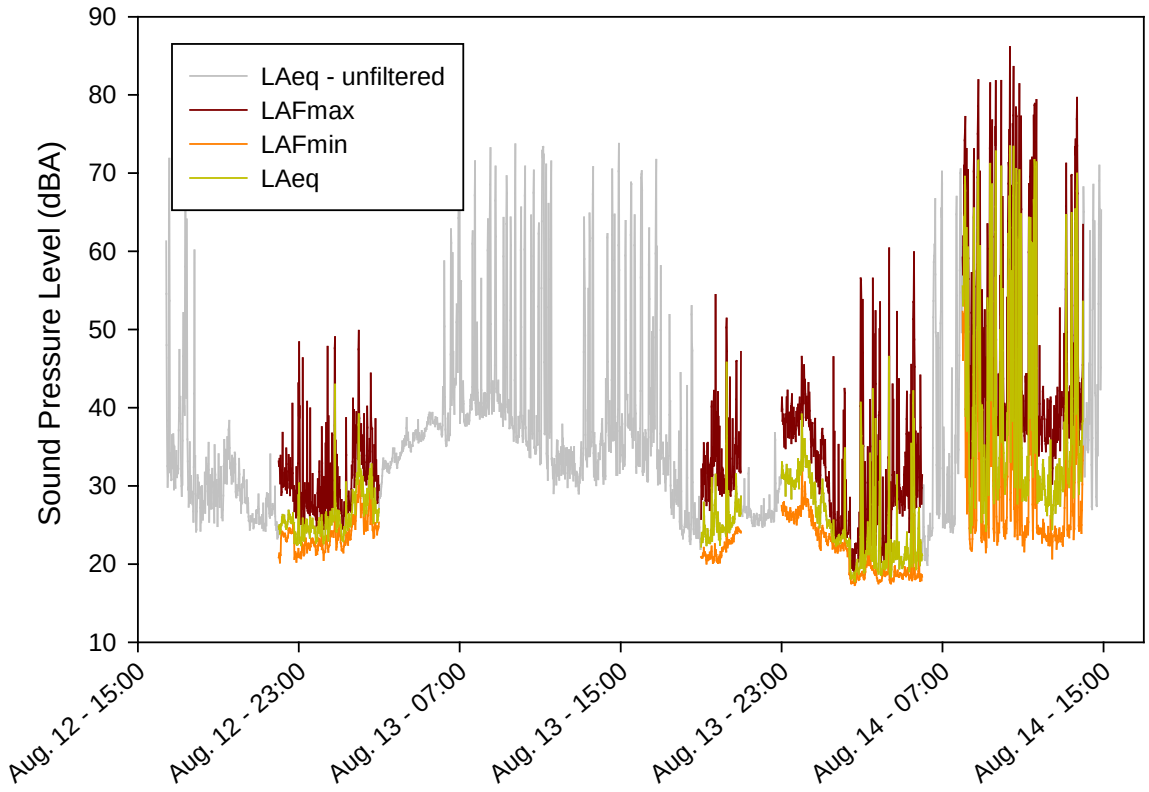


Figure 12. One-minute L_{eq}, L_{max} and L_{min} values recorded at monitoring station R5 at the Meadowbank site during monitoring event 2. Filtered data excludes those measurements taken outside of optimal conditions (set-up, wind > 4.17 m/s, RH > 90%).

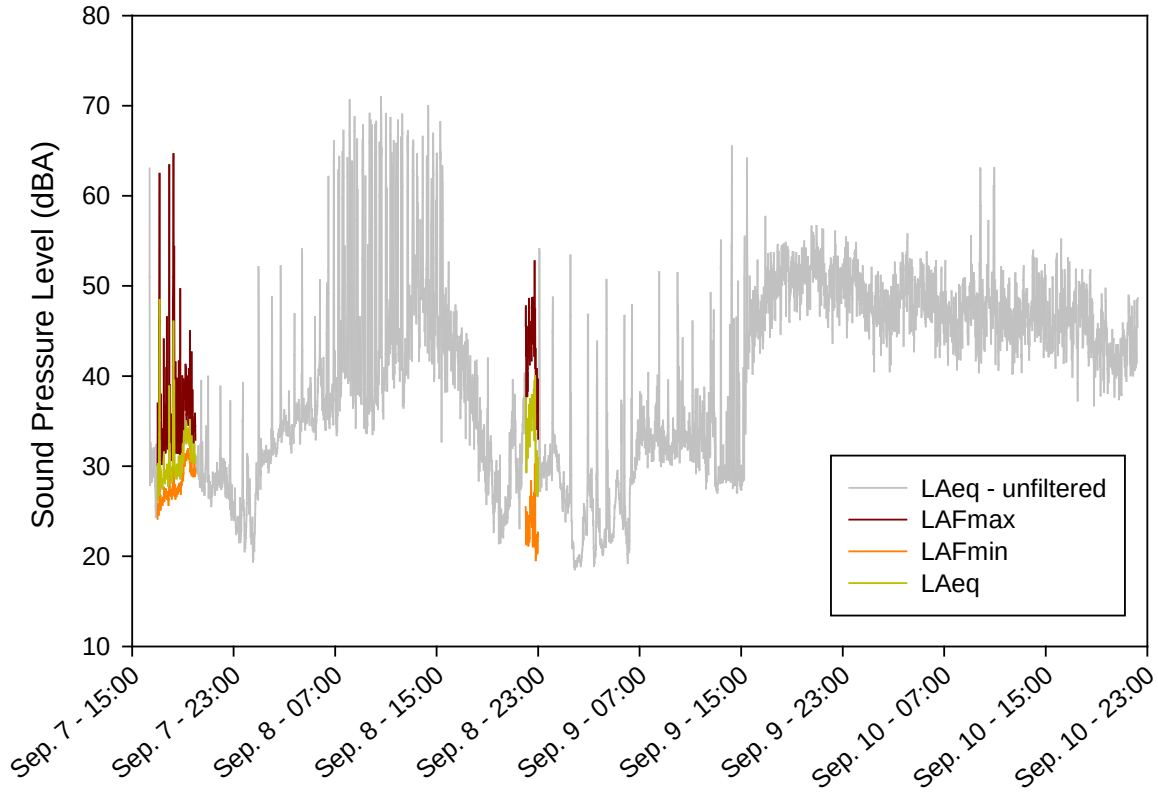


Figure 13. One-minute L_{eq}, L_{max} and L_{min} values recorded at monitoring station R5 at the Meadowbank site during monitoring event 3. Filtered data excludes those measurements taken outside of optimal conditions (set-up, wind > 4.17 m/s, RH > 90%).

Table 7. Hourly L_{eq} values for monitoring station R5 at the Meadowbank site. Data points filtered out of subsequent analyses due to set-up or non-optimal weather conditions are shaded grey.

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max. Wind Speed (m/s)
7/17/16	11:00:00 AM	61.20	10.96	71.60	9.15	12.47
	12:00:00 PM	53.58	12.43	59.17	9.47	12.15
	1:00:00 PM	56.29	13.96	51.83	10.04	13.99
	2:00:00 PM	52.70	15.01	50.46	10.03	14.07
	3:00:00 PM	52.13	15.69	46.26	10.14	13.60
	4:00:00 PM	62.38	16.09	40.24	10.00	13.31
	5:00:00 PM	57.69	16.20	45.69	10.91	13.72
	6:00:00 PM	51.62	15.97	45.35	10.96	13.66
	7:00:00 PM	52.79	15.89	46.57	9.77	13.33
	8:00:00 PM	49.55	15.67	47.35	9.43	12.27

