

## **Appendix A17.2: Detailed Baseline Noise Survey Results**

### **1 Introduction**

- 1.1.1 This appendix provides additional details of the baseline noise surveys which were undertaken as part of the DMRB 'noise and vibration' Stage 3 Assessment.
- 1.1.2 Noise monitoring was undertaken between 14 June 2016 and 6 July 2016 and consisted of unattended noise level measurements at 11 locations, regular site visits at noise monitoring locations and additional short term spot measurements at all measurement locations.
- 1.1.3 The following equipment was used when undertaking noise measurements and calibration certificates for all equipment are provided at the end of this appendix:
- Rion NC-74 Calibrator s/n 34536108;
  - Rion NL-52 Class 1 Sound Level Meter s/n 00610194;
  - Rion NL-52 Class 1 Sound Level Meter s/n 00610201;
  - Rion NL-52 Class 1 Sound Level Meter s/n 00610212;
  - Rion NL-52 Class 1 Sound Level Meter s/n 00620872;
  - Rion NL-52 Class 1 Sound Level Meter s/n 01121405; and
  - Rion NL-52 Class 1 Sound Level Meter s/n 01143556.
- 1.1.4 For each measurement location, two tables have been provided to illustrate the measured daily noise levels for the following time periods:
- The 18 hour daytime period (between 06:00 and 00:00), which is the time period that is used to describe road traffic noise in the Calculation of Road Traffic Noise (CRTN).
  - The 16 hour daytime period (between 07:00 and 23:00), which corresponds to the time period used in the World Health Organisation (WHO) and BS 8233 when describing the daytime period.
  - The eight hour night-time period (between 23:00 and 07:00), which corresponds to the time period used in WHO and BS 8233 when describing the night-time noise period.
- 1.1.5 Both the measured daily noise levels, including noise levels measured with and without periods of rainfall, are presented for each monitoring location. To minimise the effect on the noise levels as a consequence of rainfall, the noise levels measured during periods of rainfall have been removed from the data set. For each time period where rainfall has been measured, the noise levels corresponding to that time period and the following 30 minutes have been discarded. The following 30 minutes are excluded to help mitigate effects of standing water on road traffic noise on the A9 and nearby roads.
- 1.1.6 Daily noise levels are presented only for periods where noise levels were measured for the full duration of the period, i.e. the full 18 (06:00 to 00:00), 16 (07:00 to 23:00) or eight (23:00 to 07:00) hours. Where data for the full 18 hour (06:00 to 00:00) period is not available, the shortened measurement procedure (defined in CRTN) has been used to calculate the  $L_{A10(18 \text{ hour})}$ . The shortened measurement procedure has been used where there are three consecutive hours, between 10:00 and 17:00 hour, which has at least 15 minutes (and the following 30 minutes if rainfall has occurred) of rain free data per hour.

## **2 Summary of Unattended Long Term Measurements**

### **Measurement Location R5.01 – Old Faskally House, Killiecrankie, Pitlochry, PH16 5LG**

- 2.1.1 The measurement location was as shown in Photograph 1. A Rion NL-52 Class 1 sound level meter (serial number (s/n) 00610212) was positioned at a height of approximately 1.5m in free-field conditions. The equipment was 40m from the south-western façade of the property and approximately 100m from the existing A9.

**Photograph 1: Noise Monitoring Equipment at Old Faskally House**



- 2.1.2 The monitoring equipment was calibrated both before and after the measurement period using a Rion NC-74 (s/n 34536108) acoustic calibrator, which has itself been calibrated against a reference set traceable to National and International Standards. There was no significant shift in the observed calibration level.
- 2.1.3 The noise climate was dominated by traffic on the existing A9. The road traffic noise was perceived as a hum due to the distance to the existing A9, but lorries could occasionally be distinguished. Birdsong and a distant stream were also continuous sources of noise. Other noise sources included sheep, leaves rustling, people talking, passing vehicle horns and dogs.

- 2.1.4 Wind speeds ranged between 0.1ms<sup>-1</sup> and 1.8ms<sup>-1</sup> throughout the monitoring period. Rainfall occurred occasionally throughout the monitoring period, but with the exception of the hourly rainfall recorded on 24 June 2016 (2.6mm recorded between 03:00 and 04:00; 1.7mm recorded between 04:00 and 05:00) and 25 June 2016 (3.0mm recorded between 02:00 and 03:00); hourly rainfall did not exceed 1.0mm.
- 2.1.5 Table 1 and Table 2 provide the measured daily noise levels at this location, with and without noise levels measured during periods of rainfall.

**Table 1: Daily summarised noise levels at Old Faskally House, including periods of rainfall**

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
22/06/16	Wednesday	-	61.0*	-	-	-	-	52.9	57.0	41.3
23/06/16	Thursday	57.3	60.4	47.9	57.6	60.6	48.6	53.7	57.3	41.2
24/06/16	Friday	57.8	60.5	49.6	58.1	60.8	50.6	53.2	56.5	43.6
25/06/16	Saturday	57.2	59.8	49.4	57.6	60.2	50.0	50.7	54.5	42.4
26/06/16	Sunday	57.1	59.6	48.8	57.5	60.1	49.6	53.9	56.8	43.0
27/06/16	Monday	58.6	61.3	50.3	58.8	61.7	51.0	53.3	57.2	41.2
28/06/16	Tuesday	59.6	60.5	47.9	60.0	60.9	48.6	50.4	55.1	39.7

\* Determined using CRTN shortened measurement procedure

**Table 2: Daily summarised noise levels at Old Faskally House, with periods of rainfall removed**

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
22/06/16	Wednesday	-	61.0*	-	-	-	-	52.8	56.7	41.2
23/06/16	Thursday	57.3	60.4	47.9	57.6	60.6	48.6	-	-	-
24/06/16	Friday	-	60.6*	-	-	-	-	-	-	-
25/06/16	Saturday	57.3	59.9	49.5	57.6	60.3	50.1	-	-	-
26/06/16	Sunday	-	59.5*	-	-	-	-	53.9	56.8	43.0
27/06/16	Monday	58.6	61.4	50.3	58.8	61.8	51.0	53.3	57.2	41.2
28/06/16	Tuesday	-	-	-	-	-	-	50.4	55.1	39.7

\* Determined using CRTN shortened measurement procedure

- 2.1.6 It should be noted that in Table 1 and Table 2 the reported L<sub>Aeq,T</sub> level is the logarithmically averaged noise level, whereas the L<sub>A10,T</sub> and L<sub>A90,T</sub> levels are the arithmetically averaged noise levels.
- 2.1.7 In addition to long term measurements, a series of short term attended measurements were also undertaken and the results are provided in Table 3. A Rion NL-52 sound level meter (s/n 00921176) was positioned at a height of 1.5m in free field conditions adjacent to the long term monitoring equipment. The monitoring equipment was calibrated both before and after the measurement period using an acoustic calibrator, which has itself been calibrated against a reference set traceable to National and International Standards. There was no significant shift in the observed calibration level.

**Table 3: Additional attended noise level measurements at Old Faskally House**

Start Date	Start Time (hh:mm)	Duration (hh:mm)	Comments
22/06/16	18:30	00:15	Very light occasional winds, 100% cloud cover, 14°C, dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate comprises of distant road traffic from the existing A9, constant birdsong and running water of a nearby stream. Motorbike on A9 at 18:36. HGV with heavy load on A9 at 18:37. Birds near sound level meter at 18:41.

Start Date	Start Time (hh:mm)	Duration (hh:mm)	Comments
23/06/16	10:00	00:15	Very light winds, 15% cloud cover, 17°C, dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate comprises of distant road traffic from the existing A9, constant birdsong and running water of a nearby stream. Car horn on A9 at 10:07.
23/06/16	15:30	00:15	Calm, 25% cloud cover, 17°C, dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate comprises of distant road traffic from the existing A9, birdsong and running water of a nearby stream. Lorry horn on A9 at 15:39.

**Measurement Location R5.02 – Coille Essan, Killiecrankie, Pitlochry, PH16 5LG**

2.1.8 The measurement location was as shown in Photograph 2. A Rion NL-52 Class 1 sound level meter (s/n 01121405) was positioned at a height of approximately 1.5m in free-field conditions. The equipment was 10m from the north-eastern façade of the property and approximately 180m from the existing A9.

**Photograph 2: Noise monitoring equipment at Coille Essan**



- 2.1.9 The monitoring equipment was calibrated both before and after the measurement period using a Rion NC-74 (s/n 34536108) acoustic calibrator, which has itself been calibrated against a reference set traceable to National and International Standards. There was no significant shift in the observed calibration level.
- 2.1.10 The noise climate was dominated by birdsong. Traffic on the existing A9 was relatively faint in the distance largely due to the screening by terrain. Other noise sources noted were a nearby stream and leaves rustling.
- 2.1.11 Hourly wind speeds ranged between 0.1ms<sup>-1</sup> and 2.3ms<sup>-1</sup> throughout the monitoring period. Low levels of precipitation were recorded throughout the monitoring period. Peak levels of hourly rainfall were recorded on 24 June between 03:00 and 04:00 (1.7mm - 2.6mm of rainfall) and 25 June 2016 at 02:00 (3.0mm of rainfall).
- 2.1.12 Table 4 and Table 5 provides the measured daily noise levels at this location, with and without the periods of rainfall.

