

SOUTHERN HIGHLANDS REGIONAL SHOOTING COMPLEX

800M RANGE COMPLIANCE NOISE MONITORING APRIL 2019

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PREPARED FOR

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GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are here defined.

Maximum Noise Level (L_{Amax}) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

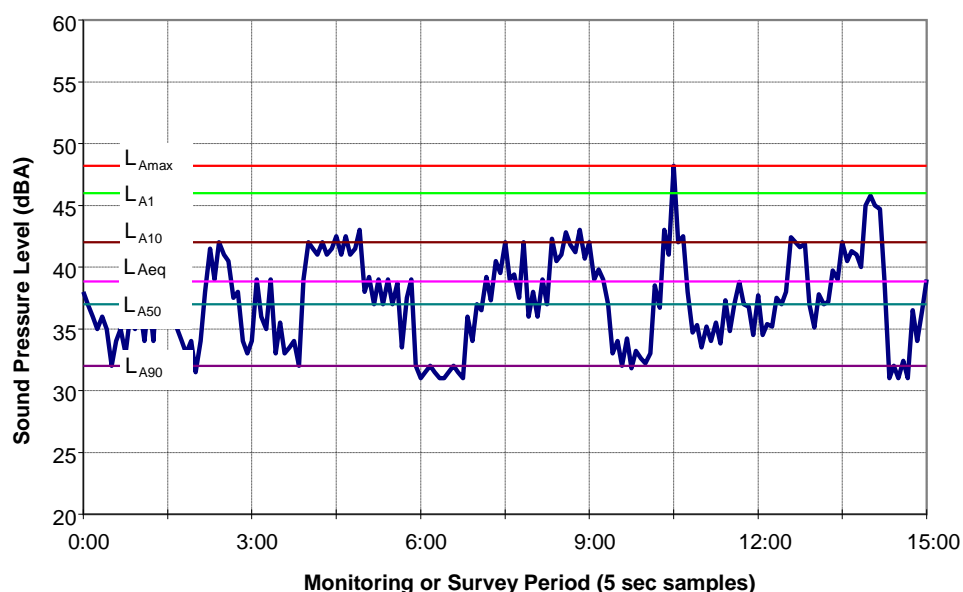
L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.

Typical Graph of Sound Pressure Level vs Time



1 INTRODUCTION

This report summarises the results of the Compliance Noise Monitoring of the 800m range at the Southern Highlands Regional Shooting Complex (SHRSC), completed on 6 April 2019.

As part of its Conditions of Approval (MP 06_0232 MOD 5), the SHRSC must complete attended noise monitoring quarterly in the first 12 months of operation of the 800m range and annually thereafter. Noise compliance was determined based on the methodology outlined in the NSW EPA document "*Target Shooting Ranges: Application Note for Assessing Noise Compliance*" (EPA Application Note).

Condition A9 also stipulates the Firearm Noise Limits and states the following:

The noise from firearms or use of the site must not exceed LZpeak 75dB at the following locations:

- a) At the south-western end of Rocky Waterholes Road, Hill Top (representing residences at 1, 2 and 4 Rocky Waterholes Road); and*
- b) At Nattai Road, Hill Top, adjacent to the western entrance to the Wattle Ridge Farm (representing the existing residence).*

