

Appendix A17.2: Detailed Baseline Noise Survey Results

1 Introduction

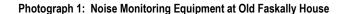
- 1.1.1 This appendix provides additional details of the baseline noise surveys which were undertaken as part of the DMRB 'noise and vibration' Stage 3 Assessment.
- 1.1.2 Noise monitoring was undertaken between 14 June 2016 and 6 July 2016 and consisted of unattended noise level measurements at 11 locations, 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.
- 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 LA10 (18 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.





- 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⁻¹ and 1.8ms⁻¹ 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			23:00 -	Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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 _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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 $L_{Aeq,T}$ level is the logarithmically averaged noise level, whereas the $L_{A10,T}$ and $L_{A90,T}$ 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⁻¹ and 2.3ms⁻¹ 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 _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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 _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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 _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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.

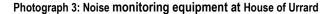
Table 6: Additional attended noise level measurements at Coille Essan

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.





- 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⁻¹) 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 _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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	00:00)	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 _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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 _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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⁻¹ and 2.3ms⁻¹ 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 _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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			23:00)	Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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			23:00)	e (betwee r Time Pei		Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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

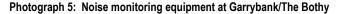
Start Date	Start Time (hh:mm)	Duration (hh:mm)	Comments
23/06/16	11:00	00:15	Little wind, 17°C, 25% cloud cover, dry. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate was dominated by the road traffic on the existing A9 and nearby B8079, running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





- 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⁻¹) 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			23:00)	Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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 Da	Day	Daytime (between 06:00 – 00:00) 18 Hour Time Period			23:00)	Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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
16/0616	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.





- 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.
- For the majority of the monitoring period, light wind speeds (up to 1.5ms⁻¹) 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 _{Aeq,T} (dB)	L _{Aeq,T} (dB)	L _{Aeq,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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			23:00)	e (betwee r Time Pei		Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L _{Aeq,T} (dB)	L _{Aeq,T} (dB)	L _{Aeq,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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

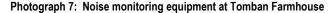
Start Date	Start Time (hh:mm)	Duration (hh:mm)	Comments
16/06/16	17:00	00:15	Low winds, 15°C, dry but moisture present on nearby roads. Weather conditions remained conducive for noise monitoring throughout the monitoring period. Noise climate is dominated by road traffic noise from a nearby minor road 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.





- 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.
- For the majority of the monitoring period, light wind speeds (up to 1.5ms⁻¹) 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			23:00)	e (betweer r Time Per		23:00 -	Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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			23:00)	Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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 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⁻¹ and 2.3ms⁻¹ and 1.9ms⁻¹ 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	ate 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 _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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			23:00)	Daytime (between 07:00 – 23:00) 16 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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			23:00)	(between Time Peri		Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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.





- 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.
- For the majority of the monitoring period, light wind speeds (up to 1.5ms⁻¹) 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 _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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	00:00)	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 _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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 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.





- 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⁻¹) were recorded. Wind speeds ranged between 1.1ms⁻¹ and 1.8ms⁻¹ 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 _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq.T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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	00:00)	e (betweer r Time Per		23:00)	e (betwee r Time Pei		23:00 -	ime (betw - 07:00) Time Per	
		L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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.

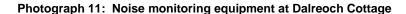
Table 30: Additional attended noise level measurements at Clunes Cottage

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 boot 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.





- 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⁻¹ and 2.3ms⁻¹ 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	00:00)			23:0		Daytime (between 07:00 – 23:00) 6 Hour Time Period			Night-time (between 23:00 – 07:00) 8 Hour Time Period		
		L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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 _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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	00:00)	e (betweer r Time Per		23:00)	e (betwee r Time Pei		23:00 -	ime (betw - 07:00) Time Per	
		L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	L _{Aeq,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (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	1-1	46.0*	-	-	-	-	-	-	-

^{*} Determined using CRTN shortened measurement procedure

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

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

Certificate Number: UCRT16/1161

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

Test Procedure Procedure TP 1 Calibration of Sound Calibrators

Description Acoustic Calibrator

IdentificationManufacturerInstrumentModelSerial No.RionCalibratorNC-7434536108

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 Dated 22 May 2015

Certificate No. UCRT15/1143

Laboratory 7623

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.