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max. Wind Speed (m/s)
	9:00:00 PM	41.56	15.14	51.61	8.75	12.09
	10:00:00 PM	36.57	13.81	56.63	7.53	10.86
	11:00:00 PM	30.87	12.78	56.50	7.15	9.66
7/18/16	12:00:00 AM	27.81	11.45	66.72	6.04	8.49
	1:00:00 AM	27.71	10.32	69.71	5.39	7.61
	2:00:00 AM	28.43	9.72	74.11	5.87	7.57
	3:00:00 AM	44.03	8.88	75.93	6.12	7.61
	4:00:00 AM	54.17	8.53	81.50	3.82	5.96
	5:00:00 AM	35.48	8.33	86.10	3.95	5.55
	6:00:00 AM	45.21	8.92	88.00	5.49	7.37
	7:00:00 AM	55.31	9.16	83.00	4.95	6.74
	8:00:00 AM	51.91	9.56	74.96	5.85	8.51
	9:00:00 AM	52.55	10.26	70.92	6.08	7.98
	10:00:00 AM	36.34	10.72	69.84	5.20	6.86
	11:00:00 AM	35.25	11.24	66.17	3.98	6.41
	12:00:00 PM	49.53	12.06	63.97	2.34	4.59
	1:00:00 PM	52.67	12.55	59.54	2.19	4.57
	2:00:00 PM	55.43	13.69	52.62	2.88	5.49
	3:00:00 PM	52.86	14.81	47.82	3.54	6.80
	4:00:00 PM	58.05	14.67	50.12	4.59	6.57
	5:00:00 PM	53.19	13.55	61.30	5.56	7.90
	6:00:00 PM	30.54	12.13	72.97	4.36	7.19
	7:00:00 PM	25.73	10.92	86.20	3.72	4.88
	8:00:00 PM	26.28	10.41	88.40	3.24	4.14
	9:00:00 PM	28.87	10.40	88.20	2.77	3.65
	10:00:00 PM	27.13	10.52	87.60	3.80	5.55
	11:00:00 PM	31.37	10.90	86.80	3.57	5.25
7/19/16	12:00:00 AM	32.48	10.67	90.60	4.91	7.12
	1:00:00 AM	26.71	10.05	85.70	4.62	7.76
	2:00:00 AM	31.27	9.97	91.50	3.72	6.04
	3:00:00 AM	32.22	9.68	78.95	4.36	6.63
	4:00:00 AM	30.13	9.39	76.38	4.14	6.70
	5:00:00 AM	50.32	8.78	77.67	3.06	4.98
	6:00:00 AM	37.43	8.71	78.66	4.42	6.00
	7:00:00 AM	36.62	8.75	79.61	4.28	5.78
	8:00:00 AM	44.29	9.42	76.35	5.04	7.27
8/12/16	4:00:00 PM	57.49	21.18	46.23	4.34	6.55
	5:00:00 PM	52.14	21.24	47.35	4.42	6.33

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max. Wind Speed (m/s)
	6:00:00 PM	29.90	21.20	49.68	4.25	6.25
	7:00:00 PM	32.58	20.80	51.74	4.86	6.37
	8:00:00 PM	28.16	19.54	59.29	5.75	7.12
	9:00:00 PM	26.81	18.15	62.07	4.39	5.49
	10:00:00 PM	25.16	17.34	64.76	4.02	5.66
	11:00:00 PM	24.57	16.32	70.44	4.11	5.29
8/13/16	12:00:00 AM	28.78	15.67	68.48	4.10	5.47
	1:00:00 AM	28.70	15.14	66.57	4.11	6.19
	2:00:00 AM	29.30	14.73	76.89	3.60	5.68
	3:00:00 AM	32.63	14.49	76.39	4.48	6.86
	4:00:00 AM	35.77	14.16	83.40	5.64	7.45
	5:00:00 AM	37.78	13.98	87.50	5.65	7.88
	6:00:00 AM	56.70	13.60	86.60	4.94	6.51
	7:00:00 AM	57.15	13.80	84.10	4.42	6.45
	8:00:00 AM	59.81	14.44	77.69	5.62	7.82
	9:00:00 AM	59.54	15.01	73.99	6.05	8.55
	10:00:00 AM	59.03	15.83	71.63	5.33	7.62
	11:00:00 AM	64.21	15.98	74.47	5.23	6.90
	12:00:00 PM	32.84	16.57	74.47	4.59	6.55
	1:00:00 PM	56.65	17.41	71.94	4.57	6.19
	2:00:00 PM	59.94	17.98	65.21	4.76	6.80
	3:00:00 PM	56.20	18.54	66.97	4.74	6.70
	4:00:00 PM	60.14	19.88	59.12	5.43	7.17
	5:00:00 PM	41.96	20.82	54.75	5.18	6.88
	6:00:00 PM	39.39	20.95	60.47	4.47	6.61
	7:00:00 PM	25.20	21.40	61.41	3.79	6.27
	8:00:00 PM	30.68	21.31	57.12	4.04	5.33
	9:00:00 PM	26.70	20.07	65.18	4.57	5.74
	10:00:00 PM	28.39	18.65	72.21	4.20	5.59
	11:00:00 PM	31.19	16.96	75.48	2.56	3.90
8/14/16	12:00:00 AM	31.84	15.51	79.78	2.43	3.59
	1:00:00 AM	25.46	14.51	88.30	2.87	4.08
	2:00:00 AM	27.84	14.44	85.80	1.89	3.29
	3:00:00 AM	29.12	14.47	87.50	1.51	2.63
	4:00:00 AM	31.39	14.22	84.60	1.30	1.82
	5:00:00 AM	29.20	14.23	83.90	1.45	2.16
	6:00:00 AM	57.56	13.81	91.30	1.21	2.00
	7:00:00 AM	57.99	13.44	90.80	1.63	2.49

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max. Wind Speed (m/s)
	8:00:00 AM	60.81	13.85	85.50	2.06	2.90
	9:00:00 AM	60.54	15.59	80.10	2.12	3.25
	10:00:00 AM	62.60	16.89	78.17	3.38	4.86
	11:00:00 AM	60.15	17.70	75.66	3.83	4.88
	12:00:00 PM	30.06	18.41	67.51	3.94	5.68
	1:00:00 PM	57.76	19.07	66.46	4.01	5.27
	2:00:00 PM	60.27	20.45	58.34	4.42	6.53
9/07/16	4:00:00 PM	47.56	9.05	88.90	1.17	2.82
	5:00:00 PM	33.20	9.93	85.40	2.45	4.12
	6:00:00 PM	33.06	10.64	83.70	3.05	4.25
	7:00:00 PM	32.40	10.78	87.40	3.80	5.39
	8:00:00 PM	30.43	10.46	90.30	4.51	6.41
	9:00:00 PM	29.74	9.79	92.70	3.75	5.21
	10:00:00 PM	28.43	9.26	94.10	3.53	5.00
	11:00:00 PM	26.78	9.15	98.20	2.51	3.94
9/08/16	12:00:00 AM	35.83	9.05	99.50	2.38	3.39
	1:00:00 AM	31.24	9.21	92.70	1.83	2.90
	2:00:00 AM	39.06	8.62	97.40	1.63	3.14
	3:00:00 AM	35.91	8.46	98.40	2.50	5.90
	4:00:00 AM	39.22	8.42	99.80	4.39	6.14
	5:00:00 AM	39.53	7.99	99.00	3.78	5.02
	6:00:00 AM	51.70	7.82	100.00	4.53	6.41
	7:00:00 AM	56.25	7.77	99.80	4.57	6.14
	8:00:00 AM	59.12	7.50	100.00	3.20	5.92
	9:00:00 AM	59.40	8.42	96.20	4.68	6.63
	10:00:00 AM	60.14	9.64	92.20	4.66	6.94
	11:00:00 AM	59.97	11.18	86.00	5.29	7.17
	12:00:00 PM	58.17	11.87	85.20	6.70	8.90
	1:00:00 PM	57.69	13.18	73.07	7.61	10.05
	2:00:00 PM	58.17	14.29	70.92	8.32	10.78
	3:00:00 PM	56.47	15.32	60.20	8.12	10.51
	4:00:00 PM	43.70	15.75	55.94	7.82	9.96
	5:00:00 PM	40.20	15.95	56.61	6.77	9.23
	6:00:00 PM	34.96	15.91	58.98	6.62	8.47
	7:00:00 PM	30.66	15.45	66.89	5.85	8.41
	8:00:00 PM	28.48	13.27	79.90	5.03	6.55
	9:00:00 PM	34.22	12.24	84.10	5.27	6.63
	10:00:00 PM	34.92	11.02	89.00	4.07	6.70