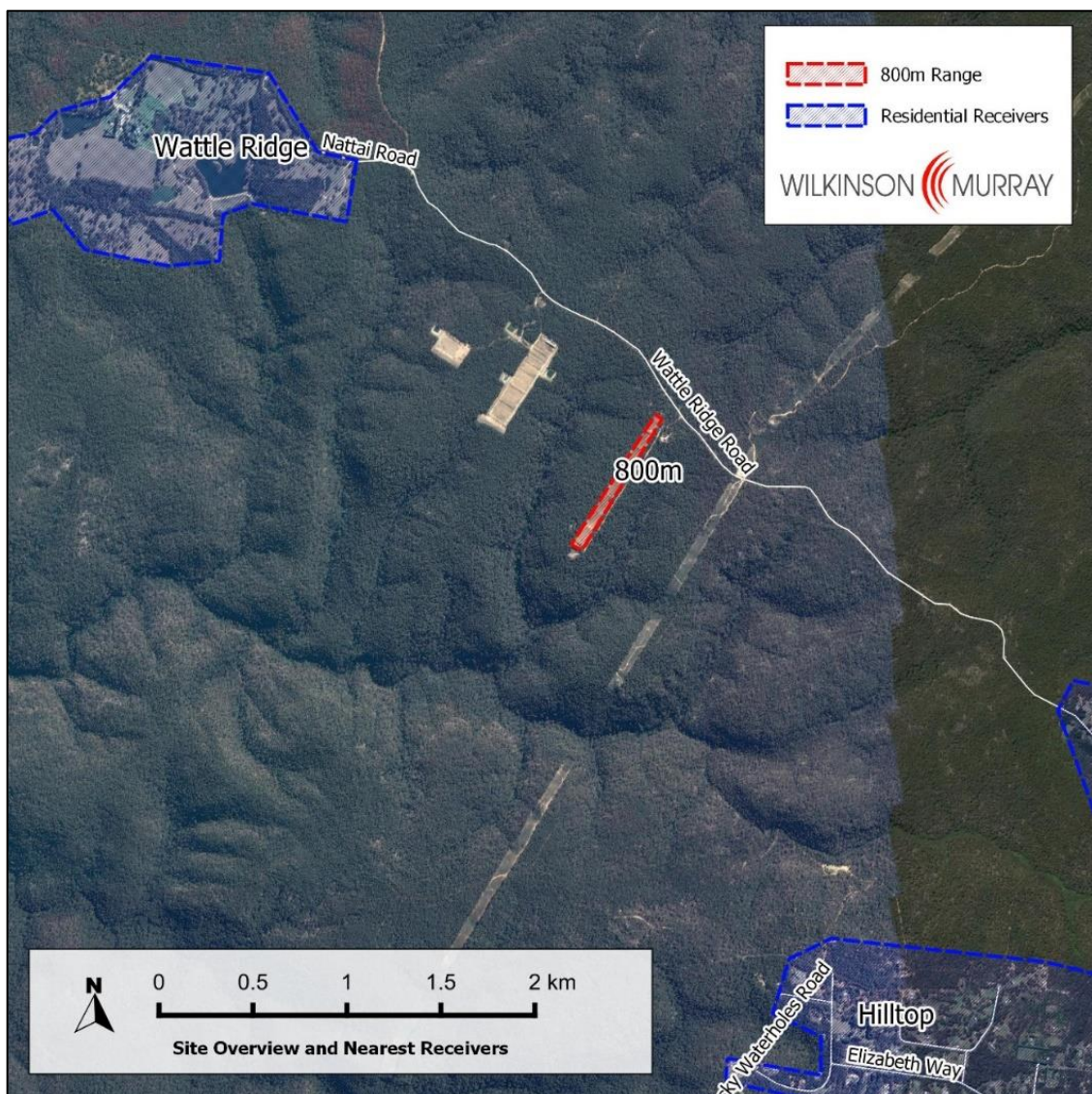
The assessment of noise compliance from the Southern Highlands Regional Complex shall be undertaken in accordance with the EPA's Target Shooting Ranges: Application Note for Assessing Noise Compliance (2015).

2 SITE DESCRIPTION

The SHRSC is located on Wattle Ridge Road, Hilltop, NSW. The complex is situated within the Nattai National Park. The complex currently consists of an 800m range, clubhouse, and an amenities block. The range currently only operates on weekends however, the existing approval allows for up to 4 days of operation a week.

The nearest residential receivers include Wattle Ridge Farm, located approximately 2.5km to the north-west, and Hilltop township located approximately 3km to the south-east. No notable topographical shielding is present between the range and receivers.

Figure 2-1 Site Overview and Nearest Receivers



3 NOISE ASSESSMENT

3.1 Methodology

Attended monitoring was completed between 1.00pm and 2.15pm on 6 April 2019. Wind speeds during the monitoring period was less than 5m/s at microphone height and were in a north-westerly direction, which is suitable for monitoring.

Measurements were conducted using a Brüel & Kjær Type 2250 Sound Level Meter and a SVAN 977A Sound Level Meter. Both meters conform to Australian Standard 1259 *Acoustics – Sound Level Meters* as a Type 1 Precision Sound Level Meter which has an accuracy suitable for field and laboratory use. The calibration of the meters was checked before and after the measurements with a Brüel & Kjær Type 4231 sound level calibrator and no significant drift was noted.