CERTIFICATE OF CALIBRATION	Certif		Num T16/11		
UKAS Accredited Calibration Laboratory No. 7623	Page	2	of	2	Pages

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

Manufacturer

Type

Brüel & Kjær

4134

Results

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

93.97 \pm 0.10 dB rel 20 μ Pa

Functional Tests and Observations

The frequency of the sound produced was

 $1001.36 \; Hz \qquad \pm \qquad 0.13 \; Hz$

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.

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

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

Certificate Number: UCRT16/1178

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 00610194 Rion **Firmware** 1.7 NH-25 20938 Rion Pre Amplifier Rion Microphone UC-59 03472 Rion Calibrator NC-74 34536109 NC-74-002 Calibrator adaptor type if applicable

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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CERTIFICATE OF CALIBRATION	Certif		Num T16/11		
UKAS Accredited Calibration Laboratory No. 7623	Page	2	of	2	Pages

SLM instruction manual title Sound Level Meter NL-42 / NL-52
SLM instruction manual source Internet download date if applicable N/A Case corrections available Uncertainties of case corrections Source of case data Wanufacturer Wind screen corrections available Uncertainties of wind screen corrections Source of wind screen data Uncertainties of Mic to F.F. corrections Source of Mic to F.F. corrections Ves Uncertainties of Mic to F.F. corrections Ves Uncertainty of the electrical self generated noise ± N/A dB Veighting Uncertainty of the electrical self generated noise ± N/A dB Veighting Uncertainty of the electrical self generated noise ± N/A dB Veighting Uncertainty of the electrical self generated noise ± N/A dB Veighting Uncertainty of the electrical self generated noise ± N/A dB Veighting Uncertainty of the electrical self generat
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Uncertainty of the electrical self generated noise ± 0.12 dB
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.
using an electrostatic actuator.
END
END





CERTIFICATE OF CALIBRATION



Date of Issue: 07 April 2016

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

Certificate Number: UCRT16/1123

Page Pages Approved Signatory M. Breslin [J. Harriman [K. Mistry [

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 UC-59 Microphone 02543 Rion NC-74 34536109 Rion Calibrator Calibrator adaptor type if applicable NC-74-002

Performance Class

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

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CERTIFICATE OF CALIBRATION	Certif		Num T16/11		
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Sound Level Meter Ins					e sour	nd leve	els ind	dicated.		
SLM instruction manual t		el Mete		L-52						
SLM instruction manual r	ef / issue		11-03							
SLM instruction manual s	ource		Manufacture	er						
Internet download date if	applicable		N/A						in the same of the	muutakeuun taasi siraksi
Case corrections available	е		Yes							intela resul
Uncertainties of case corr	rections		Yes							
Source of case data			Manufacture	r					in The Control of the	
Wind screen corrections			Yes	30					80	
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Mic pressure to free field			Yes							
Uncertainties of Mic to F.			Yes							
Source of Mic to F.F. corr			Manufacture							-
Total expanded uncertain		remen		2-1:20	02	Yes				
Specified or equivalent Ca			Specified							
Customer or Lab Calibrat			Lab Calibrato	or						
Calibrator adaptor type if	applicable		NC-74-002	_						
Calibrator cal. date			05 April 2016)						
Calibrator cert. number			T16/1118							
Calibrator cal cert issued	by	7623								
Calibrator SPL @ STP			94.01	dB	Calibr	ation re	eferen	ice sound p	oressure	level
Calibrator frequency			1001.86	Hz	Calibra	ation c	heck f	frequency	www.ss	
Reference level range			25 - 130	dB	Sille s					
Accessories used or corre	ected for during calil	oration	- Exten	sion Ca	able &	Wind S	Shield	WS-15	and Service and American	
Note - if a pre-amp extens				een th	e SLM	and th	e pre-	amp.		
Environmental conditions	during tests	T	Start		End			Andrew Market Market (1971)	B1752000 5	
	Temperature		23.10		23.25		±	0.20 °C		
	Humidity		33.3		34.6		±	3.00 %		
	Ambient Pressure		99.62		99.64		±	0.03 kP		
Response to associated C		ironme	ntal condition	s above	e.		8			
Initial indicated level	The second secon	dB	.,		ndicate	d level		94.0	dB	7
The uncertainty of the ass		17207-10					1002	0.10	dB	-
	Internal Control	er Albert verring (1)	The same of the sa	Action to the control						
Self Generated Noise Microphone installed (if re	This test is current			liis Lat	N/A		dB .	A Weightin	00	
Uncertainty of the microph					N/A		dB	T	iy	
								_		
Microphone replaced with		ce -	C C	Under	Range					
Weighting	A B.7 dB UR	1	7.6 dB	UR	23	2	dB	TUR		
Uncertainty of the electrical			7.0 Jub	UK	0.12		dB	UK		
The reported expanded ur										
a level of confidence of ap	proximately 95%.	he un	certainty evalu	uation h	nas bee	en carr	ed ou	it in accord	ance wit	h
UKAS requirements.					Inches de la constant					1200
For the test of the frequen	cy weightings as pe	r parag	graph 12. of IE	EC 616	72-3:20	006 the	actua	al micropho	one free	field
response was used.										
The acoustical frequency to	ests of a frequency	weigh	ting as per pa	ragrapl	h 11 of	IEC 6	672-3	3:2006 wer	e carried	d out
using an electrostatic actu	ator.									
			END							
Calibrated by: A Pat										R 1
Additional Comments										
None										





