Coille Beith Wind Farm

Technical Appendix 10.3: Baseline Noise Survey

June 2025

Contents

1. Introduction

1.1.1 This Technical Appendix describes the baseline noise survey measurements and results used to derive the operational and cumulative operational noise limits for the noise assessment of the Proposed Development, which forms **Chapter 10** of the **EIA Report Volume 2**.

1.1.2 Baseline noise measurements were carried out at five locations in line with ETSU-R-97[1] and the Institute of Acoustics (IOA) Good Practice Guide[2] (GPG). Measured noise levels have been correlated with hub height wind speeds (standardised to 10 m) measured using a LiDAR situated within the Site.

1.1.3 Noise limits have been derived according to ETSU-R-97, as well as The Highland Council's (THC) Onshore Wind Energy Supplementary Guidance[3].

2. Policy and Guidance

2.1.1 Baseline noise measurements were carried out in accordance with the methodology prescribed by ETSU-R-97 and the IOA GPG. These guidance documents are discussed below.

2.2 The Assessment and Rating of Noise from Wind Farms: ETSU-R-97

2.2.1 ETSU-R-97 presents the recommendations of the Working Group on Noise from Wind Turbines, set up in 1993 by the Department of Trade and Industry (DTI) as a result of difficulties experienced in applying the noise guidelines at the time to wind farm noise assessments. The group comprised independent experts on wind turbine noise, wind farm developers, DTI personnel and local authority Environmental Health Officers. In September 1996 the Working Group published its findings by way of report ETSU-R-97. This document describes a framework for the measurement of wind farm noise and specifies noise limits, which were derived with reference to existing standards and guidance relating to noise emission from various sources.

2.2.2 ETSU-R-97 recommends that, although noise limits should be set relative to existing background and should reflect the variation of both turbine and background noise with wind speed; this can imply very low noise limits in particularly quiet areas, in which case, *"it is necessary to use a margin above background in such low-noise environments. This would be unduly restrictive on developments which are recognised as having wider global benefits. Such low limits are, in any event, not necessary in order to offer a reasonable degree of protection to the wind farm neighbour".*

2.2.3 For daytime periods, the noise limit is 35-40 dB L_{A90} or 5 dB(A) above the 'quiet daytime hours' prevailing background noise, whichever is the greater. The actual value within the 35-40 dB(A) range depends on the number of dwellings in the vicinity; the impact of the limit on the number of MWh generated; and the duration and level of exposure. The quiet daytime periods are defined as evenings from 18:00-23:00 hours, plus Saturday 13:00-18:00, and Sunday 07:00-18:00.

2.2.4 For night-time periods (23:00-07:00 hours) the noise limit is 43 dB L_{A90} or 5 dB(A) above the prevailing night-time hours background noise, whichever is the greater. The 43 dB (A) lower limit is based on an internal sleep disturbance criteria of 35 dB (A) with an allowance of 10 dB(A) for attenuation through an open window and 2 dB(A) subtracted to account for the use of the L_{A90} rather than the L_{Aeq} noise measurement index.

2.2.5 At properties that are occupied by residents with a direct financial benefit from the wind farm, the daytime and night-time lower limiting values are increased to 45 dB L_{A90}.

2.2.6 It is stated that the $L_{A90,10min}$ noise descriptor should be adopted for both background and wind farm noise levels and that, for the wind farm noise, this is likely to be between 1.5 and 2.5 dB less than the L_{Aeq} measured over the same period. The $L_{Aeq,t}$ is the equivalent continuous 'A' weighted sound pressure level occurring over the measurement period 't'. It is often used as a description of the average ambient noise level. Use of the L_{A90} descriptor for wind farm noise allows reliable measurements to be made without corruption from relatively loud, transitory noise events from other sources.

2.2.7 With regard to multiple wind farms in a given area, ETSU-R-97 specifies that the absolute noise limits and margins above background should relate to the cumulative impact of all wind turbines in the area contributing to the noise received at the properties in question. Existing wind farms should therefore be included in cumulative predictions of noise levels for proposed wind turbines and not considered as part of the prevailing background noise.

[1] ETSU-R-97 (1996). The Assessment and Rating of Noise from Wind Farms. MM for the DTI
[2] Institute of Acoustics (2013). A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise. IOA
[3] The Highland Council (2022). Onshore Wind Energy Supplementary Guidance. THC

2.3 A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise

2.3.1 The GPG includes section on Context; Background Data Collection; Data Analysis and Noise Limit Derivation; Noise Predictions; Cumulative Issues; Reporting; and Other Matters including Planning Conditions, Amplitude Modulation, Post Completion Measurements and Supplementary Guidance Notes. The Context section states that the *guide "presents current good practice in the application of the ETSU-R-97 assessment methodology for all wind turbine development above 50 kW, reflecting the original principles within ETSU-R-97, and the results of research carried out and experience gained since ETSU-R-97 was published"*. It adds that *"the noise limits in ETSU-R-97 have not been examined as these are a matter for Government".*

3. Consulation with The Highland Council

3.1.1 THC were consulted regarding baseline noise monitoring locations and appropriate noise limits (see **Annex A**). In April 2024, document 3737_L01_EXT02 (**Annex A**), was sent to THC environmental health department to suggest an initial proposed noise assessment methodology to obtain noise measurement data at four locations, as set out in **Table 3.1.** It was proposed these measurement locations would supplement the data using previously derived background noise levels from the Strath Oykel wind farm application (see **Table 3.2**).

Table 3.1 – Initial Proposed Measurement Locations

Location ID	Description	Easting, Northing
M1	Langwell Lodge or The Cottage, Langwell, IV27 4HE	241482, 895426
M2	Amat Cottage or Keepers Cottage, Oykel Bridge Road, IV27 4BH	239068, 900004
M3	Lubachoinnich, Croik Manse Road, IV24 3BS	241645, 901012
M4	Upper Doune, Doune, IV24 3DP	243459, 900707

Table 3.2 – Background noise level against wind speed at Inveroykel Lodge (L_{A90})

Measurement Location	Time Period	Standardised 10 m height wind speeds								
		4	5	6	7	8	9	10	11	12
Inveroykel Lodge	Daytime	28.0	28.6	29.4	30.4	31.8	33.4	35.3	37.5	40.1
	Night-time	28.2	28.4	28.9	29.7	30.9	32.5	34.6	37.0	39.9

3.1.2 THC's environmental health officer responded confirming the use of the THC noise guidance and associated noise limit derivation. The use of previous background noise monitoring to derive limits and supplementing with additional locations was agreed.

3.1.3 Further consultation was held with the THC environmental health department regarding noise limits and assessment methodology in April 2025 (see **Annex A**). Alongside details of the cumulative developments and receptors to include within the assessment, it was proposed that a higher noise limit was adopted for the purposes of the cumulative noise assessment, on the basis that the Strath Oykel wind farm had been consented with noise limits above the normal THC target noise limits of 35 dB. It was agreed that a lower limiting value of 37 dB would be adopted for the purposes of the daytime cumulative assessment only, with standard noise limits applicable at night and for financially involved properties.

4. Baseline Noise Measurements

Survey Planning

4.1.1 Following consultation with THC, subsequent discussions with the stakeholders identified the potential merits of undertaking additional measurements at a fifth location. The final measurement locations adopted for the survey are shown in **Table 4.1**.

Table 4.1 – Adopted Measurement Locations

Location ID	Address	Easting, Northing
M1	The Cottage, Langwell, Lairg, IV27 4HE	241582, 901064
M2	4 Oykel Terrace, Oykel Bridge Road, Rosehall, IV27 4BH	238909, 900391
M3	Lubachoinnich, Croik Manse Road, Ardgay, IV24 3 BS	241481, 895426
M4	Carn Mholloch, Strathoykel, Ardgay, IV24 3DP	245118, 900739
M5	Langwell Beag, Scree Road, Ardgay, IV24 3DP	243459, 900708

4.1.2 Baseline noise measurements were carried out to characterise the existing noise environment at noise-sensitive receptor locations and to allow for appropriate noise limits to be derived for the Proposed Development in line with the methodology submitted to THC.

4.1.3 As set out in the submitted methodology, it was considered unlikely that background noise measurements would be significantly affected by existing wind turbine developments. This was confirmed through the site visits and review of predicted operational noise levels from existing developments. No correction has therefore been applied to measured noise levels to account for noise from existing wind farm developments.

Noise Survey Methodology and Instrumentation

4.1.4 Rion NL-52 sound level meters corresponding to the Class 1 standard in BS EN 61672[4], were used for the noise measurements. The calibration certificates for the sound level meters and the two Brüel and Kjær 4231 Class 1 sound level calibrators (serial numbers 2699280 and 3022368) used for the surveys are given in **Annex B**.

4.1.5 The microphones were fitted with double skin windshields based on the recommended design in ETSU and mounted on a tripod at a height of 1.2-1.5 m. Wind speeds and noise measurements were averaged for successive 10-minute measurement intervals.

4.1.6 Wind speeds were measured at a number of heights between 38 and 239 m using a LiDAR within the Site at a location designated as M6. To monitor rainfall over the duration of the noise measurements, rain gauges were installed at two of the baseline measurement locations.

4.1.7 The noise survey covered the period from 24th September to 5th November 2024.

Noise Survey Measurement Locations

4.1.8 The measurement locations are shown at **Figure 1**, which also shows the location of the Proposed Development turbines. The measurement positions and equipment used at each location are described at **Table 4.2**, including at M6, where no sound measurement equipment was installed.

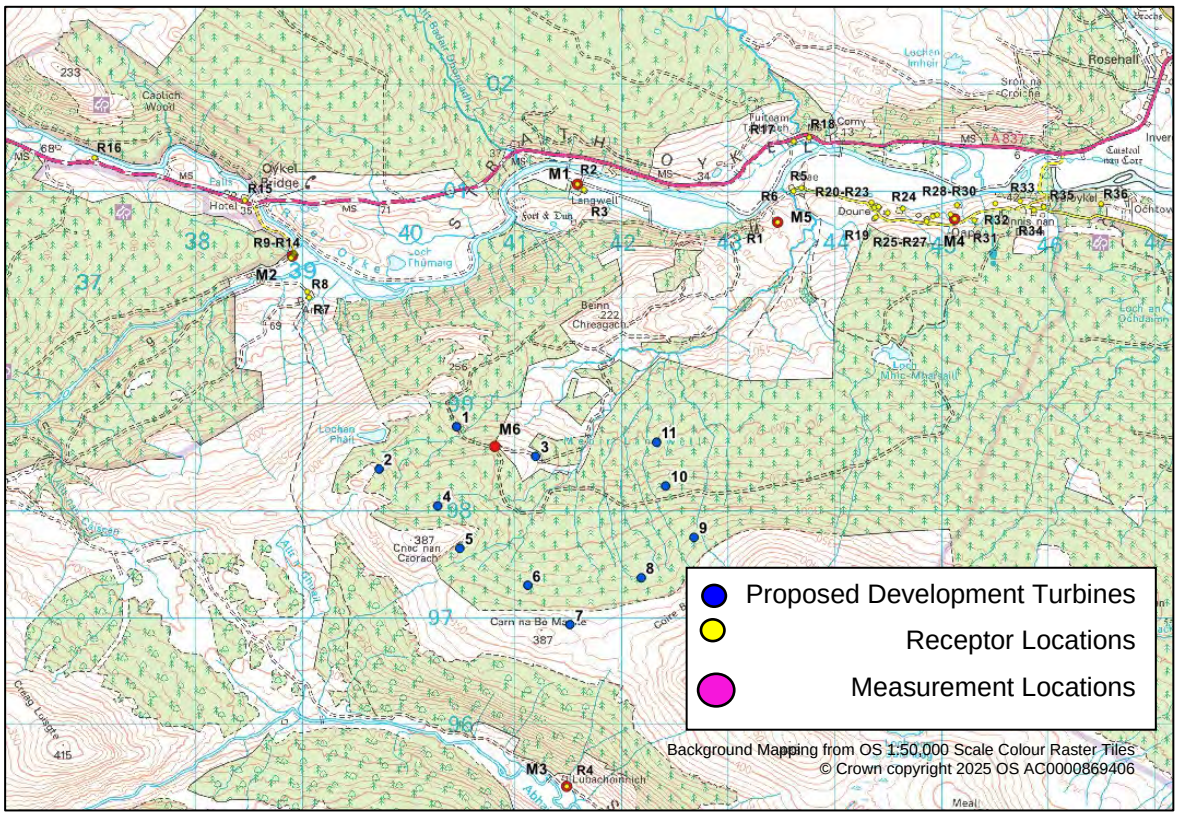

Figure 1 Baseline Measurements and Receptor Locations

[4] British Standards Institution (2013). Electroacoustics. Sound level meters – Specifications BS EN 61672-1:2013. BSI

Table 4.2 – Baseline Measurement Details

Location ID	Easting, Northing	Sound Level Meter Serial Number	Date of Previous Calibration (Valid for 24 Months)	Notes
M1	241582, 901064	01032422	10/01/2024	
M2	238909, 900391	01032450	13/06/2024	A rain gauge was also installed at this location
M3	241481, 895426	01032423	10/01/2024	
M4	245118, 900739	00231708	05/02/2024	A rain gauge was also installed at this location
M5	243459, 900708	01032452	02/07/2024	
M6	240808, 898609	n/a	n/a	A Triton SoDAR and rain gauge were installed at this location

4.1.9 The sound level meters were calibrated before and after installation. The GPG states that a calibration drift of no greater than 0.5 dB during the survey period is within an acceptable tolerance. No calibration drift of more than 0.2 dB was present on either of the sound level meters during the survey which is within the allowable tolerance.

