Bowdun Offshore Wind Farm, Onshore EIA Report

Volume 2, Appendix 13.1: Baseline Noise Survey

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Glossary

Defined term	Definition
Decibel (dB)	The ratio of sound pressures which we can hear is a ratio of 106:1. For convenience, therefore, a logarithmic measurement scale is used. The resulting parameter is called the 'sound pressure level' (L_p) and the associated measurement unit is the decibel (dB). As the decibel is a logarithmic ratio, the laws of logarithmic addition and subtraction apply.
LAeq	An index for assessment for overall noise exposure is the equivalent continuous sound level, L_{peq}. This is a notional steady level which would, over a given period of time, deliver the same sound energy as the actual time-varying sound over the same period. Hence fluctuating levels can be described in terms of a single figure level.
LAMax	The maximum noise level identified during a measurement period. Experimental data has shown that the human ear does not generally register the full loudness of transient sound events of less than 125ms duration and fast time weighting (F) has an exponential time constant of 125ms which reflects the ear's response. Slow time weighting (S) has an exponential time constant of 1s and is used to allow more accurate estimation of the average sound level on a visual display. The maximum level measured with fast time weighting is denoted as $L_{pAmax, F}$. The maximum level measured with slow time weighting is denoted $L_{pAmax, S}$.
LAMin	The minimum noise level identified during a measurement period. Experimental data has shown that the human ear does not generally register the full loudness of transient sound events of less than 125 ms duration and fast time weighting (F) has an exponential time constant of 125 ms which reflects the ear's response. Slow time weighting (S) has an exponential time constant of 1s and is used to allow more accurate estimation of the average sound level on a visual display. The minimum level measured with fast time weighting is denoted as $L_{pAmin, F}$. The minimum level measured with slow time weighting is denoted $L_{pAmin, S}$.
LAPeak	The peak level of the sound pressure wave with no time constant applied.
LA90	Indicates the underlying background noise level in an area, excluding short-term events. This parameter, often used in planning and environmental noise assessments, provides a measure of the ambient or residual sound that remains when specific noise sources are absent.
LA10	Indicates the statistical noise metric representing the A-weighted sound pressure level (dB(A)) that is exceeded for 10% of a given measurement period, with the 'A' indicating that it's been weighted to reflect human hearing perception. Commonly used in the UK, L_{A10} is a key index for assessing road traffic noise,

Acronyms

Acronym	Definition
MLWS	Mean Low Water Springs
NPL	National Physical Laboratory
NSR	Noise Sensitive Receptor

Table of Units

Units	Definition
dB	Decibel
ms	Millisecond
m/s	Metre per second
mm/s	Millimetre per second

1 Introduction

1.1.1 This Appendix presents the baseline noise survey methodology and assessment for the onshore infrastructure of the Bowdun Offshore Wind Farm ('the Project'). The onshore infrastructure of the Project, landward of Mean Low Water Springs (MLWS), is referred to as the 'Proposed Development'.

1.1.2 In order to understand the baseline noise levels in the vicinity of the proposed Substation location, a baseline survey was undertaken to assess the current acoustic environment. The survey commenced on the 22nd May 2025 and the location was agreed with the Aberdeenshire Council Environmental Health Officer who was present on site at the time the equipment was set up at the commencement of survey. This Appendix details the methodology used in the survey and provides a summary of the results.

1.1.3 At this stage of project development, it was agreed that a single baseline measurement location could be utilised, representing the closest receptors, as this is the sole location where a permanent noise source will be potentially located in the vicinity. In all other areas the works, being construction, will be of a relatively short duration, and given the guidance on the setting of construction noise thresholds it was felt that utilisation of modelled noise data would be appropriate. This assumption will be revisited in future stages.

2 Methodology

2.1.1 For the measurement of environmental noise, the methodology contained in BS 7445-1:2003: 'Description and measurement of environmental noise. Part 1: Guide to quantities and procedures', was followed. This standard sets out the requirements in relation to noise measurement equipment for environmental noise surveys, the type of location to be used for measurement and the requirement to record the environmental conditions under which measurements are taken. The noise survey undertaken for the Proposed Development has fully considered the guidance given in this standard.

2.1.2 The sound level meter used complies with BS EN 61672-1:2013 'Electroacoustics – Sound level meters. Part 1: Specifications' and can operate as a Type 1 integrating sound level meter complying with BS EN 61672-2:2013+A1:2017 'Electroacoustics – Sound level meters. Part 2: Pattern evaluation tests'. The meter and calibrator have been calibrated in an accredited National Physical Laboratory (NPL) facility within the past year, and the details are shown in Table 2.1.