CERTIFICATE OF CALIBRATION



Date of Issue: 12 May 2016

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

Certificate Number: UCRT16/1162

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 Firmware 1.7 NH-25 31965 Rion Pre Amplifier UC-59 Rion Microphone 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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CERTIFICATE OF CALIBRATION	Certi		e Num T16/11		
UKAS Accredited Calibration Laboratory No. 7623	Page	2	of	2	Pages

Sound Level Meter Ins	truction manual ar	nd data use	ed to adjus	st the sound	levels in	dicated.	
SLM instruction manual t			L-42 / NL-5				
SLM instruction manual r	ef / issue		11-03				
SLM instruction manual s	ource	Mar	ufacturer				
Internet download date if	applicable		N/A				
Case corrections available			Yes			30010	
Uncertainties of case cor	rections		Yes				
Source of case data		Mar	ufacturer				
Wind screen corrections	available		Yes		Time - Section		
Uncertainties of wind scre	en corrections		Yes				
Source of wind screen da		Mar	ufacturer				
Mic pressure to free field			Yes				
Uncertainties of Mic to F.		2.2	Yes				
Source of Mic to F.F. corr			ufacturer				
Total expanded uncertain				1:2002	Yes		
Specified or equivalent Co			pecified				
Customer or Lab Calibrat			Calibrator -74-002				
Calibrator adaptor type if	applicable						
Calibrator cal. date			May 2016				
Calibrator cert. number		UCRT16/1	156				
Calibrator cal cert issued	by	7623		_			
Calibrator SPL @ STP		94.0		o diloi di		nce sound pre	ssure level
Calibrator frequency		1001		Ganbran	on check	frequency	
Reference level range		25 - 1	130 dE	3			
Accessories used or corre				n Cable & W			
Note - if a pre-amp extens	ion cable is listed th	en it was u	sed between	n the SLM ar	nd the pre-	-amp.	
Environmental conditions	during tests	Sta	rt	End	7.7		
	Temperature	22.8	39	22.99	±	0.20 °C	
	Humidity	40.	6	38.3	±	3.00 %RH	
	Ambient Pressure	99.2	27	99.28	±	0.03 kPa	
Response to associated C	alibrator at the envir	ronmental c	onditions a	bove.			
Initial indicated level	93.9	dB	Adjuste	ed indicated le	evel	94.0	dB
The uncertainty of the ass	ociated calibrator su	pplied with	the sound I	level meter ±		0.10	dB
Self Generated Noise	This test is currently	not perfor	med by this	Lab.			
Microphone installed (if re				N/A	dB	A Weighting	
Uncertainty of the microph				N/A	dB		
Microphone replaced with	electrical input device	ce -	UR = Und	der Range in	dicated	7	
Weighting	Α		C	1	Z		
	.9 dB UR	15.9	dB UF	₹ 21.5	dB	UR	
Uncertainty of the electrica	al self generated nois	se ±		0.12	dB		
The reported expanded ur	certainty is based of	n a standar	d uncertain	tv multiplied b	ov a cover	= age factor k =	2. providina
a level of confidence of ap							
UKAS requirements.	prominatory cover.		,,, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				
or the test of the frequen	cy weightings as per	paragraph	12. of IEC	61672-3:200	6 the actu	al microphone	free field
esponse was used. The acoustical frequency t	ests of a frequency	weighting a	s per parag	raph 11 of IE	C 61672-	3:2006 were o	arried out
using an electrostatic actu	ator.						
		Е	END				
Calibrated by: A Pate	el						R 1
Additional Comments							
Vone							