4.1.10 A description of the noise environment at each measurement location is provided at **Annex C**.

Wind Profile Correction

4.1.11 The measured acoustic data has been correlated with the standardised 10 m height wind speed derived from the data measured using the on-site LiDAR in order to determine the prevailing background noise level during the night and quiet daytime periods.

4.1.12 The proposed turbine hub heights on-site 114 m, therefore the wind speeds measured at 110 m were used to calculate the standardised 10 m height wind speeds, assuming a logarithmic wind shear profile as described by the following formula:

$$V_{10} = V_h \left(\frac{\ln(\frac{10}{Z_0})}{\ln(\frac{h}{Z_0})} \right)$$

where: h is the hub height

V_{10} is the 10 m wind speed

V_h is the wind speed at hub height

Z_0 is the ground roughness length, standardised to 0.05 m

4.1.13 **Annex D** shows the wind speed and direction data measured throughout the night and quiet daytime periods of the background noise measurements.

Data Filtering and Exclusions

4.1.14 The measured noise data was filtered into the relevant time periods for night-time and quiet daytime hours, and any period where rainfall was measured at any of the rain gauges was excluded from the derivation of the average baseline noise levels at all locations.

4.1.15 Data around the dawn periods, as well as periods of elevated noise levels following heavy rainfall were also excluded, and other individual exclusions were made, where abnormally high sound levels were observed.

4.1.16 Substantial banding in the data was observed at M4, whereby there are periods of low and high constant sound levels which appear to be independent of wind speed. Investigation into this occurrence concluded that the likely cause of this effect is extended periods of water noise from local watercourses, which was not observed during installation, the interim maintenance visit, or at collection. Ordinarily, it would be anticipated that elevated watercourse noise may occur close to watercourses for 24-48 hours following heavy rainfall. However, in this case elevated noise levels were found to occur for up to 7 days, even following relatively short periods of heavy rain.

4.1.17 While there are many small watercourses in the vicinity and many receptor locations could experience a similar sound environment, noise data from M4 was notably higher than at other locations, and a reliable relationship between wind speed and background noise levels was not able to be determined for this location. The noise data at M4 was therefore considered not to be sufficiently representative of all locations in the surrounding area. Tabulated data for M4 are therefore not presented. However, **Annex E** shows the measured background noise data over the survey.

Baseline Results

4.1.18 **Annex E** shows the measured background noise level over a range of wind speeds for each measurement location during the quiet daytime hours and night-time periods, correlated with the standardised 10 m height wind speed. Where applicable, a 3rd order polynomial regression line has been plotted through the average measured noise data to derive the prevailing background noise levels.

4.1.19 The resulting derived prevailing background noise levels at each location are summarised in **Table 4.3**.

Table 4.3 – Calculated Background Noise Levels by Wind Speeds

Measurement Location	Time Period	Standardised 10 m height wind speeds									
		3	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
M1	Daytime	25.6	26.6	27.9	29.6	31.5	33.6	35.9	38.3	40.9	43.5
	Night-time	27.3	27.8	28.5	29.6	31.3	33.6	36.7	40.6	45.6	51.7
M2	Daytime	27.3	28.3	29.7	31.4	33.2	35.2	37.2	39.3	41.2	43.0
	Night-time	27.8	28.7	30.1	31.9	33.9	36.1	38.1	39.9	41.3	42.2
M3	Daytime	29.0	29.8	31.3	33.3	35.7	38.2	40.7	43.0	44.8	46.0
	Night-time	29.2	29.6	30.7	32.4	34.4	36.7	39.1	41.4	43.5	45.3
M4	Daytime	No wind speed-dependent noise profile could be reliably derived.									
	Night-time										
M5	Daytime	24.7	25.2	26.0	27.0	28.1	29.4	30.8	32.3	33.9	35.5
	Night-time	24.6	25.5	26.5	27.8	29.1	30.7	32.4	34.2	36.2	38.2

5. Derivation of Noise Limits

5.1.1 The night and daytime noise limits are derived from the prevailing background noise levels in line with ETSU-R-97, the IOA GPG, and THC's scoping response and subsequent consultation, which sets out the following wind farm noise limits:

- For receptors that are not financially involved in the development (non-FI), noise limits should be set at 35 dB $L_{A90,10min}$ for daytime hours and 38 dB $L_{A90,10min}$ for night-time hours, or the ETSU-derived limits of background noise level plus 5 dB (whichever is greater);
- For the daytime cumulative noise assessment, for non-FI receptors, noise limits should be set at 37 dB $L_{A90,10min}$ for daytime hours, or the ETSU-derived limits of background noise level plus 5 dB (whichever is greater); and
- For receptors that are financially involved in the development (FI), noise limits should be set at 45 dB $L_{A90,10min}$ for both daytime and night-time hours or ETSU-derived limits of background noise level plus 5 dB (whichever is greater).

5.1.2 The resultant noise limits are shown below in **Table 5.1**. For the purposes of the noise assessment, receptor locations can be separately categorised into being best represented by one of the measurement locations detailed herein, or by the Strath Oykel wind farm measurement at Inveroykel Lodge, and by being financially involved (FI) in the Proposed Development or not. The respective noise limits for each scenario are shown.

Table 5.1 – Derived Noise Limits for each Receptor Scenario, dB L_{A90}

Measurement Location	Time Period	Standardised 10 m height wind speeds									
		3	4	5	6	7	8	9	10	11	12
M1 Night-time	Non-FI	38.0	38.0	38.0	38.0	38.0	38.6	41.7	45.6	50.6	56.7
	FI	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.6	50.6	56.7
M1 Daytime	Non-FI	35.0	35.0	35.0	35.0	36.5	38.6	40.9	43.3	45.9	48.5
	Cumulative	37.0	37.0	37.0	37.0	37.0	38.6	40.9	43.3	45.9	48.5
	FI	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.9	48.5
M2 Night-time	Non-FI	38.0	38.0	38.0	38.0	38.9	41.1	43.1	44.9	46.3	47.2
	FI	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	46.3	47.2
M2 Daytime	Non-FI	35.0	35.0	35.0	36.4	38.2	40.2	42.2	44.3	46.2	48.0
	Cumulative	37.0	37.0	37.0	37.0	38.2	40.2	42.2	44.3	46.2	48.0
	FI	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	46.2	48.0
M3 Night-time	Non-FI	38.0	38.0	38.0	38.0	39.4	41.7	44.1	46.4	48.5	50.3
	FI	45.0	45.0	45.0	45.0	45.0	45.0	45.0	46.4	48.5	50.3
M3 Daytime	Non-FI	35.0	35.0	36.3	38.3	40.7	43.2	45.7	48.0	49.8	51.0
	Cumulative	37.0	37.0	37.0	38.3	40.7	43.2	45.7	48.0	49.8	51.0
	FI	45.0	45.0	45.0	45.0	45.0	45.0	45.7	48.0	49.8	51.0
M5 Night-time	Non-FI	38.0	38.0	38.0	38.0	38.0	38.0	38.0	39.2	41.2	43.2
	FI	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
M5 Daytime	Non-FI	35.0	35.0	35.0	35.0	35.0	35.0	35.8	37.3	38.9	40.5
	Cumulative	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.3	38.9	40.5
	FI	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
Inveroykel Lodge Night-time	Non-FI	38.0	38.0	38.0	38.0	38.0	38.0	38.0	39.6	42.0	44.9
	FI	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
Inveroykel Lodge Daytime	Non-FI	35.0	35.0	35.0	35.0	35.4	36.8	38.4	40.3	42.5	45.1
	Cumulative	37.0	37.0	37.0	37.0	37.0	37.0	38.4	40.3	42.5	45.1
	FI	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.1

6. Conclusions

6.1.1 Baseline noise measurements were undertaken at five residential receptor locations in the vicinity of the Site.

6.1.2 At one location, the data were not considered to be suitable for deriving background noise levels with respect to wind speeds.

6.1.3 For the remaining four locations, and for background noise data obtained from the Strath Oykel 2022 survey, the results of the baseline noise measurements were used to derive appropriate noise limits in line with ETSU-R-97, the IOA GPG, and THC's consultation responses and their Onshore Wind Energy Supplementary Guidance.

Annex A – EHO Correspondence

Email Exchange between Conor Tickner and Robin Fraser April 2024

Conor Tickner

From: [redacted]
Sent: 16 April 2024 15:44
To: Conor Tickner
Subject: RE: Coille Beith Wind Farm Noise

Hi Conor, that all looks fine. I have no issues with the proposed monitoring locations or the use of relevant historical monitoring data from previous applications.

The methodology looks fine. I understand that for other developments, consented limits or predicted levels plus 3dB will be used, whichever is lower. As you have said, our preference is for lower limits of 35dB daytime and 38 dB night time where possible. If daytime limits are increased beyond that the assessment would need to include an argument in terms of the criteria listed in ETSU. These limits would apply to cumulative noise and the available limit applied to Coille Beith.

Unfortunately, I'll not be able to attend the installation however, as long as the locations are documented and the assessment includes photographs of installation sites, that shouldn't be an issue. As you say, care will need to be taken to ensure that any site which is being used as a proxy location is representative of other sites in terms of other noise sources such as watercourses.

For the cumulative assessment you've mentioned all the known wind farms that I am aware of i.e. existing, consented or in Planning. I don't know if there are any proposals for the sites of the former Caplich and Invercassley applications, but it might be worth checking with Planning.

With regard to any financially involved properties, it would be for Planning to agree on that status. If required, limits can be extended to 45dB however, if not then we would prefer not to set limits that are significantly higher than required.

I hope this is of use. If there is anything you wish to discuss, please get back to me.

Regards,
Robin Fraser
Environmental Health Officer
Highland Council, 38 Harbour Road, Inverness, IV1 1UF
[redacted]

From: Conor Tickner [redacted]
Sent: Tuesday, April 16, 2024 2:15 PM
To: Robin Fraser (Environmental Health (Mid 3)) [redacted]
Subject: Coille Beith Wind Farm Noise

CAUTION: This email was sent from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Good Afternoon, Robin

I'm getting in touch seeking to agree the methodology for our noise assessment for the Coille Beith Wind Farm development.

Please see the attached letter setting out the proposed methodology and key information.

If you have any questions or you'd like to discuss, please don't hesitate to get in touch.

Kind Regards

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Document Reference 3737_L01_EXT02

Hayes McKenzie
Consultants in Acoustics

16 April 2024

Our Reference: 3737_L01_EXT02

Robin Fraser
Environmental Health Officer
The Highland Council

By email to: [redacted]

Dear Robin,

I am writing to you regarding the proposed Coille Beith Wind Farm (the 'Proposed Development). A scoping report for the Proposed Development is due to be submitted shortly and we have been appointed to carry out the environmental noise impact assessment. I am seeking your agreement on our proposed methodology, including the noise-sensitive receptors, cumulative wind farm developments identified and the proposed assessment approach.

The operational noise assessment will be carried out in line with ETSU-R-97 and the UK Institute of Acoustics Good Practice Guide on its use, including scoping out any individual small/micro scale wind turbine developments under 50 kW.

Two existing operational wind farms have been identified in the vicinity (<10 km), namely the Rosehall and Achany developments. In addition, two approved (but not constructed) wind farm developments (Mealll Buidhe and Achany Extension) and two wind farm developments with active planning applications have also been identified (Strath Oykel and Braelangwell).