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max. Wind Speed (m/s)
	11:00:00 PM	39.56	10.45	92.50	4.18	6.41
9/09/16	12:00:00 AM	34.54	10.07	96.60	3.57	5.45
	1:00:00 AM	37.07	9.61	99.20	3.47	5.65
	2:00:00 AM	32.54	9.64	98.70	2.14	3.94
	3:00:00 AM	30.80	9.43	100.00	1.46	3.65
	4:00:00 AM	34.66	9.34	100.00	1.84	3.41
	5:00:00 AM	31.74	9.15	100.00	2.79	4.70
	6:00:00 AM	33.06	8.71	100.00	3.68	5.94
	7:00:00 AM	34.43	8.36	100.00	3.94	6.64
	8:00:00 AM	36.88	7.98	100.00	4.94	6.55
	9:00:00 AM	36.18	7.75	100.00	4.32	6.35
	10:00:00 AM	36.86	7.83	100.00	4.29	5.88
	11:00:00 AM	35.01	7.78	100.00	4.49	5.57
	12:00:00 PM	37.85	7.71	100.00	4.87	6.84
	1:00:00 PM	39.60	7.90	100.00	3.90	6.35
	2:00:00 PM	48.74	8.23	100.00	3.06	4.51
	3:00:00 PM	49.34	8.55	100.00	2.64	4.35
	4:00:00 PM	48.07	7.92	100.00	4.58	9.09
	5:00:00 PM	50.54	5.74	100.00	7.07	9.21
	6:00:00 PM	51.90	4.68	100.00	8.08	10.98
	7:00:00 PM	51.52	3.64	100.00	9.30	12.82
	8:00:00 PM	52.31	2.98	100.00	9.34	12.76
	9:00:00 PM	51.21	2.44	100.00	9.25	12.68
	10:00:00 PM	51.19	1.80	100.00	8.56	11.90
	11:00:00 PM	50.83	1.55	100.00	8.78	12.05
9/10/16	12:00:00 AM	49.74	1.66	100.00	8.79	11.45
	1:00:00 AM	48.27	1.64	100.00	9.11	11.78
	2:00:00 AM	47.28	1.58	100.00	8.41	11.54
	3:00:00 AM	49.69	1.45	100.00	8.27	11.15
	4:00:00 AM	49.94	1.19	100.00	8.60	11.45
	5:00:00 AM	49.80	0.90	100.00	8.86	12.11
	6:00:00 AM	48.35	0.52	100.00	8.44	11.64
	7:00:00 AM	46.42	0.50	100.00	7.73	11.41
	8:00:00 AM	47.41	0.33	97.30	8.15	11.90
	9:00:00 AM	52.36	0.44	94.10	8.03	10.78
	10:00:00 AM	52.31	0.94	90.00	8.12	11.07
	11:00:00 AM	47.06	1.20	90.40	8.19	11.45
	12:00:00 PM	46.57	1.67	85.70	7.63	10.72

Date	Start Hour	$L_{eq\ (1\ h)}$	Air Temp. (°C)	Relative Humidity (%)	Avg. Wind Speed (m/s)	Max. Wind Speed (m/s)
	1:00:00 PM	47.35	2.41	85.50	7.57	10.84
	2:00:00 PM	48.95	3.00	85.30	7.27	10.21
	3:00:00 PM	47.10	3.15	88.60	7.60	10.70
	4:00:00 PM	48.22	3.24	86.00	7.96	11.27
	5:00:00 PM	47.13	3.28	91.10	7.93	11.49
	6:00:00 PM	46.44	3.08	93.80	7.41	11.54
	7:00:00 PM	44.32	2.73	90.10	7.27	9.94
	8:00:00 PM	41.66	2.32	92.30	7.24	11.09
	9:00:00 PM	44.36	1.96	92.30	6.45	8.62
	10:00:00 PM	45.47	1.72	93.50	6.34	8.55

SECTION 4 • SUMMARY

4.1 DAYTIME, NIGHT-TIME, AND 24 H L_{EQ}

L_{eq} values were calculated for daytime (7am-11pm), night-time (11pm-7am), 10pm-11pm, and 24 h time periods as in previous years, based on Health Canada recommendations (as described in the initial noise monitoring report - Golder, 2012). These L_{eq} values and the total hours of filtered data available for the calculations as a percent of the corresponding time period are shown in Table 8. Alberta ERCB guidance (ERCB 2007) indicates that 3 hours of valid data are required to contribute to daytime and night-time averages, so time periods with a lower percent coverage are excluded (19% daytime, 38% night-time). Time periods for which insufficient data was available are indicated with a dash ("-").

The daytime target sound level (55 dBA) was exceeded during one of three monitoring events at R5, with a recorded value of 58.1 dBA. A review of the data indicated that exceedances only occurred between 8 am and 12 pm on one monitoring day (August 14), with $L_{eq(1hr)}$ values of 60 – 62 dBA. Sound recordings indicated that all peaks in noise levels were associated with nearby helicopter start-up, landing, or take-off. This $L_{eq(1hr)}$ value is well within the range of those observed in previous years.

One value at R2 and one value at R5 slightly exceeded the night-time target sound level (45 dBA), with recorded $L_{eq,night}$ values of 45.7 dBA and 48.0 dBA, respectively. For R2, exceedances only occurred from 6-7 am on July 25 and 26, as a result of one or two short (<5 min) peaks in sound level due to helicopter flyovers. For R5, exceedances occurred between 4-5 am on July 18, and 5-6 am on July 19, again due to helicopter start-up and take-off, which happened once or twice during each hour, and lasted less than 10 min.

Table 8. Daytime, night-time, 10-11 pm, and 24-h L_{eq} values for monitoring locations R1 – R5, and percentage of the corresponding time period for which valid data was available (% coverage). Day- and Night-time periods with fewer than 3 hours of valid data are excluded (-), and those exceeding corresponding target sound levels are shaded grey.

Site	Dates (2016)	$L_{eq,\ day}$ 7am-11pm (dBA)	% coverage	$L_{eq,\ night}$ 11pm-7am (dBA)	% coverage	$L_{eq,\ 1\ h}$ 10-11pm (dBA)	$L_{eq,\ 24\ h}$ (dBA)	% coverage
R1	Jul. 1 - 2	-	6%	-	13%	-	43.3	8%
	Aug. 31 – Sept. 3	42.6	100%	32.8	100%	28.3	41.0	100%
R2	Jul. 4 - 7	43.7	94%	33.1	100%	27.8	42.0	96%
	Jul. 24 - 26	37.5	94%	45.7	88%	32.2	42.0	92%
R3	Jul. 8 - 10	31.9	100%	35.5	100%	34.3	33.4	100%
	Aug. 7 - 10	32.3	56%	-	0%	28.1	32.3	38%
R4	Jul. 12 - 14	34.2	44%	44.2	88%	-	41.6	58%
	Aug. 15 - 17	-	13%	34.9	50%	38.0	35.9	25%
	Sept. 16 - 18	-	0%	-	0%	-	-	0%
R5	Jul. 17 - 19	49.6	56%	48.0	38%	27.1	49.3	50%
	Aug. 12 - 14	58.1	56%	29.5	88%	25.2	55.6	67%
	Sept. 7 - 10	33.5	25%	-	0%	34.9	33.5	17%

4.2 HISTORICAL COMPARISON

L_{eq} measurements for all valid time periods from 2009 - 2016 are shown in Figure 14. With the exception of one overnight time period at R2, all L_{eq} values in 2016 were lower than maximum values recorded previously. As described in Section 4.1, sound files from R2 demonstrated exceedances only occurred from 6-7 am on July 25 and 26, as a result of one or two short (<5 min) peaks in sound level due to helicopter flyovers. Overnight noises are not expected to be increasing overall in this area.

