

# SOUTHERN HIGHLANDS REGIONAL SHOOTING COMPLEX

500M RANGE COMPLIANCE NOISE MONITORING APRIL 2019

**REPORT NO.** 08084-NT-500M-1  
**VERSION A**

APRIL 2019

**PREPARED FOR**

OFFICE OF SPORT  
6 B FIGTREE DRIVE  
SYDNEY OLYMPIC PARK NSW 2127

## DOCUMENT CONTROL

Version	Status	Date	Prepared By	Reviewed By
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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.

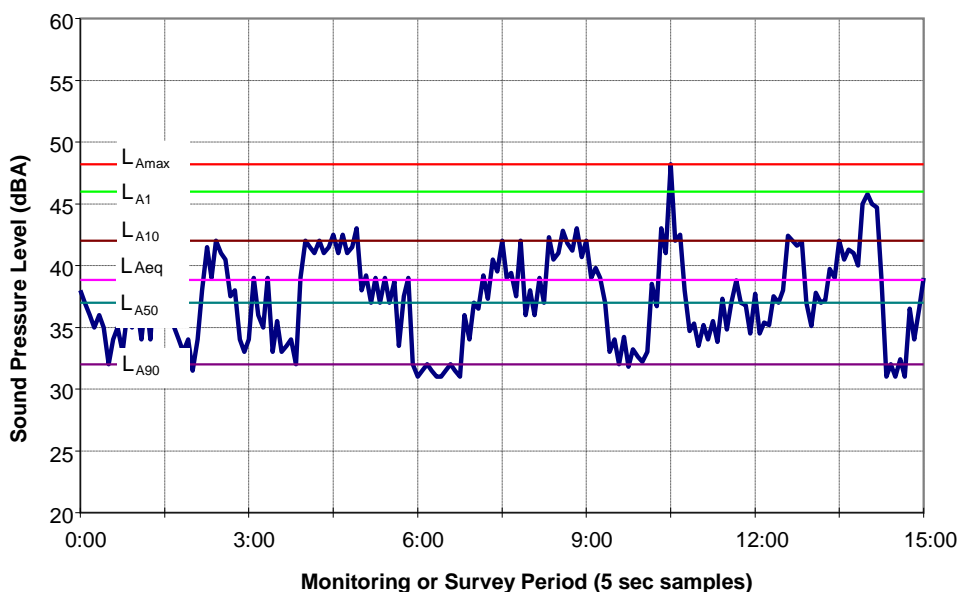
**$L_{A90}$**  – The  $L_{A90}$  level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the  $L_{A90}$  level for 10% of the time. This measure is commonly referred to as the background noise level.

**$L_{Aeq}$**  – 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 10<sup>th</sup> percentile (lowest 10<sup>th</sup> 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

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This report summarises the results of the Compliance Noise Monitoring of the 500m range at the Southern Highlands Regional Shooting Complex (SHRSC), completed on 7 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 500m 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).*