These developments are shown in Figure 1. The cumulative noise from any developments which are existing, approved, or have a live submitted application at the time of submission will be considered as part of the assessment.

Operational noise impacts from the Proposed Development will be considered to be acceptable if they meet the relevant noise limits for cumulative noise from all wind turbines in the vicinity. This limit is set at plus 5 dB above background, subject to lower limiting values. It is understood that The Highland Council's preferred policy is for lower limiting values of 35 dB and 38 dB L_{A90} during the daytime and night-time respectively and these would likely be adopted in the assessment, except where properties are identified as being financially involved in the Proposed Development, whereby a lower limiting value of 45 dB L_{A90} is proposed to be adopted for all time periods.

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Operational noise impacts will be presented in the assessment for noise sensitive properties where predicted operational noise levels from the Proposed Development acting alone are above 25 dB L_{A90}, except in the case that predicted noise from other wind farms are more than 10 dB greater than noise levels from the Proposed Development. This approach is proposed on the basis that where predicted operational noise levels are 10 dB or more below the simplified ETSU-R-97 cumulative noise limit (i.e. 35 dB L_{A90}), noise contributions from the Proposed Development can be considered to be negligible and therefore not significant.

AddressBase Plus data will be used to identify all noise sensitive receptors where the above criteria apply for the Proposed Development. For such receptors, noise levels will be calculated, taking into account the predicted operational noise levels for applicable cumulative developments in the vicinity (i.e. Rosehall, Achany, Mealll Buidhe, Achany Extension, Strath Oykel and Braelangwell). The relevant noise limits for the Proposed Development acting alone will be determined by calculating the 'remaining noise budget'. This will be calculated by logarithmically subtracting the predicted cumulative operational noise levels (not including the Proposed Development) from the relevant cumulative operational noise limit (i.e. the greater of 5 dB above background or the lower limiting values of 35 and 38 dB L_{A90} during the day and night-time respectively). Where noise levels from consented developments could be higher than predicted while still meeting their noise limits, predicted levels will be increased to an assumed 'maximum realistic' noise output of 3 dB greater than predicted, or the level at which the sites will be operating at their noise limits at the nearest controlling property, whichever is lower.

Following initial predictions based on the candidate turbine for the Proposed Development and wider information regarding proposed or built turbines for wind farm developments in the vicinity, we have identified nine individual or clusters of receptors (based on AddressBase Plus data) in the vicinity of the Proposed Development where noise will be assessed, which are listed below. Potential receptors are shown on Figure 1. At present, one property is identified as being anticipated to have a financial involvement for the purposes of the assessment, namely Langwell Beag. The status of this receptor will be confirmed prior to the assessment.

Receptor Cluster ID	Description	Easting, Northing
R1	Langwell, comprising two properties to the north of the Proposed Development, on low-lying River Oykel floodplains.	241645 , 901012

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Receptor Cluster ID	Description	Easting, Northing
R2	Okyel Bridge, comprising two properties to the north west of the Proposed Development, adjacent to the River Oykel.	238466 , 900909
R3	Oykel Bridge Road, comprising eight properties to the north west of the Proposed Development, close to the River Einig and River Oykel.	239068 , 900004
R4	Lubachoinnich comprising a single remote property to the south of the Proposed Development, adjacent to the Abhainn an t-Srath Chuileannach river.	241482 , 895426
R5	Brae, comprising four properties to the north east of the Proposed Development on or near to low-lying River Oykel floodplains.	243603 , 900998
R6	Doune and Strathoykel, comprising 17 properties to the north east of the Proposed Development, situated upon a ridge overlooking the River Oykel and its floodplains.	244378 , 900753
R7	Langwell Beag, comprising a single property to the north of the Proposed Development, situated upon a ridge overlooking the River Oykel and its floodplains.	243459 , 900707
R8	Inveroykel, comprising two properties to the north east of the Proposed Development, situated within a sloped wooded area overlooking the River Oykel and its floodplains.	246489 , 900883
R9	Rosehall and Invercassley, comprising 16 properties to the north east of the Proposed Development, adjacent to the River Cassley.	246895 , 901640

A review of available information has identified that baseline noise data is available in the public domain for the Strath Oykel Wind Farm development, comprising measurements undertaken in February to March 2022 at Inveroykel Lodge, which are considered likely to be representative of the R8 and R9 receptor clusters. However, no suitable data is available for other identified receptors. Therefore, baseline noise monitoring is proposed to be undertaken at the following four locations.

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Receptor ID	Description	Approximate Grid Reference (Easting, Northing)
M1	Langwell Lodge or The Cottage, Langwell, IV27 4HE	241482 , 895426
M2	Amat Cottage or Keepers Cottage, Oykel Bridge Road, IV27 4BH	239068 , 900004
M3	Lubachoinnich, Croik Manse Road, IV24 3BS	241645 , 901012
M4	Upper Doune, Doune, IV24 3DP	243459 , 900707

We would be pleased to invite you to attend the installation of noise monitoring equipment, should you wish to observe or provide input with respect to the specific installation location and arrangements.

It is anticipated that noise from watercourses will be a notable consideration given that most of the identified receptors are situated within potentially audible distances from the rivers Oykel, Cassley, Einig or Abhainn an t-Srath Chuileannach, with many other smaller streams or brooks in the vicinity. Careful consideration will be given to best quantify both wind-dependent and static baseline noise levels as appropriate.

I would be grateful if you could indicate whether you are happy with the proposed assessment methodology, or if you have any questions or would like to discuss the matter, please feel free to get in touch.

Yours sincerely

[redacted]

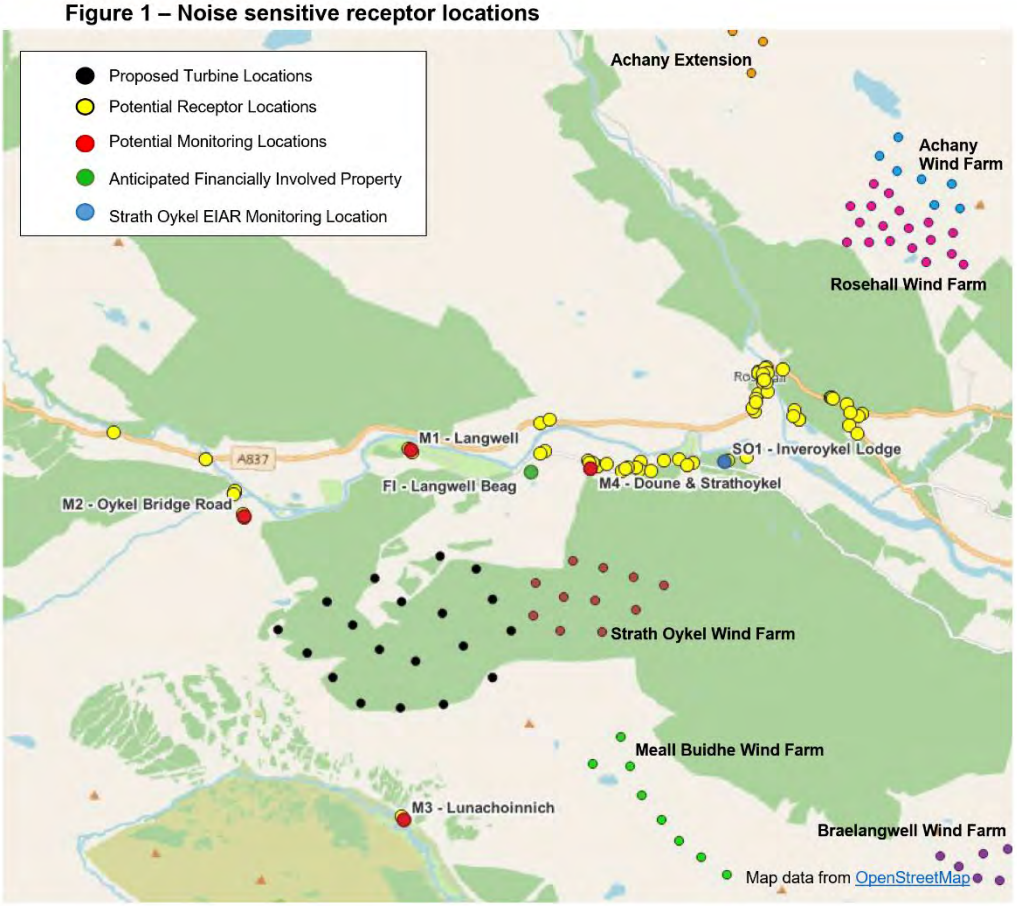
Conor Tickner BEng MIOA, Senior Consultant

[redacted]

Confidential

Hayes McKenzie
Consultants in Acoustics

Figure 1 – Noise sensitive receptor locations



Email Exchange between Conor Tickner and Robin Fraser April 2025

Conor Tickner

From: Robin Fraser (Environmental Health (Mid 3)) [redacted]
Sent: 11 April 2025 11:33
To: Conor Tickner
Subject: RE: Coille Beith Wind Farm Noise

Hi Conor, apologies for the delay in responding. Thanks for the information, my understanding is that you are seeking advice on whether a cumulative limit of 37dB could be applied for Coillie Beith in conjunction with other developments such as Strath Oykel. I understand that development has been consented with limits at some locations exceeding 35dB already. That being the case, I agree a cumulative limit of 37dB would appear reasonable. The rest of the proposed methodology looks fine.

Regards,
Robin Fraser
Environmental Health Officer
Highland Council, 38 Harbour Road, Inverness, IV1 1UF
Telephone: 07879661365

From: Conor Tickner [redacted]
Sent: 16 April 2024 14:15
To: Robin Fraser (Environmental Health (Mid 3)) [redacted]
Subject: Coille Beith Wind Farm Noise

CAUTION: This email was sent from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Good Afternoon, Robin

I'm getting in touch seeking to agree the methodology for our noise assessment for the Coille Beith Wind Farm development.

Please see the attached letter setting out the proposed methodology and key information.

If you have any questions or you'd like to discuss, please don't hesitate to get in touch.

Kind Regards

Conor Tickner
BEng MIOA
Senior Consultant | Hayes McKenzie Partnership Ltd
[redacted]
Hayes McKenzie
Consultants in Acoustics

1

Document Reference 3737_L03_EXT02

Hayes McKenzie
Consultants in Acoustics

24 March 2025

Our Reference: 3737_L03_EXT02

Robin Fraser
Environmental Health Officer
The Highland Council

By email to: [redacted]

Dear Robin,

I am writing to you to discuss and agree on appropriate noise limits for the EIA noise assessment for the proposed Coille Beith Wind Farm (the 'Proposed Development'), and other assumptions relating to the inclusion and exclusion of receptors, inclusion and exclusion of cumulative wind energy developments, and the representative background noise locations used to derive noise limits at respective receptor locations. Following our previous correspondence (letter dated 22 March 2024, ref: 3737_L02_EXT01) and completion of scoping, the design stage has been underway and the noise situation is becoming clearer.

Proposed Assessment Method

Our most recent noise predictions indicate that noise from the Proposed Development would contribute well below 35 dB at even the closest noise-sensitive receptor locations, so the individual noise effects are straightforward to assess.

The cumulative noise situation, however, is more complex. We would like to propose a cumulative daytime noise limit of 37 dB (or 5 dB above background noise levels, whichever is higher), for the purposes of the EIA cumulative noise assessment only. The reasoning for this is set out below in more detail. The preferred night-time noise limit using a lower limiting value of 38 dB would remain applicable in all scenarios.

Justification for Adopting Higher Cumulative Noise Limit

The main justification for adopting a 37 dB cumulative noise limit is that it would vastly simplify the assessment and reduce the need for nuanced technical discussion around different assumptions, contextual considerations, whether various noise contributions are negligible, etc., allowing the assessment outcomes to be clearly and concisely explained, while still providing a good level of noise protections to residents. Conversely, implementing noise

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mitigation such that lower cumulative noise limits are met would have a disproportionate effect on the power generation of the Proposed Development, for a likely imperceptible noise benefit. The resulting noise assessment would be unnecessarily technically complex and nuanced.

Being within the lower portion of the specified 35-40 dB range of appropriate lower limiting values given in ETSU-R-97, a lower limiting value of 37 dB affords a good level of protection to residents while balancing the facilitation of wider renewable energy development.

