

turbines subject to substantial curtailment. Furthermore, the generation capacity of the Site is a relevant consideration. With more than 20 turbines with energy generation capacity of 6.7 MW for each turbine, a total generation capacity of more than 100 MW for the Proposed Development is therefore, substantial. The power generating capacity of modern wind turbines has dramatically increased over that which was typical at the time the ETSU-R-97 guidelines were produced. For example, at the time the guide was produced, a wind farm site comprising around 250 turbines would have been required to achieve a similar generating capacity to that of the Proposed Development, thus highlighting the significance of the scheme.

5.6.5 Based on the above considerations, it is considered wholly appropriate to set the limit toward the middle to upper end of the range. As a conservative approach, a 37 dB(A) lower fixed limit has been adopted in this assessment for the Proposed Development cumulatively. Therefore, assessment of the Proposed Development (in isolation and cumulatively) is undertaken against the derived ETSUR97 limits: the greater of a lower fixed limit of 37 dB(A) or 5 dB above background for day-time and 43 dB(A) lower fixed limit or 5 dB above background for night-time. Table 18 and Table 19 presents the assessment of the Proposed Development in isolation with the candidate turbine (Vestas V172) operating in the low noise mode as discussed in paragraph 5.3.3 (see Table B3 for noise emission levels for different modes).

Table 18 - Difference between the ETSU-R-97 derived day time noise limits and the Proposed Development predicted L_{A90} (dB) noise immission levels at each noise assessment location. Values are based on 37 dB(A) lower day-time limit and negative values indicate the noise immission level is below the limit.

Property	Standardised 10 m Wind Speed (m/s)									
	3	4	5	6	7	8	9	10	11	12
Lettershaws Farm	-15.2	-12.0	-7.2	-4.6	-4.3	-5.1	-5.5	-5.8	-6.1	-6.4
Kirkton	-18.6	-15.6	-11.0	-8.4	-8.9	-9.5	-10.0	-10.6	-11.1	-11.7
Glencaple Farm House	-17.9	-14.3	-9.2	-6.4	-6.7	-7.4	-8.4	-9.7	-11.4	-13.6
Glencaple	-18.3	-14.8	-9.7	-6.9	-7.2	-7.9	-8.9	-10.2	-11.9	-14.0
Boghead	-21.0	-17.9	-13.3	-10.8	-11.2	-11.8	-12.4	-12.9	-13.5	-14.0
Carlisle Road North	-22.5	-19.5	-14.9	-12.4	-12.8	-13.4	-14.0	-14.5	-15.1	-15.6
Hurlieburn Lodge	-25.0	-22.0	-17.4	-14.9	-15.4	-15.9	-16.5	-17.0	-17.6	-18.2
Carlisle Road South	-27.2	-24.1	-19.5	-17.1	-17.5	-18.1	-18.6	-19.2	-19.8	-20.3
Stoneyburn	-26.6	-23.6	-19.0	-16.5	-16.9	-17.5	-18.1	-18.6	-19.2	-19.7
Elvanfoot Farm	-24.3	-21.0	-16.1	-13.3	-13.5	-13.8	-14.1	-14.4	-14.6	-14.9
Lodge Cottages	-25.2	-21.9	-17.1	-14.3	-14.5	-14.8	-15.0	-15.3	-15.6	-15.9
Leadhills Road	-24.4	-21.1	-16.2	-13.4	-13.6	-13.9	-14.2	-14.5	-14.8	-15.1
North Shortcleugh (FI)	-17.2	-13.6	-8.4	-5.4	-5.3	-5.3	-5.3	-5.3	-5.3	-6.0
South Shortcleugh	-11.8	-8.2	-3.0	0.0	-0.3	-2.0	-3.4	-5.0	-6.7	-8.6
Hass	-17.3	-14.1	-9.4	-6.8	-7.1	-7.4	-7.7	-8.0	-8.4	-8.7
Waterhead Toll Cottage	-9.4	-6.2	-1.8	0.0	-0.2	-0.6	-0.9	-1.2	-1.5	-1.9
New Glendorch	-9.8	-6.7	-2.1	-0.1	-0.4	-0.7	-1.0	-1.4	-1.7	-2.0
Glengeith	-25.2	-21.9	-17.0	-14.2	-14.4	-14.7	-15.0	-15.3	-15.6	-15.9
Leadhills	-15.5	-11.9	-6.8	-3.8	-3.7	-4.2	-6.1	-8.3	-10.6	-12.8
Leadhills (south)	-17.4	-13.8	-8.7	-5.7	-5.6	-6.0	-7.9	-10.2	-12.5	-14.7
Dentercleuch	-17.7	-14.1	-9.0	-5.9	-5.3	-5.8	-5.8	-6.5	-8.1	-10.1
Snar Farm	-19.3	-15.7	-10.6	-8.3	-9.4	-11.1	-13.1	-15.5	-18.1	-20.9
Glendouran Farm	-19.7	-16.1	-11.0	-8.8	-9.9	-11.6	-13.6	-16.0	-18.6	-21.3
Strancleugh Farm	-21.9	-18.3	-13.3	-11.0	-12.1	-13.8	-15.8	-18.2	-20.8	-23.6

