DURALIE COAL MINE

Quarterly Compliance Monitoring
October 2021

Prepared for:

Duralie Coal Ltd

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Duralie Coal Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
630.11772-R18-v1.0	21 January 2022	Martin Davenport	MD	Martin Davenport

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1 Introduction

Duralie Coal Pty Limited (DCPL), a wholly owned subsidiary of Yancoal Australia Limited (Yancoal), has commissioned SLR Consulting Australia Pty Ltd (SLR) to conduct quarterly noise monitoring for the Duralie Coal Mine (DCM) operations guided by the requirements of the *Duralie Coal Mine Noise Management Plan* (NMP), Document No. NMP-R06-A, dated May 2018. This report presents the results and findings from operator-attended operational noise monitoring conducted Thursday 28 October 2021.

The objectives of the noise monitoring programme for this operating period were as follows:

- Conduct one round of external operator-attended noise measurements during operational periods at four nominated locations listed in Project Approval, representative of receivers located in the north, west and south directions from the DCM. The monitoring locations are NM1, NM4, NM5, and NM6.
- The site currently only operates during the daytime period and during the night-time period (early morning) from 6:30 am to 7:00 am. Given the brief operating window during the night-time period only one (1) noise monitoring survey can be completed.
- Quantify all sources of noise within each of the attended noise surveys, including measured and/or estimated contribution and maximum level of individual noise sources.
- Assess the noise emissions from the DCM and determine compliance with respect to the limits contained in the NMP.

This report uses specialist acoustic terminology. An explanation of common terms is provided in **Appendix A**.

2 DCM Noise Limits

2.1 EPL Noise Limits

The site specific noise limits of sub-section L4.1 of Section L4 *Noise Limits* of the EPA's Environment Protection Licence (EPL), EPL 11701 dated 8 November 2017, for the four nominated attended noise monitoring locations, are summarised in **Table 1.**

Table 1 EPL Noise Limits for the Nominated Attended Noise Monitoring Locations

Locality	$L_{Aeq(15minute)}$			$L_{A1(1minute)}$
	Daytime	Evening	Night-time	Night-time
NM1 Woodley	35	35	35	45
NM4 Fisher-Webster	35	35	37	45
NM5 Moylan	35	35	35	45
NM6 - Oleksiuk and Carmody	35	35	39	45

Additional conditions relating to the noise monitoring location and applicable meteorological conditions are outlined in sub-sections L4.2 (a) and L4.8 of EPL 11701 and are summarised below.

L4.2 (a) with the L_{eq} (15-minute) noise limits in condition 4.1, the noise measurement equipment must be located:

Approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or

Within 30 metres of a dwelling façade, but not closer than 3 m, where any dwelling on the property is situated more than 30 metres from the boundary closest to the premises.

Noise from the premises is to be measured at a distance within 30 metres of the locations identified in L4.1 to determine compliance with this condition.

L4.8 The noise limits set out in condition in L4.1 apply under all meteorological conditions except for the following:

a) wind speeds greater than 3 metres/second at 10 metres above ground level; or

b) Temperature Inversion conditions up to 3 degrees Celsius/100m and wind speeds greater than 2 metres/second at 10 metres above the ground level; or

c) Temperature inversion conditions greater than 3 degrees Celsius/100m.

2.2 Project Approval Noise Limits

The Project approval conditions relating to the noise limits are as follows:

Noise Criteria

2. Except for the land referred to in Table 1, the Proponent shall ensure that the noise generated by the project does not exceed the criteria in Table 2 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.