Table 2.1: Baseline Noise Survey Equipment Details

Equipment	Serial Number	NPL Calibration Certificate No.	NPL Calibration Certificate Reference	Date of Calibration
Castle Mirus Sound Level Meter	35769	035748/85712	CDK2400209	5 November 2024
Svantek SV18 Pre-amplifier	41663			
Svantek 7052E ½" Microphone	58860			

Equipment	Serial Number	NPL Calibration Certificate No.	NPL Calibration Certificate Reference	Date of Calibration
Castle GA607 Acoustic Calibrator	035748			

2.1.3 The equipment was set to measure over 15-minute periods during the day and night, with a 100 ms response time. The following measurement parameters were set:

- L_{Aeq}, L_{AMax}, L_{AMin}, L_{A90}, L_{A10}

2.1.4 The survey was undertaken between 13:00 on the 15 May 2025 and 12:00 on the 22 May 2025 at the location indicated on Figure 2.1 to Figure 2.4. The single survey location was considered to be representative of the two noise sensitive receptors shown in Table 2.2.

Table 2.2: Baseline Noise Sensitive Receptor Details

Noise Sensitive Receptor (NSR)	Address
1	Clachanshiels
2	Whitehill

2.1.5 A series of consecutive 15-minute measurements recording the L_{Aeq}, L_{AMax}, L_{Amin}, L_{A10} and L_{A90} metrics in broadband and 1/3 octave bands for analysis over a period of seven days were recorded.

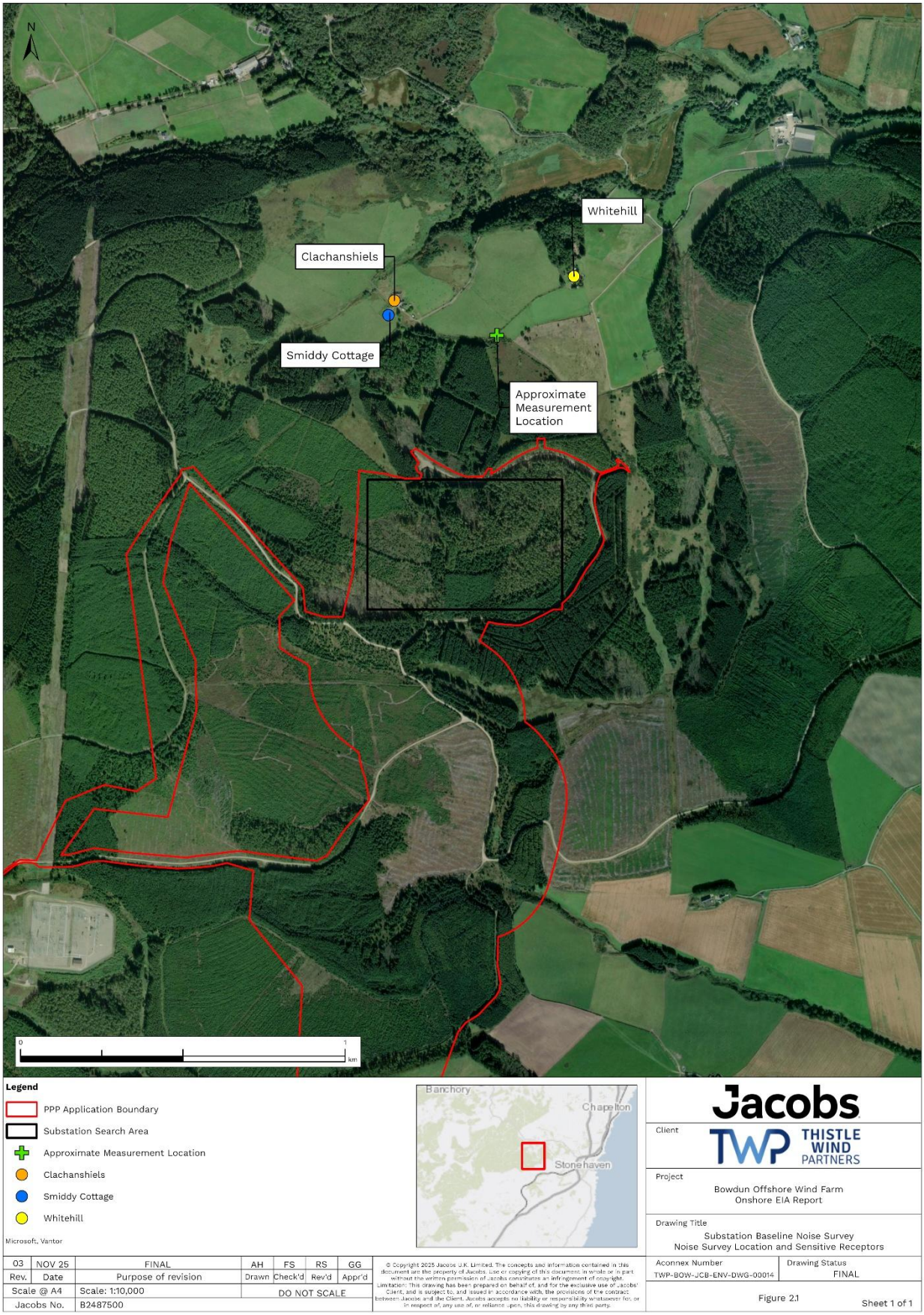

Figure 2.1: Substation Baseline Noise Survey – Noise Survey Location and Sensitive Receptors