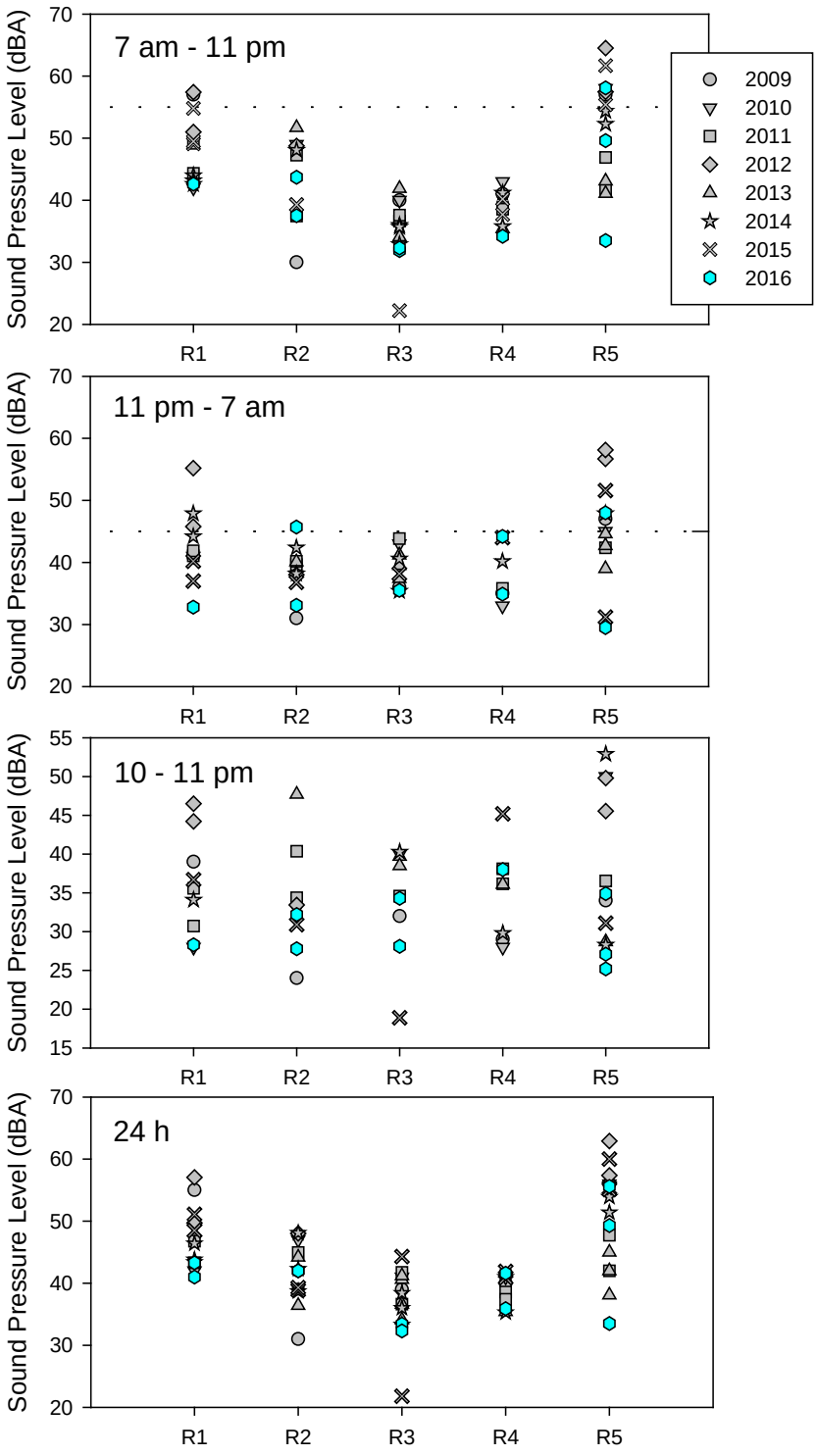


Figure 14. L_{eq} values calculated from filtered data for various time periods at locations R1 – R5 on the Meadowbank site in surveys from 2009 - 2016. Dashed lines indicate target sound levels (day-time and night-time only).

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. Agnico Eagle plans to conduct a minimum of two monitoring rounds of two to four days per station, since high winds in the area tend to substantially reduce the quantity of available valid data. In 2016, over 30 days of monitoring were conducted. Following removal of datapoints obtained under sub-optimal weather conditions, 39 – 80 hours of data were available for each station, with at least one valid measurement for each Health Canada monitoring period (daytime, night-time, 10-11 pm, 24 h).

Target sound levels (55 dBA daytime, 45 dBA night-time) were met in all cases, with the exception of the one daytime value (R5) and two night-time values (R2 and R5). However, recorded sound levels were all very close to or within the range of those observed historically, and no trends towards increasing noise levels are apparent. All exceedances were associated with sound peaks generated by helicopter noise from start-up, take-off, landing, or fly-overs.

Overall, since targets were exceeded only occasionally during peak helicopter season, and by a maximum of 3.1 dB, significant impacts are not anticipated. Although elevated wind speeds and snow cover tend to preclude monitoring during the rest of the year, results of September monitoring at R5 suggest that average sound levels decline substantially outside of the active summer months. Measurements recorded in July and August are expected to represent the highest noise levels occurring onsite, compared to the rest of the year, when helicopter activity is minimal. Based on these data, it is anticipated that target sound levels are only exceeded periodically during the busiest summer months of July and August, and are not likely to be exceeded during the rest of the year (including during the spring and fall caribou migration).

Further, regular wildlife monitoring (see 2016 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 are significantly affecting wildlife beyond impact predictions.

SECTION 6 • ACTIONS

The following actions were identified in 2015, and Agnico Eagle's responses in 2016 are indicated below each item.

- A second noise meter will be available onsite in 2016 to help prevent any delays in sampling due to instrument malfunctions.
    - Completed. No delays in monitoring occurred.
- Agnico Eagle will continue to monitor noise levels around site and particularly at the R5 location in 2016
    - Completed. Noise levels continue to remain within the range of those observed historically at R5.

- Agnico Eagle will continue to monitor wildlife though various programs as described in the Terrestrial Ecosystem Management Plan (Cumberland, 2006) to determine any impacts of site activities (including noise)
    - Completed. Wildlife monitoring in 2016 (see 2016 Wildlife Summary Report) did not indicate any significant impacts as a result of site activities.