All equipment has been laboratory calibrated within the previous two years in accordance with our in-house Quality Assurance Procedures.

Both meters were set to measure L_{zPeak} levels in accordance with EPA's Application. Noise compliance was determined by the manual method described in the Application note.

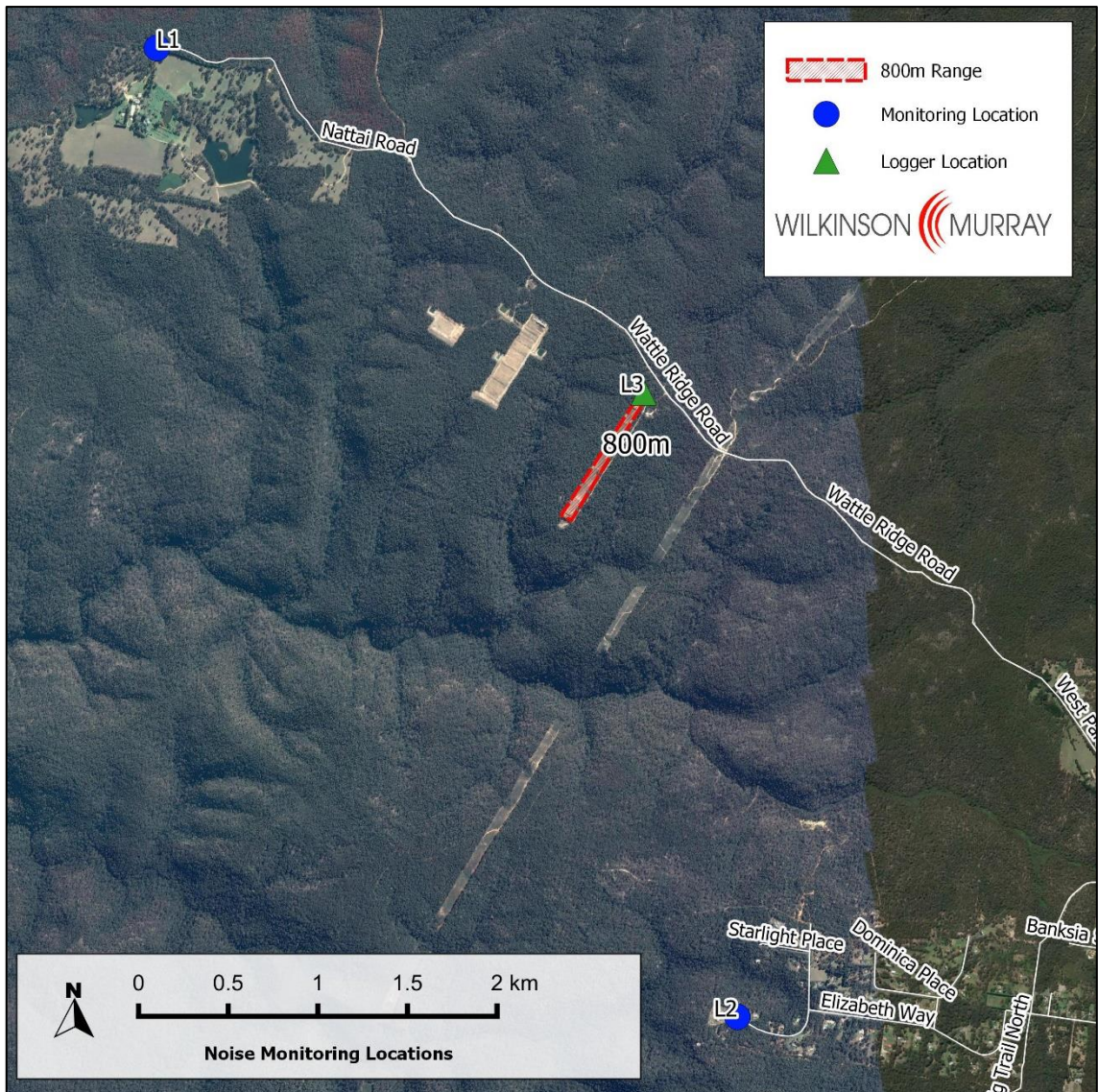
Noise monitoring locations were selected to be consistent with Condition A9 of the Consent Conditions. An ARL Ngara was also installed near to the range to allow confirmation of the timing and number of shots fired.