Table 2: Noise criteria dB(A)

Location	Day	Evening	Night	
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{A1(1\ minute)}$
172 - Lyall	35	39	40	45
126 – Hamann Pixalu PL 123 – Oleksiuk & Carmody	35	35	39	45
173 – Trigg & Holland	35	36	37	45
116 - Weismantel 127 – Fisher-Webster 131(1) - Relton	35	35	37	45
180 (1) - Thompson	35	36	36	45
95 - Smith & Ransley	35	35	36	45
144 - Wielgosinski 169 - Williams 177 - Thompson	35	36	35	45
All other privately-owned land	35	35	35	45

Notes:

- *Noise generated by the project is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy; and*
- *For this condition to apply, the exceedences of the criteria must be systemic.*

2.3 Low Frequency Noise

The 'Duralie Modification Noise and Blasting Assessment' (prepared by SLR Consulting Australia dated 9 July 2014) included a low frequency analysis of C and A weighted intrusive noise levels in accordance with the NSW *Industrial Noise Policy* (INP) requirements. The assessment indicated that there is no dominant low-frequency content relating to noise emissions from the DCM.

At all locations DCM was found to not have dominant low frequency content, not audible or significantly below the relevant noise criteria and low frequency noise is therefore not addressed further in this report. The results of the operator attended noise measurements presented in **Section 3**.

3 Operational Noise Monitoring Methodology

3.1 General Requirements

All acoustic instrumentation employed throughout the monitoring programme has been designed to comply with the requirements of AS IEC 61672.1 – 2004 *Electroacoustics—Sound level meters – Specifications*, AS IEC 61672.2-2004, AS IEC 61672.3-2004 and carried current NATA or manufacturer calibration certificates. Instrument calibration was checked before and after each measurement survey, with the variation in calibrated levels not exceeding ±0.5 dBA.

3.2 Methodology – Operator-attended Noise Monitoring Locations

Noise monitoring was conducted guided by the requirements of the NMP. Operator-attended noise measurements were conducted during the day period for 15 minutes per period at each of the four nominated noise monitoring locations. An operator attended noise measurement was also conducted at one of the four nominated noise monitoring locations during the night-time period for a minimum of 15 minutes. The details of the operator-attended noise monitoring locations are contained within **Table 2** and shown in **Figure 1**. During the operator attended noise measurements, the character and relative contribution of ambient noise sources along with the mine contributions were noted.

Table 2 DCM Operational Noise Monitoring Locations

Monitoring Location	Receiver Type	Resident / Owner	Monitoring Location - MGA Zone 56	
			Easting (m)	**Northing (m)**
NM1	Residence	Woodley[1]	400644	6421907
NM4	Residence	Fisher-Webster	396790	6428961
NM5	Residence	Moylan	396770	6428945
NM6	Residence	Oleksiuk and Carmody	399661	6431862

Note 1: Woodley property has changed ownership but will retain the title of 'Woodley' until a License revision.

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ATTENDED NOISE MONITORING LOCATIONS

FIGURE 1

The objective of the DCM operational operator-attended noise monitoring was to measure the maximum (L_{Amax}) and the $L_{Aeq(15minute)}$ noise level contributions at the nearest potentially affected receptors to determine the noise contribution of mining activities associated with Duralie Coal Mine operations over a 15 minute measurement period. In addition, the operator quantifies and characterises the overall levels of ambient noise in the area (i.e. L_{Amax}, L_{A1}, L_{A10}, L_{A90}, and L_{Aeq}) over the 15 minute measurement interval. Operator-attended noise measurements were conducted using a one-third octave integrating Brüel & Kjær Type 2270 sound level meter (s/n 2697354).

4 Results

4.1 Operator-attended Monitoring – DCM Operational Activity

Operator-attended noise measurements were conducted during the day and night period on Thursday 28 October 2021. Results of the operator-attended noise surveys at NM1, NM4, NM5, NM6 are provided in **Table 3**.

A summary of the results for the operator-attended noise monitoring are displayed graphically in **Appendix B**. Charts of the noise surveys show L_{Amax}, L_{Aeq}, and $L_{Aeq(\leq 1.25kHz)}$ in 1-second intervals throughout the monitoring survey.

Ambient noise levels presented include all noise sources such as transport (roads, rail and aircraft), fauna (insects, frogs, birds, and bats), farm animals, the natural environment (wind in trees), domestic noises, other industrial operations as well as Duralie Coal Mine noise emissions.

Weather data during the monitoring period has been obtained from the weather station located on the Duralie Coal Mine site. Where this data was not available meteorological conditions have been estimated based on observed conditions during the monitoring period.