**Table 4: Daily summarised noise levels at Coille Essan, including periods of rainfall**

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
22/06/16	Wednesday	-	49.7*	-	-	-	-	46.3	47.3	44.8
23/06/16	Thursday	47.8	49.0	45.4	47.9	49.0	45.5	46.7	47.6	44.6
24/06/16	Friday	48.3	49.6	45.9	48.2	49.6	45.8	48.8	49.5	47.5
25/06/16	Saturday	50.8	51.8	49.1	50.9	51.9	49.1	50.0	50.3	47.7
26/06/16	Sunday	49.8	50.7	47.1	49.5	50.7	47.1	47.5	48.1	46.3
27/06/16	Monday	50.1	50.8	46.9	50.3	51.1	47.0	46.8	47.5	45.2
28/06/16	Tuesday	61.8	50.2	46.3	62.2	50.4	46.4	47.6	47.9	45.7
29/06/16	Wednesday	56.5	50.8	47.1	56.9	50.9	47.2	47.9	48.7	47.2
30/06/16	Thursday	50.8	50.3	47.1	51.0	50.4	47.0	47.8	48.5	47.0
01/07/16	Friday	53.4	50.5	47.4	53.8	50.8	47.4	46.9	47.7	46.0
02/07/16	Saturday	49.6	50.4	47.7	49.8	50.7	47.8	48.5	49.0	47.5
03/07/16	Sunday	50.0	50.2	47.9	50.3	50.5	47.9	48.0	48.6	46.9
04/07/16	Monday	49.0	49.7	47.1	49.1	49.9	47.2	47.1	47.7	46.2
05/07/16	Tuesday	48.9	50.0	46.9	49.0	50.2	47.0	46.4	47.5	45.6

\* Determined using CRTN shortened measurement procedure

**Table 5: Daily summarised noise levels at Coille Essan, with periods of rainfall removed**

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
22/06/16	Wednesday	-	49.7*	-	-	-	-	46.3	47.3	44.8
23/06/16	Thursday	47.9	49.1	45.5	47.9	49.2	45.5	-	-	-
24/06/16	Friday	-	49.4*	-	-	-	-	-	-	-
25/06/16	Saturday	50.8	51.9	49.1	50.9	52.0	49.1	-	-	-
26/06/16	Sunday	-	50.0*	-	-	-	-	47.5	48.1	46.3
27/06/16	Monday	50.0	50.9	46.9	50.3	51.1	47.0	46.8	47.5	45.2
28/06/16	Tuesday	-	-	-	-	-	-	-	-	-
29/06/16	Wednesday	-	48.9*	-	-	-	-	47.9	48.7	47.2
30/06/16	Thursday	-	50.4*	-	-	-	-	-	-	-
01/07/16	Friday	-	-	-	-	-	-	-	-	-

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
02/07/16	Saturday	-	50.9*	-	-	-	-	48.5	49.0	47.5
03/07/16	Sunday	-	50.2*	-	-	-	-	48.0	48.6	46.9
04/07/16	Monday	-	49.8*	-	-	-	-	-	-	-
05/07/16	Tuesday	-	50.2*	-	-	-	-	-	-	-

\* Determined using CRTN shortened measurement procedure

2.1.13 In addition to long term measurements, a series of short term attended measurements were also undertaken and the results are provided in Table A17.2.6. A Rion NL-52 sound level meter (s/n 00921176) was positioned at a height of 1.5m in free-field conditions adjacent to the long term monitoring equipment. The monitoring equipment was calibrated both before and after the measurement period using an acoustic calibrator, which has itself been calibrated against a reference set traceable to National and International Standards. There was no significant shift in the observed calibration level.

**Table 6: Additional attended noise level measurements at Coille Essan**

Start Date	Start Time (hh:mm)	Duration (hh:mm)	Comments
22/06/16	17:45	00:15	Light winds, 14°C, dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate comprised of distant road traffic noise on the existing A9, running water from a nearby stream, birdsong and wind in vegetation.
23/06/16	10:30	00:15	Light winds, 17°C, 10% cloud cover and dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate comprised of distant road traffic noise on the existing A9, running water from a nearby stream, birdsong and occasional wind in vegetation. Closing of a nearby bin lid at the property at 10:43.
23/06/16	15:00	00:15	Calm, 17°C, 25% cloud cover, dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate was dominated by distant road traffic on the existing A9, birdsong and running water from a nearby stream.

**Measurement Location 5.03 – House of Urrard, Killiecrankie, Pitlochry, PH16 5LN**

- 2.1.14 The measurement location was as shown in Photograph 3. A Rion NL-52 Class 1 sound level meter (s/n 00610201) was positioned at a height of approximately 1.5 m in free-field conditions. The equipment was approximately 20m from the eastern façade of the property and approximately 160m from the existing A9.

**Photograph 3: Noise monitoring equipment at House of Urrard**



- 2.1.15 The monitoring equipment was calibrated both before and after the measurement period using a Rion NC-74 (s/n 34536108) acoustic calibrator, which has itself been calibrated against a reference set traceable to National and International Standards. There was no significant shift in the observed calibration level.
- 2.1.16 The noise climate comprised of predominantly birdsong and A9 traffic. The traffic noise from the A9 was perceived as a hum due to the distance to the road; however, HGVs could occasionally be distinguished. Other noise sources audible included a tractor, distant trains and rustling leaves. It was also noted that there were sheep, peacocks, and dogs present near the property that could have contributed to the noise environment.
- 2.1.17 For the majority of the monitoring period, light wind speeds (up to 1.5ms<sup>-1</sup>) were recorded. Rainfall was recorded occasionally throughout the monitoring period and with the exception of the hourly rainfall recorded on 15 June 2016 (1.9mm at 09:00 and 1.8mm at 19:00); hourly rainfall did not exceed 1.3mm.
- 2.1.18 Table 7 and Table 8 provides the measured daily noise levels at this location with and without the periods of rainfall.

**Table 7: Daily summarised noise levels at House of Urrard, including periods of rainfall**

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Daytime (between 06:00 – 00:00) 18 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
14/06/16	Tuesday	-	53.1*	-	-	-	-	47.8	49.2	49.2
15/06/16	Wednesday	51.4	53.0	45.9	51.8	53.6	46.5	48.6	49.4	39.6

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Daytime (between 06:00 – 00:00) 18 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
16/06/16	Thursday	51.8	53.1	45.2	52.1	53.5	45.8	50.4	51.8	41.7
17/06/16	Friday	54.6	56.5	48.6	54.9	57.1	49.5	49.5	51.7	39.8
18/06/16	Saturday	48.6	49.9	41.8	48.8	50.1	42.5	48.4	48.5	35.3
19/06/16	Sunday	51.5	51.9	44.7	51.9	52.5	45.7	48.8	50.0	39.0
20/06/16	Monday	63.5	52.3	44.5	64.0	52.8	45.4	48.5	48.5	34.8
21/06/16	Tuesday	65.0	50.0	42.1	65.5	50.1	42.7	49.3	48.8	36.4

\* Determined using CRTN shortened measurement procedure

**Table 8: Daily summarised noise levels at House of Urrard, with periods of rainfall removed**

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Daytime (between 06:00 – 00:00) 18 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
14/06/16	Tuesday	-	52.9*	-	-	-	-	-	-	-
15/06/16	Wednesday	-	-	-	-	-	-	-	-	-
16/06/16	Thursday	-	52.2*	-	-	-	-	-	-	-
17/06/16	Friday	-	57.3*	-	-	-	-	49.5	51.7	39.8
18/06/16	Saturday	48.6	49.9	41.8	48.8	50.1	42.5	48.4	48.5	35.3
19/06/16	Sunday	-	52.8*	-	-	-	-	48.7	49.9	38.9
20/06/16	Monday	64.7	52.4	44.6	65.2	52.9	45.4	48.5	48.5	34.8
21/06/16	Tuesday	65.0	50.0	42.1	65.5	50.1	42.7	49.0	48.7	36.4

\* Determined using CRTN shortened measurement procedure

2.1.19 In addition to long term measurements, a series of short term attended measurements were also undertaken and the results are provided in Table 9. A Rion NL-52 sound level meter (s/n 00921176) was positioned at a height of 1.5m in free-field conditions adjacent to the long term monitoring equipment. The monitoring equipment was calibrated both before and after the measurement period using an acoustic calibrator, which has itself been calibrated against a reference set traceable to National and International Standards. There was no significant shift in the observed calibration level.

**Table 9: Additional attended noise level measurements at House of Urrard**

Start Date	Start Time (hh:mm)	Duration (hh:mm)	Comments
16/06/16	16:15	00:15	Low winds, 15°C, dry but moisture from earlier rainfall present. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate primarily dominated by road traffic noise, but when traffic flow is low, bird song is the dominant noise source. Distant train pass by at 16:19
17/06/16	10:00	00:15	Breezy, 100% cloud cover, dry. Ground wet due to previous rainfall. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate dominated by road traffic noise, birdsong and wind in vegetation.
20/06/16	13:15	00:15	Breezy, 13°C, 100% cloud cover, dry but ground wet due to previous rainfall. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate dominated by road traffic noise, birdsong and wind in vegetation.
21/06/16	18:30	00:15	Light winds with breezy bursts, 13°C, 80% cloud cover, dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate dominated by road traffic noise and birdsong. During gusts, wind in vegetation is audible. Train pass by and horn at 18:38 and occasional animal noises between 18:40 and 18:44.

**Measurement Location R5.04 – 2 Essengal Cottages, Killiecrankie, Pitlochry, PH16 5LT**

2.1.20 The measurement location was as shown in Photograph 4. A Rion NL-52 Class 1 sound level meter (s/n 00610201) was positioned at a height of approximately 1.5 m in façade conditions. The equipment was 1m from the south-western façade of the property. The equipment was approximately 20m from the existing A9 and 5m from the B8079.

**Photograph 4: Noise monitoring equipment at 2 Essengal Cottages**



- 2.1.21 The monitoring equipment was calibrated both before and after the measurement period using a Rion NC-74 (s/n 34536108) acoustic calibrator, which has itself been calibrated against a reference set traceable to National and International Standards. There was no significant shift in the observed calibration level.
- 2.1.22 The noise climate was dominated by road traffic from the A9 and B8079. Although traffic on the B8079 is intermittent, when vehicles pass they dominate over the road traffic noise from the A9. Other noise sources noted were passing trains from the nearby railway line, the nearby River Garry, leaves rustling and birdsong.
- 2.1.23 Hourly wind speeds ranged between 0.1ms<sup>-1</sup> and 2.3ms<sup>-1</sup> throughout the monitoring period. Low levels of precipitation were recorded throughout the monitoring period. Peak levels of hourly rainfall were recorded on 24 June between 03:00 and 04:00 (1.7mm - 2.6mm of rainfall) and 25 June 2016 at 02:00 (3.0mm of rainfall).
- 2.1.24 Table 10 and Table 11 provides the measured daily noise levels at this location, with and without the periods of rainfall.