The Strath Oykel Wind Farm, situated immediately to the east of the Proposed Development, was recently granted consent. Noise limits in the Strath Oykel decision notice are set for each identified receptor location at their predicted noise levels plus 2 dB. This results in consented noise levels up to 36.4 dB at key receptors in the Doune and Strathoykel village areas. Where the consented noise limits are greater than 35 dB, it is presumed that these limits supersede the usual 35 dB lower limiting value in terms of cumulative noise at that property, creating a variable noise situation in the area.

It is also worth noting that our noise predictions do not agree with the predictions in the Strath Oykel EIA Report, leading to a potential controlling property situation at Doune Mills (location J in the Strath Oykel EIA Report), where we predict that the Strath Oykel development would not be able to fully utilise its consented noise limits at other locations without exceeding the limit at this location. For example, if the Strath Oykel predicted noise levels meet the consented noise limits of 34.5 dB at Doune Mils, our predicted noise levels for Strath Oykel at Wester Doune (location O in the Strath Oykel EIA Report) are 35.2 dB, despite having consented noise limits of 35.5 dB for that location. An indication of a difference in predicted noise levels less than 1 dB between these locations can also be observed in **Figure 1**.

Through the design process, substantial efforts have been made to refine the Proposed Development and minimise noise effects, while balancing other critical constraints. The most recent predictions are for the Proposed Development to contribute less than 30 dB at the most critical cumulative receptors. In these areas, Strath Oykel is predicted to contribute noise levels of up to 34.4 dB, albeit consented up to 36.4 dB as mentioned previously. Depending on the cumulative noise limit adopted, a strict evaluation of the cumulative noise situation would indicate that cumulative noise limits would be exceeded by the introduction of the Proposed Development, with some noise mitigation required.

Derivation of Cumulative Noise Limits and Representative Background Locations

The noise limits proposed to be adopted are derived based on representative background noise levels for respective receptor locations. Measurement data was collected at Carn Mholloch in

Strathoykel by Hayes McKenzie last year and for the Strath Oykel EIA Report in 2022, but neither dataset were deemed to be suitable for deriving noise limits due to significant noise banding in the data, believed to be due to extended durations of noisy water run-off from local watercourses following heavy rainfall. The most suitable data in this area is therefore considered to be from Inveroykel Lodge to the east of Strathoykel. This data was adopted for the noise assessment in the Strath Oykel EIA Report 2022. Other areas away from Doune and Strathoykel have representative noise data from our 2024 survey.

Receptors to be Included in the EIA Report

We have identified five additional noise-sensitive receptors which were not included in the Strath Oykel noise assessment but are within the vicinity of receptors that were included, see **Table 1**. The most representative receptor location with Strath Oykel consented noise limits is also identified. These receptors can also be seen in **Figure 2** and **Figure 3**.

Our proposed assessment method is to derive cumulative noise limits for each receptor at the background noise level +5 dB, 35 dB, or the Strath Oykel consented noise limit, whichever is highest. The receptors in **Table 1** are assumed to have noise limits the same as the consented limits at the most representative nearby location.

Table 1 Receptors Not Identified in Strath Oykel EIA Report

Receptor Address (Easting, Northing)	Representative Property (ID Ref.)
The Cottage, Langwell (241582, 901064)	Langwell Lodge, Langwell (A)
Tutim Cottage (243754, 901503)	Tuiteam (B)
Dr Malone's, Strathoykel (244404, 900852)	Wester Doune, Strathoykel (O)
The Steading, Strathoykel (244914, 900764)	Moravia, Strathoykel (G)
Bluepool Cottage, Strathoykel (245140, 900869)	River House, Strathoykel (R)

Two receptors, identified as I and K in the Strath Oykel EIA Report, are considered to form part of the Doune Mills property and are not noise-sensitive. There is only one addressbase point for this location and the main residential property is clearly identifiable from aerial photography.

Cumulative Developments to be Included in the EIA Report

Cumulative wind energy developments are proposed to be included in cumulative noise calculations for any given receptor location only if their highest predicted noise levels for any wind speed (up to 12 m/s) are within 10 dB of the cumulative noise limit. Where the predicted noise levels for a development are below the cumulative noise limit by a margin of greater than 10 dB at all wind speeds, they would be excluded from assessment calculations.

On the basis of the above criteria, noise from Strath Oykel would be included at all Doune and Strathoykel locations and most other locations, while noise from Rosehall would be included only in some locations to the eastern part of Strathoykel. Other identified cumulative wind energy developments would be excluded at all locations, including Achany, Achany Extension, and Meall Buidhe, due to their low contributions to cumulative noise levels, typically less than 20 dB. Developments not consented are not proposed to be included. However, at present, no development applications are known to have been submitted but not yet consented in this area.

Effects of the Development on Quiet Respite Periods

With regards to addressing potential effects on quiet respite periods, a qualitative approach is proposed. The Strath Oykel development is to the south of the key receptors where there is the potential for cumulative noise issues, while the Proposed Development is to the southwest. There would be a minor decrease in the proportion of wind directions where receptors are upwind from all major wind energy developments, resulting in a small reduction in quiet respite periods. Regardless, noise from the Proposed Development would be unlikely to dominate the soundscape in these key areas for any wind direction.

Summary

Due to the complex and nuanced cumulative situation, it would vastly simplify and resolve many of the above issues if we were able to adopt a cumulative noise limit using a lower limiting value of 37 dB. This would not be predicted to be exceeded based on our most recent predictions using the calculation methods and assumptions described above.

I look forward to your feedback and would be grateful to continue the dialogue on this matter. If you have any questions or would like to discuss in more detail, please feel free to get in touch.

It would be greatly appreciated if a response is able to be provided by 18th April 2025.

Yours sincerely

[redacted]

Conor Tickner BEng MIOA
Senior Consultant
Hayes McKenzie Partnership Limited

[redacted]

Statkraft Internal

Hayes McKenzie
Consultants in Acoustics

Figure 1 Strath Oykel Wind Farm Predicted Noise Levels

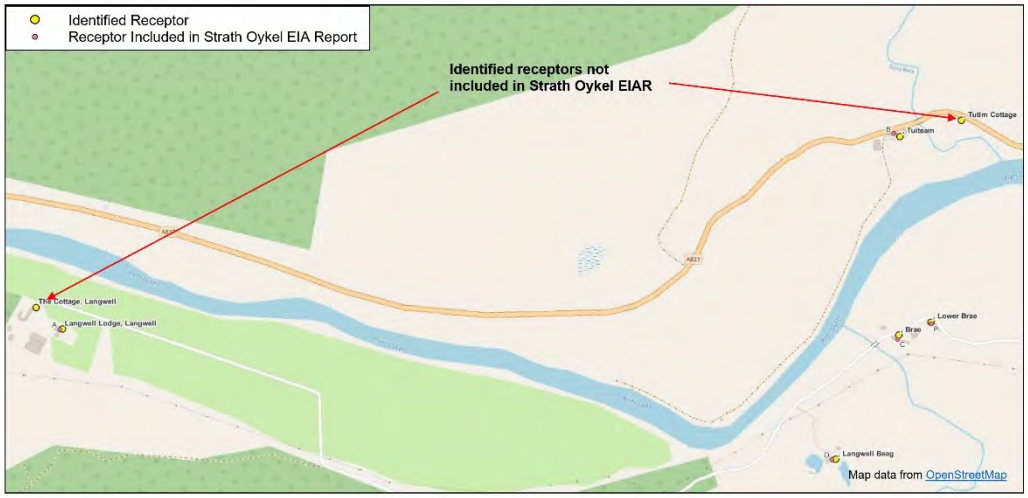

Figure 2 Langwell and Tuiteam Receptors

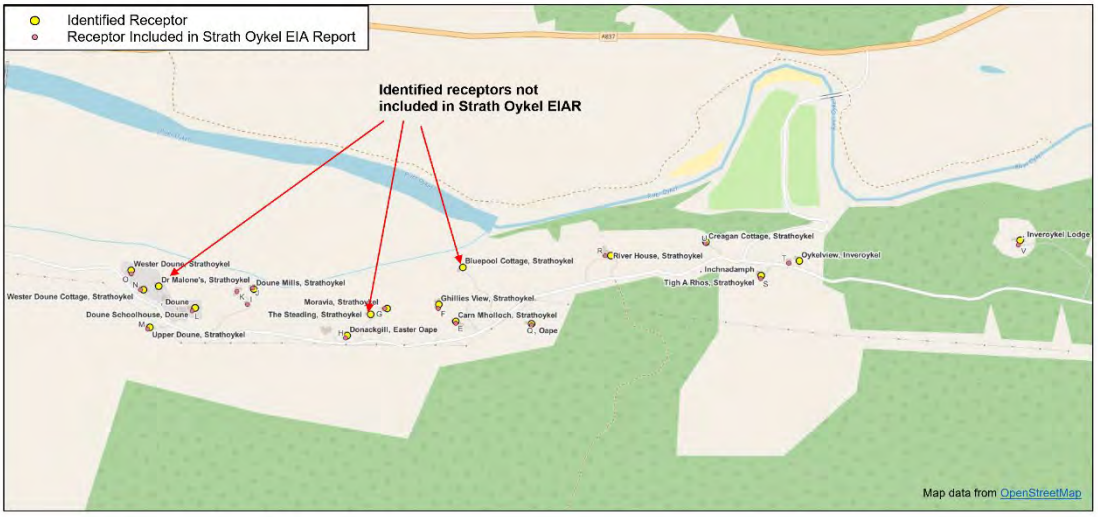

Figure 3 Doune and Strathoykel Receptors

Annex B – Calibration Certificates

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 05 March 2024 **Certificate Number: UCRT24/1372**

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

Page 1 of 2 Pages

Approved Signatory [redacted]

K. Mistry

Customer	Hayes McKenzie Partnership Ltd Unit 3 Oakridge Office Park Whaddon Salisbury SP5 3HT			
Order No.	1001/301			
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator			
Identification	*Manufacturer*	*Instrument*	*Type*	*Serial No. / Version*
	Rion	Sound Level Meter	NL-52	00231708 (HMP49)
	Rion	Firmware		2.0
	Rion	Pre Amplifier	NH-25	21656
	Rion	Microphone	UC-59	16860
	Rion	Calibrator	NC-75	34334830
		Calibrator adaptor type if applicable		NC-75-022
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	04 March 2024	ANV Job No.	UKAS24/03202	
Date Calibrated	05 March 2024			

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*
	02 March 2022	UCRT22/1294	0653

CERTIFICATE OF CALIBRATION

UKAS Accredited Calibration Laboratory No. 0653

Certificate Number
UCRT24/1372

Page 2 of 2 Pages

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

SLM instruction manual title	Sound Level Meter NL-42 / NL-52		
SLM instruction manual ref / issue	11-03		
SLM instruction manual source	Manufacturer		
Internet download date if applicable	N/A		
Case corrections available	Yes		
Uncertainties of case corrections	Yes		
Source of case data	Manufacturer		
Wind screen corrections available	Yes		
Uncertainties of wind screen corrections	Yes		
Source of wind screen data	Manufacturer		
Mic pressure to free field corrections	Yes		
Uncertainties of Mic to F.F. corrections	Yes		
Source of Mic to F.F. corrections	Manufacturer		
Total expanded uncertainties within the requirements of IEC 61672-1:2002	Yes		
Specified or equivalent Calibrator	Specified		
Customer or Lab Calibrator	Lab Calibrator		
Calibrator adaptor type if applicable	NC-75-022		
Calibrator cal. date	22 February 2024		
Calibrator cert. number	UCRT24/1295		
Calibrator cal cert issued by	0653		
Calibrator SPL @ STP	93.98	dB	Calibration reference sound pressure level
Calibrator frequency	1000.00	Hz	Calibration check frequency
Reference level range	25 - 130	dB	

Accessories used or corrected for during calibration - Extension Cable (No Wind Shield)
Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	23.94	22.25	± 0.30 °C
Humidity	39.9	39.4	± 3.00 %RH
Ambient Pressure	100.30	100.44	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	94.1	dB	Adjusted indicated level	94.0	dB
The uncertainty of the associated calibrator supplied with the sound level meter ±				0.10	dB

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

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A			C			Z		
	10.9	dB	UR	14.9	dB	UR	20.6	dB	UR
Uncertainty of the electrical self generated noise ±							0.12	dB	

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

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

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

…… END ……

Calibrated by: K. Zablocki R 1

Additional Comments The results on this certificate only relate to the items calibrated as identified above.
None