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

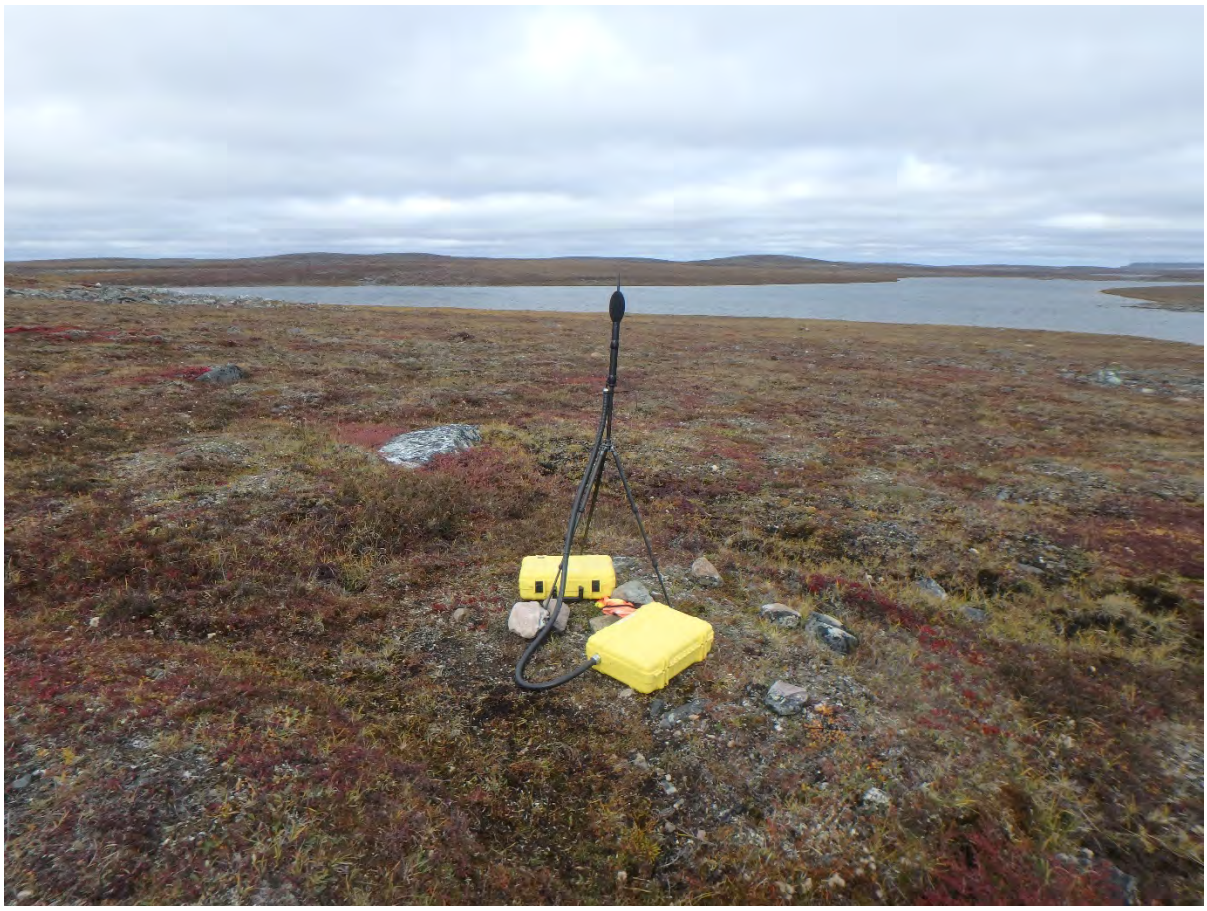


Figure -Apx 1: Monitoring location R1 (August 31, 2016).

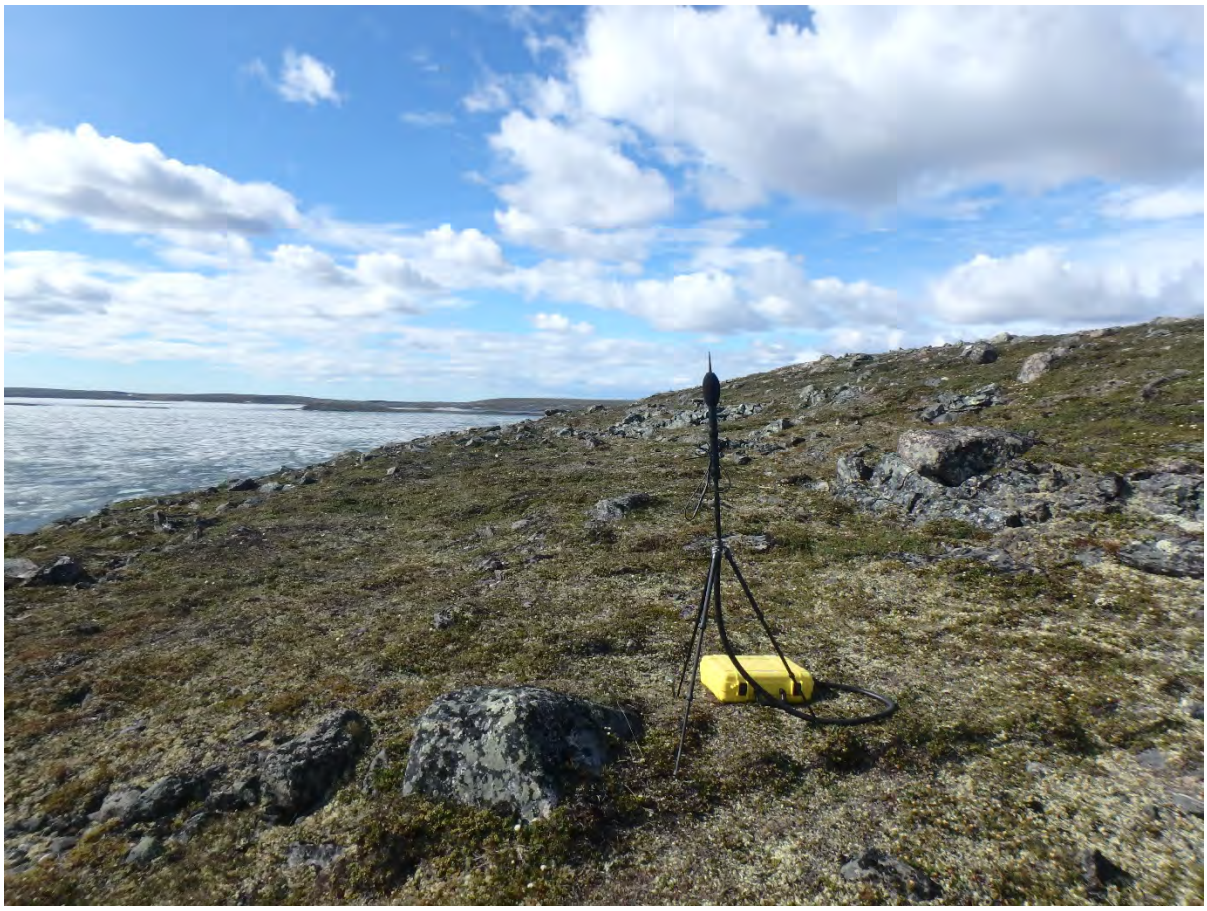


Figure -Apx 2: Monitoring location R2 (July 4, 2016).

Figure -Apx 3: Monitoring location R3 (July 11, 2016).

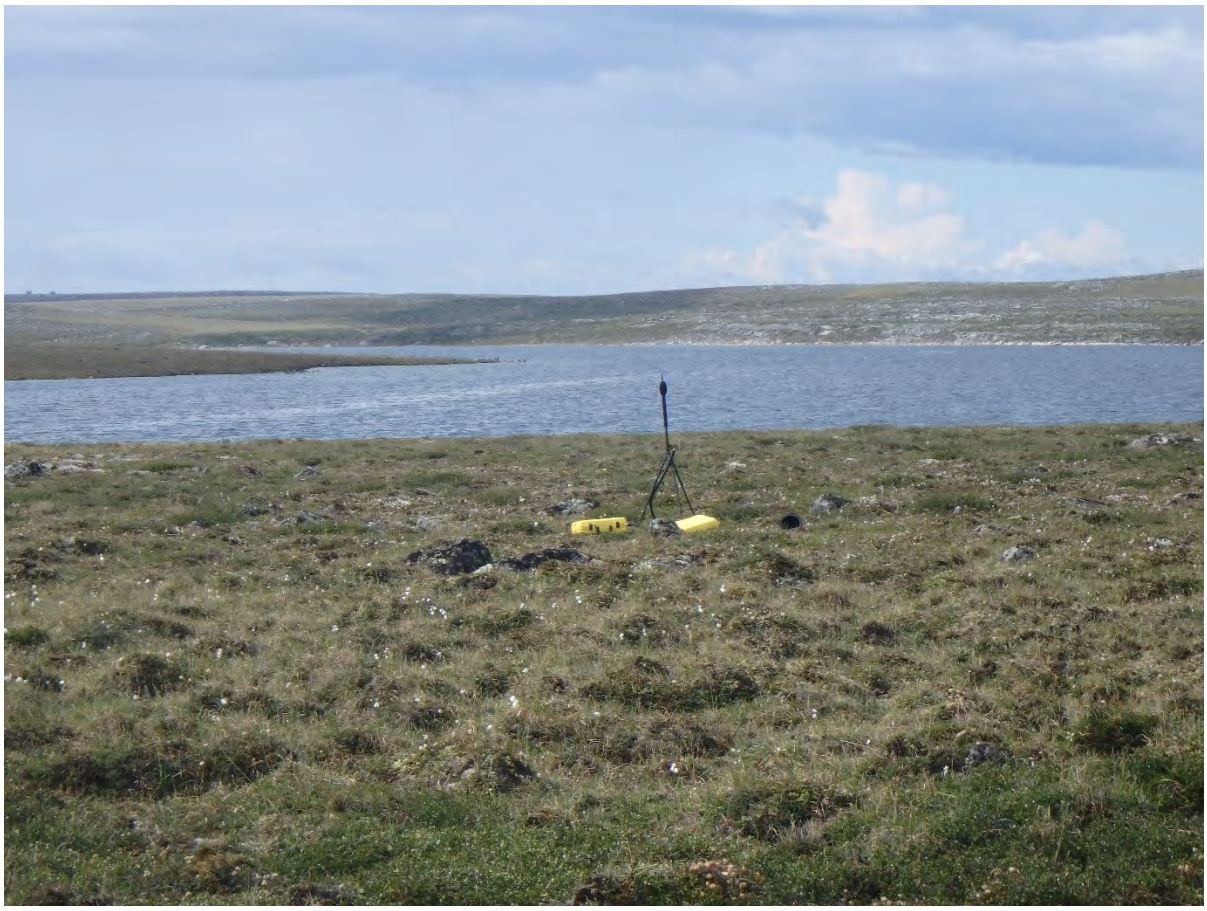
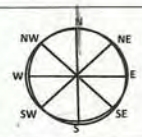


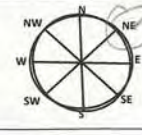
Figure -Apx 4: Monitoring location R4 (July 14, 2016).