**Table 10: Daily summarised noise levels at Essengal Cottages, including periods of rainfall**

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
22/06/16	Wednesday	-	69.5*	-	-	-	-	57.0	58.8	46.5
23/06/16	Thursday	64.9	67.0	49.4	65.0	67.6	49.7	59.7	59.1	46.3

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
24/06/16	Friday	65.0	67.2	51.0	65.2	67.8	51.5	60.0	58.4	47.4
25/06/16	Saturday	64.8	66.6	50.4	64.9	67.4	50.9	59.3	56.4	46.5
26/06/16	Sunday	63.5	65.2	50.8	63.6	66.1	51.3	60.4	59.3	47.1
27/06/16	Monday	66.9	67.4	53.3	67.3	68.1	53.9	57.4	58.6	45.6
28/06/16	Tuesday	67.2	67.2	48.9	67.6	68.0	49.3	58.1	58.7	46.1
29/06/16	Wednesday	67.2	67.1	49.7	67.6	67.8	50.0	58.5	59.4	47.1
30/06/16	Thursday	67.3	67.2	51.2	67.7	68.0	51.7	59.6	59.6	46.7
01/07/16	Friday	68.0	67.9	52.9	68.4	68.6	53.6	58.5	57.8	46.5
02/07/16	Saturday	67.7	66.9	52.5	68.1	67.8	53.2	57.7	56.2	47.1
03/07/16	Sunday	67.3	66.6	53.4	67.7	67.5	54.2	59.2	59.1	46.3
04/07/16	Monday	67.3	67.3	49.3	-	-	-	-	-	-

\* Determined using CRTN shortened measurement procedure

**Table 11: Daily summarised noise levels at Essengal Cottages, with periods of rainfall removed**

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
22/06/16	Wednesday	-	69.5*	-	-	-	-	57.2	58.6	46.4
23/06/16	Thursday	64.9	67.0	49.4	65.0	67.7	49.8	-	-	-
24/06/16	Friday	-	68.9*	-	-	-	-	-	-	-
25/06/16	Saturday	64.8	66.6	50.5	64.9	67.4	50.9	-	-	-
26/06/16	Sunday	-	67.1*	-	-	-	-	60.4	59.3	47.1
27/06/16	Monday	67.0	67.4	53.3	67.4	68.1	54.0	57.4	58.6	45.6
28/06/16	Tuesday	-	-	-	-	-	-	-	-	-
29/06/16	Wednesday	-	68.6*	-	-	-	-	58.5	59.4	47.1
30/06/16	Thursday	-	69.1*	-	-	-	-	-	-	-
01/07/16	Friday	-	-	-	-	-	-	-	-	-
02/07/16	Saturday	-	70.2*	-	-	-	-	57.7	56.2	47.1
03/07/16	Sunday	-	69.1*	-	-	-	-	59.2	59.1	46.3
04/07/16	Monday	-	69.7*	-	-	-	-	-	-	-

\* Determined using CRTN shortened measurement procedure

2.1.25

In addition to long term measurements, a series of short term attended measurements were also undertaken and the results are provided in Table 12. A Rion NL-52 sound level meter (s/n 00921176) was positioned at a height of 1.5m in façade conditions adjacent to the long term monitoring equipment. The monitoring equipment was calibrated both before and after the measurement period using an acoustic calibrator, which has itself been calibrated against a reference set traceable to National and International Standards. There was no significant shift in the observed calibration level.

**Table 12: Additional attended noise level measurements at Essengal Cottages**

Start Date	Start Time (hh:mm)	Duration (hh:mm)	Comments
23/06/16	11:00	00:15	Little wind, 17°C, 25% cloud cover, dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate was dominated by the road traffic on the existing A9 and nearby B8079, running water from a nearby river, frequent birdsong and occasional wind in vegetation. Motorbike on A9 at 11:06.

Start Date	Start Time (hh:mm)	Duration (hh:mm)	Comments
23/06/16	14:30	00:15	Light wind, 17°C, 40% cloud cover, dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate was dominated by the road traffic on the existing A9 and less frequently on the nearby B8079. Additionally, running water from a nearby river and frequent birdsong contributed to the noise climate. Digger on major road at 12:34. Scooter on B8079 at 12:36. Residents were undertaking gardening tasks during monitoring period (e.g. grass cutting and hedge cutting).

**Measurement Location R5.05 –The Bothy, Garrybank, Blair Atholl, PH18 5TN**

2.1.26 The measurement location was as shown in Photograph 5. A Rion NL-52 Class 1 sound level meter (s/n 00610194) was positioned at a height of approximately 1.5 m in free-field conditions. The equipment was approximately 13m from the north-western façade of Garrybank and approximately 25m from the existing A9.

**Photograph 5: Noise monitoring equipment at Garrybank/The Bothy**



2.1.27 The monitoring equipment was calibrated both before and after the measurement period using a RION NC-74 (s/n 34536108) acoustic calibrator, which has itself been calibrated against a reference set traceable to National and International Standards. There was no significant shift in the observed calibration level.

2.1.28 The noise climate was dominated by traffic on the existing A9. Traffic could be seen through the foliage and individual vehicle contribution could be distinguished. It was noted that the road surface was uneven causing an increase in road traffic noise when lorries and HGVs passed. Other noise sources noted were birdsong, leaves rustling and a nearby stream.

2.1.29 For the majority of the monitoring period, light wind speeds (up to 1.5ms<sup>-1</sup>) were recorded. Rainfall was recorded occasionally throughout the monitoring period and with the exception of the hourly rainfall recorded on 15 June 2016 (1.9mm at 09:00 and 1.8mm at 19:00); hourly rainfall did not exceed 1.3mm.

2.1.30 Table 13 and 14 provides the measured daily noise levels at this location, with and without the periods of rainfall.

**Table 13: Daily summarised noise levels at The Bothy, including periods of rainfall**

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
14/06/16	Tuesday	-	-	-	-	-	-	54.3	56.8	56.8
15/06/16	Wednesday	58.6	62.1	50.2	58.9	62.5	50.5	54.7	57.5	47.9
16/06/16	Thursday	58.6	61.7	49.6	58.9	62.0	49.8	54.4	57.2	47.5
17/06/16	Friday	59.4	62.4	51.4	59.7	62.8	51.8	53.6	56.9	46.9
18/06/16	Saturday	56.9	60.1	49.2	57.1	60.5	49.4	51.9	54.8	46.2
19/06/16	Sunday	58.1	60.7	50.6	58.4	61.3	51.0	54.1	56.5	47.9
20/06/16	Monday	58.3	61.4	49.9	58.5	61.8	50.2	53.5	56.1	46.8
21/06/16	Tuesday	64.2	61.3	48.6	64.7	61.7	48.8	55.0	56.5	46.9
22/06/16	Wednesday	-	61.1*	-	-	-	-	-	-	-

\* Determined using CRTN shortened measurement procedure

**Table 14: Daily summarised noise levels at The Bothy, with periods of rainfall removed**

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
14/06/16	Tuesday	-	-	-	-	-	-	-	-	-
15/06/16	Wednesday	-	-	-	-	-	-	-	-	-
16/06/16	Thursday	-	61.2*	-	-	-	-	-	-	-
17/06/16	Friday	-	62.7*	-	-	-	-	53.6	56.9	46.9
18/06/16	Saturday	56.9	60.1	49.2	57.1	60.5	49.4	51.9	54.8	46.2
19/06/16	Sunday	-	61.0*	-	-	-	-	54.1	56.4	47.9
20/06/16	Monday	58.3	61.4	50.0	58.5	61.8	50.2	53.5	56.1	46.8
21/06/16	Tuesday	64.2	61.3	48.6	64.7	61.7	48.8	55.1	56.6	47.0
22/06/16	Wednesday	-	61.2*	-	-	-	-	-	-	-

\* Determined using CRTN shortened measurement procedure

2.1.31

In addition to long term measurements, a series of short term attended measurements were also undertaken and the results are provided in Table 15. A Rion NL-52 sound level meter (s/n 00921176) was positioned at a height of 1.5m in free-field conditions adjacent to the long term monitoring equipment. The monitoring equipment was calibrated both before and after the measurement period using an acoustic calibrator, which has itself been calibrated against a reference set traceable to National and International Standards. There was no significant shift in the observed calibration level.

**Table 15: Additional attended noise level measurements at The Bothy**

Start Date	Start Time (hh:mm)	Duration (hh:mm)	Comments
16/06/16	18:30	00:15	Low winds with occasional gusts, 12°C, dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate dominated by road traffic on the A9. Noise from nearby birdsong and running water from the River Garry and wind in vegetation are also audible.
20/06/16	18:45	00:15	Slight breeze, 14°C, 30% cloud cover and dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate dominated by road traffic on the existing A9. Birdsong, wind in vegetation and running water from the River Garry was also audible.

Start Date	Start Time (hh:mm)	Duration (hh:mm)	Comments
21/06/16	14:00	00:15	Light breeze, 14°C, 85% cloud cover and dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate dominated by road traffic noise on the existing A9. Birdsong, occasional wind in vegetation and running water at the River Gary was also audible. A trailer of a vehicle passed at 14:00, a HGV with a heavy load passed at 14:12 and a vehicle trailer passed at 14:13.

**Measurement Location R5.06 – 2 Woodend, Blair Atholl, Pitlochry, PH18 5TN**

2.1.32 The measurement location was as shown in Photograph 6. A Rion NL-52 Class 1 sound level meter (s/n 00620872) was positioned at a height of approximately 1.5 m in free-field conditions. The equipment was approximately 4m from the southern façade of the property, approximately 230m from the existing A9 and 35m from the B8079.

**Photograph 6: Noise monitoring equipment at Woodend**



2.1.33 The monitoring equipment was calibrated both before and after the measurement period using a RION NC-74 (s/n 34536108) acoustic calibrator, which has itself been calibrated against a reference set traceable to National and International Standards. There was no significant shift in the observed calibration level.

2.1.34 The noise climate comprised of birdsong, A9 traffic, passing trains, leaves rustling and B8079 traffic. A9 traffic was a continuous background hum, whilst less frequent movements on the B8079 and the railroad would dominate when vehicles passed. During lulls in traffic on the B8079 and the railroad, birdsong would dominate. Other minor noise sources included leaves rustling and distant motorcycles.

2.1.35 For the majority of the monitoring period, light wind speeds (up to 1.5ms<sup>-1</sup>) were recorded. Rainfall was recorded occasionally throughout the monitoring period and with the exception of the hourly rainfall recorded on 15 June 2016 (1.9mm at 09:00 and 1.8mm at 19:00); hourly rainfall did not exceed 1.3mm.

2.1.36 Table 16 and Table 17 provides the measured daily noise levels at this location, with and without the periods of rainfall.