The tables provide the following information:

- Date and start time, operator and equipment details.
- Monitoring location.
- Wind velocity (m/s) and temperature (ºC) at the measurement location.
- Typical maximum (L_{Amax}) and contributed $L_{Aeq(15minute)}$ noise levels.

4.1.1 Operator-attended Noise Survey Results

Results of the operator-attended noise surveys at all monitoring locations are provided in **Table 3**. Monitoring location NM1 represents residential receptors located to the south of the site. Due to access restrictions noise monitoring was conducted at the entrance to the property.

Table 3 Daytime Operator Attended Noise Survey Results

Location	Date/Start Time/ Weather	Primary Noise Descriptor dBA (15 minute)						Description of Noise Emissions and Typical Maximum Noise Levels (dBA)
		L_{Amax}	L_{A1}	L_{A10}	L_{A90}	L_{Aeq}	L_{Aeq} (≤1.25kHz)	
NM1	28/10/2021 09:09 22°C 2.2 m/s NW	70	55	51	35	48	46	*Site related noise events:* Train loading and mechanical plant 27-32 **DCM: Audible** **$L_{Aeq(15minute)}$ Contribution 29 dBA** *Other noise events:* Train passbys 53-55 Road traffic 70 Birdsong 44-55
NM4 (Night)	28/10/2021 06:44 16°C 1.6 m/s W	71	55	45	32	45	38	*Site related noise events:* **DCM: Inaudible** *Other noise events:* Train 53 Birdsong 40-71 Road traffic 33-44
NM4	28/10/20210 7:42 19°C 1.4 m/s SE	71	55	44	31	44	35	*Site related noise events:* **DCM: Inaudible** *Other noise events:* Birdsong 40-71 Road traffic 30-42
NM5	28/10/2021 09:46 25°C 1.0 m/s SSE	54	49	41	30	38	34	*Site related noise events:* **DCM: Inaudible** *Other noise events:* Birdsong 35-54 Road traffic 32-43
NM6	28/10/2021 08:11 21°C 1.4 m/s WNW	76	56	43	32	49	48	*Site related noise events:* **DCM: Inaudible** *Other noise events:* Birdsong 38-60 Farm quad bike 30-37 Traffic 30-76

NM1

- DCM operations were audible during the operator-attended survey at this location generating a $L_{Aeq(15minute)}$ noise contribution of 29 dBA
- The ambient noise environment at the monitoring location generally consisted of road traffic as well as natural sources such as insects and birdsong.

NM4

- DCM operations were inaudible during the day and night-time operator-attended survey at this location.
- The ambient noise environment at the monitoring location generally consisted of road and rail traffic noise as well as natural sources such as birdsong.

NM5

- DCM operations were inaudible during the operator-attended survey at this location.
- The ambient noise environment at the monitoring location generally consisted of natural sources such as birdsong as well as road traffic noise.

NM6

- DCM operations were inaudible during the operator-attended survey at this location.
- The ambient noise environment at the monitoring location generally consisted of road traffic noise as well as natural sources such as birdsong.

4.2 Operator Attended Monitoring - Rail Noise Monitoring

Results of the operator-attended rail noise surveys at TN1, TN2 and TN3 are presented in **Table 4**.

Table 4 Operator-attended Rail Noise Monitoring Results

Monitoring Location	Date and Time	L_{Amax} dBA	
		Horn Included	Horn Excluded
TN1	28/10/2021 12:11	71	71
TN2	28/10/2021 8:38	75	75
TN3	28/10/2021 12:03	78	78

Maximum Duralie Shuttle rail pass-by noise levels were below 85 dBA at all receiver locations including the sounding of horns (if sounded) on approach to level crossings.

5 Performance Assessment

5.1 Operational Noise

Results of the operator-attended noise measurements compared with the relevant noise criteria contained in the Project Approval and EPL 11701 are given in **Table 5**.