Figure 2.2: Baseline Measurement Location Looking North

Figure 2.3: Baseline Measurement Location Looking North-East

Figure 2.4: Baseline Measurement Location Looking North-West

2.1.6 During set up and collection of the sound level meter an impression was gained of the local acoustic environment. The area in the vicinity of the two closest residential receptors is particularly rural in nature, with no major or minor roads nearby. The acoustic environment is as a consequence predominantly affected by agricultural activity coupled with some activity from the two residential receptors and occasional forestry activity.

2.1.7 No weather station was installed in order to minimise the risk of damage or loss to remotely installed equipment. As a consequence, weather data was gathered from a local weather station located to the south east of the measurement location, approximately 2.9 km distant, which reports data via the 'Wunderground' online network of residential weather stations, in order to assess the prevailing weather conditions.

3 Results

3.1.1 Table 3.1 and Table 3.2 present the averaged measured noise levels for the daytime and night-time periods recorded during the survey period.

3.1.2 Data from the nearby weather station referred to above has been used to filter the noise data for periods of rain and windspeeds exceeding a steady 3 m/s or 5 mm/s gusts, to avoid the effects of higher windspeeds over the sound level meter microphone. There was no rain during the period of the survey which would have had an effect on the results. It is possible that as the weather station was located to the south east, on the opposite side of the Fetteresso Forest, some peak data from localised wind speed events may have been missed. Nonetheless, over the averaged data for the seven days, the survey is considered accurate and in order to fully understand the quiet nature of the area, the minimum daytime and night-time 15 minute LA_{eq} has also been reported.

3.1.3 From the individual 15-minute periods there were some high peaks evident in the night-time data, which are not explained by windspeed, but might be by noise from birds, or from cattle in an adjacent field.

3.1.4 The lowest measured daytime and night-time 15-minute LA_{eq} during the survey have also been reported in the tables in order to indicate the range between the average and lowest LA_{eq} noise levels experienced at the survey location.

3.1.5 It is considered that the survey results provide suitable indicative noise levels for the assessment of both the construction and operational noise levels in the vicinity of the Substation location.

Table 3.1: Baseline Noise Survey Daytime Results

L_{APeak}	L_{AMax}	L_{AMin}	L_{Aeq}	L_{A10}	L_{A90}
100	88	18	45	43	34
Lowest L_{Aeq}			22		

Table 3.2: Baseline Noise Survey Night-time Results

L_{APeak}	L_{AMax}	L_{AMin}	L_{Aeq}	L_{A10}	L_{A90}
90	78	17	41	34	27
Lowest L_{Aeq}			20		

3.1.6 Upon completion of the survey the summary data was made available for the review and comment of the Aberdeenshire Council Environmental Health Officer. The results were then discussed and resulted in receipt of further guidance from Aberdeenshire Council in relation to acceptable operational noise limits for noise sources in the vicinity, received by email on 18 June 2025. This stated that:

"*...It is accepted that rural areas of Aberdeenshire may have exceptionally low background noise levels which can present challenges. In cases of both low background noise levels (<30dB LA90) and low rating levels (<35dB LarTr) subclause 11(1) of BS4142:2019 allows the setting aside of normal comparison of the rating level with the background level and attaches more importance to the absolute noise levels.*

However, this may result in a proposal showing significant exceedances of the background level – particularly where there is a tonal element – that may normally be indicative of an adverse impact (a difference of around +5dB) or even a significant adverse impact (a difference of around +10dB or more). In these cases, we would be seeking measures to reduce the difference between the rating level and the low background in the interest of preserving amenity.

I would also take the opportunity to highlight the benefits to the developer in the form of reduced community opposition and an enhanced reputation where proposals are demonstrated not to have an adverse impact on the amenity of the location."

3.1.7 This consultation response has been utilised in the assessment of operational noise in the main assessment reported in Volume 1, Chapter 13: Noise and Vibration.

4 References

British Standards Institution (2003). BS 7445-1:2003. Description and measurement of environmental noise - Part 1: Guide to quantities and procedures.

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

British Standards Institution (2017). BS EN 61672-2:2013+A1:2017: Electroacoustics – Sound level meters - Pattern evaluation tests.

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