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Introduction

- 13.1 This Chapter provides an assessment of the potential noise effects of the Proposed Development on receptors sensitive to noise during the operational phase.
- 13.2 This assessment has considered the Site layout as described in **Chapter 3: Description of Development**. The Proposed Development will consist of four wind turbines, solar photovoltaic (PV) arrays and associated infrastructure including wind turbine crane hardstandings, internal access tracks, underground cabling, a substation compound with a control building and a Battery Energy Storage System (BESS). The solar array would cover an area of approximately 11.1ha and have a rated output of approximately 12MW.
- 13.3 The candidate wind turbine considered as part of this assessment is the Vestas V162. As noted in **Chapter 3: Description of Development**, this is a candidate wind turbine model used for various assessments, however the final selection of wind turbine model would be made post-consent following a tendering exercise.
- 13.4 This chapter is supported by the following Figures and Technical Appendices:
- **Figure 13.1** - Study Area, NSRs, Proposed Turbine Layout, 35 decibel (dB) Contour;
 - **Figure 13.2** - Noise Monitoring Positions (NMPs);
 - **Technical Appendix 13.1** – Record of Baseline Survey;
 - **Technical Appendix 13.2** – Wind Rose and Charts Showing Baseline Data;
 - **Technical Appendix 13.3** – Summary of Relevant Guidance;
 - **Technical Appendix 13.4** – Tabulated Noise Limits
- 13.5 Legislation, guidance and policy relevant to this assessment is detailed in **Technical Appendix 4.1: Legislation, Guidance and Policy** and **Technical Appendix 13.3: Summary of Relevant Guidance**.
- 13.6 A summary of all relevant guidance is also provided in **Technical Appendix 13.4**.

Scope and Consultation

- 13.7 **Table 13-1** below provides detail of consultations undertaken with relevant regulatory bodies, together with action undertaken by the Applicant in response to consultation feedback.

Table 13-1: Scoping and Other Consultation Responses

| Consultee and Date | Issue Raised | Response / Action Taken |
|---|---|-------------------------|
| Scoping | | |
| D&GC Environmental Health Officer, Scoping Response, March 2025 | SLR proposed assessment in accordance with ETSU-R-97 and the IoA GPG. D&GC Environmental Health Officer (EHO) confirmed no objections in principle. | Noted. |
| Post Scoping | | |
| D&GC Environmental Health Officer, | R proposed noise monitoring locations and durations, and | Noted. |

| Consultee and Date | Issue Raised | Response / Action Taken |
|---|--|-------------------------|
| Baseline Survey Consultation, August 2025 | advised of the methodology for the baseline noise survey. D&GC Environmental Health Officer (EHO) confirmed no objections in principle | |

Effects Assessed in Full

13.8 The scope of this assessment comprises the following:

- evaluation of noise effects associated with the operation of the Proposed Development;
- specification of appropriate mitigation, where necessary; and
- evaluation of residual effects.

Effects Scoped Out

13.9 The following aspects have been scoped out of assessment:

- Vibration associated with the Proposed Development is predicted to be negligible at sensitive receptors given the distance between construction locations and receptors, therefore assessment of vibration has been scoped out.
- Noise from construction and decommissioning activities will mostly occur at locations remote from Noise Sensitive Receptors (NSRs) and can be minimised by implementing appropriate controls on working hours and by adoption of good practices in the specification of construction plant and methods. Noise from construction traffic can be minimised using a traffic management plan and is unlikely to be significant compared with baseline flows. Construction traffic will therefore fall below the significance criteria in the Design Manual for Roads and Bridges (DMRB) (refer to **Technical Appendix 13.4**). A Construction Environmental Management Plan (CEMP) will be produced detailing methods by which construction noise will be controlled, which will include a Construction Traffic Management Plan (TMP). Detailed evaluation of construction and decommissioning noise has therefore been scoped out.
- Excess Amplitude Modulation - Amplitude Modulation (AM) is the noticeable characteristic of wind turbine noise which can result in 'chopping' and 'thumping' noise. Some element of AM will always be present in wind turbine noise, but the Institute of Acoustics (IoA) has produced guidance and tools for evaluating 'excess' AM. AM effects cannot be predicted, however, these can be controlled by planning condition. Where excess AM is identified, mitigation can be put in place.

Approach and Methods

Study Area

13.10 The study area for this assessment is shown on **Figure 13.1** and has been informed by maps and aerial images of the Site and its surroundings, as well as Site visits undertaken.

A sample of the closest, and therefore potentially worst-affected, NSRs to the Proposed Development have been identified and adopted for the evaluation of noise impacts. These have been selected to represent a geographic spread across the local area. NSRs identified are either single dwellings or representative of a group or cluster of dwellings.

- 13.11 The study area for an Energy Park with wind turbines is dictated by the wind turbine element. Determination of the study area for a wind farm typically requires that the 35 dBL_{A90} noise contour is predicted.
- 13.12 The 35 dBL_{A90} operational noise contour for the Proposed Development at the wind speed at which the proposed turbines generate their maximum sound power level, is shown in **Figure 13.1**.
- 13.13 There are six identified properties within the 35 dB contour (shaded grey in the Table below) and 15 NSRs outside the 35 dB noise contour in the wider locality. NSRs 1, 20 and 21 are financially involved in the Proposed Development. The representative NSRs considered in the assessment are listed in **Table 13-2**.

Table 13-2: Noise Sensitive Receptors

| NSR Name | NSR ID | NSR OSGB Coordinates | |
|--|--------|----------------------|--------|
| | | X | Y |
| West Scales Farm (covering West Scales Farm, 1 West Scales Cottages, and 2 West Scales Cottages) | NSR1 | 327443 | 567570 |
| Hazeldean | NSR2 | 327825 | 566824 |
| Newtonlea | NSR3 | 327261 | 566376 |
| Woodfield | NSR4 | 326543 | 566181 |
| Bridgend Bungalow | NSR5 | 326040 | 566208 |
| Elmside Farm | NSR6 | 325797 | 566211 |
| Calgary Grove | NSR7 | 325447 | 566470 |
| Irvington | NSR8 | 325722 | 566844 |
| 3 North Road, Lowtherton | NSR9 | 324879 | 566729 |
| Todholes | NSR10 | 325130 | 567969 |
| Todholes 2 | NSR11 | 325342 | 568066 |
| Westlands Country Park Lodges | NSR12 | 325793 | 568811 |
| Broats | NSR13 | 325276 | 568956 |
| Flosh | NSR14 | 326248 | 569157 |
| Nutberry Farm | NSR15 | 326736 | 568929 |
| High Nutberry Farm | NSR16 | 326886 | 569187 |
| Hillhead | NSR17 | 327352 | 569051 |
| Calvertsholm Cottages | NSR18 | 328127 | 568923 |
| Riggheads | NSR19 | 328329 | 568370 |

| NSR Name | NSR ID | NSR OSGB Coordinates | |
|----------------------|--------|----------------------|--------|
| | | X | Y |
| Redwood House | NSR20 | 327610 | 567452 |
| West Scales Bungalow | NSR21 | 327657 | 567597 |
| Hillhead Cottage | NSR22 | 327473 | 568641 |

Field Surveys

- 13.14 A noise survey was undertaken at four locations to characterise baseline noise levels at representative NSRs within the study area, as agreed with D&GC. The noise monitoring positions (NMPs) used are provided in **Table 13-3** described and detailed within **Technical Appendix 13.1** and shown on **Figure 13.2**.