CERTIFICATE OF CALIBRATION

Date of Issue: 10 January 2024

Certificate Number: TCRT24/1027

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

Approved Signatory

K. Mistry [redacted]

Customer	Hayes McKenzie Partnership Ltd Unit 3 Oakridge Office Park Whaddon Salisbury SP5 3HT
Order No.	1001/294
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	*Instrument*	*Type*	*Serial No. / Version*
Rion	Sound Level Meter	NL-52	01032422 (HMP 52)
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	32450
Rion	Microphone	UC-59	16453
Rion	Calibrator	NC-75	34334830
	Calibrator adaptor type if applicable		NC-75-022

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 09 January 2024 ANV Job No. TRAC24/01011

Date Calibrated 10 January 2024

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 January 2022	TCRT22/1055	ANV Measurement Systems

CERTIFICATE OF CALIBRATION

Certificate Number
TCRT24/1027
Page 2 of 2 Pages

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

SLM instruction manual title	Sound Level Meter	NL-42 / NL-52	
SLM instruction manual ref / issue		11-03	
SLM instruction manual source		Manufacturer	
Internet download date if applicable		N/A	
Case corrections available		Yes	
Uncertainties of case corrections		Yes	
Source of case data		Manufacturer	
Wind screen corrections available		Yes	
Uncertainties of wind screen corrections		Yes	
Source of wind screen data		Manufacturer	
Mic pressure to free field corrections		Yes	
Uncertainties of Mic to F.F. corrections		Yes	
Source of Mic to F.F. corrections		Manufacturer	
Total expanded uncertainties within the requirements of IEC 61672-1:2002		Yes	
Specified or equivalent Calibrator		Specified	
Customer or Lab Calibrator		Lab Calibrator	
Calibrator adaptor type if applicable		NC-75-022	
Calibrator cal. date		18 December 2023	
Calibrator cert. number		UCRT23/2596	
Calibrator cal cert issued by		ANV Measurement Systems	
Calibrator SPL @ STP		94.01 dB	Calibration reference sound pressure level
Calibrator frequency		1000.00 Hz	Calibration check frequency
Reference level range		25 - 130 dB	

Accessories used or corrected for during calibration - Extension Cable (No Wind Shield)
Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	24.90	22.28	± 0.30 °C
Humidity	28.1	30.5	± 3.00 %RH
Ambient Pressure	102.01	102.04	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	93.9 dB		Adjusted indicated level	94.0 dB	
The uncertainty of the associated calibrator supplied with the sound level meter ±				0.10 dB	

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

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A			C			Z		
	11.8	dB	UR	16.2	dB	UR	23.2	dB	UR
Uncertainty of the electrical self generated noise ±							0.12	dB	

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with the Guide to the Expression of Uncertainty in Measurement published by ISO.

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

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

..... END .....

Calibrated by: B. Bogdan R 2

Additional Comments
None

CERTIFICATE OF CALIBRATION

Date of Issue: 10 January 2024

Certificate Number: TCRT24/1029

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

Approved Signatory

K. Mistry [redacted]

Customer	Hayes McKenzie Partnership Ltd Unit 3 Oakridge Office Park Whaddon Salisbury SP5 3HT
Order No.	1001/294
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	*Instrument*	*Type*	*Serial No. / Version*
Rion	Sound Level Meter	NL-52	01032423 (HMP 53)
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	32451
Rion	Microphone	UC-59	05798
Rion	Calibrator	NC-75	34334830
	Calibrator adaptor type if applicable		NC-75-022

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 09 January 2024 ANV Job No. TRAC24/01011

Date Calibrated 10 January 2024

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*
	20 January 2022	TCRT22/1053	ANV Measurement Systems

CERTIFICATE OF CALIBRATION

Certificate Number
TCRT24/1029

Page 2 of 2 Pages

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

SLM instruction manual title	Sound Level Meter	NL-42 / NL-52	
SLM instruction manual ref / issue		11-03	
SLM instruction manual source		Manufacturer	
Internet download date if applicable		N/A	
Case corrections available		Yes	
Uncertainties of case corrections		Yes	
Source of case data		Manufacturer	
Wind screen corrections available		Yes	
Uncertainties of wind screen corrections		Yes	
Source of wind screen data		Manufacturer	
Mic pressure to free field corrections		Yes	
Uncertainties of Mic to F.F. corrections		Yes	
Source of Mic to F.F. corrections		Manufacturer	
Total expanded uncertainties within the requirements of IEC 61672-1:2002		Yes	
Specified or equivalent Calibrator		Specified	
Customer or Lab Calibrator		Lab Calibrator	
Calibrator adaptor type if applicable		NC-75-022	
Calibrator cal. date		18 December 2023	
Calibrator cert. number		UCRT23/2596	
Calibrator cal cert issued by		ANV Measurement Systems	
Calibrator SPL @ STP		94.01 dB	Calibration reference sound pressure level
Calibrator frequency		1000.00 Hz	Calibration check frequency
Reference level range		25 - 130 dB	

Accessories used or corrected for during calibration - Extension Cable (No Wind Shield)
Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	22.46	21.29	± 0.30 °C
Humidity	39.7	39.5	± 3.00 %RH
Ambient Pressure	102.02	102.02	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	93.9 dB		Adjusted indicated level	94.0 dB	
The uncertainty of the associated calibrator supplied with the sound level meter ±				0.10 dB	

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

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A			C			Z		
	12.1	dB	UR	16.9	dB	UR	23.5	dB	UR
Uncertainty of the electrical self generated noise ±							0.12	dB	

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with the Guide to the Expression of Uncertainty in Measurement published by ISO.

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

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

..... END .....

Calibrated by: B. Bogdan R 2

Additional Comments
None

CERTIFICATE OF CALIBRATION

Date of Issue: 13 June 2024

Certificate Number: TCRT24/1434

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

Approved Signatory [redacted]

K. Mistry

Customer	Hayes Mckenzie Partnership Ltd Unit 3 Oakridge Office Park Salisbury Wiltshire SP5 3HT
Order No.	1001/308
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	*Instrument*	*Type*	*Serial No. / Version*
Rion	Sound Level Meter	NL-52	01032450(HMP54)
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	32478
Rion	Microphone	UC-59	16933
Rion	Calibrator	NC-75	34334830
	Calibrator adaptor type if applicable		NC-75-022

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 12 June 2024 ANV Job No. TRAC24/06243

Date Calibrated 13 June 2024

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

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	15 June 2022	TCRT22/1380	ANV Measurement Systems

CERTIFICATE OF CALIBRATION

Certificate Number
TCRT24/1434

Page 2 of 2 Pages

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

SLM instruction manual title	Sound Level Meter	NL-42 / NL-52	
SLM instruction manual ref / issue		11-03	
SLM instruction manual source		Manufacturer	
Internet download date if applicable		N/A	
Case corrections available		Yes	
Uncertainties of case corrections		Yes	
Source of case data		Manufacturer	
Wind screen corrections available		Yes	
Uncertainties of wind screen corrections		Yes	
Source of wind screen data		Manufacturer	
Mic pressure to free field corrections		Yes	
Uncertainties of Mic to F.F. corrections		Yes	
Source of Mic to F.F. corrections		Manufacturer	
Total expanded uncertainties within the requirements of IEC 61672-1:2002		Yes	
Specified or equivalent Calibrator		Specified	
Customer or Lab Calibrator		Lab Calibrator	
Calibrator adaptor type if applicable		NC-75-022	
Calibrator cal. date		04 June 2024	
Calibrator cert. number		UCRT24/1808	
Calibrator cal cert issued by		ANV Measurement Systems	
Calibrator SPL @ STP		94.01 dB	Calibration reference sound pressure level
Calibrator frequency		1000.00 Hz	Calibration check frequency
Reference level range		25 - 130 dB	

Accessories used or corrected for during calibration - Extension Cable (No Wind Shield)
Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	23.41	23.68	± 0.30 °C
Humidity	43.5	43.2	± 3.00 %RH
Ambient Pressure	99.99	99.96	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	94.3 dB		Adjusted indicated level	94.0 dB	
The uncertainty of the associated calibrator supplied with the sound level meter ±				0.10 dB	

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

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A			C			Z		
	12.8	dB	UR	18.5	dB	UR	24.3	dB	UR
Uncertainty of the electrical self generated noise ±							0.12	dB	

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with the Guide to the Expression of Uncertainty in Measurement published by ISO.

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

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

..... END .....

Calibrated by: K. Zablocki R 1

Additional Comments
None

CERTIFICATE OF CALIBRATION

Date of Issue: 02 July 2024

Certificate Number: TCRT24/1493

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

Approved Signatory K. Mistry [redacted]

Customer	Hayes McKenzie Partnership Ltd Unit 3 Oakridge Office Park Whaddon Salisbury SP5 3HT
Order No.	1001/312
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	*Instrument*	*Type*	*Serial No. / Version*
Rion	Sound Level Meter	NL-52	01032452 [HMP56]
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	32480
Rion	Microphone	UC-59	05843
Rion	Calibrator	NC-75	34334830
	Calibrator adaptor type if applicable		NC-75-022

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 July 2024 ANV Job No. TRAC24/07280

Date Calibrated 02 July 2024

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*
	28 July 2022	TCRT22/1476	ANV Measurement Systems

CERTIFICATE OF CALIBRATION

Certificate Number
TCRT24/1493

Page 2 of 2 Pages

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

SLM instruction manual title	Sound Level Meter	NL-42 / NL-52	
SLM instruction manual ref / issue		11-03	
SLM instruction manual source		Manufacturer	
Internet download date if applicable		N/A	
Case corrections available		Yes	
Uncertainties of case corrections		Yes	
Source of case data		Manufacturer	
Wind screen corrections available		Yes	
Uncertainties of wind screen corrections		Yes	
Source of wind screen data		Manufacturer	
Mic pressure to free field corrections		Yes	
Uncertainties of Mic to F.F. corrections		Yes	
Source of Mic to F.F. corrections		Manufacturer	
Total expanded uncertainties within the requirements of IEC 61672-1:2002		Yes	
Specified or equivalent Calibrator		Specified	
Customer or Lab Calibrator		Lab Calibrator	
Calibrator adaptor type if applicable		NC-75-022	
Calibrator cal. date		04 June 2024	
Calibrator cert. number		UCRT24/1808	
Calibrator cal cert issued by		ANV Measurement Systems	
Calibrator SPL @ STP		94.01 dB	Calibration reference sound pressure level
Calibrator frequency		1000.00 Hz	Calibration check frequency
Reference level range		25 - 130 dB	

Accessories used or corrected for during calibration - Extension Cable (No Wind Shield)
Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	23.85	23.84	± 0.30 °C
Humidity	51.2	49.4	± 3.00 %RH
Ambient Pressure	100.89	100.89	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

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

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

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

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A			C			Z		
	12.6	dB	UR	16.5	dB	UR	22.1	dB	UR
Uncertainty of the electrical self generated noise ±							0.12	dB	

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with the Guide to the Expression of Uncertainty in Measurement published by ISO.

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

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

..... END .....

Calibrated by: K. Zablocki R 1

Additional Comments

Prior to calibration the meter was realigned (0.8dB drift).

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 27 November 2023

Certificate Number: UCRT23/2516

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

Page 1 of 2 Pages

Approved Signatory [redacted]

K. Mistry

Customer	Hayes McKenzie Partnership Ltd Unit 3 Oakridge Office Park Whaddon Salisbury SP5 3HT			
Order No.	1001/290			
Test Procedure	Procedure TP 1 Calibration of Sound Calibrators			
Description	Acoustic Calibrator			
Identification	*Manufacturer*	*Instrument*	*Model*	*Serial No.*
	Brüel & Kjær	Calibrator	4231	3022368 (SAL 5)

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.	UKAS23/11810	
Date Received	24 November 2023	
Date Calibrated	27 November 2023	
Previous Certificate	*Dated*	08 December 2022
	Certificate No.	UCRT22/2449
	Laboratory	0653

CERTIFICATE OF CALIBRATION	Certificate Number UCRT23/2516
UKAS Accredited Calibration Laboratory No. 0653	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

94.12 ± 0.10 dB rel 20 µPa

Functional Tests and Observations

The frequency of the sound produced was	1000.02	±	0.12 Hz
The total distortion was	0.18	±	0.03 % Distortion

During the measurements environmental conditions were

Temperature	23	to	25	℃
Relative Humidity	36	to	47	%
Barometric Pressure	98.7	to	98.8	kPa

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

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

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

…… END ……

Note:

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

Additional Comments The results on this certificate only relate to the items calibrated as identified above.