**Table 16: Daily summarised noise levels at Woodend, including periods of rainfall**

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
14/06/16	Tuesday	-	56.5*	-	-	-	-	50.4	50.2	37.9
15/06/16	Wednesday	56.7	56.8	45.9	56.7	57.4	46.6	51.4	48.6	38.2
16/06/16	Thursday	57.7	56.0	44.0	57.7	56.4	44.5	50.9	47.7	37.5
17/06/16	Friday	54.9	53.7	44.9	54.9	54.1	45.6	47.0	48.3	36.1
18/06/16	Saturday	55.1	52.3	41.7	55.1	52.7	42.2	46.3	45.6	32.8
19/06/16	Sunday	54.3	53.3	42.8	54.3	53.9	43.9	51.3	47.4	37.2
20/06/16	Monday	55.7	54.1	45.8	55.7	54.6	46.5	-	-	34.3
21/06/16	Tuesday	-	-	-	-	-	-	48.1	47.7	34.4
22/06/16	Wednesday	-	55.2*	-	-	-	-	-	0.0	0.0

\* Determined using CRTN shortened measurement procedure

**Table 17: Daily summarised noise levels at Woodend, with periods of rainfall removed**

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
14/06/16	Tuesday	-	56.3*	-	-	-	-	-	-	-
15/06/16	Wednesday	-	-	-	-	-	-	-	-	-
16/06/16	Thursday	-	56.1*	-	-	-	-	-	-	-
17/06/16	Friday	-	53.2*	-	-	-	-	47.0	48.3	36.1
18/06/16	Saturday	55.1	52.3	41.7	55.4	52.7	42.2	46.3	45.6	32.8
19/06/16	Sunday	-	53.1*	-	-	-	-	51.3	47.3	37.0
20/06/16	Monday	56.2	54.1	45.7	56.5	54.6	46.5	-	-	-
21/06/16	Tuesday	-	-	-	-	-	-	49.0	48.7	34.5
22/06/16	Wednesday	-	-	-	-	-	-	-	-	-

\* Determined using CRTN shortened measurement procedure

2.1.37

In addition to long term measurements, a series of short term attended measurements were also undertaken and the results are provided in Table 18. A Rion NL-52 sound level meter (s/n 00921176) was positioned at a height of 1.5m in free field conditions adjacent to the long term monitoring equipment. The monitoring equipment was calibrated both before and after the measurement period using an acoustic calibrator, which has itself been calibrated against a reference set traceable to National and International Standards. There was no significant shift in the observed calibration level.

**Table 18: Additional attended noise level measurements at Woodend**

Start Date	Start Time (hh:mm)	Duration (hh:mm)	Comments
16/06/16	17:00	00:15	Low winds, 15°C, dry but moisture present on nearby roads. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate is dominated by road traffic noise from a nearby minor road or the A9 in the distance. When no traffic is present, birdsong is the dominant noise source. Train pass by at 17:03.
20/06/16	14:00	00:15	Breezy, 16°C, 90% cloud cover and dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate dominated by road traffic noise on the existing A9 and minor roads. Traffic on A9 is audible in the distance. During periods of low traffic counts on minor road, bird song and wind in vegetation becomes the dominant noise source. A tractor and motor cycle passed at 13:55 and laughing was audible at 14:12.

Start Date	Start Time (hh:mm)	Duration (hh:mm)	Comments
21/06/16	18:00	00:15	Breezy, 13°C, 90% cloud cover, dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate dominated by road traffic noise from A9 in the distance. Birdsong and wind in vegetation also contribute to the noise climate, particularly when traffic flow is low.

**Measurement Location R5.07 – Tomban Farmhouse, Calvine, Pitlochry, PH18 5UD**

2.1.38 The measurement location was as shown in Photograph 7. A Rion NL-52 Class 1 sound level meter (s/n 00610212) was positioned at a height of approximately 1.5 m in façade conditions. The equipment was 1m from the northern façade of the property and approximately 190m from the existing A9.

**Photograph 7: Noise monitoring equipment at Tomban Farmhouse**



2.1.39 The monitoring equipment was calibrated both before and after the measurement period using a Rion NC-74 (s/n 34536108) acoustic calibrator, which has itself been calibrated against a reference set traceable to National and International Standards. There was no significant shift in the observed calibration level.

2.1.40 The noise climate was dominated by traffic on the existing A9. The property was elevated and allowed for some views of the vehicles through the foliage. Other noise sources included birdsong, sheep, trains passing in the distance and leaves rustling.

2.1.41 For the majority of the monitoring period, light wind speeds (up to 1.5ms<sup>-1</sup>) were recorded. Rainfall was recorded occasionally throughout the monitoring period and with the exception of the hourly rainfall recorded on 15 June 2016 (1.9mm at 09:00 and 1.8mm at 19:00); hourly rainfall did not exceed 1.3mm.

2.1.42 Table 19 and Table 20 provides the measured daily noise levels at this location, with and without the periods of rainfall.

**Table 19: Daily summarised noise levels at Tomban Farmhouse, including periods of rainfall**

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
14/06/16	Tuesday	-	-	-	-	-	-	53.6	57.0	38.7
15/06/16	Wednesday	59.1	62.3	49.3	59.4	62.6	50.0	54.2	58.0	42.8
16/06/16	Thursday	60.0	63.0	50.2	60.3	63.6	51.1	53.9	57.6	41.5
17/06/16	Friday	60.5	63.4	51.1	60.9	63.8	51.9	53.3	57.3	41.2
18/06/16	Saturday	53.7	56.5	44.7	53.8	56.6	45.2	49.1	52.5	37.2
19/06/16	Sunday	54.6	57.4	46.1	55.0	58.0	47.1	53.6	56.6	42.4
20/06/16	Monday	58.5	61.9	47.4	58.8	62.3	48.0	52.0	55.8	38.3
21/06/16	Tuesday	64.4	54.1	42.0	64.9	53.9	42.1	49.0	52.3	37.2

**Table 20: Daily summarised noise levels at Tomban Farmhouse, with periods of rainfall removed**

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
14/06/16	Tuesday	-	-	-	-	-	-	-	-	-
15/06/16	Wednesday	-	-	-	-	-	-	-	-	-
16/06/16	Thursday	-	63.6*	-	-	-	-	-	-	-
17/06/16	Friday	-	64.5*	-	-	-	-	53.3	57.3	41.2
18/06/16	Saturday	53.7	56.5	44.7	53.8	56.6	45.2	49.1	52.5	37.2
19/06/16	Sunday	-	58.5*	-	-	-	-	53.2	56.5	42.3
20/06/16	Monday	58.7	62.0	47.6	58.9	62.4	48.1	52.0	55.8	38.3
21/06/16	Tuesday	64.4	54.1	42.0	64.9	53.9	42.1	49.2	52.6	37.4

\* Determined using CRTN shortened measurement procedure

2.1.43 In addition to long term measurements, a series of short term attended measurements were also undertaken and the results are provided in Table 21. A Rion NL-52 sound level meter (s/n 00921176) was positioned at a height of 1.5m in free-field conditions adjacent to the long term monitoring equipment. The monitoring equipment was calibrated both before and after the measurement period using an acoustic calibrator, which has itself been calibrated against a reference set traceable to National and International Standards. There was no significant shift in the observed calibration level.

**Table 21: Additional attended noise level measurements at Tomban Farmhouse**

Start Date	Start Time (hh:mm)	Duration (hh:mm)	Comments
16/06/16	19:00	00:15	Light breeze, 11°C, dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate dominated by road traffic on existing A9. Occasional birdsong, sheep and wind in vegetation was audible during monitoring period.
20/06/16	19:15	00:15	Slight breeze, 14°C 15% cloud cover, dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate dominated by road traffic on the existing A9, birdsong and wind in vegetation. Noise from nearby sheep at 19:15. HGV passed with distinct noise at 19:18. Bird feeder hitting steel post at 19:23. Horn from vehicle on A9 at 19:26.
21/06/16	17:30	00:15	Breezy, 95% cloud cover, 14°C, dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate dominated by road traffic noise, wind in vegetation and birdsong. Stronger winds noted at 17:40.

**Measurement Location R5.08 – Old Reading Room, Pitagowan, Blair Atholl, PH18 5TW**

2.1.44 The measurement location was as shown in Photograph 8. A Rion NL-52 Class 1 sound level meter (s/n 01143556) was positioned at a height of approximately 1.5 m in free-field conditions. The equipment was 18m from the southern façade of the property, approximately 30m from the existing A9 and 5m from B847.

**Photograph 8: Noise monitoring equipment at Old Reading Room**



2.1.45 The monitoring equipment was calibrated both before and after the measurement period using a Rion NC-74 (s/n 34536108) acoustic calibrator, which has itself been calibrated against a reference set traceable to National and International Standards. There was no significant shift in the observed calibration level.

2.1.46 The noise climate was dominated by road traffic off of the A9 and B847. Though traffic on B847 is intermittent, when vehicles pass they dominate over the A9. Vehicles on both roads are clearly visible and individual noise contributions can be distinguished. Other noise sources were birdsong, people talking, motorcycles, and leaves rustling.

2.1.47 Hourly wind speeds ranged between 0.1ms<sup>-1</sup> and 2.3ms<sup>-1</sup> and 1.9ms<sup>-1</sup> throughout the monitoring period. Low levels of precipitation were recorded throughout the monitoring period. Peak levels of hourly rainfall were recorded on 24 June between 03:00 and 04:00 (1.7mm - 2.6mm of rainfall) and 25 June 2016 at 02:00 (3.0mm of rainfall).

2.1.48 Table 22 and Table 23 provides the measured daily noise levels at this location, with and without the periods of rainfall.

**Table 22: Daily summarised noise levels at Old Reading Room, including periods of rainfall**

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
22/06/16	Wednesday	-	-	-	-	-	-	57.3	60.3	35.6
23/06/16	Thursday	62.9	65.9	45.5	63.2	66.2	46.4	58.0	61.1	37.3

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
24/06/16	Friday	62.9	65.8	46.8	63.2	66.1	48.2	56.5	60.2	35.8
25/06/16	Saturday	61.5	64.3	45.2	61.8	64.6	46.2	54.8	56.3	32.3
26/06/16	Sunday	62.1	64.6	46.2	62.5	65.2	47.8	57.6	59.8	34.6
27/06/16	Monday	64.4	66.8	48.9	64.7	67.3	50.1	57.1	60.1	33.4
28/06/16	Tuesday	63.1	66.2	45.6	63.4	66.7	46.8	57.6	60.0	34.4
29/06/16	Wednesday	62.7	65.9	45.1	62.9	66.3	46.0	57.5	60.7	35.0
30/06/16	Thursday	63.8	66.6	46.9	64.1	67.0	48.0	57.7	60.9	36.8
01/07/16	Friday	64.0	66.5	49.1	64.3	66.9	50.6	55.9	59.2	33.5
02/07/16	Saturday	62.6	65.1	47.8	63.0	65.6	49.0	54.5	58.2	33.9
03/07/16	Sunday	63.4	65.7	48.3	63.8	66.4	50.2	56.3	59.8	32.6

**Table 23: Daily summarised noise levels at Old Reading Room, with periods of rainfall removed**

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
22/06/16	Wednesday	-	-	-	-	-	-	57.2	59.9	35.2
23/06/16	Thursday	62.9	65.9	45.4	63.2	66.3	46.3	-	-	-
24/06/16	Friday	-	65.6*	-	-	-	-	-	-	-
25/06/16	Saturday	61.6	64.4	45.3	61.9	64.7	46.3	-	-	-
26/06/16	Sunday	-	64.5*	-	-	-	-	57.6	59.8	34.6
27/06/16	Monday	64.5	66.8	49.0	64.8	67.3	50.3	57.1	60.1	33.4
28/06/16	Tuesday	-	-	-	-	-	-	-	-	-
29/06/16	Wednesday	-	66.0*	-	-	-	-	57.5	60.7	35.0
30/06/16	Thursday	-	67.2*	-	-	-	-	-	-	-
01/07/16	Friday	-	-	-	-	-	-	-	-	-
02/07/16	Saturday	-	66.3*	-	-	-	-	54.5	58.2	33.9
03/07/16	Sunday	-	66.7*	-	-	-	-	57.1	59.8	32.4

\* Determined using CRTN shortened measurement procedure

2.1.49 In addition to long term measurements, a series of short term attended measurements were also undertaken and the results are provided in Table 24. A Rion NL-52 sound level meter (s/n 00921176) was positioned at a height of 1.5m in free field conditions adjacent to the long term monitoring equipment. The monitoring equipment was calibrated both before and after the measurement period using an acoustic calibrator, which has itself been calibrated against a reference set traceable to National and International Standards. There was no significant shift in the observed calibration level.