Table 5 Performance Assessment – Operations

Location	Estimated DCM $L_{Aeq(15minute)}$ Contribution dBA	Noise Criteria $L_{Aeq(15minute)}$ dBA	Compliance
NM1	29	35	Yes
NM4 (day time)	I/A[1]	35	Yes
NM4 (night-time)	I/A	37	Yes
NM5	I/A	35	Yes
NM6	I/A	35	Yes

1. I/A = Inaudible

5.2 Sleep Disturbance

Results of the night period sleep disturbance measurements compared with the relevant noise criteria contained in the Project Approval and EPL 11701 are given in **Table 6**.

Table 6 Performance Assessment – Sleep Disturbance

Location	DCM $L_{A1(1minute)}$ Contribution	Noise Criteria $L_{A1(1minute)}$	Compliance
NM4	I/A	45	Yes

Results presented in **Table 5** and **Table 6** indicate that compliance with the relevant criteria was achieved at all operator-attended monitoring locations.

5.3 Rail Noise

Maximum Duralie Shuttle rail pass-by noise levels were below 85 dBA at all receiver locations including the sounding of horns on approach to level crossings.

6 Conclusion

SLR has conducted quarterly noise monitoring for the DCM guided by the requirements of the NMP.

Operator-attended operational noise monitoring was conducted at four locations on Thursday 28 October 2021. The assessment of daytime and night-time operational noise emissions found DCM to be compliant with the relevant criteria contained within the DCM PA and EPL.

Maximum Duralie Shuttle rail pass-by noise levels were below 85 dBA at all receiver locations including the sounding of horns on approach to level crossings.

APPENDIX A

Acoustic Terminology

The following is a brief description of the acoustic terminology.

Acoustic Terminology	Description
'A' Weighted	Frequency filter applied to measured noise levels to represent how humans hear sounds.
dBA	'A' Weighted overall sound pressure level.
L_{90} , L_{10}, L_{1}	A statistical measurement giving the sound pressure level which is exceeded for the given percentile of an observation period, i.e., L_{90} is the level which is exceeded for 90 percent of an observation period. L_{90} is commonly referred to as the background sound level.
L_{Amax}	Highest value of the A-weighted sound pressure level with a specified time weighting that occurs during a given event.