None

Calibrated by: K. Zablocki R 1

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 21 June 2024

Certificate Number: UCRT24/1880

Calibrated at & Certificate 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

Approved Signatory [redacted]

K. Mistry

Customer	Hayes McKenzie Partnership Ltd Unit 3 Oakridge Office Park Whaddon Salisbury SP5 3HT			
Order No.	1001/309			
Test Procedure	Procedure TP 1 Calibration of Sound Calibrators			
Description	Acoustic Calibrator			
Identification	*Manufacturer*	*Instrument*	*Model*	*Serial No.*
	Brüel & Kjær	Calibrator	4231	2699280

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.	UKAS24/06453	
Date Received	20 June 2024	
Date Calibrated	21 June 2024	
Previous Certificate	*Dated*	15 June 2023
	Certificate No.	UCRT23/1790
	Laboratory	0653

CERTIFICATE OF CALIBRATION	Certificate Number UCRT24/1880
UKAS Accredited Calibration Laboratory No. 0653	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

94.05 ± 0.10 dB rel 20 µPa

Functional Tests and Observations

The frequency of the sound produced was	999.99	±	0.12 Hz
The total distortion was	0.37	±	0.04 % Distortion

During the measurements environmental conditions were

Temperature	23	to	23	℃
Relative Humidity	46	to	52	%
Barometric Pressure	100.3	to	100.4	kPa

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

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

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

…… END ……

Note:

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

Additional Comments The results on this certificate only relate to the items calibrated as identified above.

None

Calibrated by: K. Zablocki R 1

Annex C – Baseline Measurement Location Details

M1 – The Cottage

Description of Measurement Position

The Cottage is to the north of the Site. The equipment was installed in a grassy garden to the northwest of the residential dwelling. The equipment was in a fenced area in a free-field position.

Weather conditions during installation were damp with light rain and low wind speeds. Weather conditions during collection were fair, although ground conditions were damp.

Description of Local Noise Environment

The noise sources noted during installation and collection-site visits included noise from an agricultural yard nearby, water noise dripping from surfaces following recent rainfall, birds, occasional road traffic noise, and domestic noise / people. No wind turbine noise was audible.

Figure 2 M1 Noise Monitoring Photos

M2 – 4 Oykel Terrace

Description of Measurement Position

4 Oykel Terrace is to the northwest of the Site. The equipment was installed in a grassy garden to the east of the residential dwelling. The equipment was in a fenced area in a free-field position. A rain gauge was also installed at this location.

Weather conditions during installation were damp with no rain and low wind speeds. Weather conditions during collection were fair.

Description of Local Noise Environment

The noise sources noted during installation and collection-site visits included noise from birds including geese and songbirds, water noise from the River Oykel, domestic noise / people, and wind in the vegetation nearby. No wind turbine noise was audible.

Figure 3 M2 Noise Monitoring Photos

M3 – Lubachoinnich

Description of Measurement Position

Lubachoinnich is to the south of the Site. The equipment was installed in a grassy garden to the north of the property. While the property appeared to be uninhabited, there is the potential for future occupiers to take residence. The equipment was in a fenced area in a free-field position.

Weather conditions during installation were wet with heavy rain and moderate wind speeds. Weather conditions during collection were fair, although ground conditions were damp.

Description of Local Noise Environment

The noise sources noted during installation and collection-site visits included water noise from the River Abhainn an t-Srath Chuileannach, occasional farm traffic, and deer stalking (gunshots). No wind turbine noise was audible.

Figure 4 M3 Noise Monitoring Photos

M4 – Carn Mholloch

Description of Measurement Position

Carn Mholloch is to the northeast of the Site. The equipment was installed in a grassy garden to the east of the residential dwelling. The equipment was in a fenced area in a free-field position. A rain gauge was also installed at this location.

Weather conditions during installation were damp with no rain and low wind speeds. Weather conditions during collection were fair.

Description of Local Noise Environment

The noise sources noted during installation and collection-site visits included water noise from a stream, crickets / flying insects, birds including geese and songbirds, and occasional traffic noise from local roads or across the glen. No wind turbine noise was audible.

Figure 5 M4 Noise Monitoring Photos

M5 – Langwell Beag

Description of Measurement Position

Langwell Beag is to the north of the Site. The equipment was installed in a grassy garden to the north of the property. The equipment was in a fenced area in a free-field position.

Weather conditions during installation were damp with light rain and low wind speeds. Weather conditions during collection were fair, although ground conditions were damp.

Description of Local Noise Environment

The noise sources noted during installation and collection-site visits included noise from wind in vegetation, birdsong, distant river noise, forest machinery, and sheep. No wind turbine noise was audible.