APPENDIX B

Field Logs

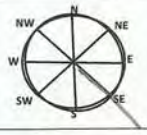
MONITORING STARTS			
Operator:	RS/BE		
Location:	RS		
Noise Meter Start Time:			
Date:	2016-07-17		
Calibration complete ?:			
Sensitivity	50.13		
Derviation	-0.02		
Time of Calibration:	11:11		
Battery Power Check:	Good	Poor	
Photographs of Setup (Y/N)	Y		
Photographs of Surrounding (Y/N)	Y		
Check 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):	10		
Wind Speed (km/hr):			
Wind Direction: North wind (wind blows from North)	36 Km/hr *39.2/Max		
Barometric Pressure (kPa):			
Relative Humidity (%)	57.4		
Precipitation:	none	drizzle	rain

GENERAL SITE DESCRIPTION			
GPS Location	Latitude	Longitude	Altitude
Type of Ground Surface:	Tundra		
Acoustic Environment:			
Traffic	Trucks, Planes, atvs, helicopters		
Human activities	Trucks, helicopters, road work		
Animal	Mosquitos, birds		
Other noise sources			

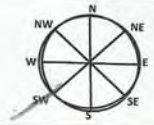
MONITORING ENDS			
Operator:	RA EK S RS		
Record Data File Name:			
Total Monitoring Period			
Noise Meter End Time:	8:37		
Date:	19-07-2016		
Calibration complete ?:	Y		
Sensitivity	50.38		
Derviation	0		
Time of Calibration:	16:-07-19 (9:18)		
Check file size (GB)			
Battery Power Check:		Po	
Cloud cover:	10-25 cloudy	partly cloudy	sunny
Height of cloud (feet):	0-10,000	10,000-25,000	25,000 +
Air Temperature (C):	10.5 C°		
Wind Speed (km/hr):	10.3 AVG -- 15.2 max		
Wind Direction: North wind (wind blows from North)	10.3 AVG 15.2 Max		
Barometric Pressure (kPa):			
Relative Humidity (%)	69.5		
Precipitation:	none	drizzle	rain
Depature Time:	8:40		

MONITORING STARTS			
Operator:	RS/MA		
Location:	R5		
Noise Meter Start Time:	15:24		
Date:	2016-08-12		
Calibration complete ?:	Y		
Sensitivity	~~50.52~~ 49.98		
Derviation	~~0.34~~ -0.03		
Time of Calibration:	~~16:14~~ 16:13		
Battery Power Check:	Good	Poor	
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):	22°		
Wind Speed (km/hr): (m/s)	Avg: 4.6 Max: 10		
Wind Direction: North wind (wind blows from North)			
Barometric Pressure (kPa):			
Relative Humidity (%)	51.9		
Precipitation:	none	drizzle	rain

GENERAL SITE DESCRIPTION			
GPS Location	Latitude	Longitude	Altitude
	65° 01.361	095 09.32	
Type of Ground Surface:	Tundra		
Acoustic Environment:			
Traffic	helicopter - road activity (trucks)		
Human activities	helicopter, trucks,		
Animal	bugs, birds, squirrel		
Other noise sources			

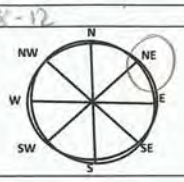
MONITORING ENDS			
Operator:	RS/MT		
Record Data File Name:	R5		
Total Monitoring Period			
Noise Meter End Time:	14:53		
Date:	2016-08-14 14:50		
Calibration complete ?:	Y		
Sensitivity	50.08		
Derviation	0.02		
Time of Calibration:	13:20		
Check file size (GB)	✓		
Battery Power Check:	Good	Poor	
Cloud cover:	cloudy	partly cloudy	sunny
Height of cloud (feet):	0-10,000	10,000-25,000	25,000 +
Air Temperature (C):	25.5		
Wind Speed (km/hr):	—		
Wind Direction: North wind (wind blows from North)	Avg 3.4 Max 9.1 		
Barometric Pressure (kPa):			
Relative Humidity (%)	46.4		
Precipitation:	none	drizzle	rain
Depature Time:	14:59		

16:15

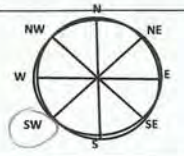
MONITORING STARTS			
Operator:	RB MT		
Location:			
Noise Meter Start Time:			
Date:	2016-9-9		
Calibration complete ?:			
Sensitivity	50.50		
Derviation	0.04		
Time of Calibration:	16:17		
Battery Power Check:	Good	Poor	
Photographs of Setup (Y/N)	Y		
Photographs of Surrounding (Y/N)	Y		
Check available 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):	9.3		
Wind Speed (km/hr):			
Wind Direction: North wind (wind blows from North)	3.7 AVG 4.2 Max		
Barometric Pressure (kPa):	-		
Relative Humidity (%)	87.3		
Precipitation:	none	drizzle	rain

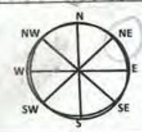
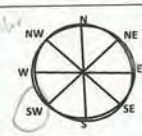
GENERAL SITE DESCRIPTION			
GPS Location	Latitude	Longitude	Altitude
Type of Ground Surface:			
Acoustic Environment:			
Traffic			
Human activities			
Animal			
Other noise sources			

MONITORING ENDS			
Operator:	TT & MT		
Record Data File Name:			
Total Monitoring Period			
Noise Meter End Time:	2016-09-11 17:00		
Date:			
Calibration complete ?:			
Sensitivity	50.37		
Derviation	±0.03		
Time of Calibration:	7:54 AM		
Check file size (GB)			
Battery Power Check:		Po	
Cloud cover:	cloudy	partly cloudy	sunny
Height of cloud (feet):	0-10,000	10,000-25,000	25,000 +
Air Temperature (C):			
Wind Speed (km/hr):			
Wind Direction: North wind (wind blows from North)	12.5 max 9.3 Avg. 5°C -2		
Barometric Pressure (kPa):			
Relative Humidity (%)	57.2	4.8	
Precipitation:	none	drizzle	rain
Depature Time:			

MONITORING STARTS			
Operator:	FANNY LAPORTE		
Location:	R1-1 (DYNO)		
Noise Meter Start Time:	15:19		
Date:	01/07/2016		
Calibration complete ?:	Yes		
Sensitivity	0.01		
Derviation	-0.01		
Time of Calibration:	15:00		
Battery Power Check:	Good		Poor
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):	23		
Wind Speed (km/hr):	8-12		
Wind Direction: North wind (wind blows from North)			
Barometric Pressure (kPa):	0		
Relative Humidity (%)	57		
Precipitation:	none	drizzle	rain

GENERAL SITE DESCRIPTION			
GPS Location	Latitude	Longitude	Altitude
Type of Ground Surface:	tundra		
Acoustic Environment:			
Traffic	AWR / Helicopter / Emulsion Plant		
Human activities	Emulsion Plant		
Animal	Birds / insect /		
Other noise sources			