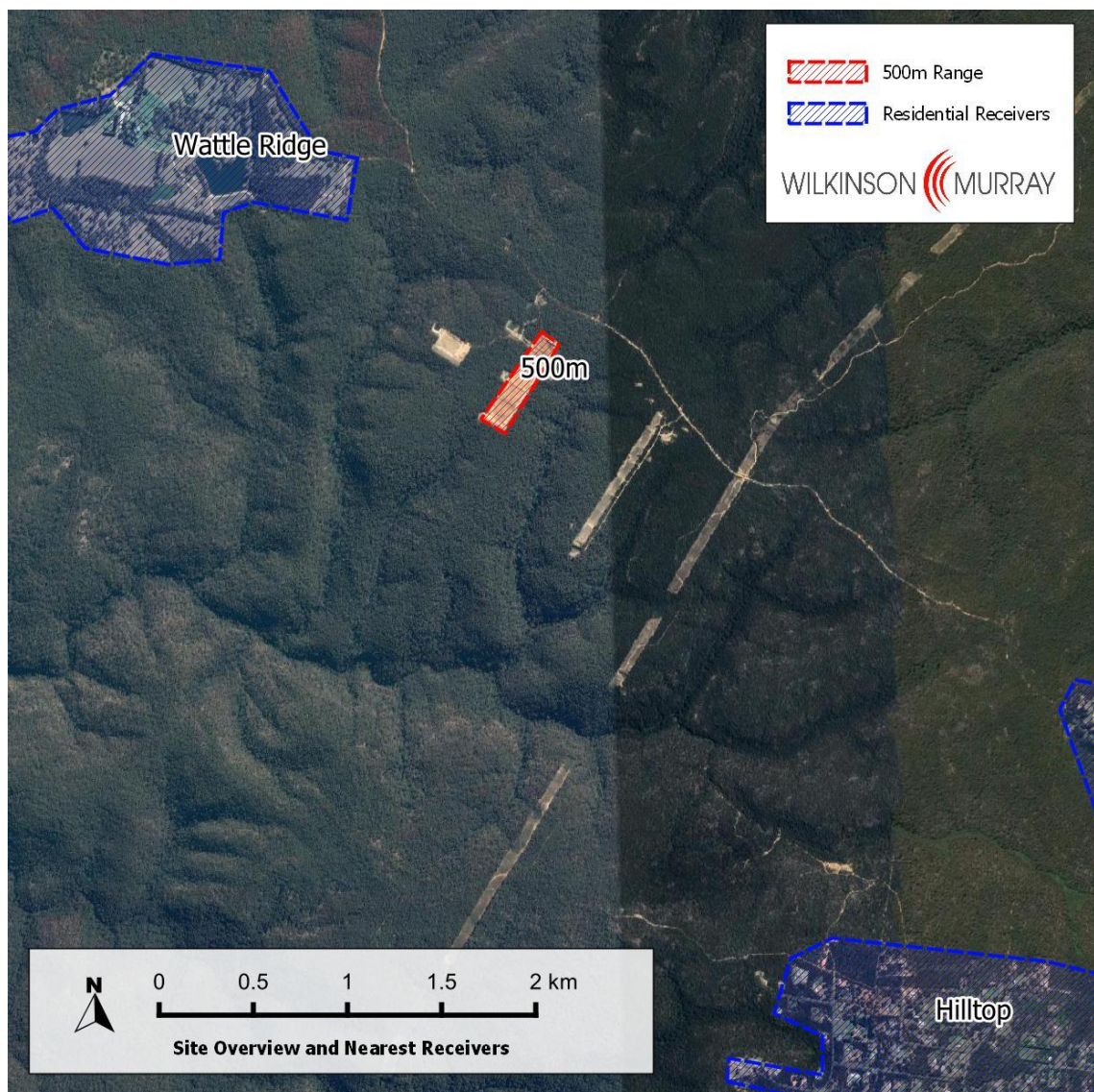
*The assessment of noise compliance from the Southern Highlands Regional Complex shall be undertaken in accordance with the EPA's Target Shooting Ranges: Application Note for Assessing Noise Compliance (2015).*

## 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 50m handgun range, a 500m rifle range, 800m rifle 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 1.2km to the north-west of the 500m range, and Hilltop township located approximately 3.4km to the south-east of the 500m range. No notable topographical shielding is present between the range and receivers.

**Figure 2-1 Site Overview and Nearest Receivers**





### 3 NOISE ASSESSMENT

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#### 3.1 Methodology

Attended monitoring was completed between 10.15am and 11.15am on 7 April 2019. Wind speeds during the monitoring period was less than 5m/s at microphone height and in a north-westerly direction, which is suitable for noise 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.