Table 19 - Difference between the ETSU-R-97 derived night-time noise limits and the Proposed Development predicted LA90 (dB) noise immission levels at each noise assessment location. Values are based on 43 dB(A) lower night-time limit and negative values indicate the noise immission level is below the limit.

Property	Standardised 10 m Wind Speed (m/s)									
	3	4	5	6	7	8	9	10	11	12
Lettershaws Farm	-20.0	-16.4	-11.3	-8.4	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3
Kirkton	-20.0	-16.4	-11.2	-8.2	-8.1	-8.1	-8.1	-8.1	-8.1	-8.1
Glencaple Farm House	-20.6	-17.0	-11.8	-8.7	-8.7	-8.7	-8.7	-8.7	-8.7	-8.7
Glencaple	-21.1	-17.5	-12.3	-9.2	-9.1	-9.1	-9.1	-9.1	-9.1	-9.1
Boghead	-22.4	-18.8	-13.6	-10.5	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4
Carlisle Road North	-24.0	-20.4	-15.2	-12.1	-12.0	-12.0	-12.0	-12.0	-12.0	-12.0
Hurlieburn Lodge	-26.5	-22.9	-17.7	-14.6	-14.5	-14.5	-14.5	-14.5	-14.5	-14.5
Carlisle Road South	-28.6	-25.0	-19.8	-16.8	-16.7	-16.7	-16.7	-16.7	-16.7	-16.7
Stoneyburn	-28.0	-24.4	-19.3	-16.2	-16.1	-16.1	-16.1	-16.1	-16.1	-16.1
Elvanfoot Farm	-23.8	-20.3	-15.1	-12.4	-12.7	-13.1	-13.5	-13.8	-14.2	-14.6
Lodge Cottages	-24.8	-21.2	-16.1	-13.4	-13.7	-14.1	-14.4	-14.8	-15.2	-15.6
Leadhills Road	-23.9	-20.3	-15.2	-12.6	-12.8	-13.2	-13.6	-14.0	-14.3	-14.7
North Shortcleugh (FI)	-17.2	-13.6	-8.4	-5.4	-5.3	-5.3	-5.3	-5.3	-5.3	-5.3
South Shortcleugh	-17.8	-14.2	-9.0	-6.0	-5.9	-5.9	-5.9	-5.9	-5.9	-5.9
Hass	-22.1	-18.6	-13.5	-10.6	-10.5	-10.5	-10.5	-10.5	-10.5	-10.5
Waterhead Toll Cottage	-14.1	-10.7	-5.9	-3.8	-3.7	-3.7	-3.7	-3.7	-3.7	-3.7
New Glendorch	-14.6	-11.1	-6.3	-3.9	-3.8	-3.8	-3.8	-3.8	-3.8	-3.8
Glengeith	-24.7	-21.1	-16.0	-13.4	-13.6	-14.0	-14.4	-14.8	-15.1	-15.5
Leadhills	-21.5	-17.9	-12.8	-9.8	-9.7	-9.7	-9.7	-9.7	-9.7	-9.7
Leadhills (south)	-23.4	-19.8	-14.7	-11.7	-11.6	-11.6	-11.6	-11.6	-11.6	-11.6
Dentercleuch	-23.7	-20.1	-15.0	-11.9	-11.8	-11.8	-11.8	-11.8	-11.8	-11.8
Snar Farm	-22.2	-18.6	-13.5	-10.6	-10.5	-10.5	-11.6	-13.7	-13.7	-13.7
Glendouran Farm	-22.5	-19.0	-13.9	-11.0	-10.9	-10.9	-12.0	-14.2	-14.2	-14.2
Strancleugh Farm	-24.8	-21.2	-16.1	-13.2	-13.1	-13.1	-14.3	-16.4	-16.4	-16.4