Table 13-3: Baseline Noise Monitoring Positions

| NMP Name | NMP ID | NMP OSGB Coordinates | |
|----------------------|--------|----------------------|--------|
| | | X | Y |
| Redwood House | NMP1 | 327602 | 567459 |
| Proxy Position North | NMP2 | 326954 | 568052 |
| Todholes | NMP3 | 325291 | 568041 |
| Proxy Position South | NMP4 | 327224 | 567200 |

- 13.15 The baseline survey was completed over the period 5 September to 10 October 2025.
- 13.16 The sound level meters (SLMs) used were compliant with Class 1 specification, as described in BS EN 61672-1:2003. The calibration of the SLMs was checked in the field before and after each measurement and no significant drift in calibration was noted. The SLMs and the calibrator used were within their accredited laboratory calibration period of two years and one year, respectively.
- 13.17 The SLMs were installed at the monitoring positions each with a microphone at a height of approximately 1.5m above ground in a free-field location, i.e. at least 3.5m from any vertical sound reflective surfaces. The microphones were fitted with double-skin outdoor wind shields with a minimum 200 mm diameter.
- 13.18 The monitoring locations are described as follows:
- 13.19 NMP1 – Redwood House – SLM installed in a sheltered area of garden. The SLM was sited more than 3.5m from any façades, and as distant from possible boiler flue/extractor fan vents as possible (greater than 15m). Weather conditions during installation were mostly dry and overcast, with moderate wind speeds.
- 13.20 NMP2 – Proxy Position North – SLM installed in a position to the edge of a field to the northwest of NSR1 West Scales Farm. The SLM was sited more than 3.5m from any façades, and distant from trees and bushes. Weather conditions during installation were mostly dry and overcast, with moderate wind speeds.
- 13.21 NMP3 – Todholes - SLM installed in farmyard / garden area. The SLM was sited more than 3.5m from any façades, and as distant from possible boiler flue/extractor fan vents as possible. Weather conditions during installation were mostly raining and overcast, with moderate wind speeds.

- 13.22 NMP4 – Proxy Position South – SLM installed in a position to the edge of a field to the south of NSR1 West Scales Farm and approximately 100m from the A75. The SLM was sited more than 3.5m from any façades, and distant from trees and bushes. Weather conditions during installation were mostly dry and overcast, with moderate wind speeds.
- 13.23 A full record of the installation was provided to the D&GC EHO prior to the commissioning visit and the D&GC EHO confirmed that the locations used were acceptable. Full details of the monitoring locations and photographs of the equipment in-situ are provided in **Technical Appendix 13.1**.
- 13.24 Wind speed data was gathered using a LiDAR device. Wind speeds were measured at multiple heights above the local ground level, including at 120m, which is representative of the proposed maximum hub height of 119m.
- 13.25

Assessment Methods

Construction Phase Noise – Derivation of Noise Limits

- 13.26 Prediction and evaluation of construction and decommissioning phase noise has been scoped out of this assessment.
- 13.27 Construction noise limits have been derived from measured baseline noise levels, using criteria derived in accordance with the ABC method set out in BS5228. Following the ABC assessment method, the most stringent assessment criterion (Category A), applies during the daytime (07:00 to 19:00 weekdays and 07:00 to 13:00 Saturdays) where the prevailing ambient noise levels are below 65 dBL_{Aeq,T}.

Operational Phase Wind Turbine Noise

General Method of Prediction

- 13.28 A detailed noise model has been prepared for the Site and surrounding area, including the adopted NSRs. This model was prepared using the CadnaA® noise modelling software. The model was set to use the ISO 9613 prediction method, which includes prescribed methods for accounting for the effects of geometric divergence, ground absorption, and atmospheric absorption, in accordance with the requirements of ETSU-R-97 and the IoA GPG.
- 13.29 Whilst the IoA GPG presents methodologies for the determination of additional corrections to account for propagation directivity, which could be used for example to account for the effects of wind direction where a receptor is located between two developments, such corrections have not been included within this assessment. The predicted operational noise levels can therefore be considered worst-case in this regard.
- 13.30 The noise model was configured to ensure noise level predictions in compliance with the IoA GPG, including the following:
- Ground absorption: $G=0.5$;
 - Receptor Height: 4 m;
 - Uncertainty correction of +2dB was applied;
 - A correction from $L_{Aeq,T}$ to $L_{A90,T}$ of -2 dB was applied;
 - Temperature: 10°C; and

- Humidity: 70%.

- 13.31 The requirement to apply valley corrections and topographic screening corrections was determined with reference to the IoA GPG. Valley corrections have been determined on a turbine-by-turbine basis for all identified NSRs.
- 13.32 This assessment has determined that no corrections for concavity will apply at any NSR for the Proposed Development. No wind turbines of the Proposed Development are entirely screened from line of sight at any receptors, therefore the -2 dB correction for topographic screening has not been applied to predicted noise levels.

Details of the Proposed Development

- 13.33 The noise assessment is based on the Vestas V162 6.2MW wind turbine, which has a serrated trailing edge of the wind turbine blades to reduce noise. The source noise terms of the V162 have been provided by Vestas as octave band data, quoted as sound power levels over the operation range hub-height wind speeds. This may not be the final wind turbine chosen for the Proposed Development, but the Applicant will ensure any change in wind turbine meets the noise levels detailed within this assessment.
- 13.34 The octave band data has been standardised to 10m height wind speeds, and an appropriate uncertainty correction of 2 dB has been applied to the sound power levels in accordance with the requirements of the IoA GPG. The resultant A-weighted sound power levels for the V162 are provided in **Table 13-4**.

Table 13-4: Vestas V162 Sound Power Levels

| | Standardised (10 m) Wind Speed, ms ⁻¹ | | | | | | | | |
|-------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|
| | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | Sound Power Level, dBA | | | | | | | | |
| Vestas V162-6.2MW | 98.0 | 102.1 | 105.7 | 106.3 | 106.3 | 106.3 | 106.3 | 106.3 | 106.3 |

- 13.35 Spectral data for the turbine is provided by the manufacturer. The spectrum has been applied within the noise model and normalised to the A-weighted broad band noise level for each wind speed. The representative spectrum applied is provided in **Table 13-5**.