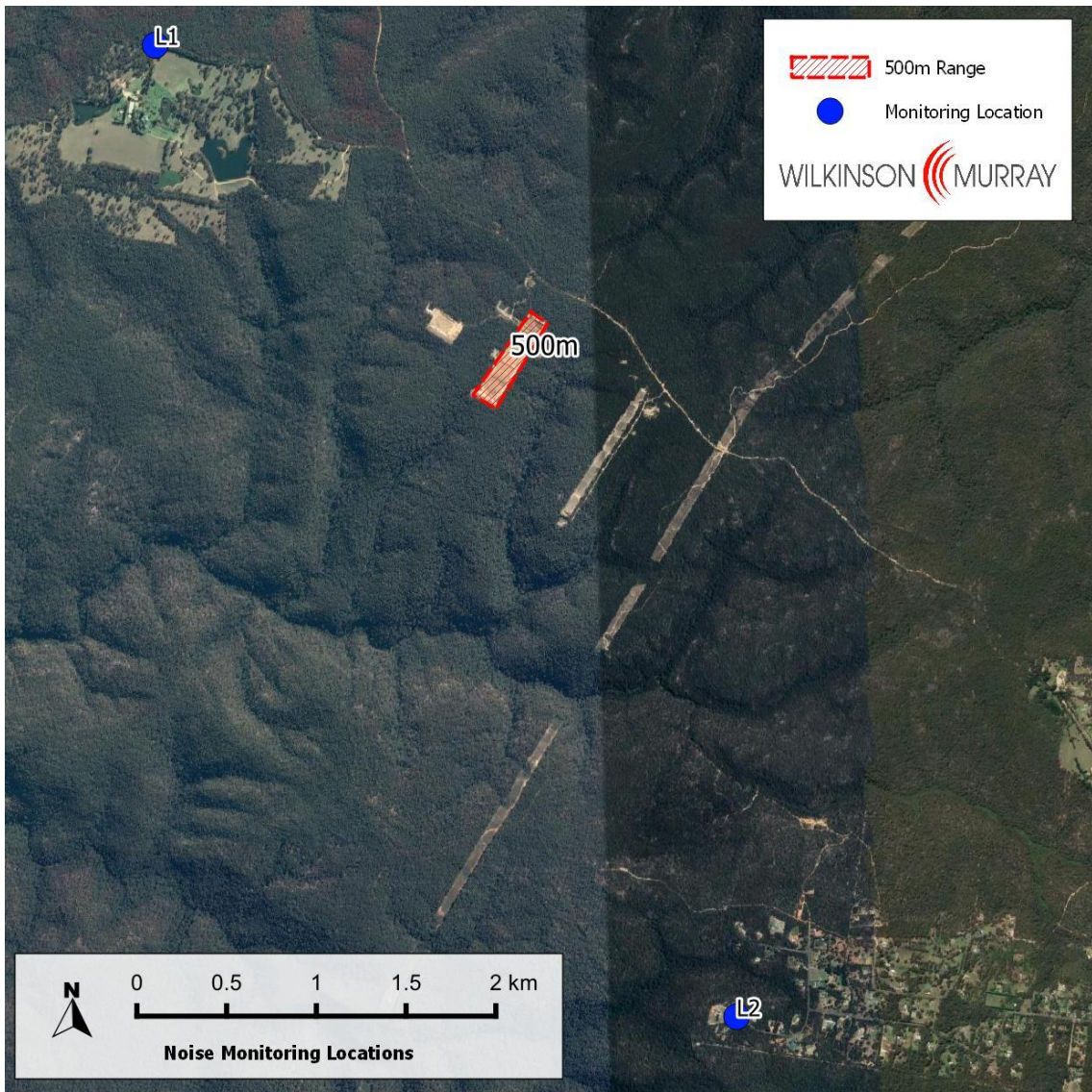
Noise monitoring locations were selected to be consistent with Condition A9 of the Consent Conditions.

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	Brüel & Kjær 2250	3008381
L2	Rocky Waterhole	SVAN 977A	59633

**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<sub>ZPeak</sub>**

Location	No. of Shots Measured	Category		Arithmetic Average
		A	B	
L1 Wattle Ridge	-	-	-	-
L2 Rocky Waterhole	50	43	7	59



During monitoring, shots were audible but not 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 500m 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**

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Wilkinson Murray has conducted noise monitoring of the operation of the 500m range at the Southern Highlands Regional Shooting Complex. Monitoring was conducted on 7 April 2010 between 10.15am to 11.15am. The results of the noise monitoring determined that the operation of the 500m range complies with relevant criteria when assessed at residential receivers and satisfies all conditions of consent relating to noise.

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# APPENDIX A

## NOISE MEASUREMENT RESULTS

## L2 – Rocky Waterholes Noise Monitoring Data

No.	Pre-Shot L <sub>z</sub> Peak	Shot L <sub>z</sub> Peak	Difference	Category
1	52	56	4	A
2	52	58	6	A
3	54	60	6	A
4	52	56	4	A
5	54	59	5	A
6	53	57	4	A
7	54	60	6	A
8	53	60	7	A
9	56	61	5	A
10	53	61	8	A
11	55	60	5	A
12	57	59	2	B
13	56	59	3	B
14	56	60	4	A
15	57	61	4	A
16	58	61	3	B
17	55	56	1	B
18	54	60	6	A
19	53	63	10	A
20	52	60	8	A
21	55	61	6	A
22	54	58	4	A
23	52	60	8	A
24	53	62	9	A
25	54	59	5	A
26	52	59	7	A
27	55	61	6	A
28	56	59	3	B
29	54	60	6	A
30	53	61	8	A
31	54	58	4	A
32	53	59	6	A
33	56	59	3	B
34	53	58	5	A
35	54	59	5	A
36	55	60	5	A
37	55	61	6	A
38	54	61	7	A
39	52	58	6	A
40	51	54	3	B
41	53	59	6	A
42	54	59	5	A
43	52	56	4	A
44	52	58	6	A
45	54	60	6	A
46	52	56	4	A
47	54	59	5	A
48	53	57	4	A
49	54	60	6	A
50	53	60	7	A
<b>Total no. of Category A Shots</b>				<b>43</b>
<b>Total no. of Category B Shots</b>				<b>7</b>
<b>Final Noise Level</b>				<b>59</b>

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APPENDIX B  
TYPICAL NOISE MONITORING SETUP

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### Typical Noise Monitoring Setup – Rocky Waterhole