CERTIFICATE OF CALIBRATION

M. Breslin [



J. Harriman [/

Date of Issue: 05 May 2016

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 Lld trading as ANV Measurement Systems

Certificate Number: UCRT16/1152

Page 1 of 2 Pages
Approved Signatory

K. Mistry [

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 Serial No. / Version Manufacturer Instrument Type Rion Sound Level Meter NL-52 00620872 Rion Firmware 1.7 NH-25 20932 Rion Pre Amplifier UC-59 03715 Rion Microphone 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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CERTIFICATE OF CALIBRATION	Certif		Num T16/11		
UKAS Accredited Calibration Laboratory No. 7623	Page	2	of	2	Pages

Sound Level Meter Ins					und lev	els ind	dicated.		
SLM instruction manual t		el Meter N	IL-42 / NL	52					
SLM instruction manual			11-03						
SLM instruction manual s	source	Mar	nufacturer	r					
Internet download date if	applicable		N/A						
Case corrections availab	le		Yes						
Uncertainties of case cor	rections		Yes						
Source of case data		Mar	nufacturer	r					
Wind screen corrections	available		Yes						2
Uncertainties of wind screen	een corrections		Yes						
Source of wind screen da		Mar	nufacturer	•				1000	
Mic pressure to free field			Yes						
Uncertainties of Mic to F.	F. corrections		Yes						
Source of Mic to F.F. cor	CHELORES SERVICIONES AND	118,000,000	ufacturer						
Total expanded uncertain				2-1:2002	Yes				
Specified or equivalent C			pecified						
Customer or Lab Calibrat			Calibrator	r					
Calibrator adaptor type if	applicable		-74-002						
Calibrator cal. date		18 A	April 2016						
Calibrator cert. number		UCRT16/1	133						
Calibrator cal cert issued	by	7623							
Calibrator SPL @ STP		94.0	02	dB Calib	ration re	eferen	ce sound pre	ssure leve	اد
Calibrator frequency		1001	.92				frequency		
Reference level range		25 - 1	130	dB					
Accessories used or corre	ected for during calib	ration -	Evtens	sion Cable &	2 Mind 9	Shipld	WS-15		
Note - if a pre-amp extens									
Environmental conditions	during tests	Sta	rt I	Enc	1				
	Temperature	23.7	77	24.0	5	±	0.20 °C	7	
	Humidity	32.	9	32.4	l.	±	3.00 %RH	1	
	Ambient Pressure	100.	94	100.8	37	±	0.03 kPa	1	
Response to associated (Calibrator at the envi	ronmental o	onditions	above.	1		7	-	
Initial indicated level		dB		sted indicate			94.0	dB	
The uncertainty of the ass	ociated calibrator su	pplied with	the sound	d level mete	er ±		0.10	dB	
Self Generated Noise	This test is currently	v not perfor	med by th	nis Lab					
Microphone installed (if re				N/A		dB /	A Weighting		
Uncertainty of the microph				N/A		dB	T		
Microphone replaced with				Jnder Range	e indicat	ed	i		
Weighting	A	-	C	Zilder Kang		7	1		
	I.1 dB UR	15.2		UR 2		dB	TUR		
Uncertainty of the electrical			Jub ,	0.12	-	dB	TOTAL STATE OF THE PARTY OF THE		
			d upporto				J sas fostor ku	مالمان مسمد المالم	
The reported expanded un a level of confidence of ap									ıg
UKAS requirements.	proximately 95 %. I	ne uncertai	illy evalue	ation has be	cii caii	eu ou	i iii accordani	ce with	
			10 -115	0 64670 0.0	2000 16-			f f : 1 d	
For the test of the frequen response was used.	cy weightings as per	paragrapn	12. 01 IE	C 01072-3:2	2006 the	actua	ai microphone	e tree tield	
The acoustical frequency	ests of a frequency	weighting a	s ner nar:	agraph 11 c	f IEC 61	672-3	3-2006 were o	arried out	
using an electrostatic actu		rroignang a	o por port	agrapii i i o	LOU	0120		arriod out	
3		-	ENID						
Calibrated by: A Dat		[END .						o 4
Calibrated by: A Pat	- 1							r	₹ 1
Additional Comments None									
INOLIG									