Table 13-5: Representative Spectrum Applied

| | Octave Band Centre Frequency, Hz | | | | | | | | |
|--|----------------------------------|------|------|------|------|------|------|------|------|
| | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| | Sound power level, dB(A) | | | | | | | | |
| Vestas V162 6.2 MW with Trailing Edge Serrations (TES), 6 ms ⁻¹ | 60.8 | 71.9 | 79.9 | 84.8 | 86.7 | 85.4 | 81.1 | 73.6 | 63.0 |
| Vestas V162 6.2 MW with Trailing Edge Serrations (TES), 7ms ⁻¹ | 63.8 | 74.9 | 82.9 | 87.8 | 89.7 | 88.4 | 84.1 | 76.6 | 66.1 |
| Vestas V162 6.2 MW with Trailing | 68.9 | 79.9 | 87.8 | 92.7 | 94.6 | 93.3 | 89.0 | 81.7 | 71.3 |

| | Octave Band Centre Frequency, Hz | | | | | | | | |
|---|----------------------------------|------|------|------|------|------|------|------|------|
| | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| | Sound power level, dB(A) | | | | | | | | |
| Edge Serrations (TES), 9 ms-1 | | | | | | | | | |
| Vestas V162 6.2 MW with Trailing Edge Serrations (TES), 12 ms-1 | 69.1 | 80.0 | 87.8 | 92.7 | 94.7 | 93.7 | 89.7 | 82.7 | 72.8 |

Sensitivity of Receptor

- 13.36 The guidance contained within TAN to PAN 1/2011 has been drawn upon in the generation of an appropriate set of significance criteria. The receptor sensitivity criteria for the construction, operational and decommissioning phases of the Proposed Development are considered to be the same. These are presented within **Table 13-6**.

Table 13-6: Noise Receptor Sensitivity Criteria

| Receptor Sensitivity | Description | Examples |
|----------------------|--|---|
| High | Receptors where people or operations are particularly susceptible to noise. | Residential, quiet outdoor recreational areas, schools and hospitals. |
| Medium | Receptors moderately sensitive to noise, where it may cause some distraction or disturbance. | Offices and restaurants. |
| Low | Receptors where distraction or disturbance from noise is minimal. | Buildings not occupied, factories and working environments with existing levels of noise. |

Magnitude – Operational Wind Turbine Noise

- 13.37 The impact magnitude of operational wind turbine noise has been determined solely by reference to the proposed noise limits.

Impact Magnitude - Fixed (Non-Wind Turbine) Plant Noise

- 13.38 For noise from any fixed (non-wind turbine) plant such as substations, solar array fixed plant items and battery energy storage, it is appropriate to determine significance criteria based on the guidance contained within BS 4142, i.e. by consideration of the difference between the rating level from the plant noise and the prevailing background sound level, but also with respect to context and the resulting sound levels in absolute terms.
- 13.39 The impact magnitude associated with noise generated from fixed plant are presented in **Table 13-7**.

Table 13-7- Impact Magnitude for Fixed (non-wind turbine) Plant Noise

| Difference between Rating Level (L _{Ar,Tr}) and Background Sound Level (L _{A90}) | BS4142 Guidance | Impact Magnitude |
|--|--|------------------|
| ≥+10 | Indication of significant adverse impact | High |
| +5 | Indication of adverse impact | Medium |
| 0 | Indication of low Impact | Low |
| -10 | - | Negligible |
| Where the rating level (L _{Ar,Tr}) is below 35 dB the impact magnitude is classified as 'Negligible' regardless of the relationship to the background noise level, in accordance with BS 4142. | | |
| + indicates rating level above background noise level | | |
| - indicates rating level below background noise level | | |

Significance of Effect – Operational Wind Turbine Noise

- 13.40 The significance of operational wind turbine noise has been determined only with reference to the proposed ETSU-R-97 and D&GC Supplementary Guidance noise limits as follows:
- 13.41 This assessment considers that compliance with the proposed noise limits at NSRs will demonstrate that effects from operational wind turbine noise are 'not significant'; and
- 13.42 This assessment considers that effects from operational wind turbines, where noise levels at NSRs are above the proposed noise limits, would be 'significant'.

Significance of Effect – Operational Non-Wind Turbine Noise

- 13.43 The significance of effect from non-wind turbine noise emitting, operational plant, has been determined by consideration to both the receptor sensitivity and the impact magnitude according to the matrix detailed in **Table 13-8**.

Table 13-8- Effect Significance Matrix

| Impact Magnitude | Receptor Sensitivity | | |
|------------------|----------------------|------------|------------|
| | High | Medium | Low |
| High | Major | Moderate | Minor |
| Medium | Moderate | Minor | Negligible |
| Low | Minor | Negligible | Negligible |

- 13.44 This assessment considers all identified NSRs to be of 'high' sensitivity in accordance with **Table 13-6** given that they are residential dwellings. This assessment considers that effects with a significance of 'moderate' and 'major' are significant and effects with a significance of 'negligible' and 'minor' are not significant.

Requirements for Mitigation

- 13.45 Consideration has been given to available mitigation measures to reduce adverse effects where relevant. Where mitigation measures are detailed, these are committed to by the Applicant and have been determined through professional judgement and the implementation of best practice.

Assessment of Residual Significant Effects

- 13.46 Residual effects have been assessed following the methodologies described above but taking into account the committed mitigation measures

Statement of Significance

- 13.47 A Statement of Significance is provided in the assessment. Effects of 'major' and 'moderate' significance are considered to be 'significant' in terms of the EIA Regulations.

Assumptions, Limitations and Confidence

- 13.48 Detailed information on techniques and equipment for the construction phase of the Proposed Development is not currently available. Appropriate construction noise limits have therefore been derived.
- 13.49 The assessment of operational impacts associated with the wind turbines has been undertaken adopting source noise levels for the candidate wind turbine models. Following completion of the tendering process, it is possible that the precise turbine make / model adopted and / or the operational mode will change from that adopted within the assessment. It should be noted, however, that the final turbine model chosen will be selected to ensure compliance with the derived noise level limits.
- 13.50 Proxy Noise Monitoring Locations were chosen, one to the north and one to the south, due to access permissions:
- Proxy North reflects the northernmost boundary of the site and an accessible location, and was selected to represent background sound levels at receptors to the north of the Proposed Development, noting the lack of significant transport infrastructure influence.
 - Proxy South is considered representative of receptors to the south with NSR8 indicated as being the closest in this cluster to the Proposed Development.

Baseline Conditions

- 13.51 Wind speed data was checked for quality on receipt. All wind speeds <1 ms⁻¹ were excluded from further analysis.
- 13.52 A wind rose of measured wind speeds and directions derived to 10m above ground level over the period of the baseline survey is provided in Chart 13.1 in **Technical Appendix 13.2**. With reference to Chart 13.1, the most commonly occurring wind speeds were in the range 3 ms⁻¹ – 8 ms⁻¹ and the most prominent wind directions were westerly to west-north-westerly and north easterly to east-north-easterly with infrequent southerlies. Wind from the north and south east occurred for less than approximately two percent of the time.