APPENDIX B

Operator-attended Noise Survey Charts

Figure B1 – Day Period – NM1 Operator Attended Noise Survey Results

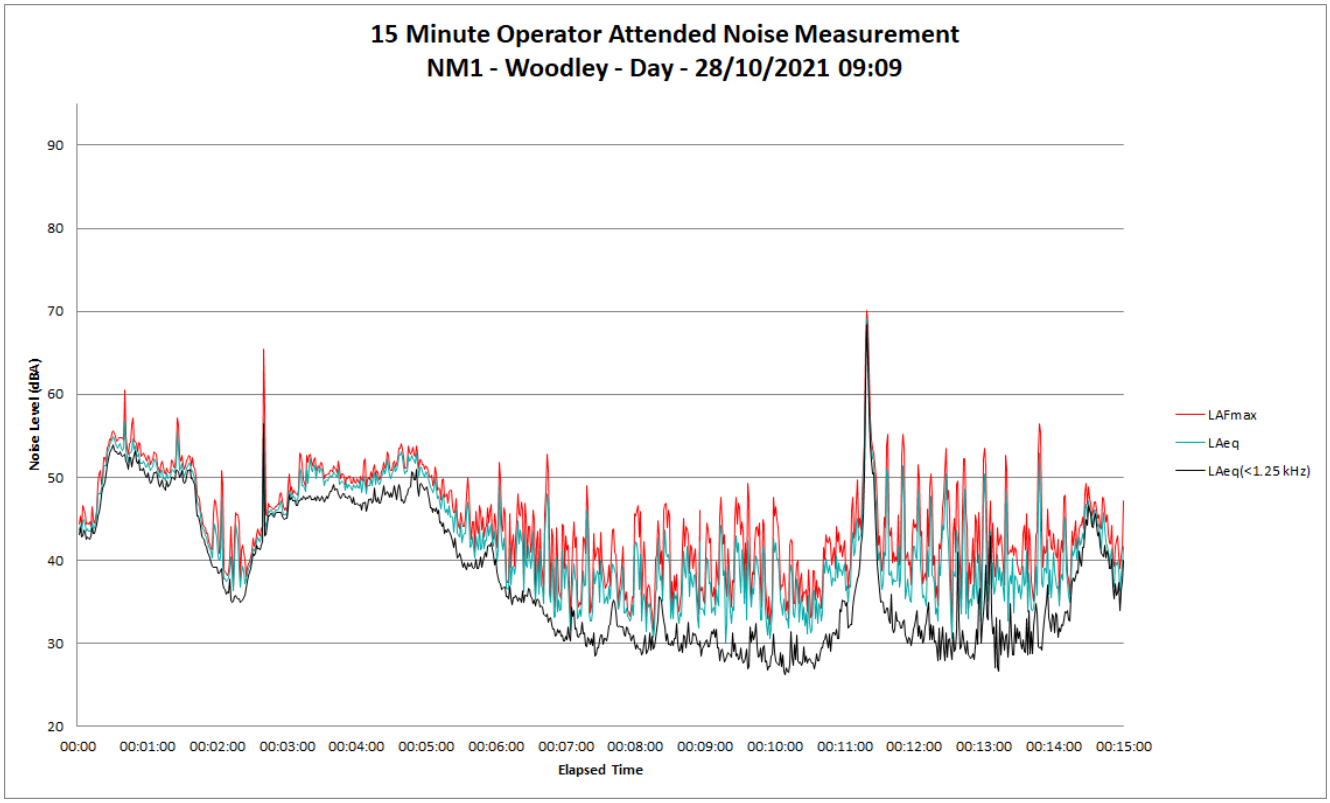