Figure 3-1 presents monitoring locations relative to the site and receivers and Table 3-1 summarises the attended monitoring information. Photos of the monitoring set up are shown in Appendix B.

Table 3-1 Summary of Monitoring Setup

Location No.	Location	Logger	SN
L1	Wattle Ridge Farm	SVAN 977A	59633
L2	Rocky Waterhole	Brüel & Kjær 2250	3008381
L3	800m Range	ARL Ngara	878062

Figure 3-1 Noise Monitoring Locations



3.2 Noise Monitoring Results

Table 3-2 summarises monitoring results. The raw data is summarised in Appendix A.

Table 3-2 Noise Monitoring Results – dB L_ZPeak

Location	No. of Shots Measured	Category		Arithmetic Average
		A	B	
L1 Wattle Ridge	-	-	-	-
L2 Rocky Waterhole	77	63	14	69
L3 800m Range	>120	-	-	-

During monitoring, no shots were audible or measurable at the Wattle Ridge monitoring location. As more than 30 shots were fired on range and weather conditions were suitable, as per the Application Note, compliance has been demonstrated for operation of the 800m range when assessed at Wattle Ridge Farm.

From the noise monitoring results, the arithmetic average of the received shot levels when measured at Rocky Waterhole does not exceed the 75 L_{zPeak} level stipulated by criteria.

4 CONCLUSION

Wilkinson Murray has conducted noise monitoring of the operation of the 800m range at the Southern Highlands Regional Shooting Complex. Monitoring was conducted on 6 April 2019 between 1.00pm to 2.15pm. The results of the noise monitoring determined that the operation of the 800m range complies with relevant criteria when assessed at residential receivers and satisfies all conditions of consent relating to noise.

APPENDIX A

NOISE MEASUREMENT RESULTS

L2 – Rocky Waterholes Noise Monitoring Data

No.	Pre-Shot L _{zPeak}	Shot L _{zPeak}	Difference	Category
1	58	68	10	A
2	55	62	7	A
3	64	72	8	A
4	57	66	9	A
5	62	72	10	A
6	69	76	7	A
7	57	61	4	A
8	64	66	2	B
9	59	65	6	A
10	59	60	1	B
11	59	60	1	B
12	62	68	6	A
13	63	68	5	A
14	70	75	5	A
15	71	75	4	A
16	66	72	6	A
17	52	58	6	A
18	58	62	4	A
19	55	62	7	A
20	57	72	15	A
21	65	69	4	A
22	65	73	8	A
23	58	72	14	A
24	68	73	5	A
25	68	74	6	A
26	70	74	4	A
27	69	71	2	B
28	60	64	4	A
29	68	74	6	A
30	65	68	3	B
31	68	71	3	B
32	60	68	8	A
33	63	69	6	A
34	66	70	4	A
35	65	74	9	A
36	68	70	2	B
37	75	79	4	A
38	64	71	7	A
39	64	70	6	A
40	66	68	2	B
41	56	62	6	A
42	57	63	6	A

No.	Pre-Shot L _{zPeak}	Shot L _{zPeak}	Difference	Category
43	57	65	8	A
44	62	68	6	A
45	59	66	7	A
46	61	68	7	A
47	59	65	6	A
48	59	62	3	B
49	68	76	8	A
50	69	73	4	A
51	68	73	5	A
52	67	76	9	A
53	60	78	18	A
54	65	68	3	B
55	65	68	3	B
56	64	71	7	A
57	64	72	8	A
58	66	71	5	A
59	72	76	4	A
60	59	67	8	A
61	66	68	2	B
62	64	75	11	A
63	58	74	16	A
64	68	70	2	B
65	69	72	3	B
66	62	66	4	A
67	56	66	10	A
68	59	64	5	A
69	58	62	4	A
70	58	64	6	A
71	58	65	7	A
72	61	72	11	A
73	61	68	7	A
74	57	63	6	A
75	58	68	10	A
76	58	62	4	A
77	58	68	10	A
Total no. of Category A Shots				63
Total no. of Category B Shots				14
Final Noise Level				69

APPENDIX B
TYPICAL NOISE MONITORING SETUP

Typical Noise Monitoring Setup – Wattle Ridge