Current Baseline

- 13.53 Time-history charts of the measured ambient (L_{Aeq}) and background (L_{A90}) noise levels for each monitoring location are provided in **Technical Appendix 13.2**.
- 13.54 Charts showing the measured background noise levels correlated with wind speed, and divided into Quiet Daytime and Night-time periods, in accordance with ETSU, are provided in **Technical Appendix 13.2** for all three NMPs. The proposed hub height (119m) was used to derive the standardised 10m wind speed for correlation with background noise levels; this is a robust approach.
- 13.55 The charts show the wind-dependent background noise level, the ‘background +5 dB’ criterion and the derived noise limits. Rainfall-affected data has been screened out, in accordance with the IoA GPG (i.e. with the periods preceding and after the recorded rainfall also excluded).

NMP1 – Redwood House

- 13.56 The dominant noise source was road traffic noise from the A75. Noise from wind rustling trees was also audible as well as agricultural activities and occasional road traffic on the minor road to the east.
- 13.57 A time-history graph of measured L_{Aeq} (ambient) and L_{A90} (background) levels and rainfall events is provided as Chart 1 in **Technical Appendix 13.2**. With reference to Chart 1, the following observations are noted with regard to measured baseline noise levels:
- the ambient and background levels show a relatively close correlation throughout the majority of the measurement period; this is indicative of a fairly constant noise source such as distant road traffic or wind induced noise, rather than intermittent anthropogenic activities;
 - there is a clear diurnal variation, with declining noise levels during the evening, the lowest noise level in the middle of the night and increasing noise levels towards the morning;
 - the diurnal variation occurs on most days;
 - noise levels show an increase during the night-time period on one day (03 to 04 October 2025), attributed to a prolonged period of very high wind speeds ($>14\text{ms}^{-1}$); and
 - during periods of heavy rainfall, the ambient and background levels exhibit lower consistency, attributed to rain-induced noise on the microphone wind shield (note – rain-affected noise data has been screened out of further consideration in the assessment).
- 13.58 The measured daytime and night-time background noise levels for NMP1, correlated to wind speed, and with rain-affected data removed, are provided in **Technical Appendix 13.2**; Chart 2 shows the daytime period and Chart 3 the night-time period. The following observations are noted with regard to the correlation of noise and wind speed data, and the derivation of noise limits:
- There are a substantial number of datapoints across the full range of operational wind speeds, both during the daytime and night-time period, meeting the minimum requirement provided in the GPG at all wind speeds;
 - With reference to Chart 2, there is a positive correlation (R^2 of 0.2795) between wind speed and measured background noise level;

- During the daytime period the measured background level is generally above the fixed minimum daytime noise level (35 dB).
- With reference to Chart 3, there is a positive correlation (R^2 of 0.4986) between wind speed and measured background noise level.

NMP2 – Proxy Location North

- 13.59 The dominant noise source was distant road traffic noise from the A75. Noise from wind rustling trees was also audible as well as agricultural activities.
- 13.60 A time-history graph of measured L_{Aeq} (ambient) and L_{A90} (background) levels and rainfall events is provided as Chart 4 in **Technical Appendix 13.2**. With reference to Chart 4, the following observations are noted with regard to measured baseline noise levels:
- the ambient and background levels show a relatively close correlation throughout the majority of the measurement period; this is indicative of a fairly constant noise source such as distant road traffic or wind induced noise, rather than intermittent anthropogenic activities;
 - there is a clear diurnal variation, with declining noise levels during the evening, the lowest noise level in the middle of the night and increasing noise levels towards the morning;
 - the diurnal variation occurs on most days;
 - noise levels show an increase during the night-time period on one day (03 to 04 October 2025), attributed to a prolonged period of very high wind speeds ($>14\text{ms}^{-1}$; and
 - during periods of heavy rainfall, the ambient and background levels exhibit lower consistency, attributed to rain-induced noise on the microphone wind shield (note – rain-affected noise data has been screened out of further consideration in the assessment).
- 13.61 The measured daytime and night-time background noise levels for NMP1, correlated to wind speed, and with rain-affected data removed, are provided in **Technical Appendix 13.2**; Chart 5 shows the daytime period and Chart 6 the night-time period. The following observations are noted with regard to the correlation of noise and wind speed data, and the derivation of noise limits:
- there are a substantial number of datapoints across the full range of operational wind speeds, both during the daytime and night-time period, meeting the minimum requirement provided in the GPG at all wind speeds;
 - with reference to Chart 5, there is a positive correlation (R^2 of 0.5234) between wind speed and measured background noise level; and
 - during the daytime period the measured background level is generally above the fixed minimum daytime noise level (35 dB).

With reference to Chart 6, there is a positive correlation (R^2 of 0.5693) between wind speed and measured background noise level.

NMP3 – Todholes

- 13.62 The dominant noise source was distant road traffic noise from the A75. Noise from wind rustling trees was also audible as well as agricultural activities.

- 13.63 A time-history graph of measured L_{Aeq} (ambient) and L_{A90} (background) levels and rainfall events is provided as Chart 7 in **Technical Appendix 13.2**. With reference to Chart 7, the following observations are noted with regard to measured baseline noise levels:
- there is a clear diurnal variation, with declining noise levels during the evening, the lowest noise level in the middle of the night and increasing noise levels towards the morning;
 - the diurnal variation occurs on most days;
 - noise levels show an increase during the night-time period on one day (03 to 04 October 2025), attributed to a prolonged period of very high wind speeds ($>14\text{ms}^{-1}$; and
 - during periods of heavy rainfall, the ambient and background levels exhibit lower consistency, attributed to rain-induced noise on the microphone wind shield (note – rain-affected noise data has been screened out of further consideration in the assessment).
- 13.64 The measured daytime and night-time background noise levels for NMP1, correlated to wind speed, and with rain-affected data removed, are provided in **Technical Appendix 13.2**; Chart 8 shows the daytime period and Chart 9 the night-time period. The following observations are noted with regard to the correlation of noise and wind speed data, and the derivation of noise limits:
- there are a substantial number of datapoints across the full range of operational wind speeds, both during the daytime and night-time period, meeting the minimum requirement provided in the GPG at all wind speeds;
 - with reference to Chart 8, there is a positive correlation (R^2 of 0.4904) between wind speed and measured background noise level;
 - during the daytime period the measured background level is generally above the fixed minimum daytime noise level (35 dB).
- With reference to Chart 9, there is a positive correlation (R^2 of 0.6784) between wind speed and measured background noise level.