**Table 24: Additional attended noise level measurements at Old Reading Cottage**

Start Date	Start Time (hh:mm)	Duration (hh:mm)	Comments
23/06/16	11:45	00:15	Calm, 17°C, 30% cloud cover, dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate dominated by road traffic on the existing A9 and less frequently on the nearby B847. Noise from constant birdsong and wind in vegetation during light gusts also contribute to the noise climate.
23/06/16	18:30	00:15	Calm, 14°C, 80% cloud cover, dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate dominated by road traffic on the existing A9 and less frequently on the nearby B847. Constant birdsong also contributes to the noise climate. Three

Start Date	Start Time (hh:mm)	Duration (hh:mm)	Comments
			motorbikes at 18:30. Talking at 18:38.

**Measurement Location R5.09 – Tigh Sona, Calvine, Pitlochry, PH18 5UA**

2.1.50 The measurement location was as shown in Photograph 9. A Rion NL-52 Class 1 sound level meter (s/n 01143556) was positioned at a height of approximately 1.5 m in free-field conditions. The equipment was approximately 35m from the northern façade of the property. The equipment was approximately 65m from the existing A9.

**Photograph 9: Noise monitoring equipment at Tigh Sona**



2.1.51 The monitoring equipment was calibrated both before and after the measurement period using a Rion NC-74 (s/n 34536108) acoustic calibrator, which has itself been calibrated against a reference set traceable to National and International Standards. There was no significant shift in the observed calibration level.

2.1.52 The noise climate was dominated by traffic on the existing A9. Traffic could clearly be seen and individual vehicle contribution could be distinguished, especially for HGVs. Other noise sources noted were birdsong, leaves rustling, and a nearby stream.

2.1.53 For the majority of the monitoring period, light wind speeds (up to 1.5ms<sup>-1</sup>) were recorded. Rainfall was recorded occasionally throughout the monitoring period and with the exception of the hourly rainfall recorded on 15 June 2016 (1.9mm at 09:00 and 1.8mm at 19:00); hourly rainfall did not exceed 1.3mm.

2.1.54 Table 25 and Table 26 provides the measured daily noise levels at this location, with and without the periods of rainfall.

**Table 25: Daily summarised noise levels at Tigh Sona, including periods of rainfall**

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
14/06/16	Tuesday	-	56.7*	-	-	-	-	49.4	52.2	38.6
15/06/16	Wednesday	-	57.5*	-	-	-	-	-	-	-
16/06/16	Thursday	-	57.9*	-	-	-	-	50.1	53.0	40.0
17/06/16	Friday	55.1	57.5	46.7	55.1	57.9	47.5	48.8	52.0	38.7
18/06/16	Saturday	51.8	54.5	43.0	51.8	54.8	43.5	47.1	50.2	36.1
19/06/16	Sunday	53.9	56.1	45.0	53.9	56.7	45.8	49.6	51.9	42.2
20/06/16	Monday	52.9	55.3	44.4	52.9	55.7	44.9	49.1	51.1	37.3
21/06/16	Tuesday	67.3	55.3	42.9	67.3	55.6	43.4	48.6	51.6	37.6
22/06/16	Wednesday	-	54.5*	-	-	-	-	-	-	-

\* Determined using CRTN shortened measurement procedure

**Table 26: Daily summarised noise levels at Tigh Sona, with periods of rainfall removed**

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
14/06/16	Tuesday	-	56.6*	-	-	-	-	-	-	-
15/06/16	Wednesday	-	-	-	-	-	-	-	-	-
16/06/16	Thursday	-	57.9*	-	-	-	-	-	-	-
17/06/16	Friday	-	58.9*	-	-	-	-	48.8	52.0	38.7
18/06/16	Saturday	51.8	54.5	43.0	52.1	54.8	43.5	47.1	50.2	36.1
19/06/16	Sunday	-	56.2*	-	-	-	-	49.5	51.8	42.1
20/06/16	Monday	53.1	55.3	44.4	53.3	55.7	45.0	49.1	51.1	37.3
21/06/16	Tuesday	67.3	55.3	42.9	67.7	55.6	43.4	49.0	52.0	37.6
22/06/16	Wednesday	-	53.6*	-	-	-	-	-	-	-

\* Determined using CRTN shortened measurement procedure

2.1.55

In addition to long term measurements, a series of short term attended measurements were also undertaken and the results are provided in Table 27. A Rion NL-52 sound level meter (s/n 00921176) was positioned at a height of 1.5m in free-field conditions adjacent to the long term monitoring equipment. The monitoring equipment was calibrated both before and after the measurement period using an acoustic calibrator, which has itself been calibrated against a reference set traceable to National and International Standards. There was no significant shift in the observed calibration level.

**Table 27: Additional attended noise level measurements at Tigh Sona**

Start Date	Start Time (hh:mm)	Duration (hh:mm)	Comments
16/06/16	17:45	00:15	Moderate winds with stronger gusts, 13°C and occasional light rainfall. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate dominated by road traffic noise, primarily from the A9, where HGVs were particularly audible. Birdsong and wind in vegetation is also audible.
17/06/16	11:00	00:15	Slight breeze, 11°C, 100% cloud cover, dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate comprises of road traffic noise, occasional birdsong, occasional wind in vegetation and running water from a nearby stream.

Start Date	Start Time (hh:mm)	Duration (hh:mm)	Comments
20/06/16	15:00	00:15	Breezy, 14°C, 60% cloud cover and dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate comprises mainly of road traffic noise from the existing A9, occasional wind in vegetation and occasional birdsong. A high number of HGVs were noted on the A9 during monitoring period.
21/06/16	13:30	00:15	Light breeze, 11°C, 100% cloud cover, primarily dry but light rainfall occurred near the end of the monitoring period. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate dominated by road traffic noise on the existing A9, occasional wind in vegetation and occasional birdsong. Slightly heavier rainfall between 13:36 -13:39. Coughing at 13:33 occurred and flapping curtain of a HGV was audible at 13:41.

**Measurement Location R5.10 – Clunes Cottage, Calvine, Pitlochry, PH18 5UN**

2.1.56 The measurement location was as shown in Photograph. A Rion NL-52 Class 1 sound level meter (s/n 00610194) was positioned at a height of approximately 1.5 m in free-field conditions. The equipment was 5m from the north-eastern façade of the property and approximately 65m from the existing A9.

**Photograph 10: Noise Monitoring Equipment at Clunes Cottage**



2.1.57 The monitoring equipment was calibrated both before and after the measurement period using a Rion NC-74 (s/n 34536108) acoustic calibrator, which has itself been calibrated against a reference set traceable to National and International Standards. There was no significant shift in the observed calibration level.

2.1.58 The noise climate was dominated by the existing A9 traffic noise which was perceived as a constant hum. From the monitoring location, the existing A9 was not visible due to intervening terrain. Other noise sources were birdsong, dogs barking, cars driving near the property, wood chopping, jet plane and leaves rustling.

2.1.59 For the majority of the monitoring period, light wind speeds (up to 1.8ms<sup>-1</sup>) were recorded. Wind speeds ranged between 1.1ms<sup>-1</sup> and 1.8ms<sup>-1</sup> throughout the monitoring period. Rainfall occurred occasionally throughout the monitoring period, but with the exception of the hourly rainfall recorded on

24 June 2016 (2.6mm recorded between 03:00 and 04:00; 1.7mm recorded between 04:00 and 05:00) and 25 June 2016 (3.0mm recorded between 02:00 and 03:00); hourly rainfall did not exceed 1.0mm.

2.1.60 Table 28 and Table 29 provides the measured daily noise levels at this location, with and without the periods of rainfall.

**Table 28: Daily summarised noise levels at Clunes Cottage, including periods of rainfall**

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
22/06/16	Wednesday	-	-	-	-	-	-	43.1	45.0	45.0
23/06/16	Thursday	55.8	46.7	38.6	56.3	46.8	38.8	42.9	45.0	36.6
24/06/16	Friday	49.7	48.3	39.7	50.1	48.8	40.0	43.3	44.0	36.5
25/06/16	Saturday	49.3	50.1	40.9	49.7	50.6	41.4	45.7	42.5	35.0
26/06/16	Sunday	49.4	49.9	40.6	49.8	50.4	41.2	41.9	44.4	35.1

**Table 29: Daily summarised noise levels at Clunes Cottage, with periods of rainfall removed**

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
22/06/16	Wednesday	-	-	-	-	-	-	42.9	44.8	44.8
23/06/16	Thursday	55.7	46.5	38.6	56.2	46.7	38.8	-	-	-
24/06/16	Friday	-	49.6*	-	-	-	-	-	-	-
25/06/16	Saturday	49.4	50.2	41.1	49.7	50.8	41.6	-	-	-
26/06/16	Sunday	-	47.0*	-	-	-	-	41.9	44.4	35.1

\* Determined using CRTN shortened measurement procedure

2.1.61 In addition to long term measurements, a series of short term attended measurements were also undertaken and the results are provided in Table 30. A Rion NL-52 sound level meter (s/n 00921176) was positioned at a height of 1.5m in free field conditions adjacent to the long term monitoring equipment. The monitoring equipment was calibrated both before and after the measurement period using an acoustic calibrator, which has itself been calibrated against a reference set traceable to National and International Standards. There was no significant shift in the observed calibration level.