Figure B2 – Day Period – NM4 Operator Attended Noise Survey Results

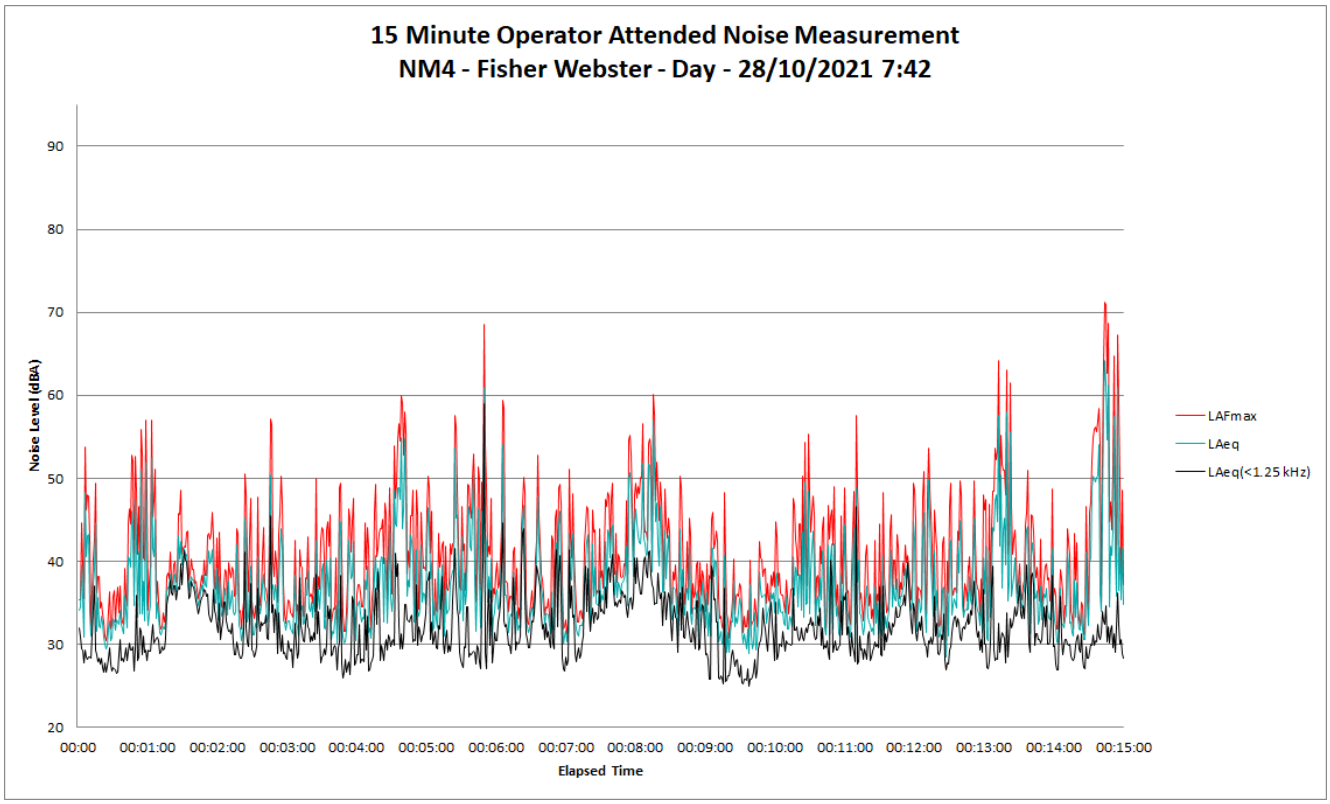


Figure B3 – Night Period – NM4 Operator Attended Noise Survey Results