NMP4 – Proxy Location South

- 13.65 The dominant noise source was road traffic noise from the A75. Noise from wind rustling trees was also audible as well as agricultural activities, livestock and occasional road traffic on the minor road to the east.
- 13.66 A time-history graph of measured L_{Aeq} (ambient) and L_{A90} (background) levels and rainfall events is provided as Chart 10 in **Technical Appendix 13.2**. With reference to Chart 10, the following observations are noted with regard to measured baseline noise levels:
- the ambient and background levels show a relatively close correlation throughout the majority of the measurement period; this is indicative of a fairly constant noise source such as distant road traffic or wind induced noise, rather than intermittent anthropogenic activities;
 - there is a clear diurnal variation, with declining noise levels during the evening, the lowest noise level in the middle of the night and increasing noise levels towards the morning;
 - the diurnal variation occurs on most days;

- noise levels show an increase during the night-time period on one day (03 to 04 October 2025), attributed to a prolonged period of very high wind speeds ($>14\text{ms}^{-1}$; and
- during periods of heavy rainfall, the ambient and background levels exhibit lower consistency, attributed to rain-induced noise on the microphone wind shield (note – rain-affected noise data has been screened out of further consideration in the assessment).

13.67 The measured daytime and night-time background noise levels for NMP1, correlated to wind speed, and with rain-affected data removed, are provided in **Technical Appendix 13.2**; Chart 11 shows the daytime period and Chart 12 the night-time period. The following observations are noted with regard to the correlation of noise and wind speed data, and the derivation of noise limits:

- there are a substantial number of datapoints across the full range of operational wind speeds, both during the daytime and night-time period, meeting the minimum requirement provided in the GPG at all wind speeds;
- with reference to Chart 11, there is a positive correlation (R^2 of 0.2795) between wind speed and measured background noise level;
- during the daytime period the measured background level is generally above the fixed minimum daytime noise level (35 dB).

13.68 With reference to Chart 12, there is a positive correlation (R^2 of 0.4986) between wind speed and measured background noise level.

Adopted noise limits

Construction and decommissioning noise limits

13.69 With reference noise levels presented in **Technical Appendix 13.2**, specifically in Chart 1, the baseline ambient level is below 65 dB throughout the majority of the survey. The construction phase noise limit for weekday daytimes and Saturdays, in accordance with the ABC method provided in BS 5228, is therefore Category A; 65 dBLAeq,T.

Operational noise limits – fixed non-turbine plant

13.70 Operational noise limits for fixed non-turbine plant, such as transformers and substations, have been derived in accordance with BS4142, with reference to measured background noise levels at NMP1. It is assumed that such plant will operate at a constant level, therefore noise limits will be determined by the night-time background level, when noise from road traffic and other anthropogenic sources is at a minimum. At wind speeds lower than 5 m/s and in the absence of rainfall (as required by BS4142), as shown in Chart 1 the measured background level during the night-time period at NMP1 was typically below 30 dBLA90,T.

13.71 This assessment adopts the rating level noise limit of 35 dB at any identified NSR, in accordance with **Table 13-7**.

Operational noise limits – wind turbine noise

13.72 The derived noise limits are provided in **Table 13-9** for the range of operational wind speeds of the candidate turbine. The noise limits derived from measurements at the

NMPs have been allocated to NSRs on the basis of observations of the noise environment while setting up the SLMs.

- 13.73 Background noise data was filtered for quiet daytime and night periods, to remove rain affected data (in accordance with the GPG, any potentially rain affected data was removed, including the 10 minute period before and after recorded rainfall).
- 13.74 The approach to the allocation of NMP-derived noise limits has been agreed with D&GC EHO. NSR1, NSR20 and NSR21 are financially involved (FI) with the Proposed Development and the FI lower fixed limit of 45 dBLA90 has been applied at these NSRs

Table 13-9 – Derivation of noise limits, dBLA90,10min

| NSR ID | Representative NMP applicable | Wind Speed, ms-1 | | | | | | | | |
|---------------|-------------------------------|---|------|------|------|------|------|------|------|------|
| | | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | | Baseline derived 'background +5 dB noise limit' | | | | | | | | |
| Quiet Daytime | | | | | | | | | | |
| NSR1 | NMP1 | 45.3 | 45.7 | 46.3 | 47.2 | 48.2 | 49.4 | 50.7 | 52.1 | 53.6 |
| NSR2 | NMP4 | 43.5 | 44.4 | 45.1 | 45.8 | 46.5 | 47.2 | 47.9 | 48.7 | 49.6 |
| NSR3 | NMP4 | 43.5 | 44.4 | 45.1 | 45.8 | 46.5 | 47.2 | 47.9 | 48.7 | 49.6 |
| NSR4 | NMP4 | 43.5 | 44.4 | 45.1 | 45.8 | 46.5 | 47.2 | 47.9 | 48.7 | 49.6 |
| NSR5 | NMP4 | 43.5 | 44.4 | 45.1 | 45.8 | 46.5 | 47.2 | 47.9 | 48.7 | 49.6 |
| NSR6 | NMP4 | 43.5 | 44.4 | 45.1 | 45.8 | 46.5 | 47.2 | 47.9 | 48.7 | 49.6 |
| NSR7 | NMP4 | 43.5 | 44.4 | 45.1 | 45.8 | 46.5 | 47.2 | 47.9 | 48.7 | 49.6 |
| NSR8 | NMP4 | 43.5 | 44.4 | 45.1 | 45.8 | 46.5 | 47.2 | 47.9 | 48.7 | 49.6 |
| NSR9 | NMP4 | 43.5 | 44.4 | 45.1 | 45.8 | 46.5 | 47.2 | 47.9 | 48.7 | 49.6 |
| NSR10 | NMP3 | 41.4 | 41.7 | 42.6 | 43.9 | 45.6 | 47.6 | 49.9 | 52.4 | 54.9 |
| NSR11 | NMP3 | 41.4 | 41.7 | 42.6 | 43.9 | 45.6 | 47.6 | 49.9 | 52.4 | 54.9 |
| NSR12 | NMP2 | 42.6 | 43.2 | 44.0 | 45.0 | 46.2 | 47.6 | 49.2 | 50.9 | 52.9 |
| NSR13 | NMP2 | 42.6 | 43.2 | 44.0 | 45.0 | 46.2 | 47.6 | 49.2 | 50.9 | 52.9 |
| NSR14 | NMP2 | 42.6 | 43.2 | 44.0 | 45.0 | 46.2 | 47.6 | 49.2 | 50.9 | 52.9 |
| NSR15 | NMP2 | 42.6 | 43.2 | 44.0 | 45.0 | 46.2 | 47.6 | 49.2 | 50.9 | 52.9 |
| NSR16 | NMP2 | 42.6 | 43.2 | 44.0 | 45.0 | 46.2 | 47.6 | 49.2 | 50.9 | 52.9 |
| NSR17 | NMP2 | 42.6 | 43.2 | 44.0 | 45.0 | 46.2 | 47.6 | 49.2 | 50.9 | 52.9 |
| NSR18 | NMP2 | 42.6 | 43.2 | 44.0 | 45.0 | 46.2 | 47.6 | 49.2 | 50.9 | 52.9 |
| NSR19 | NMP2 | 42.6 | 43.2 | 44.0 | 45.0 | 46.2 | 47.6 | 49.2 | 50.9 | 52.9 |
| NSR20 | NMP1 | 45.3 | 45.7 | 46.3 | 47.2 | 48.2 | 49.4 | 50.7 | 52.1 | 53.6 |
| NSR21 | NMP1 | 45.3 | 45.7 | 46.3 | 47.2 | 48.2 | 49.4 | 50.7 | 52.1 | 53.6 |
| NSR22 | NMP2 | 42.6 | 43.2 | 44.0 | 45.0 | 46.2 | 47.6 | 49.2 | 50.9 | 52.9 |
| Night-time | | | | | | | | | | |