5.6.6 The assessment (shown in tabular form in Table 18 and Table 19) shows that the predicted wind farm noise immission levels from the Proposed Development in isolation (with the low noise modes outlined in paragraph 5.3.3) meet the ETSU-R-97 derived noise limits under all wind speeds and at all locations for day-time and night-time. Predicted noise immission levels for the cumulative total (Proposed Development and all surrounding windfarms) as shown in Table 17 are compared to the derived limits to present difference for day and night respectively, shown in Table 20 and Table 21 below.

Table 20 - Difference between the ETSU-R-97 derived daytime noise limits and the cumulative predicted LA90 (dB) wind farm Noise immission levels at each noise assessment location with some Proposed Development turbines operating at reduced noise modes as outlined in paragraph 5.3.3. Negative values indicate the immission level is below the limit

Property	Standardised 10 m Wind Speed (m/s)									
	3	4	5	6	7	8	9	10	11	12
Lettershaws Farm	-14.5	-11.3	-6.5	-3.8	-3.9	-4.2	-4.6	-4.9	-5.2	-5.6
Kirkton	-17.8	-14.8	-10.1	-7.4	-7.5	-8.1	-8.6	-9.2	-9.8	-10.3
Glencaple Farm House	-17.0	-13.5	-8.4	-5.5	-5.6	-6.3	-7.3	-8.6	-10.3	-12.4
Glencaple	-17.5	-13.9	-8.8	-6.0	-6.1	-6.8	-7.8	-9.1	-10.8	-12.9
Boghead	-19.3	-16.3	-11.2	-8.2	-8.0	-8.6	-9.1	-9.7	-10.3	-10.8
Carlisle Road North	-20.3	-17.3	-12.1	-9.0	-8.6	-9.2	-9.7	-10.3	-10.9	-11.4
Hurlieburn Lodge	-19.5	-16.6	-10.8	-7.2	-6.5	-7.0	-7.6	-8.1	-8.7	-9.3
Carlisle Road South	-19.3	-16.4	-10.4	-6.7	-5.8	-6.4	-6.9	-7.5	-8.0	-8.6
Stoneyburn	-17.9	-15.0	-8.9	-5.2	-4.2	-4.8	-5.3	-5.9	-6.5	-7.0
Elvanfoot Farm	-20.6	-17.4	-11.5	-7.8	-6.9	-7.2	-7.4	-7.7	-8.0	-8.3
Lodge Cottages	-21.2	-18.0	-12.0	-8.3	-7.3	-7.6	-7.9	-8.2	-8.4	-8.7
Leadhills Road	-20.6	-17.4	-11.5	-7.8	-6.9	-7.2	-7.5	-7.8	-8.0	-8.3
North Shortcleugh	-16.9	-13.3	-8.0	-4.9	-4.6	-4.6	-4.6	-4.6	-4.6	-5.3
South Shortcleugh	-11.4	-7.8	-2.5	0.7	0.2	-1.1	-2.5	-4.0	-5.7	-7.7
Hass	-16.9	-13.7	-8.9	-6.2	-6.3	-6.6	-7.0	-7.3	-7.6	-7.9
Waterhead Toll Cottage	-9.2	-6.1	-1.7	0.2	-0.1	-0.4	-0.7	-1.0	-1.3	-1.7
New Glendorch	-9.7	-6.6	-2.0	0.0	-0.2	-0.5	-0.9	-1.2	-1.5	-1.8
Glengeith	-20.7	-17.6	-11.5	-7.7	-6.7	-7.0	-7.3	-7.6	-7.9	-8.2
Leadhills	-15.1	-11.6	-6.5	-3.5	-3.3	-3.7	-5.6	-7.8	-10.1	-12.3
Leadhills (south)	-16.9	-13.3	-8.2	-5.1	-4.9	-5.3	-7.2	-9.4	-11.7	-13.9
Dentercleuch	-17.2	-13.7	-8.6	-5.5	-5.3	-5.3	-5.3	-6.0	-7.6	-9.6
Snar Farm	-17.6	-14.2	-9.3	-7.1	-7.9	-9.6	-11.6	-14.0	-16.6	-19.4
Glendouran Farm	-16.4	-13.1	-8.5	-6.2	-7.0	-8.6	-10.7	-13.0	-15.6	-18.4
Strancleugh Farm	-17.3	-14.2	-9.7	-7.4	-8.0	-9.6	-11.7	-14.1	-16.7	-19.4