**Table 30: Additional attended noise level measurements at Clunes Cottage**

Start Date	Start Time (hh:mm)	Duration (hh:mm)	Comments
23/06/16	12:15	00:15	Little wind, 17°C, 40% cloud cover, dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate comprised of distant traffic on the existing A9, constant birdsong and running water from a river in the distance. Additionally, the owner of Clunes Cottage was chopping during the monitoring period. Dogs (combination of 3-4 dogs) barking at 12:15. Low flying test fighter passing overhead at 12:27. Due to the high noise levels of the test fighter plane, these noise levels were removed.
23/06/16	19:00	00:15	Calm, 14°C, 90% cloud cover, dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate comprised of distant traffic on the existing A9, constant birdsong and running water from a river in the distance. Opening and closing of a nearby boat at 19:01 and 19:02. Boiler turned on at 19:04. Owner drove past sound level meter in vehicle at 19:07.

**Measurement Location R5.11 – Dalreoch Cottage, Calvine, Pitlochry, PH18 5UL**

2.1.62 The measurement location was as shown in Photograph 11. A Rion NL-52 Class 1 sound level meter (s/n 00620872) was positioned at a height of approximately 1.5 m in free-field conditions. The equipment was 6m from the eastern façade of the property and approximately 67m from the existing A9.

**Photograph 11: Noise monitoring equipment at Dalreoch Cottage**



2.1.63 The monitoring equipment was calibrated both before and after the measurement period using a Rion NC-74 (s/n 34536108) acoustic calibrator, which has itself been calibrated against a reference set traceable to National and International Standards. There was no significant shift in the observed calibration level.

2.1.64 The noise climate was dominated by the existing A9 traffic noise which was partially visible from the property. Other noise sources were birdsong, trains, sheep and leaves rustling.

2.1.65 Hourly wind speeds ranged between 1.1 ms<sup>-1</sup> and 2.3ms<sup>-1</sup> throughout the monitoring period. Low levels of precipitation were recorded throughout the monitoring period. Peak levels of hourly rainfall were recorded on 24 June between 03:00 and 04:00 (1.7mm - 2.6mm of rainfall) and 25 June 2016 at 02:00 (3.0mm of rainfall).

2.1.66 Table 31 and Table 32 provides the measured daily noise levels at this location, with and without the periods of rainfall.

**Table 31: Daily summarised noise levels at Dalreoch Cottage, including periods of rainfall**

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
22/06/16	Wednesday	-	-	-	-	-	-	49.1	51.0	51.0
23/06/16	Thursday	53.7	51.2	40.8	53.9	50.9	41.0	46.4	49.5	49.5
24/06/16	Friday	49.7	51.2	40.9	50.0	51.6	41.3	45.1	47.1	47.1
25/06/16	Saturday	47.8	50.0	40.2	47.9	50.0	40.7	42.0	44.8	44.8

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
26/06/16	Sunday	46.2	47.6	39.9	46.6	47.9	40.3	43.7	45.9	45.9
27/06/16	Monday	48.6	49.6	43.7	48.9	50.1	44.3	44.4	45.3	45.3
28/06/16	Tuesday	50.9	53.5	41.9	51.2	53.7	42.4	45.9	49.5	49.5
29/06/16	Wednesday	47.8	49.3	40.4	48.0	49.4	40.8	43.7	46.8	46.8
30/06/16	Thursday	54.2	49.1	41.1	54.6	49.0	41.3	45.2	47.8	47.8
01/07/16	Friday	46.4	47.7	40.8	46.5	47.9	41.1	43.7	46.3	46.3
02/07/16	Saturday	46.8	48.5	41.5	46.8	48.6	41.8	43.1	44.4	44.4
03/07/16	Sunday	48.8	47.9	42.9	49.1	48.5	43.4	42.0	44.2	44.2
04/07/16	Monday	48.0	48.8	39.3	48.3	49.1	39.7	42.6	45.8	45.8
05/07/16	Tuesday	46.2	48.5	39.0	46.4	48.6	39.6	44.0	47.1	47.1
06/07/16	Wednesday	-	45.8*	-	-	-	-	-	-	-

\* Determined using CRTN shortened measurement procedure

**Table 32: Daily summarised noise levels at Dalreoch Cottage, with periods of rainfall removed**

Date	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)	L <sub>Aeq,T</sub> (dB)	L <sub>A10,T</sub> (dB)	L <sub>A90,T</sub> (dB)
22/06/16	Wednesday	-	-	-	-	-	-	49.2	51.4	38.5
23/06/16	Thursday	53.7	51.4	40.9	53.9	51.0	41.1	-	-	-
24/06/16	Friday	-	54.0*	-	-	-	-	-	-	-
25/06/16	Saturday	47.8	50.1	40.3	47.8	50.2	40.8	-	-	-
26/06/16	Sunday	-	46.6*	-	-	-	-	43.7	45.9	36.1
27/06/16	Monday	48.7	49.7	43.8	49.0	50.2	44.5	44.4	45.3	37.1
28/06/16	Tuesday	-	-	-	-	-	-	-	-	-
29/06/16	Wednesday	-	49.1*	-	-	-	-	43.7	46.8	37.0
30/06/16	Thursday	-	48.2*	-	-	-	-	-	-	-
01/07/16	Friday	-	-	-	-	-	-	-	-	-
02/07/16	Saturday	-	48.4*	-	-	-	-	43.1	44.4	40.2
03/07/16	Sunday	-	48.7*	-	-	-	-	42.0	44.2	34.1
04/07/16	Monday	-	50.1*	-	-	-	-	-	-	-
05/07/16	Tuesday	-	48.1*	-	-	-	-	44.0	47.1	35.4
06/07/16	Wednesday	-	46.0*	-	-	-	-	-	-	-

\* Determined using CRTN shortened measurement procedure

2.1.67

In addition to long term measurements, a series of short term attended measurements were also undertaken and the results are provided in Table 33. A Rion NL-52 sound level meter (s/n 00921176) was positioned at a height of 1.5m in free field conditions adjacent to the long term monitoring equipment. The monitoring equipment was calibrated both before and after the measurement period using an acoustic calibrator, which has itself been calibrated against a reference set traceable to National and International Standards. There was no significant shift in the observed calibration level.

**Table 33: Additional attended noise level measurements at Dalreoch Cottage**

Start Date	Start Time (hh:mm)	Duration (hh:mm)	Comments
23/06/16	12:45	00:15	Light wind (with occasional stronger winds), 16°C, 50% overcast, dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate dominated by road traffic noise on the A9, constant birdsong, wind in vegetation and running water from a river in the distance. Motorbike on A9 at 12:46. Train pass by at 12:47. Movement of birds on property roof 12:50.
23/06/16	19:30	00:15	Calm, 13°C, 90% cloud cover, very short light showers of rainfall. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate dominated by road traffic noise on the existing A9, constant birdsong and running water from a river in the distance. Sheep heard in the distance occasionally.

**3 Calibration certificates**



**CERTIFICATE  
OF CALIBRATION**



**Date of Issue: 11 May 2016**

**Certificate Number: UCRT16/1161**

Issued by:  
ANV Measurement Systems  
Beaufort Court  
17 Roebuck Way  
Milton Keynes MK5 8HL  
Telephone 01908 642846 Fax 01908 642814  
E-Mail: info@noise-and-vibration.co.uk  
Web: www.noise-and-vibration.co.uk

Page 1 of 2 Pages
Approved Signatory
M. Breslin [ ]    K. Mistry [ ]    J. Harriman [✓]

Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Customer            ANV Measurement Systems  
Beaufort Court  
17 Roebuck Way  
Milton Keynes  
MK5 8HL

Order No.            ANV MS Hire

Test Procedure        Procedure TP 1 Calibration of Sound Calibrators

Description            Acoustic Calibrator

Identification	<i>Manufacturer</i>	<i>Instrument</i>	<i>Model</i>	<i>Serial No.</i>
	Rion	Calibrator	NC-74	34536108

The calibrator has been tested as specified in Annex B of IEC 60942:2003. As public evidence was available from a testing organisation (PTB) responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the class 1 requirements of IEC 60942:2003.

ANV Job No.            UKAS16/05098

Date Received        06 May 2016

Date Calibrated        11 May 2016

Previous Certificate	<i>Dated</i>	22 May 2015
	<i>Certificate No.</i>	UCRT15/1143
	<i>Laboratory</i>	7623

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<b>CERTIFICATE OF CALIBRATION</b>	Certificate Number <b>UCRT16/1161</b>
	Page 2 of 2 Pages

UKAS Accredited Calibration Laboratory No. 7623

Measurements

The sound pressure level generated by the calibrator in its WS2 configuration was measured five times by the Insert Voltage Method using a microphone as detailed below. The mean of the results obtained is shown below. It is corrected to the standard atmospheric pressure of 101.3 kPa (1013 mBar) using original manufacturers information.

Test Microphone	<i>Manufacturer</i>	<i>Type</i>
	Brüel & Kjær	4134

Results

The level of the calibrator output under the conditions outlined above was

$$93.97 \pm 0.10 \text{ dB rel } 20 \mu\text{Pa}$$

Functional Tests and Observations

The frequency of the sound produced was	1001.36 Hz	±	0.13 Hz
The total distortion was	1.42 %	±	6.6 % of Reading

During the measurements environmental conditions were

Temperature	22	to	23 °C
Relative Humidity	33	to	39 %
Barometric Pressure	99.3	to	99.4 kPa

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k = 2$ , providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

The uncertainties refer to the measured values only with no account being taken of the ability of the instrument to maintain its calibration.

A small correction factor may need to be applied to the sound pressure level quoted above if the device is used to calibrate a sound level meter which is fitted with a free-field response microphone. See manufacturers handbook for details.

..... END .....