Figure 6 M5 Noise Monitoring Photos

Annex D – Wind Conditions During the Survey

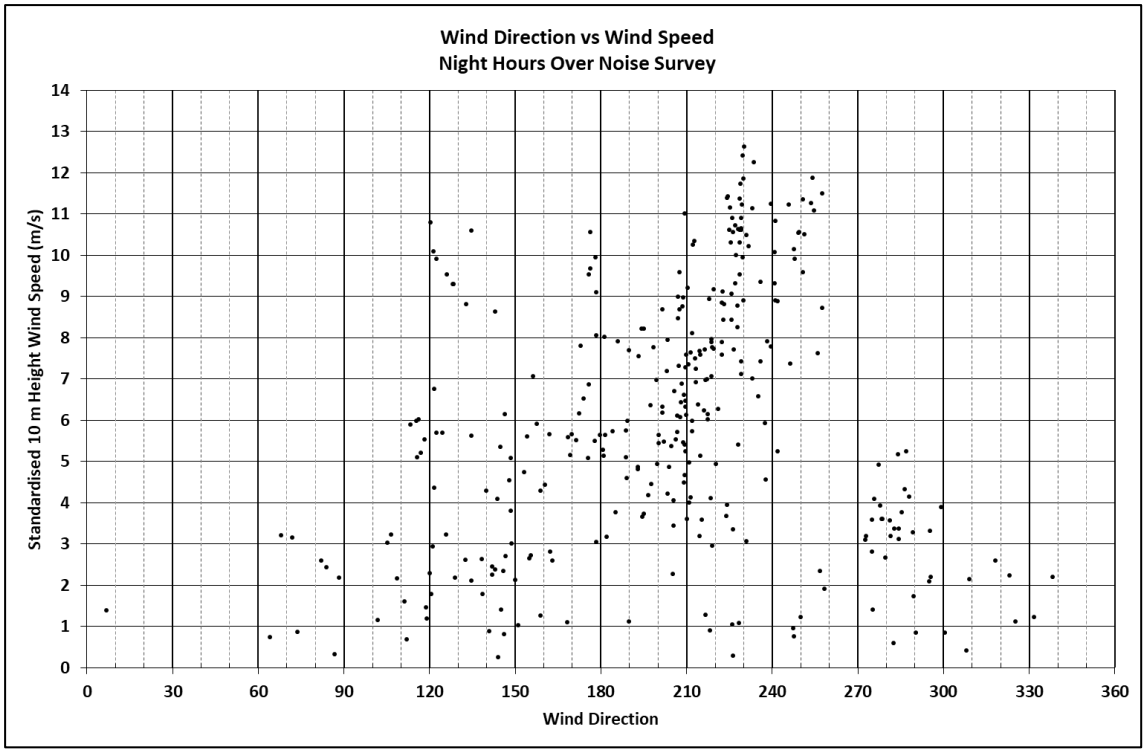

Figure 7 Variation of Wind Speed and Direction During Night Hours

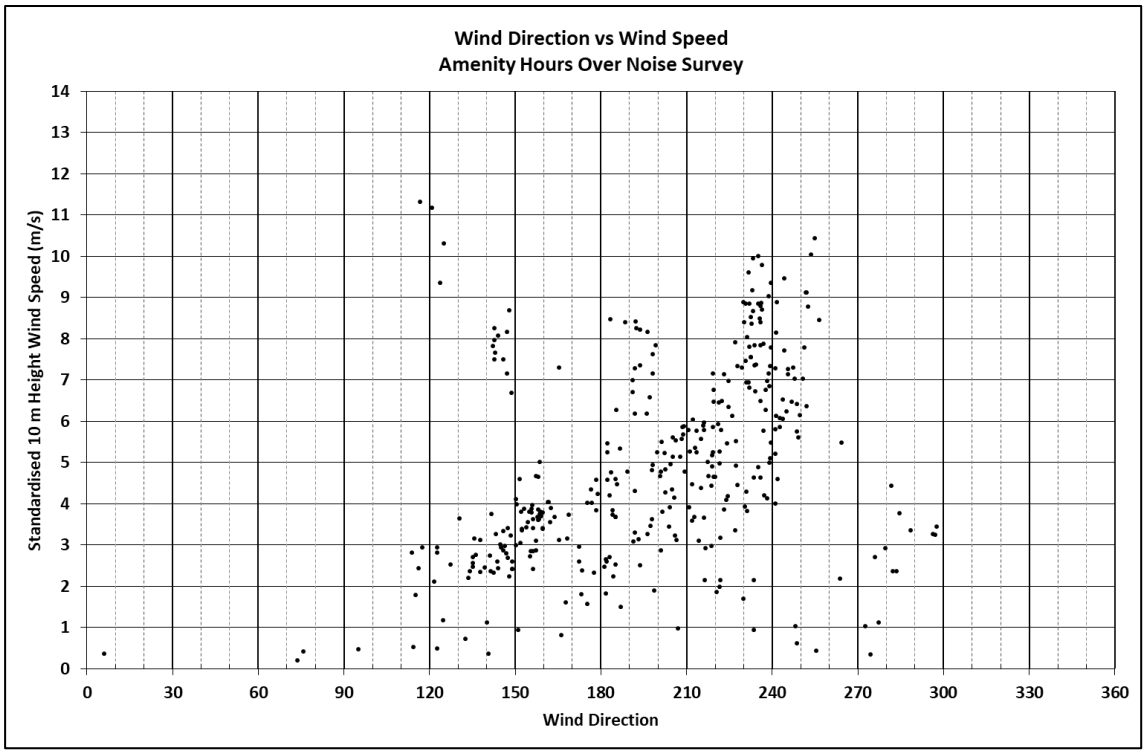

Figure 8 Variation of Wind Speed and Direction During Quiet Daytime Hours

Annex E – Baseline Results and Derived Noise Limits

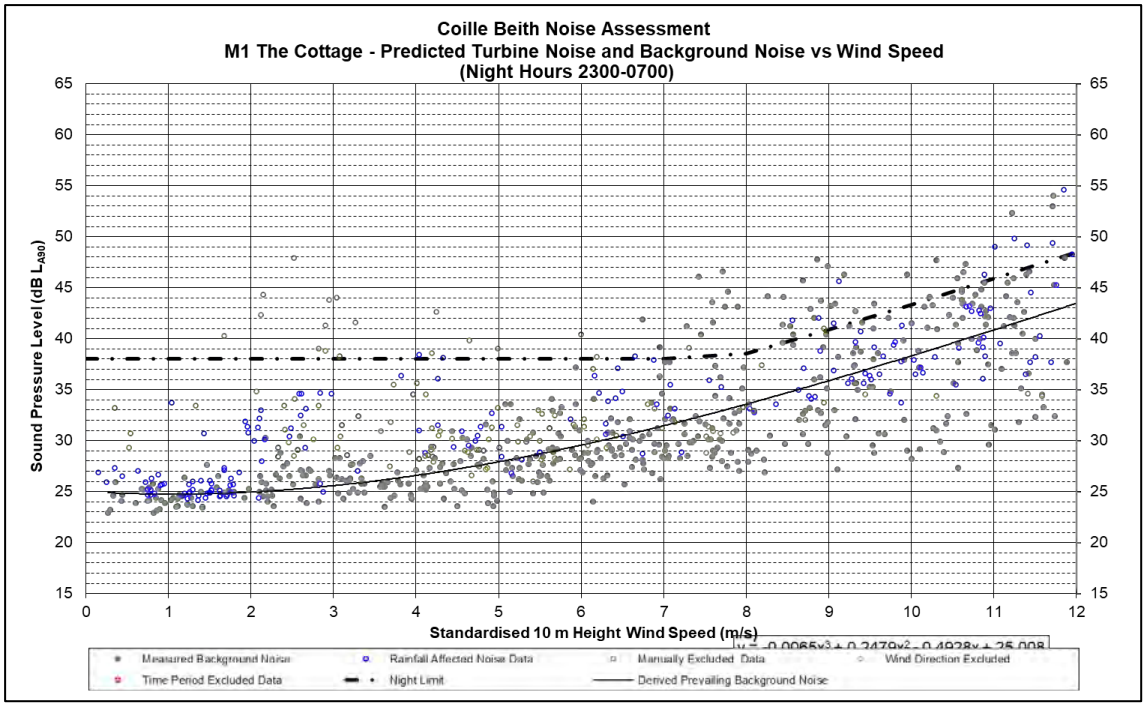

Figure 9 M1 Night-time Background Noise Levels and Noise Limits

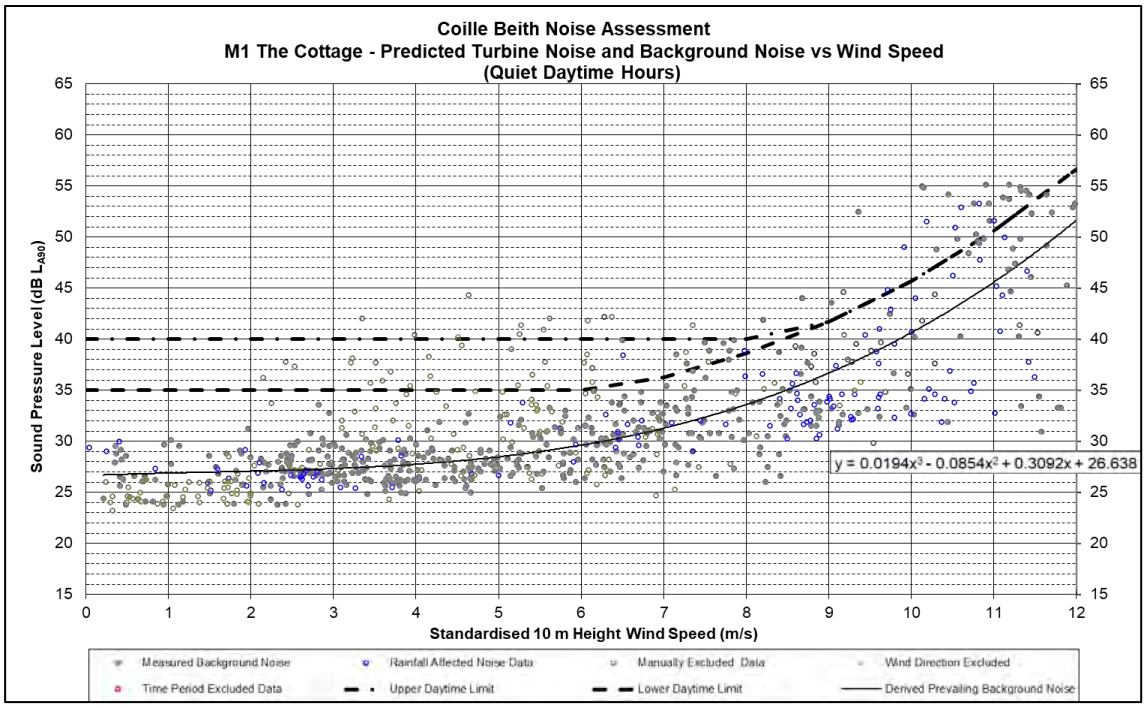

Figure 10 M1 Daytime Background Noise Levels and Noise Limits

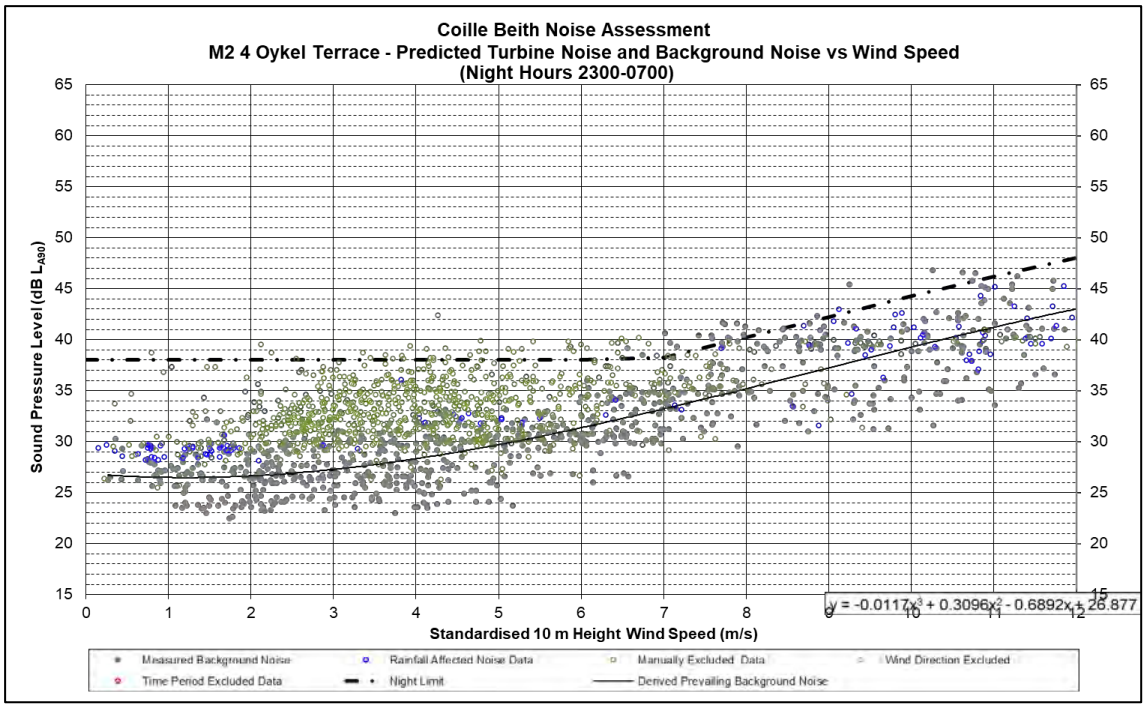

Figure 11 M2 Night-time Background Noise Levels and Noise Limits