| NSR ID | Representative NMP applicable | Wind Speed, ms ⁻¹ | | | | | | | | |
|--------|-------------------------------|---|----|----|----|------|------|------|------|------|
| | | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | | Baseline derived 'background +5 dB noise limit' | | | | | | | | |
| NSR1 | NMP1 | 45 | 45 | 45 | 45 | 45 | 45.1 | 47.4 | 49.8 | 52.2 |
| NSR2 | NMP4 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 44.3 | 46.2 |
| NSR3 | NMP4 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 44.3 | 46.2 |
| NSR4 | NMP4 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 44.3 | 46.2 |
| NSR5 | NMP4 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 44.3 | 46.2 |
| NSR6 | NMP4 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 44.3 | 46.2 |
| NSR7 | NMP4 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 44.3 | 46.2 |
| NSR8 | NMP4 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 44.3 | 46.2 |
| NSR9 | NMP4 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 44.3 | 46.2 |
| NSR10 | NMP3 | 43 | 43 | 43 | 43 | 43.6 | 46.4 | 49.3 | 52.3 | 55.4 |
| NSR11 | NMP3 | 43 | 43 | 43 | 43 | 43.6 | 46.4 | 49.3 | 52.3 | 55.4 |
| NSR12 | NMP2 | 43 | 43 | 43 | 43 | 43 | 44.6 | 46.7 | 49.0 | 51.4 |
| NSR13 | NMP2 | 43 | 43 | 43 | 43 | 43 | 44.6 | 46.7 | 49.0 | 51.4 |
| NSR14 | NMP2 | 43 | 43 | 43 | 43 | 43 | 44.6 | 46.7 | 49.0 | 51.4 |
| NSR15 | NMP2 | 43 | 43 | 43 | 43 | 43 | 44.6 | 46.7 | 49.0 | 51.4 |
| NSR16 | NMP2 | 43 | 43 | 43 | 43 | 43 | 44.6 | 46.7 | 49.0 | 51.4 |
| NSR17 | NMP2 | 43 | 43 | 43 | 43 | 43 | 44.6 | 46.7 | 49.0 | 51.4 |
| NSR18 | NMP2 | 43 | 43 | 43 | 43 | 43 | 44.6 | 46.7 | 49.0 | 51.4 |
| NSR19 | NMP2 | 43 | 43 | 43 | 43 | 43 | 44.6 | 46.7 | 49.0 | 51.4 |
| NSR20 | NMP1 | 45 | 45 | 45 | 45 | 45 | 45.1 | 47.4 | 49.8 | 52.2 |
| NSR21 | NMP1 | 45 | 45 | 45 | 45 | 45 | 45.1 | 47.4 | 49.8 | 52.2 |
| NSR22 | NMP2 | 43 | 43 | 43 | 43 | 43 | 44.6 | 46.7 | 49.0 | 51.4 |

Cumulative Situation

- 13.75 Investigations of the D&GC and Carlise/Cumberland Councils' planning portals confirmed that there are no existing, consented or proposed wind turbines within 5km of the Proposed Development. A detailed assessment of cumulative effects has therefore not been undertaken.
- 13.76 Approximately 7.5km to the west of the Proposed Development lies Beck Burn Wind Farm (Cumberland Council Planning Portal reference 13/0866); predicted noise levels due to the Proposed Development, at the closest assessed noise sensitive receptor between the two schemes (Braemar, Springfield, were more than 10 dB below the predicted noise levels due to Beck Burn Wind Farm and cumulative impacts are therefore unlikely..

Assessment of Effects

Embedded Measures

- 13.77 This assessment considers the candidate wind turbine model, which includes trailing edge serrations (TES) to the blades as standard. Blades with TES generate lower levels of aerodynamic noise than blades with straight edges.
- 13.78 The Applicant is committed to meeting the appropriate noise limits, which it is anticipated would be specified in a relevant planning condition should the Proposed Development receive consent. The eventual wind turbine model installed, if different to the candidate wind turbine, would be selected on the basis of having a similar sound power level and its ability to meet the consented noise limits.
- 13.79 The Applicant is committed to meeting the appropriate noise limits for non-wind turbine fixed plant, which it is anticipated would be specified in a relevant planning condition should the Proposed Development receive consent.

Potential Operational Effects

- 13.80 Predicted noise levels due to operation of the wind turbines of the Proposed Development at all NSRs are provided in **Table 13-10**.

Table 13-10 – Predicted Operational Noise Levels

| NSR Name | NSR ID | Standardised (10 m) Wind Speed, ms ⁻¹ | | | | | | | | |
|-------------------------------|--------|---|------|------|------|------|------|------|------|------|
| | | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | | Predicted Operational Noise Level, dBL _{A90,10min} | | | | | | | | |
| West Scales Farm | NSR1 | 32.5 | 36.6 | 40.2 | 40.8 | 40.8 | 40.8 | 40.8 | 40.8 | 40.8 |
| Hazeldean | NSR2 | 26.0 | 30.1 | 33.6 | 34.2 | 34.2 | 34.2 | 34.2 | 34.2 | 34.2 |
| Newtonlea | NSR3 | 26.0 | 30.1 | 33.7 | 34.2 | 34.2 | 34.2 | 34.2 | 34.2 | 34.2 |
| Woodfield | NSR4 | 25.4 | 29.5 | 33.1 | 33.6 | 33.6 | 33.6 | 33.6 | 33.6 | 33.6 |
| Bridgend Bungalow | NSR5 | 24.6 | 28.7 | 32.3 | 32.8 | 32.8 | 32.8 | 32.8 | 32.8 | 32.8 |
| Elmside Farm | NSR6 | 23.8 | 27.9 | 31.5 | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| Calgary Grove | NSR7 | 23.7 | 27.8 | 31.4 | 31.9 | 31.9 | 31.9 | 31.9 | 31.9 | 31.9 |
| Irvington | NSR8 | 27.3 | 31.4 | 35.0 | 35.5 | 35.5 | 35.5 | 35.5 | 35.5 | 35.5 |
| 3 North Road, Lowtherton | NSR9 | 21.8 | 25.9 | 29.5 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 |
| Todholes | NSR10 | 25.2 | 29.3 | 32.9 | 33.4 | 33.4 | 33.4 | 33.4 | 33.4 | 33.4 |
| Todholes 2 | NSR11 | 26.8 | 30.9 | 34.5 | 35.0 | 35.0 | 35.0 | 35.0 | 35.0 | 35.0 |
| Westlands Country Park Lodges | NSR12 | 26.6 | 30.7 | 34.3 | 34.8 | 34.8 | 34.8 | 34.8 | 34.8 | 34.8 |
| Broats | NSR13 | 23.1 | 27.2 | 30.8 | 31.3 | 31.3 | 31.3 | 31.3 | 31.3 | 31.3 |