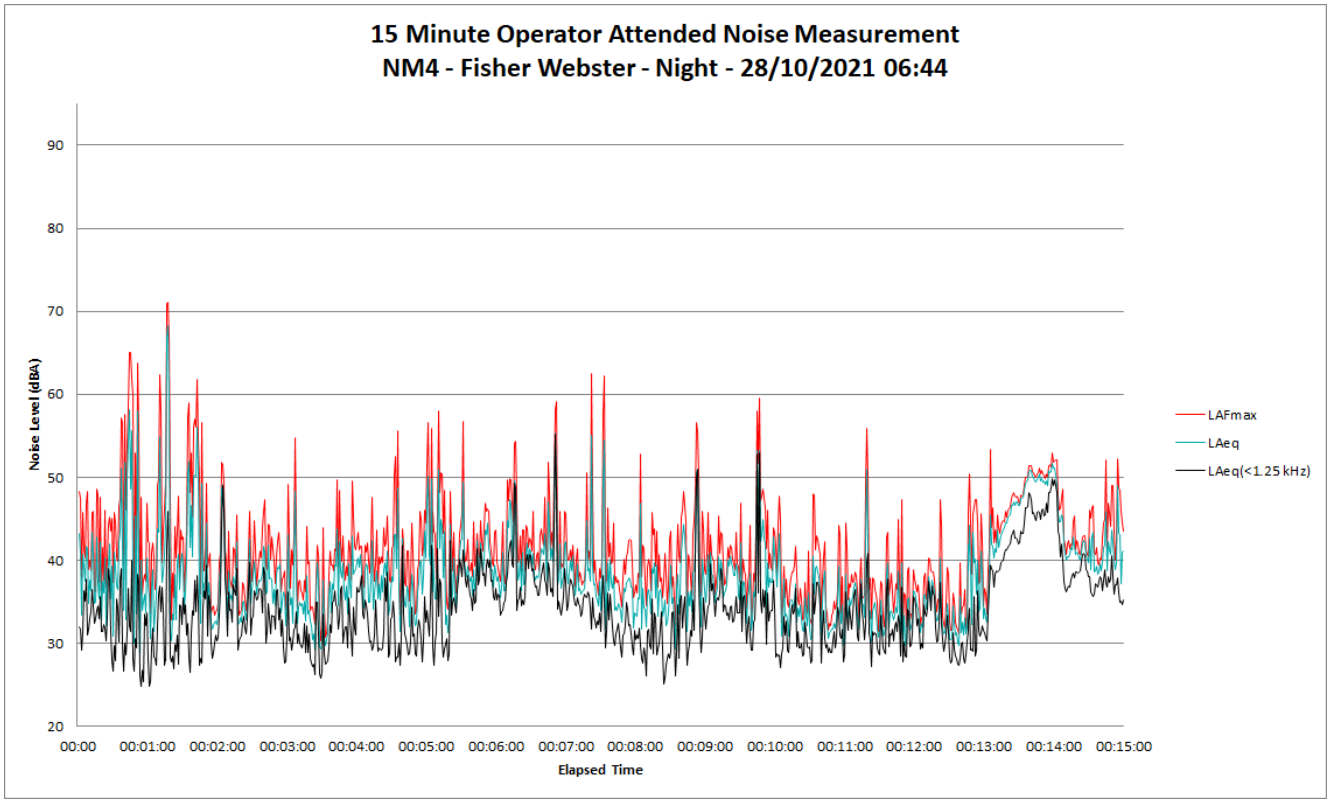


Figure B4 – Day Period – NM5 Operator Attended Noise Survey Results

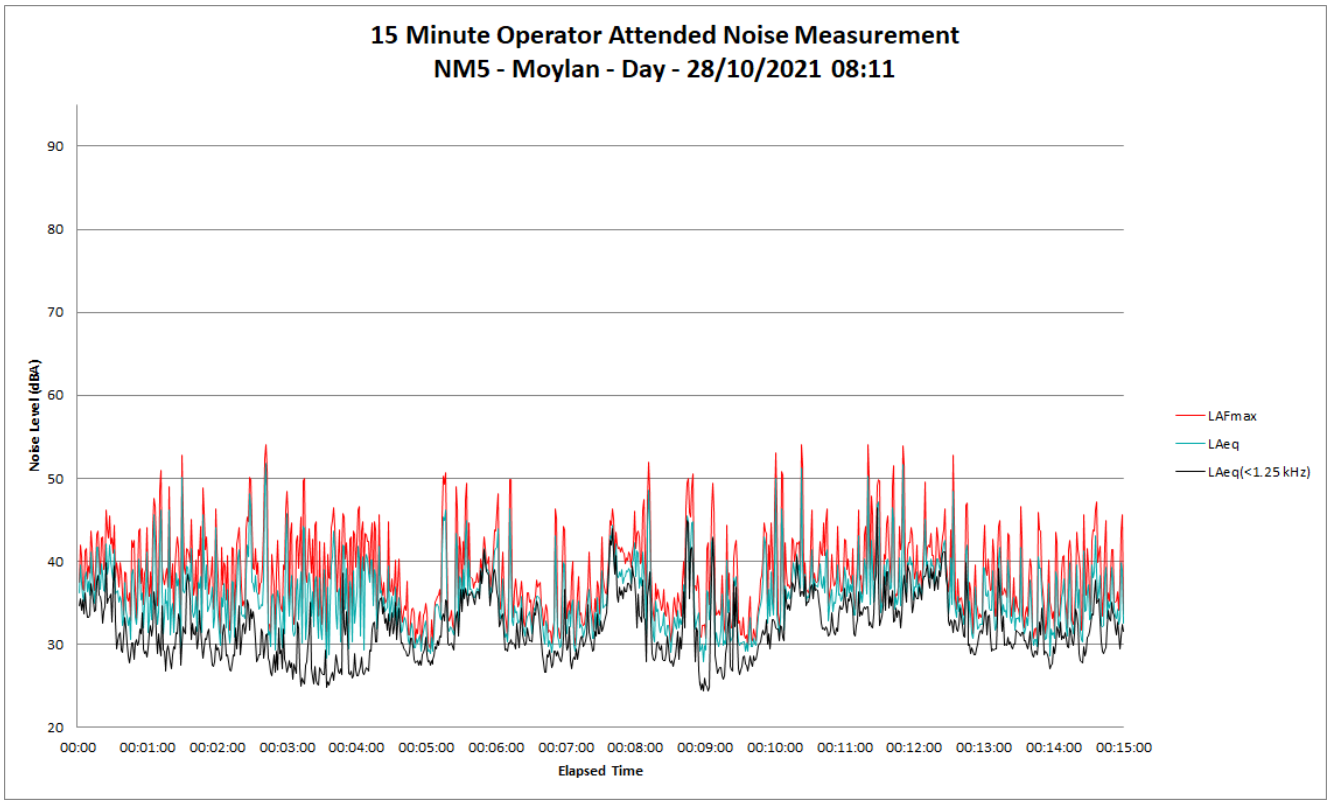