MONITORING ENDS			
Operator:	Fanny Laporte / Michael B. Allen		
Record Data File Name:	R1-1 DYNO		
Total Monitoring Period			
Noise Meter End Time:	2016/07/04		
Date:	15H40		
Calibration complete ?:	NO error code on meter		
Sensitivity			
Derviation			
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):	17.5 °C		
Wind Speed (km/hr):	8 KM/H		
Wind Direction: North wind (wind blows from North)			
Barometric Pressure (kPa):			
Relative Humidity (%)	49.5		
Precipitation:	none	drizzle	rain
Depature Time:	15H50		

MONITORING STARTS			
Operator:	Fanny Laporte / Patric Ahern		
Location:	RI DYNO		
Noise Meter Start Time:			
Date:	20 July 2016 10H50		
Calibration complete ?:	Yes 10H42.		
Sensitivity	50,44		
Derviation	[illegible],01		
Time of Calibration:			
Battery Power Check:	Good	Poor	
Photographs of Setup (Y/N)	yes		
Photographs of Surrounding (Y/N)	yes		
Check available disk memory (Y/N)	yes		
Cloud cover:	cloudy	partly cloudy	sunny
Height of cloud (feet):	0-10,000	10,000-25,000	25,000 +
Air Temperature (C):	11,1		
Wind Speed (km/hr):	10,5 MAX AV. 6,1		
Wind Direction: North wind (wind blows from North)			
Barometric Pressure (kPa):			
Relative Humidity (%)	61,5		
Precipitation:	none	drizzle	rain
GENERAL SITE DESCRIPTION			
GPS Location RI GPS.	Latitude	Longitude	Altitude
Type of Ground Surface:	TUNDRA		
Acoustic Environment:	ROAD / DYNO plant		
Traffic			
Human activities	EMR		
Animal	Wildlife - Birds		
Other noise sources	MUSQUITOS		
MONITORING ENDS			
Operator:	PAT Ahern		
Record Data File Name:	RI Dyno		
Total Monitoring Period			
Noise Meter End Time:	11:11		
Date:	13-07-2016		
Calibration complete ?:			
Sensitivity	50.26 mV/PA		
Derviation	-0.03		
Time of Calibration:	1:53 pm		
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):	14.5		
Wind Speed (km/hr):	13 max / Avg: 3km/hr		
Wind Direction: North wind (wind blows from North)			
Barometric Pressure (kPa):			
Relative Humidity (%)	86		
Precipitation:	none	drizzle	rain
Depature Time:	12:30		

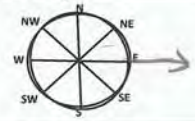
MONITORING STARTS			
Operator:	PA TT RJ		
Location:			
Noise Meter Start Time:	2016/08/13		
Date:			
Calibration complete ?:	50.32		
Sensitivity	0.04		
Derviation			
Time of Calibration:	14:59		
Battery Power Check:	Good	Poor	
Photographs of Setup (Y/N)			
Photographs of Surrounding (Y/N)			
Check available 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):	3.5		
Wind Speed (km/hr):			
Wind Direction: North wind (wind blows from North)	16.4 AVG 11.6 MAX		
Barometric Pressure (kPa):			
Relative Humidity (%)			
Precipitation:	none	drizzle	rain

GENERAL SITE DESCRIPTION			
GPS Location	Latitude	Longitude	Altitude
	MW0630	721 7101	
Type of Ground Surface:	Tundra		
Acoustic Environment:			
Traffic	Awar Trucks / fuel trucks		
Human activities			
Animal	Bugs / Birds / Sig Sies		
Other noise sources			

MONITORING ENDS			
Operator:	TT IRS		
Record Data File Name:	RJ		
Total Monitoring Period			
Noise Meter End Time:	1610		
Date:	2016/9-03		
Calibration complete ?:			
Sensitivity	50.57		
Derviation	0.04		
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):	4		
Wind Speed (km/hr):			
Wind Direction: North wind (wind blows from North)	10.3 avg 12.8 max		
Barometric Pressure (kPa):			
Relative Humidity (%)	87.5		
Precipitation:	none	drizzle	rain
Depature Time:			

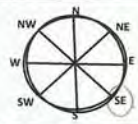
MONITORING STARTS			
Operator:	Fanny Laporte - Michael B. Allen		
Location:	R2		
Noise Meter Start Time:	17H10		
Date:	2016/07/04		
Calibration complete ?:	Yes		
Sensitivity	49		
Derviation	0.01		
Time of Calibration:	17H06		
Battery Power Check:	Good	Poor	
Photographs of Setup (Y/N)	YES		
Photographs 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):	20.1		
Wind Speed (km/hr):	2.4 MAX 6		
Wind Direction: North wind (wind blows from North)			
Barometric Pressure (kPa):			
Relative Humidity (%)	51		
Precipitation:	none	drizzle	rain

GENERAL SITE DESCRIPTION			
GPS Location	Latitude	Longitude	Altitude
Type of Ground Surface:			
Acoustic Environment:			
Traffic	Trucks on road		
Human activities	Helicopter		
Animal			
Other noise sources			

MONITORING ENDS			
Operator:	Robin B. / Brady S		
Record Data File Name:	//		
Total Monitoring Period	//		
Noise Meter End Time:	15:32		
Date:	2016-07-07		
Calibration complete ?:	Y		
Sensitivity	47.95		
Derviation	0.01		
Time of Calibration:	8:05 2016-07-08		
Check file size (GB)	/		
Battery Power Check:	/	Poor	
Cloud cover:	cloudy	partly cloudy	sunny
Height of cloud (feet):	0-10,000	10,000-25,000	25,000 +
Air Temperature (C):	23.7		
Wind Speed (km/hr):	9.8 max 5.3 average		
Wind Direction: North wind (wind blows from North)			
Barometric Pressure (kPa):			
Relative Humidity (%)	25.3		
Precipitation:	none	drizzle	rain
Depature Time:	16:45		

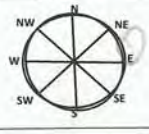
MONITORING STARTS			
Operator:	Patrick Ahern		
Location:	R2 Station		
Noise Meter Start Time:	9H16		
Date:	24/07/2016		
Calibration complete ?:	Y		
Sensitivity	50,42		
Derviation	0,03		
Time of Calibration:	9:14 AM		
Battery Power Check:	Good	Poor	
Photographs of Setup (Y/N)	Y		
Photographs of Surrounding (Y/N)	Y		
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):	10,5		
Wind Speed (km/hr):	Avg 11,41 Max 22 mph		
Wind Direction: North wind (wind blows from North)			
Barometric Pressure (kPa):			
Relative Humidity (%)	56,13		
Precipitation:	none	drizzle	rain

GENERAL SITE DESCRIPTION			
GPS Location	Latitude	Longitude	Altitude
Type of Ground Surface:	Tundra		
Acoustic Environment:	1		
Traffic	boats		
Human activities	hike		
Animal	birds, bugs		
Other noise sources			

MONITORING ENDS			
Operator:	Fanny Lapointe / Patrick Ahern		
Record Data File Name:	(R2) Project 1 5 1 HRS.		
Total Monitoring Period			
Noise Meter End Time:	13H30		
Date:	2016/07/26		
Calibration complete ?:			
Sensitivity	49.83		
Derviation	0.00		
Time of Calibration:	17H29		
Check file size (GB)			
Battery Power Check:	1/2	Poor	
Cloud cover:	cloudy	partly cloudy	sunny
Height of cloud (feet):	0-10,000	10,000-25,000	25,000 +
Air Temperature (C):	17,1 °C		
Wind Speed (km/hr):	MAX 4,1	Av. 2,1	
Wind Direction: North wind (wind blows from North)			
Barometric Pressure (kPa):			
Relative Humidity (%)	45		
Precipitation:	none	drizzle	rain
Depature Time:	13H40		