**Note:**

Calibrator adjusted prior to calibration?	NO	
Initial Level	N/A	dB
Initial Frequency	N/A	Hz

Additional Comments

None

Calibrated by: A Patel

R 1



**CERTIFICATE  
OF CALIBRATION**



**Date of Issue: 02 June 2016**

**Certificate Number: UCRT16/1178**

Issued by:  
ANV Measurement Systems  
Beaufort Court  
17 Roebuck Way  
Milton Keynes MK5 8HL  
Telephone 01908 642846 Fax 01908 642814  
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Web: www.noise-and-vibration.co.uk  
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Page 1 of 2 Pages
Approved Signatory
M. Breslin [ ]      K. Mistry [ ]      J. Harriman [v]

Customer ANV Measurement Systems  
Beaufort Court  
17 Roebuck Way  
Milton Keynes  
MK5 8HL

Order No. ANV MS Hire  
Description Sound Level Meter / Pre-amp / Microphone / Associated Calibrator  
Identification

Manufacturer	Instrument	Type	Serial No. / Version
Rion	Sound Level Meter	NL-52	00610194
Rion	Firmware		1.7
Rion	Pre Amplifier	NH-25	20938
Rion	Microphone	UC-59	03472
Rion	Calibrator	NC-74	34536109
	Calibrator adaptor type if applicable		NC-74-002

Performance Class 1  
Test Procedure TP 2.SLM 61672-3 TPS-49  
*Procedures from IEC 61672-3:2006 were used to perform the periodic tests.*  
Type Approved to IEC 61672-1:2002 YES Approval Number 21.21 / 13.02  
*If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003*  
Date Received 01 June 2016 ANV Job No. UKAS16/06111  
Date Calibrated 02 June 2016

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	Dated	Certificate No.	Laboratory
	01 July 2015	UCRT15/1177	7623

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<b>CERTIFICATE OF CALIBRATION</b>	<b>Certificate Number</b> UCRT16/1178
	Page 2 of 2 Pages

UKAS Accredited Calibration Laboratory No. 7623

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title	Sound Level Meter	NL-42 / NL-52
SLM instruction manual ref / issue		11-03
SLM instruction manual source		Manufacturer
Internet download date if applicable		N/A
Case corrections available		Yes
Uncertainties of case corrections		Yes
Source of case data		Manufacturer
Wind screen corrections available		Yes
Uncertainties of wind screen corrections		Yes
Source of wind screen data		Manufacturer
Mic pressure to free field corrections		Yes
Uncertainties of Mic to F.F. corrections		Yes
Source of Mic to F.F. corrections		Manufacturer
Total expanded uncertainties within the requirements of IEC 61672-1:2002	Yes	
Specified or equivalent Calibrator		Specified
Customer or Lab Calibrator		Lab Calibrator
Calibrator adaptor type if applicable		NC-74-002
Calibrator cal. date		01 June 2016
Calibrator cert. number		UCRT16/1175
Calibrator cal cert issued by		7623
Calibrator SPL @ STP	94.05	dB Calibration reference sound pressure level
Calibrator frequency	1001.86	Hz Calibration check frequency
Reference level range	25 - 130	dB

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15  
Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	23.43	23.32	± 0.20 °C
Humidity	47.4	45.0	± 3.00 %RH
Ambient Pressure	101.10	101.06	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.			
Initial indicated level	94.1	dB	Adjusted indicated level 94.1 dB
The uncertainty of the associated calibrator supplied with the sound level meter ±			0.10 dB

Self Generated Noise	This test is currently not performed by this Lab.		
Microphone installed (if requested by customer) = Less Than	N/A	dB	A Weighting
Uncertainty of the microphone installed self generated noise ±	N/A	dB	
Microphone replaced with electrical input device -	UR = Under Range indicated		
Weighting	A	C	Z
	13.2 dB UR	17.3 dB UR	23.0 dB UR
Uncertainty of the electrical self generated noise ±		0.12	dB

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k=2$ , providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

END

Calibrated by: A Patel

R 1

Additional Comments

None



**CERTIFICATE  
OF CALIBRATION**



**Date of Issue: 07 April 2016**

**Certificate Number: UCRT16/1123**

Issued by:

ANV Measurement Systems  
Beaufort Court  
17 Roebuck Way  
Milton Keynes MK5 8HL  
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Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Page 1 of 2 Pages
Approved Signatory
M. Breslin [ ]      K. Mistry [ ]      J. Harriman [✓]

Customer ANV Measurement Systems  
Beaufort Court  
17 Roebuck Way  
Milton Keynes  
MK5 8HL

Order No. ANV MS Hire  
Description Sound Level Meter / Pre-amp / Microphone / Associated Calibrator  
Identification

Manufacturer	Instrument	Type	Serial No. / Version
Rion	Sound Level Meter	NL-52	00610201
Rion	Firmware		1.7
Rion	Pre Amplifier	NH-25	10195
Rion	Microphone	UC-59	02543
Rion	Calibrator	NC-74	34536109
	Calibrator adaptor type if applicable		NC-74-002

Performance Class 1  
Test Procedure TP 2.SLM 61672-3 TPS-49  
*Procedures from IEC 61672-3:2006 were used to perform the periodic tests.*  
Type Approved to IEC 61672-1:2002 YES Approval Number 21.21 / 13.02  
*If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003*  
Date Received 10 March 2016 ANV Job No. UKAS16/03049  
Date Calibrated 07 April 2016

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	Dated	Certificate No.	Laboratory
	15 April 2015	UCRT15/1101	7623

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<b>CERTIFICATE OF CALIBRATION</b>	<b>Certificate Number</b> <b>UCRT16/1123</b>
	Page 2 of 2 Pages
UKAS Accredited Calibration Laboratory No. 7623	

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title	Sound Level Meter	NL-42 / NL-52
SLM instruction manual ref / issue		11-03
SLM instruction manual source	Manufacturer	
Internet download date if applicable		N/A
Case corrections available		Yes
Uncertainties of case corrections		Yes
Source of case data	Manufacturer	
Wind screen corrections available		Yes
Uncertainties of wind screen corrections		Yes
Source of wind screen data	Manufacturer	
Mic pressure to free field corrections		Yes
Uncertainties of Mic to F.F. corrections		Yes
Source of Mic to F.F. corrections	Manufacturer	
Total expanded uncertainties within the requirements of IEC 61672-1:2002	Yes	
Specified or equivalent Calibrator	Specified	
Customer or Lab Calibrator	Lab Calibrator	
Calibrator adaptor type if applicable		NC-74-002
Calibrator cal. date		05 April 2016
Calibrator cert. number	UCRT16/1118	
Calibrator cal cert issued by	7623	
Calibrator SPL @ STP	94.01	dB Calibration reference sound pressure level
Calibrator frequency	1001.86	Hz Calibration check frequency
Reference level range	25 - 130	dB

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15  
 Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	23.10	23.25	± 0.20 °C
Humidity	33.3	34.6	± 3.00 %RH
Ambient Pressure	99.62	99.64	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.			
Initial indicated level	94.2	dB	Adjusted indicated level 94.0 dB
The uncertainty of the associated calibrator supplied with the sound level meter ±			0.10 dB

Self Generated Noise This test is currently not performed by this Lab.  
 Microphone installed (if requested by customer) = Less Than N/A dB A Weighting  
 Uncertainty of the microphone installed self generated noise ± N/A dB

Microphone replaced with electrical input device -	UR = Under Range indicated					
Weighting	A		C		Z	
	13.7	dB UR	17.6	dB UR	23.2	dB UR
Uncertainty of the electrical self generated noise ±					0.12	dB

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k=2$ , providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

..... END .....

Calibrated by: A Patel R 1

Additional Comments  
None



**CERTIFICATE  
OF CALIBRATION**



**Date of Issue: 12 May 2016**

**Certificate Number: UCRT16/1162**

Issued by:  
ANV Measurement Systems  
Beaufort Court  
17 Roebuck Way  
Milton Keynes MK5 8HL  
Telephone 01908 642846 Fax 01908 642814  
E-Mail: info@noise-and-vibration.co.uk  
Web: www.noise-and-vibration.co.uk  
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Page 1 of 2 Pages
Approved Signatory
M. Breslin [ ]      K. Mistry [ ]      J. Harriman [✓]

Customer ANV Measurement Systems  
Beaufort Court  
17 Roebuck Way  
Milton Keynes  
MK5 8HL

Order No. ANV MS Hire  
Description Sound Level Meter / Pre-amp / Microphone / Associated Calibrator  
Identification

Manufacturer	Instrument	Type	Serial No. / Version
Rion	Sound Level Meter	NL-52	00610212
Rion	Firmware		1.7
Rion	Pre Amplifier	NH-25	31965
Rion	Microphone	UC-59	06271
Rion	Calibrator	NC-74	34536109
	Calibrator adaptor type if applicable		NC-74-002

Performance Class 1  
Test Procedure TP 2.SLM 61672-3 TPS-49  
*Procedures from IEC 61672-3:2006 were used to perform the periodic tests.*  
Type Approved to IEC 61672-1:2002 YES Approval Number 21.21 / 13.02  
*If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003*  
Date Received 10 May 2016 ANV Job No. UKAS16/05099  
Date Calibrated 12 May 2016

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	Dated	Certificate No.	Laboratory
	05 June 2015	UCRT15/1160	7623

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<b>CERTIFICATE OF CALIBRATION</b>	<b>Certificate Number</b> <b>UCRT16/1162</b>
	Page 2 of 2 Pages

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title	Sound Level Meter	NL-42 / NL-52
SLM instruction manual ref / issue		11-03
SLM instruction manual source	Manufacturer	
Internet download date if applicable		N/A
Case corrections available	Yes	
Uncertainties of case corrections	Yes	
Source of case data	Manufacturer	
Wind screen corrections available	Yes	
Uncertainties of wind screen corrections	Yes	
Source of wind screen data	Manufacturer	
Mic pressure to free field corrections	Yes	
Uncertainties of Mic to F.F. corrections	Yes	
Source of Mic to F.F. corrections	Manufacturer	
Total expanded uncertainties within the requirements of IEC 61672-1:2002	Yes	
Specified or equivalent Calibrator	Specified	
Customer or Lab Calibrator	Lab Calibrator	
Calibrator adaptor type if applicable		NC-74-002
Calibrator cal. date		06 May 2016
Calibrator cert. number	UCRT16/1156	
Calibrator cal cert issued by	7623	
Calibrator SPL @ STP	94.02	dB Calibration reference sound pressure level
Calibrator frequency	1001.85	Hz Calibration check frequency
Reference level range	25 - 130	dB

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15  
Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	22.89	22.99	± 0.20 °C
Humidity	40.6	38.3	± 3.00 %RH
Ambient Pressure	99.27	99.28	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.			
Initial indicated level	93.9	dB	Adjusted indicated level 94.0 dB
The uncertainty of the associated calibrator supplied with the sound level meter ±			0.10 dB

Self Generated Noise	This test is currently not performed by this Lab.		
Microphone installed (if requested by customer) = Less Than	N/A	dB	A Weighting
Uncertainty of the microphone installed self generated noise ±	N/A	dB	
Microphone replaced with electrical input device -	UR = Under Range indicated		
Weighting	A	C	Z
	11.9	15.9	21.5
	dB	dB	dB
	UR	UR	UR
Uncertainty of the electrical self generated noise ±	0.12 dB		

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k=2$ , providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

END

Calibrated by: A Patel

R 1

Additional Comments

None



**CERTIFICATE  
OF CALIBRATION**



**Date of Issue: 05 May 2016**

**Certificate Number: UCRT16/1152**

Issued by:

ANV Measurement Systems  
Beaufort Court  
17 Roebuck Way  
Milton Keynes MK5 8HL  
Telephone 01908 642846 Fax 01908 642814  
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Web: www.noise-and-vibration.co.uk  
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Page 1 of 2 Pages
Approved Signatory
M. Breslin [ ]      K. Mistry [ ]      J. Harriman [✓]

Customer ANV Measurement Systems  
Beaufort Court  
17 Roebuck Way  
Milton Keynes  
MK5 8HL