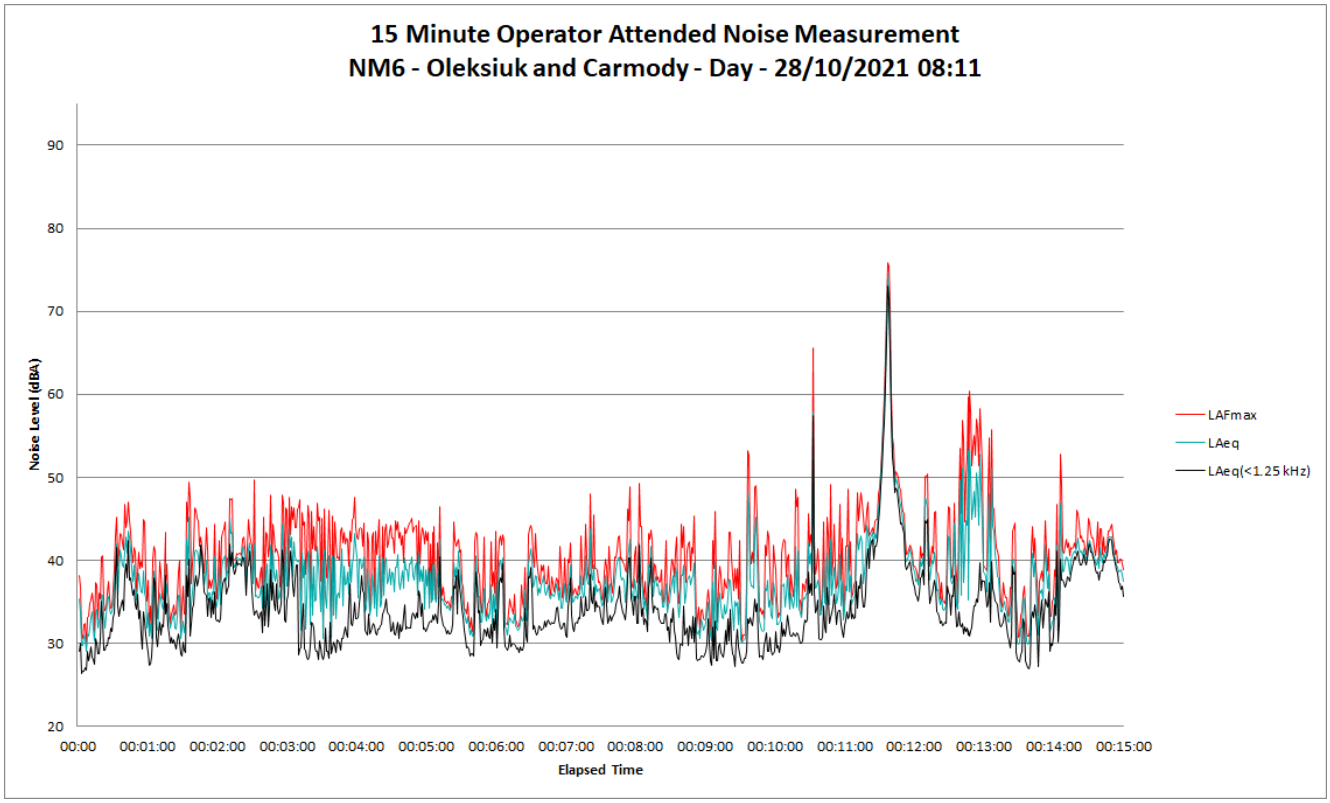


Figure B5 – Day Period – NM6 Operator Attended Noise Survey Results



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