| NSR Name | NSR ID | Standardised (10 m) Wind Speed, ms ⁻¹ | | | | | | | | |
|-----------------------|--------|---|------|------|------|------|------|------|------|------|
| | | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | | Predicted Operational Noise Level, dBL _{A90,10min} | | | | | | | | |
| Flosh | NSR1 4 | 25.6 | 29.7 | 33.3 | 33.8 | 33.8 | 33.8 | 33.8 | 33.8 | 33.8 |
| Nutberry Farm | NSR1 5 | 28.1 | 32.2 | 35.8 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 |
| High Nutberry Farm | NSR1 6 | 25.7 | 29.8 | 33.4 | 33.9 | 33.9 | 33.9 | 33.9 | 33.9 | 33.9 |
| Hillhead | NSR1 7 | 25.6 | 29.7 | 33.3 | 33.8 | 33.8 | 33.8 | 33.8 | 33.8 | 33.8 |
| Calvertsholm Cottages | NSR1 8 | 22.7 | 26.8 | 30.4 | 30.9 | 30.9 | 30.9 | 30.9 | 30.9 | 30.9 |
| Riggheads | NSR1 9 | 23.3 | 27.4 | 31.0 | 31.5 | 31.5 | 31.5 | 31.5 | 31.5 | 31.5 |
| Redwood House | NSR2 0 | 30.3 | 34.4 | 38.0 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 |
| West Scales Bungalow | NSR2 1 | 30.0 | 34.1 | 37.7 | 38.2 | 38.2 | 38.2 | 38.2 | 38.2 | 38.2 |
| Hillhead Cottage | NSR2 2 | 25.6 | 29.7 | 33.3 | 33.8 | 33.8 | 33.8 | 33.8 | 33.8 | 33.8 |

13.81 The predicted operational noise levels are compared with the consented noise limits in **Table 13-11**.

Table 13-11 – Evaluation of Operational Noise Levels Against Consented Noise Limits

| NSR Name | NSR ID | Standardised (10 m) Wind Speed, ms ⁻¹ | | | | | | | | |
|-------------------------|--------|--|-------|-------|-------|-------|-------|-------|-------|-------|
| | | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | | Comparison : Derived Noise Limit Minus Predicted Operational Noise Level, dB | | | | | | | | |
| Daytime (07:00 – 23:00) | | | | | | | | | | |
| West Scales Farm | NSR1 | -12.8 | -9.1 | -6.1 | -6.4 | -7.4 | -8.6 | -9.9 | -11.3 | -12.8 |
| Hazeldean | NSR2 | -17.5 | -14.3 | -11.5 | -11.6 | -12.3 | -13.0 | -13.7 | -14.5 | -15.4 |
| Newtonlea | NSR3 | -17.5 | -14.3 | -11.4 | -11.6 | -12.3 | -13.0 | -13.7 | -14.5 | -15.4 |
| Woodfield | NSR4 | -18.1 | -14.9 | -12.0 | -12.2 | -12.9 | -13.6 | -14.3 | -15.1 | -16.0 |
| Bridgend Bungalow | NSR5 | -18.9 | -15.7 | -12.8 | -13.0 | -13.7 | -14.4 | -15.1 | -15.9 | -16.8 |
| Elmside Farm | NSR6 | -19.7 | -16.5 | -13.6 | -13.8 | -14.5 | -15.2 | -15.9 | -16.7 | -17.6 |
| Calgary Grove | NSR7 | -19.8 | -16.6 | -13.7 | -13.9 | -14.6 | -15.3 | -16.0 | -16.8 | -17.7 |
| Irvington | NSR8 | -16.2 | -13.0 | -10.1 | -10.3 | -11.0 | -11.7 | -12.4 | -13.2 | -14.1 |

| NSR Name | NSR ID | Standardised (10 m) Wind Speed, ms ⁻¹ | | | | | | | | |
|-----------------------------------|--------|--|-------|-------|-------|-------|-------|-------|-------|-------|
| | | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | | Comparison : Derived Noise Limit Minus Predicted Operational Noise Level, dB | | | | | | | | |
| 3 North Road, Lowtherton | NSR9 | -21.7 | -18.5 | -15.6 | -15.8 | -16.5 | -17.2 | -17.9 | -18.7 | -19.6 |
| Todholes | NSR10 | -16.2 | -12.4 | -9.7 | -10.5 | -12.2 | -14.2 | -16.5 | -19.0 | -21.5 |
| Todholes 2 | NSR11 | -14.6 | -10.8 | -8.1 | -8.9 | -10.6 | -12.6 | -14.9 | -17.4 | -19.9 |
| Westlands Country Park Lodges | NSR12 | -16.0 | -12.5 | -9.7 | -10.2 | -11.4 | -12.8 | -14.4 | -16.1 | -18.1 |
| Broats | NSR13 | -19.5 | -16.0 | -13.2 | -13.7 | -14.9 | -16.3 | -17.9 | -19.6 | -21.6 |
| Flosh | NSR14 | -17.0 | -13.5 | -10.7 | -11.2 | -12.4 | -13.8 | -15.4 | -17.1 | -19.1 |
| Nutberry Farm | NSR15 | -14.5 | -11.0 | -8.2 | -8.7 | -9.9 | -11.3 | -12.9 | -14.6 | -16.6 |
| High Nutberry Farm | NSR16 | -16.9 | -13.4 | -10.6 | -11.1 | -12.3 | -13.7 | -15.3 | -17.0 | -19.0 |
| Hillhead | NSR17 | -17.0 | -13.5 | -10.7 | -11.2 | -12.4 | -13.8 | -15.4 | -17.1 | -19.1 |
| Calvertsholm Cottages | NSR18 | -19.9 | -16.4 | -13.6 | -14.1 | -15.3 | -16.7 | -18.3 | -20.0 | -22.0 |
| Riggheads | NSR19 | -19.3 | -15.8 | -13.0 | -13.5 | -14.7 | -16.1 | -17.7 | -19.4 | -21.4 |
| Redwood House | NSR20 | -15.0 | -11.3 | -8.3 | -8.7 | -9.7 | -10.9 | -12.2 | -13.6 | -15.1 |
| West Scales Bungalow | NSR21 | -15.3 | -11.6 | -8.6 | -9.0 | -10.0 | -11.2 | -12.5 | -13.9 | -15.4 |
| Hillhead Cottage | NSR22 | -17.0 | -13.5 | -10.7 | -11.2 | -12.4 | -13.8 | -15.4 | -17.1 | -19.1 |
| Night-time (23:00 – 07:00) | | | | | | | | | | |
| West Scales Farm | NSR1 | -12.5 | -8.4 | -4.8 | -4.2 | -4.2 | -4.3 | -6.6 | -9.0 | -11.4 |
| Hazeldean | NSR2 | -17.0 | -12.9 | -9.4 | -8.8 | -8.8 | -8.8 | -8.8 | -10.1 | -12.0 |
| Newtonlea | NSR3 | -17.0 | -12.9 | -9.3 | -8.8 | -8.8 | -8.8 | -8.8 | -10.1 | -12.0 |
| Woodfield | NSR4 | -17.6 | -13.5 | -9.9 | -9.4 | -9.4 | -9.4 | -9.4 | -10.7 | -12.6 |
| Bridgend Bungalow | NSR5 | -18.4 | -14.3 | -10.7 | -10.2 | -10.2 | -10.2 | -10.2 | -11.5 | -13.4 |
| Elmside Farm | NSR6 | -19.2 | -15.1 | -11.5 | -11.0 | -11.0 | -11.0 | -11.0 | -12.3 | -14.2 |