Order No. ANV MS hire  
Description Sound Level Meter / Pre-amp / Microphone / Associated Calibrator  
Identification

Manufacturer	Instrument	Type	Serial No. / Version
Rion	Sound Level Meter	NL-52	00620872
Rion	Firmware		1.7
Rion	Pre Amplifier	NH-25	20932
Rion	Microphone	UC-59	03715
Rion	Calibrator	NC-74	34536109
	Calibrator adaptor type if applicable		NC-74-002

Performance Class 1  
Test Procedure TP 2.SLM 61672-3 TPS-49  
*Procedures from IEC 61672-3:2006 were used to perform the periodic tests.*  
Type Approved to IEC 61672-1:2002 YES Approval Number 21.21 / 13.02  
*If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003*  
Date Received 22 April 2016 ANV Job No. UKAS16/04086  
Date Calibrated 05 May 2016

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	Dated	Certificate No.	Laboratory
	21 May 2015	UCRT15/1142	7623

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<b>CERTIFICATE OF CALIBRATION</b>	<b>Certificate Number</b> UCRT16/1152
	Page 2 of 2 Pages

UKAS Accredited Calibration Laboratory No. 7623

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title	Sound Level Meter	NL-42 / NL-52
SLM instruction manual ref / issue		11-03
SLM instruction manual source	Manufacturer	
Internet download date if applicable		N/A
Case corrections available	Yes	
Uncertainties of case corrections	Yes	
Source of case data	Manufacturer	
Wind screen corrections available	Yes	
Uncertainties of wind screen corrections	Yes	
Source of wind screen data	Manufacturer	
Mic pressure to free field corrections	Yes	
Uncertainties of Mic to F.F. corrections	Yes	
Source of Mic to F.F. corrections	Manufacturer	
Total expanded uncertainties within the requirements of IEC 61672-1:2002	Yes	
Specified or equivalent Calibrator	Specified	
Customer or Lab Calibrator	Lab Calibrator	
Calibrator adaptor type if applicable	NC-74-002	
Calibrator cal. date	18 April 2016	
Calibrator cert. number	UCRT16/1133	
Calibrator cal cert issued by	7623	
Calibrator SPL @ STP	94.02	dB Calibration reference sound pressure level
Calibrator frequency	1001.92	Hz Calibration check frequency
Reference level range	25 - 130	dB

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15  
 Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	23.77	24.05	± 0.20 °C
Humidity	32.9	32.4	± 3.00 %RH
Ambient Pressure	100.94	100.87	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	94.2	dB	Adjusted indicated level	94.0	dB
The uncertainty of the associated calibrator supplied with the sound level meter ±			0.10 dB		

Self Generated Noise This test is currently not performed by this Lab.

Microphone installed (if requested by customer) = Less Than	N/A	dB	A Weighting
Uncertainty of the microphone installed self generated noise ±	N/A	dB	
Microphone replaced with electrical input device -	UR = Under Range indicated		
Weighting	A	C	Z
	11.1 dB UR	15.2 dB UR	21.0 dB UR
Uncertainty of the electrical self generated noise ±	0.12 dB		

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k=2$ , providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

END

Calibrated by: A Patel

R 1

Additional Comments

None



**CERTIFICATE  
OF CALIBRATION**



**Date of Issue: 04 September 2015**

**Certificate Number: UCRT15/1233**

Issued by:

ANV Measurement Systems  
Beaufort Court  
17 Roebuck Way  
Milton Keynes MK5 8HL  
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Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Page 1 of 2 Pages	
Approved Signatory	
	
M. Breslin [ ]	K. Mistry [ ]
	J. Harriman [ / ]

Customer ANV Measurement Systems  
Beaufort Court  
17 Roebuck Way  
Milton Keynes  
MK5 8HL

Order No. ANV MS Hire  
Description Sound Level Meter / Pre-amp / Microphone / Associated Calibrator  
Identification

Manufacturer	Instrument	Type	Serial No. / Version
Rion	Sound Level Meter	NL-52	01121405
Rion	Firmware		1.5
Rion	Pre Amplifier	NH-25	21449
Rion	Microphone	UC-59	04440
Rion	Calibrator	NC-74	34536109
	Calibrator adaptor type if applicable		NC-74-002

Performance Class 1  
Test Procedure TP 2.SLM 61672-3 TPS-49  
*Procedures from IEC 61672-3:2006 were used to perform the periodic tests.*  
Type Approved to IEC 61672-1:2002 YES Approval Number 21.21 / 13.02  
*If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003*  
Date Received 21 August 2015 ANV Job No. UKAS15/08150  
Date Calibrated 04 September 2015

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	Dated	Certificate No.	Laboratory
	19 September 2014	UCRT14/1209	7623

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<b>CERTIFICATE OF CALIBRATION</b>	<b>Certificate Number</b>				
	<b>UCRT15/1233</b>				
	UKAS Accredited Calibration Laboratory No. 7623	Page	2	of	2

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title	Sound Level Meter	NL-42 / NL-52		
SLM instruction manual ref / issue		11-03		
SLM instruction manual source		Manufacturer		
Internet download date if applicable		N/A		
Case corrections available		Yes		
Uncertainties of case corrections		Yes		
Source of case data		Manufacturer		
Wind screen corrections available		Yes		
Uncertainties of wind screen corrections		Yes		
Source of wind screen data		Manufacturer		
Mic pressure to free field corrections		Yes		
Uncertainties of Mic to F.F. corrections		Yes		
Source of Mic to F.F. corrections		Manufacturer		
Total expanded uncertainties within the requirements of IEC 61672-1:2002		Yes		
Specified or equivalent Calibrator		Specified		
Customer or Lab Calibrator		Lab Calibrator		
Calibrator adaptor type if applicable		NC-74-002		
Calibrator cal. date		19 August 2015		
Calibrator cert. number		UCRT15/1221		
Calibrator cal cert issued by		7623		
Calibrator SPL @ STP		94.07	dB	Calibration reference sound pressure level
Calibrator frequency		1001.88	Hz	Calibration check frequency
Reference level range		25 - 130	dB	

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15  
Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	22.63	22.85	± 0.20 °C
Humidity	47.7	46.9	± 3.00 %RH
Ambient Pressure	100.72	100.73	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.			
Initial indicated level	94.3	dB	Adjusted indicated level
			94.1
			dB
The uncertainty of the associated calibrator supplied with the sound level meter ±			0.10
			dB

Self Generated Noise	This test is currently not performed by this Lab.		
Microphone installed (if requested by customer) = Less Than	N/A	dB	A Weighting
Uncertainty of the microphone installed self generated noise ±	N/A	dB	
Microphone replaced with electrical input device -	UR = Under Range indicated		
Weighting	A	C	Z
	11.0	15.2	21.0
	dB	dB	dB
	UR	UR	
Uncertainty of the electrical self generated noise ±		0.12	dB

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k=2$ , providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

END

Calibrated by: A Patel

R 1

Additional Comments

None



**CERTIFICATE  
OF CALIBRATION**



**Date of Issue: 31 May 2016**

**Certificate Number: UCRT16/1173**

Issued by:  
ANV Measurement Systems  
Beaufort Court  
17 Roebuck Way  
Milton Keynes MK5 8HL  
Telephone 01908 642846 Fax 01908 642814  
E-Mail: info@noise-and-vibration.co.uk  
Web: www.noise-and-vibration.co.uk  
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Page 1 of 2 Pages
Approved Signatory
M. Breslin [ ]      K. Mistry [✓]      J. Harriman [ ]

Customer ANV Measurement Systems  
Beaufort Court  
17 Roebuck Way  
Milton Keynes  
MK5 8HL

Order No. ANV MS Hire  
Description Sound Level Meter / Pre-amp / Microphone / Associated Calibrator  
Identification

Manufacturer	Instrument	Type	Serial No. / Version
Rion	Sound Level Meter	NL-52	01143556
Rion	Firmware		1.7
Rion	Pre Amplifier	NH-25	43573
Rion	Microphone	UC-59	07362
Rion	Calibrator	NC-74	34536109
	Calibrator adaptor type if applicable		NC-74-002

Performance Class 1  
Test Procedure TP 2.SLM 61672-3 TPS-49  
*Procedures from IEC 61672-3:2006 were used to perform the periodic tests.*  
Type Approved to IEC 61672-1:2002 YES Approval Number 21.21 / 13.02  
*If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003*  
Date Received 27 May 2016 ANV Job No. UKAS16/05106  
Date Calibrated 31 May 2016

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	Dated	Certificate No.	Laboratory
	22 April 2015	UCRT15/1109	7623

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<b>CERTIFICATE OF CALIBRATION</b>	<b>Certificate Number</b> <b>UCRT16/1173</b>
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UKAS Accredited Calibration Laboratory No. 7623

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title	Sound Level Meter	NL-42 / NL-52
SLM instruction manual ref / issue		11-03
SLM instruction manual source	Manufacturer	
Internet download date if applicable		N/A
Case corrections available	Yes	
Uncertainties of case corrections	Yes	
Source of case data	Manufacturer	
Wind screen corrections available	Yes	
Uncertainties of wind screen corrections	Yes	
Source of wind screen data	Manufacturer	
Mic pressure to free field corrections	Yes	
Uncertainties of Mic to F.F. corrections	Yes	
Source of Mic to F.F. corrections	Manufacturer	
Total expanded uncertainties within the requirements of IEC 61672-1:2002	Yes	
Specified or equivalent Calibrator	Specified	
Customer or Lab Calibrator	Lab Calibrator	
Calibrator adaptor type if applicable	NC-74-002	
Calibrator cal. date	13 May 2016	
Calibrator cert. number	UCRT16/1163	
Calibrator cal cert issued by	7623	
Calibrator SPL @ STP	94.02	dB Calibration reference sound pressure level
Calibrator frequency	1001.93	Hz Calibration check frequency
Reference level range	25 - 130	dB

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15  
Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	22.95	23.15	± 0.20 °C
Humidity	42.9	44.2	± 3.00 %RH
Ambient Pressure	100.77	100.76	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	94.0	dB	Adjusted indicated level	94.0	dB	
The uncertainty of the associated calibrator supplied with the sound level meter ±			0.10			dB

Self Generated Noise This test is currently not performed by this Lab.

Microphone installed (if requested by customer) = Less Than	N/A	dB	A Weighting
Uncertainty of the microphone installed self generated noise ±	N/A	dB	

Microphone replaced with electrical input device -	UR = Under Range indicated					
Weighting	A		C		Z	
	11.8	dB	UR	15.9	dB	UR
Uncertainty of the electrical self generated noise ±			0.12		dB	

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k=2$ , providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

END

Calibrated by: A Patel

R 1

Additional Comments

None