CERTIFICATE OF CALIBRATION



Date of Issue: 04 September 2015

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 Lld trading as ANV Measurement Systems Certificate Number: UCRT15/1233

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

IdentificationManufacturerInstrumentTypeSerial No. / VersionRionSound Level MeterNL-5201121405

Rion Firmware 1.5 Rion Pre Amplifier NH-25 21449 UC-59 04440 Rion Microphone NC-74 34536109 Rion Calibrator 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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CERTIFICATE OF CALIBRATION	Certif		● Num T15/12		
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Sound Level Meter In	struction manual ar	id data used to	adjust t	he sound lev	els in	dicated.	
SLM instruction manua			/ NL-52			one for the second conduct checker.	
SLM instruction manua	ref / issue	11-03	3				
SLM instruction manua	source	Manufact	urer				
Internet download date	if applicable	N/A					
Case corrections availa	ble	Yes					
Uncertainties of case co	orrections	Yes					
Source of case data		Manufact	urer				
Wind screen correction		Yes	A.111				
Uncertainties of wind so	reen corrections	Yes					
Source of wind screen of		Manufact	urer				
Mic pressure to free fiel		Yes					
Uncertainties of Mic to I		Yes					
Source of Mic to F.F. co	STATE OF THE AMERICAN STATE OF THE STATE OF	Manufact			T		
Total expanded uncerta				002 Yes			
Specified or equivalent		Specifie					
Customer or Lab Calibrator adoptor type		Lab Calibration NC-74-0					
Calibrator adaptor type Calibrator cal. date	аррисаріе	19 August					
No. 2000 11 10 10 10 10 10 10 10 10 10 10 10			2015				
Calibrator cert. number	T I was	UCRT15/1221					
Calibrator cal cert issue	d by	7623					
Calibrator SPL @ STP		94.07	dB			nce sound pres	ssure level
Calibrator frequency		1001.88	Hz	Calibration of	heck t	frequency	12
Reference level range		25 - 130	dB				
Accessories used or cor				Cable & Wind 9			
Note - if a pre-amp exte	nsion cable is listed th	en it was used b	etween tl	ne SLM and th	е рге-	amp.	
Environmental condition	s during tests	Start		End			
	Temperature	22.63	1000	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 envir	onmental condit	ions abov	ve.			
Initial indicated lev				indicated level		94.1	dB
The uncertainty of the as	ssociated calibrator su					0.10	dB
Self Generated Noise	This test is currently						
Microphone installed (if			1	N/A	dB .	A Weighting	
Uncertainty of the micro				N/A	dB	T	
Microphone replaced with			= Under	Range indica	tod	ī	
Weighting	A A	C	- Oridei		7	1	
	11.0 dB UR	15.2 dB	lur	21.0	dB		
Uncertainty of the electri					dB		
The reported expanded	On any Virginia and		ertainty r	Share was a same		ane factor k=3	providina
a level of confidence of a							
UKAS requirements.	pproximatery 5576.	no anocitamity of	raidadon	rido been dan	ica oa	10000100110	O WILLI
For the test of the freque	ncy weightings as per	naragraph 12	f IEC 61	672-3·2006 the	actua	al microphone	free field
response was used.	ricy weightings as per	paragraph 12. c	ILOUI	072-0.2000 trie	actue	ai illioropilorie	iree iieiu
	toots of a fraguanau	voighting as per	DOFORFOR	h 11 of IEC 6	1670 1	2.2006 wara a	period out
The acoustical frequency using an electrostatic ac	A CANADA CANADA I LACO ANALYSIA CANADA CANAD	weighting as per	paragrap		10/2-3	5.2006 were ca	arried out
using an electrostatic ac		END					
0-11		END	******				
Calibrated by: A Pa	itei						R 1
Additional Comments							
None							





CERTIFICATE OF CALIBRATION



Date of Issue: 31 May 2016

Issued by:

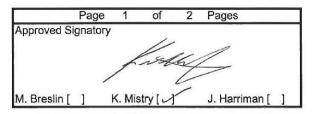
ANV Measurement Systems

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

Certificate Number: UCRT16/1173



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 Туре Serial No. / Version NL-52 Rion Sound Level Meter 01143556 Rion Firmware 1.7 Rion Pre Amplifier NH-25 43573

 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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CERTIFICATE OF CALIBRATION	Certif		Num T16/11		
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		in the second	- Lore					
Sound Level Meter Inst	ruction manual ar	nd data	used to adi	ust the	sound leve	els indi	icated.	
SLM instruction manual tit			NL-42 / NL		, , , , , , , , , , , , , , , , , , , ,			
SLM instruction manual re			11-03	. 02				
SLM instruction manual so		1	Manufacturer	e.				
Internet download date if a	applicable		N/A					
Case corrections available)		Yes					
Uncertainties of case corre			Yes					
Source of case data			Manufacturer	58:				
Wind screen corrections a	vailable		Yes					
Uncertainties of wind scre	en corrections		Yes					
Source of wind screen dat	a		Manufacturer	•				
Mic pressure to free field of	corrections		Yes					
Uncertainties of Mic to F.F	corrections		Yes					
Source of Mic to F.F. corre	ections		Manufacturer	•				
Total expanded uncertaint	ies within the requir	rements	of IEC 6167	2-1:200)2 Yes			
Specified or equivalent Ca			Specified					
Customer or Lab Calibrate	or	L	_ab Calibrato	Г				
Calibrator adaptor type if a	applicable		NC-74-002					
Calibrator cal. date			13 May 2016					
Calibrator cert. number		UCRT	16/1163					
Calibrator cal cert issued I	ον	7623						
Calibrator SPL @ STP	.,		94.02	dB	Calibration r	eferenc	ce sound pres	ssure level
Calibrator frequency		1	001.93	1000	Calibration of			,ou. o 10101
Reference level range	6 00000		5 - 130	dB	Calibration	IICON II	equency	
Accessories used or corre	oted for during calil			cion Co	able & Wind	Shield \	NC 15	
Note - if a pre-amp extens					management continues		AC BOOM IN THE CO.	
		TOTAL VIC		CON THE		1	p.	
Environmental conditions			Start		End		0.00 %C	1
	Temperature		22.95		23.15	±	0.20 °C	+
	Humidity	1	42.9		44.2 100.76	±	3.00 %RH	4
	Ambient Pressure	- X	100.77			±	0.03 kPa	J
Response to associated C	alibrator at the env	ironmer	ntal conditions	s above	Э.			
Initial indicated level		dB			dicated leve		94.0	dB
The uncertainty of the ass	ociated calibrator s	upplied	with the sour	nd level	meter ±		0.10	dB
Self Generated Noise	This test is current	ly not pe	erformed by t	his Lab).			
Microphone installed (if re					N/A	dB /	A Weighting	
Uncertainty of the microph	none installed self g	enerate	d noise ±		N/A	dB		
Microphone replaced with	electrical input dev	ice -	UR =	Under I	Range indica	ted	1	
Weighting	Α ΄		Ċ			Z		
	1.8 dB UR	15	.9 dB	UR	21.9	dB	UR	
Uncertainty of the electrical	al self generated no	ise ±			0.12	dB		
The reported expanded ur	ncertainty is based	on a sta	ndard uncert	aintv m	ultiplied by a	covera	age factor k =	2. providina
a coverage probability of a	approximately 95%.	The ur	certainty eva	luation	has been ca	arried o	ut in accorda	nce with
UKAS requirements.	ipproximately corre							
For the test of the frequen	cv weightings as ne	er narad	raph 12 of IF	C 616	72-3:2006 th	e actua	al microphone	free field
response was used.	by weightings do pe	or parag	10pii 12. 01 ii	-0 010	12 0.2000	o dotat	ar rinor oprior to	THOU HOLD
The acoustical frequency	tacts of a frequency	weight	ina se ner na	ranranl	h 11 of IEC 6	1672-3	8·2006 were o	earried out
using an electrostatic actu	and the second of the second o	weight	ing as per pa	ragrapi	ii ii oi ilo	1012	7.2000 WC/C	arried out
1000			END					
			END	•••••		• • • • • • •		
Calibrated by: A Pat	.eı							R 1
Additional Comments								
None								