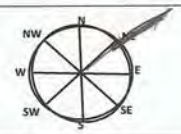
MONITORING STARTS			
Operator:	RS. MBA, BT		
Location:	R3		
Noise Meter Start Time:	15:16		
Date:	2016-08-07		
Calibration complete ?:			
Sensitivity	50.32		
Derviation	-0.04		
Time of Calibration:	16:44		
Battery Power Check:	Good	Poor	
Photographs of Setup (Y/N)	N		
Photographs of Surrounding (Y/N)	N		
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):	11.6		
Wind Speed (km/hr):			
Wind Direction: North wind (wind blows from North)	3.7 AVG 6.0 Max		
Barometric Pressure (kPa):	N/A		
Relative Humidity (%)	54.3		
Precipitation:	none	drizzle	rain

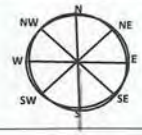
GENERAL SITE DESCRIPTION			
GPS Location R3	Latitude 65°01'23.3"	Longitude 096°00'12.0"	Altitude
Type of Ground Surface:	Tundra		
Acoustic Environment:			
Traffic	Boats		
Human activities	walking/talking		
Animal	Birds, mosquitos, etc		
Other noise sources	Blade		

MONITORING ENDS			
Operator:	PAT A. TANDY S.		
Record Data File Name:	R3		
Total Monitoring Period			
Noise Meter End Time:	14:20		
Date:	08/10/2016		
Calibration complete ?:			
Sensitivity	50.17		
Derviation	0.03		
Time of Calibration:	15:33		
Check file size (GB)			
Battery Power Check:		Poor	
Cloud cover:	cloudy	partly cloudy	sunny
Height of cloud (feet):	0-10,000	10,000-25,000	25,000 +
Air Temperature (C):	18.8		
Wind Speed (km/hr):	4.6	12.8 Max	
Wind Direction: North wind (wind blows from North)	mph		
Barometric Pressure (kPa):			
Relative Humidity (%)	44.1		
Precipitation:	none	drizzle	rain
Depature Time:	14:40		

MONITORING STARTS			
Operator:	RANDY / SAMANTHA / MICHAEL		
Location:	R4	R4	
Noise Meter Start Time:	16:45		
Date:		2016-07-12	
Calibration complete ?:	Yes 16:40		
Sensitivity	49.94		
Derviation	-0.03		
Time of Calibration:	16:40		
Battery Power Check:	Good	Poor	
Photographs of Setup (Y/N)		N	
Photographs of Surrounding (Y/N)		N	
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):		22.8	
Wind Speed (km/hr):	13.6	(18.7 MAX)	
Wind Direction: North wind (wind blows from North)			
Barometric Pressure (kPa):	N/A		
Relative Humidity (%)		38.6	
Precipitation:	none	drizzle	rain

GENERAL SITE DESCRIPTION			
GPS Location	Latitude	Longitude	Altitude
	14W 0639475	7218520	
Type of Ground Surface:	Tundra		
Acoustic Environment:			
Traffic	Helicopter / Otter plane / haul truck		
Human activities	Blast, haul trucks		
Animal	Mosquitoes, birds, ground squirrel		
Other noise sources			

MONITORING ENDS			
Operator:	Randy S. + Mitch R.		
Record Data File Name:	R4		
Total Monitoring Period	16:52 - 16:52		
Noise Meter End Time:	16:52		
Date:	2016-07-14		
Calibration complete ?:			
Sensitivity	50.24		
Derviation	0.05		
Time of Calibration:	16:49		
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):	19		
Wind Speed (km/hr):	NW 16.3 / 17.8 MW		
Wind Direction: North wind (wind blows from North)			
Barometric Pressure (kPa):			
Relative Humidity (%)	75.5		
Precipitation:	none	drizzle	rain
Depature Time:	2016-07-14 - 14:03		

MONITORING STARTS			
Operator:	RS / AP		
Location:	R4		
Noise Meter Start Time:			
Date:	2016-08-15		
Calibration complete ?:			
Sensitivity	50.14		
Derviation	0.01		
Time of Calibration:			
Battery Power Check:	Good	Poor	
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):	22		
Wind Speed (km/hr):	-		
Wind Direction: North wind (wind blows from North)	9 avg 13 max		
Barometric Pressure (kPa):	97.150		
Relative Humidity (%)	47.10%		
Precipitation:	none	drizzle	rain
GENERAL SITE DESCRIPTION			
GPS Location	Latitude	Longitude	Altitude
	65 03 46.9	096 02 06.7	
Type of Ground Surface:	tundra		
Acoustic Environment:			
Traffic	Haul trucks / otter plane		
Human activities	Haul trucks / handheld radio		
Animal	~~mosquitoes~~ bugs / squirrels / birds		
Other noise sources			
MONITORING ENDS			
Operator:	RS / AP		
Record Data File Name:	R4		
Total Monitoring Period			
Noise Meter End Time:	14:50		
Date:	2016-09-17 14:50		
Calibration complete ?:	2016-08-17 Y		
Sensitivity	50.26		
Derviation	0.02		
Time of Calibration:	16:00		
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):	16		
Wind Speed (km/hr):	-		
Wind Direction: North wind (wind blows from North)	3 km/avg 9/max		
Barometric Pressure (kPa):	-		
Relative Humidity (%)	49.490		
Precipitation:	none	drizzle	rain
Depature Time:	14:53		

APPENDIX C

L_{eq} Values by Day

Appx C - Table 1. Daytime, night-time, 10-11 pm and 24 h L_{eq} values for each monitoring day 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 indicates the time period was not assessed.

Site	Start Date (2016)	$L_{eq, day}$ 7am-11pm (dBA)	Total Hrs	$L_{eq, night}$ 11pm-7am (dBA)	Total Hrs	$L_{eq, 1\ h}$ 10-11pm (dBA)	$L_{eq, 24\ h}$ (dBA)	Total Hrs
R1	07/01	-	0	-	0	-	-	0
	07/02	-	1	-	1	NA	43.3	2
	08/31	-	0	-	0	-	44.4	15
	09/01	45.9	14	34.3	7	-	42.3	13
	09/02	37.7	15	-	1	28.3	35.2	19
	09/03	37.8	5	32.8	5	NA	36.0	10
R2	07/04	-	2	-	1	29.6	37.4	12
	07/05	35.1	5	37.2	7	-	33.1	15
	07/06	35.0	9	29.7	8	24.4	42.4	22
	07/07	46.1	9	28.1	7	NA	NA	NA
	07/24	-	0	-	0	-	47.6	7
	07/25	37.2	12	47.6	7	32.2	39.8	20
	07/26	38.0	6	42.8	6	-	38.2	4
R3	07/08	30.9	5	-	0	-	32.8	22
	07/09	31.0	16	34.7	8	34.8	33.2	24
	07/10	32.7	15	35.7	7	33.8	35.7	6
	08/07	29.1	5	-	0	-	29.1	5
	08/08	-	1	-	0	28.1	34.2	4
	08/09	35.2	3	-	0	-	35.1	1
	08/10	-	1	-	0	NA	NA	NA
R4	07/12	-	0	-	0	-	46.1	1
	07/13	-	0	-	1	-	42.0	14
	07/14	34.2	7	44.6	7	NA	NA	NA
	08/15	-	1	-	1	38.0	35.7	5
	08/16	-	0	34.2	3	-	36.5	1
	08/17	-	1	-	0	NA	NA	NA
	09/16	-	0	-	0	-	-	0
	09/17	-	0	-	0	-	-	0
	09/18	-	0	-	0	NA	NA	NA
R5	07/17	-	0	-	0	-	51.2	2
	07/18	49.6	9	49.5	3	27.1	48.9	12
	07/19	-	0	-	2	NA	NA	NA
	08/12	-	1	-	1	25.2	27.7	5
	08/13	-	2	29.6	4	-	55.9	15
	08/14	59.8	6	29.6	6	NA	NA	NA

Site	Start Date (2016)	$L_{eq,\ day}$ 7am-11pm (dBA)	Total Hrs	$L_{eq,\ night}$ 11pm-7am (dBA)	Total Hrs	$L_{eq,\ 1\ h}$ 10-11pm (dBA)	$L_{eq,\ 24\ h}$ (dBA)	Total Hrs
	09/07	32.9	3	-	0	-	42.0	4
	09/08	-	1	-	0	34.9	34.9	1
	09/09	-	0	-	0	-	-	0
	09/10	-	0	-	0	NA	-	0