| NSR Name | NSR ID | Standardised (10 m) Wind Speed, ms ⁻¹ | | | | | | | | |
|-------------------------------|--------|--|-------|-------|-------|-------|-------|-------|-------|-------|
| | | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | | Comparison : Derived Noise Limit Minus Predicted Operational Noise Level, dB | | | | | | | | |
| Calgary Grove | NSR7 | -19.3 | -15.2 | -11.6 | -11.1 | -11.1 | -11.1 | -11.1 | -12.4 | -14.3 |
| Irvington | NSR8 | -15.7 | -11.6 | -8.0 | -7.5 | -7.5 | -7.5 | -7.5 | -8.8 | -10.7 |
| 3 North Road, Lowtherton | NSR9 | -21.2 | -17.1 | -13.5 | -13.0 | -13.0 | -13.0 | -13.0 | -14.3 | -16.2 |
| Todholes | NSR10 | -17.8 | -13.7 | -10.1 | -9.6 | -10.2 | -13.0 | -15.9 | -18.9 | -22.0 |
| Todholes 2 | NSR11 | -16.2 | -12.1 | -8.5 | -8.0 | -8.6 | -11.4 | -14.3 | -17.3 | -20.4 |
| Westlands Country Park Lodges | NSR12 | -16.4 | -12.3 | -8.7 | -8.2 | -8.2 | -9.8 | -11.9 | -14.2 | -16.6 |
| Broats | NSR13 | -19.9 | -15.8 | -12.2 | -11.7 | -11.7 | -13.3 | -15.4 | -17.7 | -20.1 |
| Flosh | NSR14 | -17.4 | -13.3 | -9.7 | -9.2 | -9.2 | -10.8 | -12.9 | -15.2 | -17.6 |
| Nutberry Farm | NSR15 | -14.9 | -10.8 | -7.2 | -6.7 | -6.7 | -8.3 | -10.4 | -12.7 | -15.1 |
| High Nutberry Farm | NSR16 | -17.3 | -13.2 | -9.6 | -9.1 | -9.1 | -10.7 | -12.8 | -15.1 | -17.5 |
| Hillhead | NSR17 | -17.4 | -13.3 | -9.7 | -9.2 | -9.2 | -10.8 | -12.9 | -15.2 | -17.6 |
| Calvertsholm Cottages | NSR18 | -20.3 | -16.2 | -12.6 | -12.1 | -12.1 | -13.7 | -15.8 | -18.1 | -20.5 |
| Riggheads | NSR19 | -19.7 | -15.6 | -12.0 | -11.5 | -11.5 | -13.1 | -15.2 | -17.5 | -19.9 |
| Redwood House | NSR20 | -14.7 | -10.6 | -7.0 | -6.5 | -6.5 | -6.6 | -8.9 | -11.3 | -13.7 |
| West Scales Bungalow | NSR21 | -13.0 | -8.9 | -5.3 | -4.8 | -4.8 | -6.9 | -9.2 | -11.6 | -14.0 |
| Hillhead Cottage | NSR22 | -17.4 | -13.3 | -9.7 | -9.2 | -9.2 | -10.8 | -12.9 | -15.2 | -17.6 |

13.82 The predicted operational noise levels meet the consented noise limits by a minimum margin of 4.2 dB. Noise impacts associated with operation of the Proposed Development have therefore been assessed as **not significant**.

Fixed (non-turbine) Plant Noise

13.83 Noise from non-wind turbine operational plant would comprise noise from the substation, transformers within the solar array and battery storage elements only. The sound power levels of the proposed plant are not yet available, however, noise from the installed plant

will be attenuated by acoustic enclosure (if required), such that it meets the derived non-wind turbine noise limits (see Paragraph 13.71).

- 13.84 The Applicant has committed to installed plant meeting these criteria. With reference to **Table 13-7** and **Table 13-8** the impact magnitude would therefore be low and the significance of effect would therefore be minor. As such, noise from fixed (non-wind turbine) plant is predicted to be **not significant** in EIA terms.

Further Survey Requirements and Monitoring

- 13.85 The 2025 consultation for updates to ETSU-R-97 provides guidance on compliance monitoring in Section 3.

- 13.86 The proposed updated guidance states:

“Noise from wind farms should be controlled through planning conditions (or equivalent requirements) which direct the wind farm operator, at any time during the operation of the development, to undertake measurements at one or more specific properties following justified complaints related to noise. A condition requiring periodic monitoring, or post-completion monitoring at residences in the absence of complaints, is not required under this technical guidance.”

- 13.87 In addition, the guidance states:

“Where it has been identified (e.g. through complaint records) that complaints specifically relate to operational wind turbine noise at wind speeds which are above those considered in the noise assessment and contained within the planning conditions, appropriate noise limits can be determined as part of the initial compliance assessment protocol to be submitted and agreed with the relevant Planning Authority.”

- 13.88 No additional surveying or compliance monitoring exercises are warranted, where the operational wind farm noise is expected to meet ETSU-R-97, IOA GPG and DGC requirements.

Statement of Significance

- 13.89 This chapter has considered potential noise effects associated with construction and operation of the Proposed Development.
- 13.90 The assessment of noise comprised consultation with D&GC, characterisation of the baseline noise environment, prediction of noise levels associated with operational wind turbines and evaluation of predicted levels against derived criteria.
- 13.91 Noise limits have been derived for construction activities and non-wind turbine fixed plant associated with operation of the Proposed Development. Items of fixed plant, including the BESS, will be specified during procurement such that they meet the derived noise limits at all representative NSRs. Noise effects from fixed plant are therefore assessed as **not significant** in EIA terms.
- 13.92 Predicted wind turbine noise levels associated with operation of the Proposed Development meet derived day and night-time noise limits at all the identified representative NSRs, for all wind speeds. Noise effects due to the operation of wind turbines are therefore assessed as **not significant** in EIA terms.

References

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