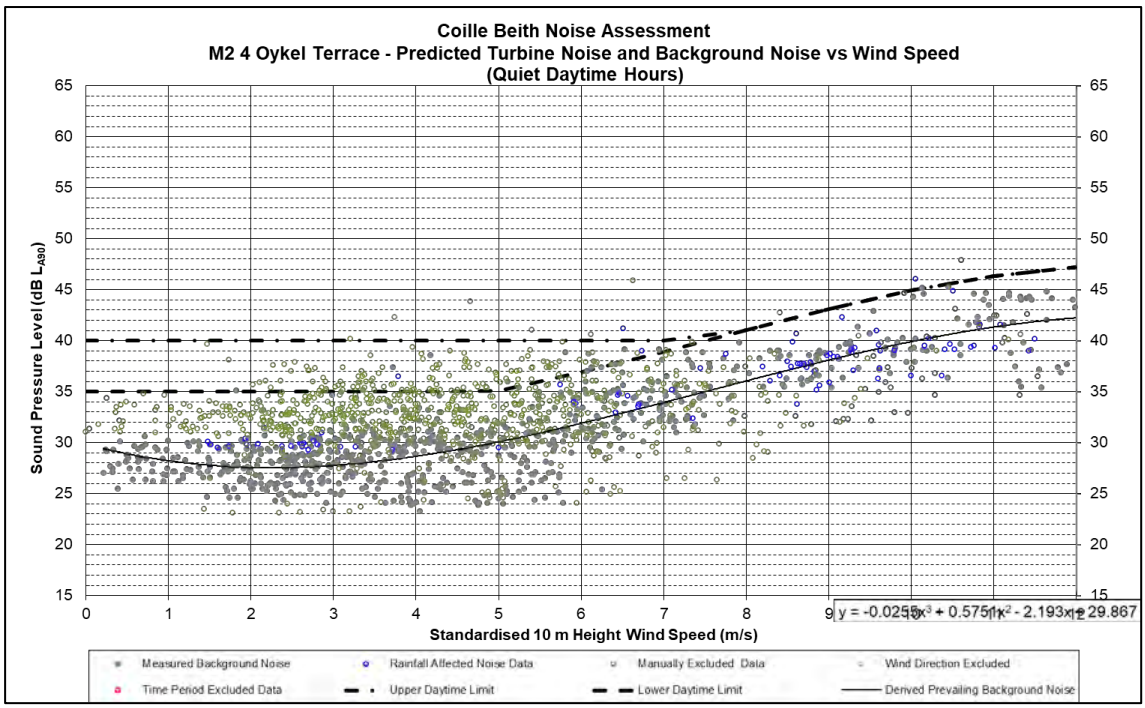

Figure 12 M2 Daytime Background Noise Levels and Noise Limits

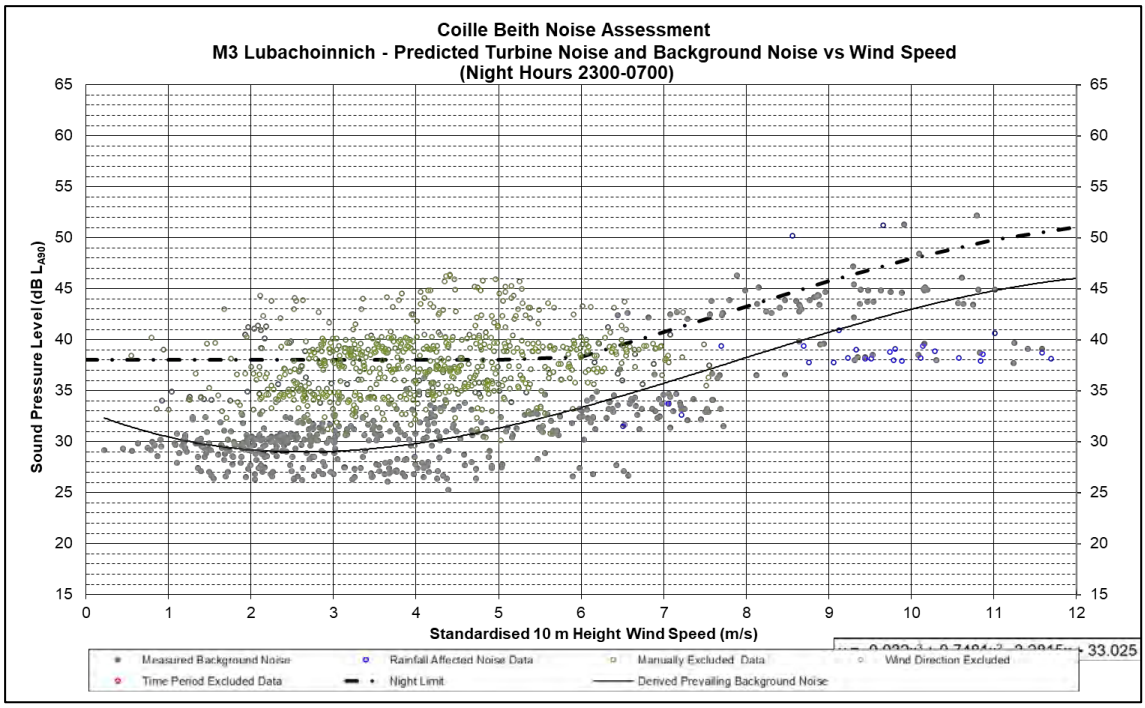

Figure 13 M3 Night-time Background Noise Levels and Noise Limits

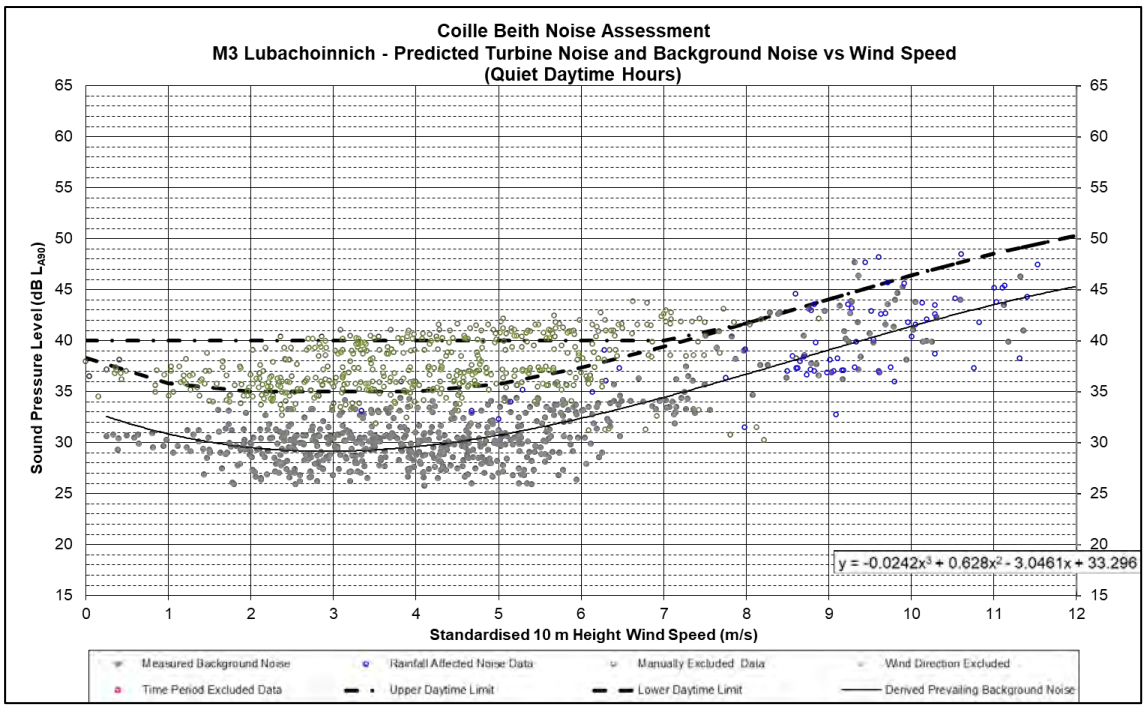

Figure 14 M3 Daytime Background Noise Levels and Noise Limits

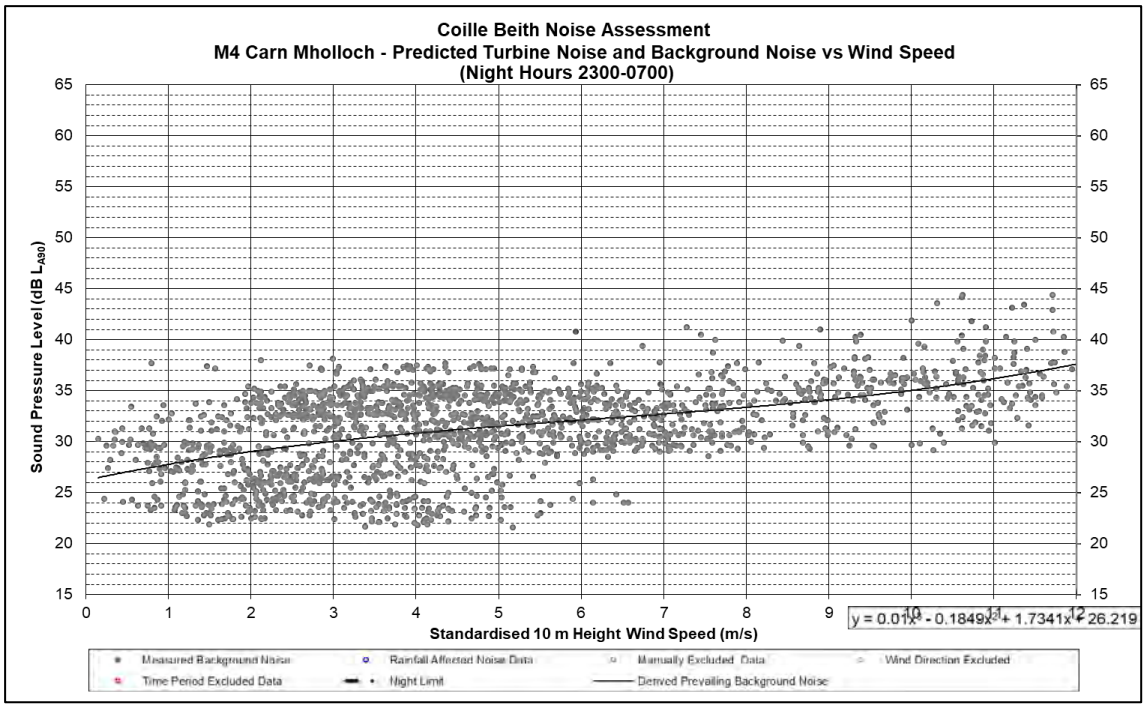

Figure 15 M4 Night-time Background Noise Levels

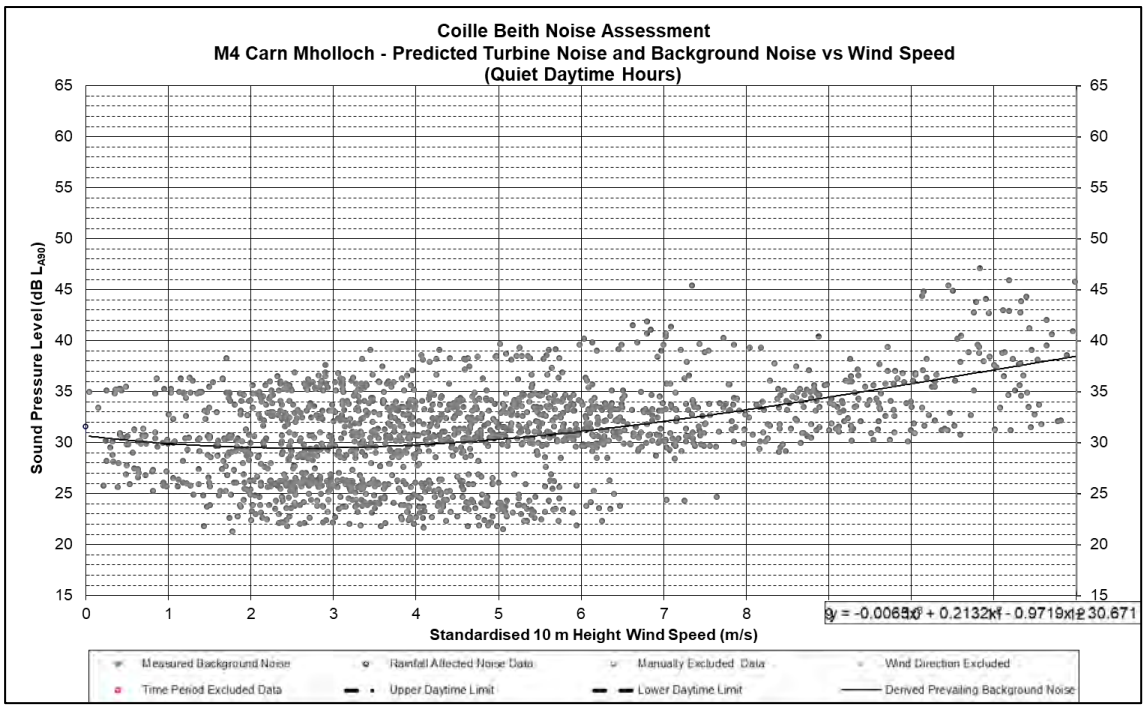

Figure 16 M4 Daytime Background Noise Levels

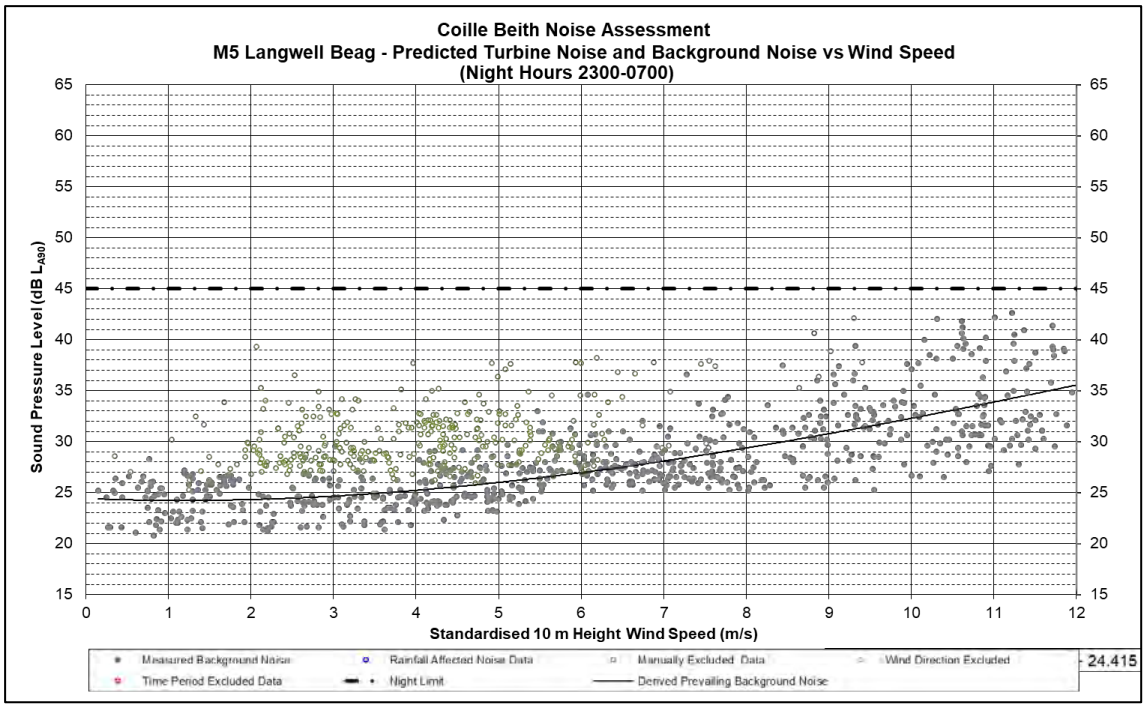

Figure 17 M5 Night-time Background Noise Levels and Noise Limits

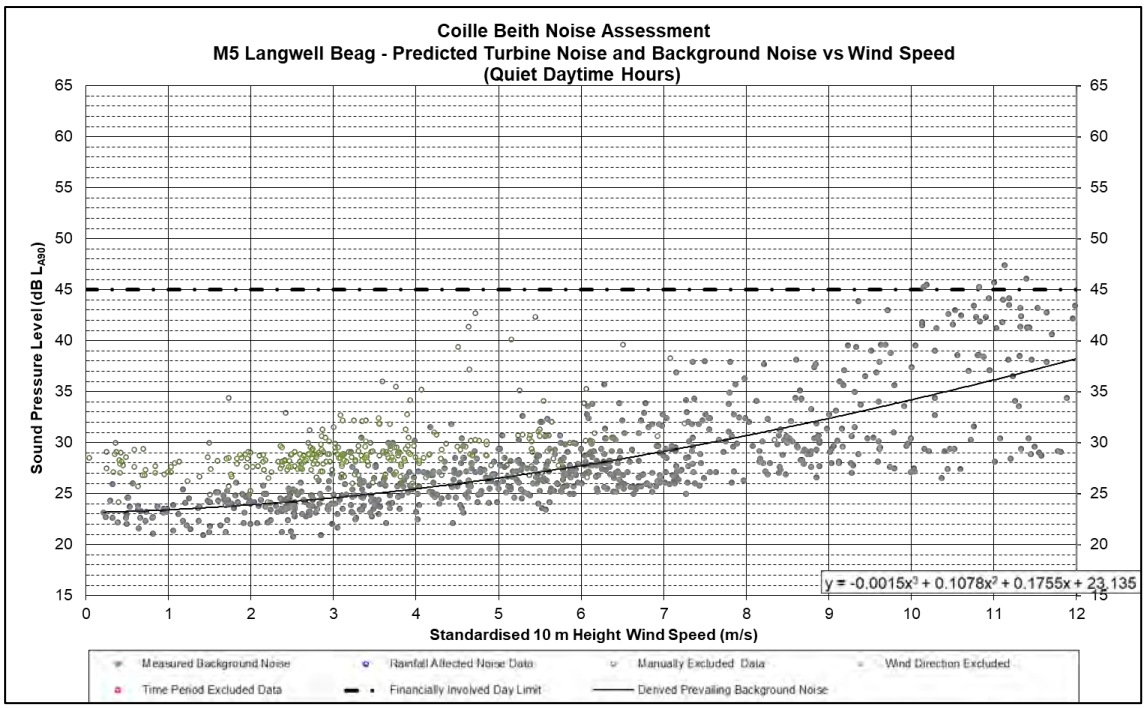

Figure 18 M5 Daytime Background Noise Levels and Noise Limits