Table 21 - Difference between the ETSU-R-97 derived night time noise limits and the cumulative predicted L_{A90} (dB) wind farm Noise immission levels at each noise assessment location with some Proposed Development turbines operating at reduced noise modes as outlined in paragraph 5.3.3. Negative values indicate the immission level is below the limit

Property	Standardised 10 m Wind Speed (m/s)									
	3	4	5	6	7	8	9	10	11	12
Lettershaws Farm	-19.2	-15.7	-10.6	-7.6	-7.4	-7.4	-7.4	-7.4	-7.4	-7.4
Kirkton	-19.3	-15.7	-10.3	-7.1	-6.7	-6.7	-6.7	-6.7	-6.7	-6.7
Glencaple Farm House	-19.8	-16.2	-11.0	-7.8	-7.5	-7.5	-7.5	-7.5	-7.5	-7.5
Glencaple	-20.2	-16.6	-11.4	-8.3	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
Boghead	-20.7	-17.2	-11.5	-8.0	-7.2	-7.2	-7.2	-7.2	-7.2	-7.2
Carlisle Road North	-21.7	-18.2	-12.4	-8.7	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8
Hurlieburn Lodge	-21.0	-17.5	-11.1	-7.0	-5.6	-5.6	-5.6	-5.6	-5.6	-5.6
Carlisle Road South	-20.7	-17.3	-10.7	-6.4	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0
Stoneyburn	-19.3	-15.9	-9.2	-4.9	-3.4	-3.4	-3.4	-3.4	-3.4	-3.4
Elvanfoot Farm	-20.2	-16.7	-10.5	-6.9	-6.1	-6.5	-6.8	-7.2	-7.6	-8.0
Lodge Cottages	-20.7	-17.2	-11.0	-7.4	-6.5	-6.9	-7.3	-7.6	-8.0	-8.4
Leadhills Road	-20.2	-16.7	-10.5	-7.0	-6.1	-6.5	-6.9	-7.2	-7.6	-8.0
North Shortcleugh	-16.9	-13.3	-8.0	-4.9	-4.6	-4.6	-4.6	-4.6	-4.6	-4.6
South Shortcleugh	-17.4	-13.8	-8.5	-5.3	-4.9	-4.9	-4.9	-4.9	-4.9	-4.9
Hass	-21.7	-18.2	-13.0	-10.0	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8
Waterhead Toll Cottage	-14.0	-10.6	-5.8	-3.6	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5
New Glendorch	-14.5	-11.0	-6.2	-3.8	-3.7	-3.7	-3.7	-3.7	-3.7	-3.7
Glengeith	-20.3	-16.8	-10.5	-6.9	-5.9	-6.3	-6.7	-7.1	-7.5	-7.8
Leadhills	-21.1	-17.6	-12.5	-9.5	-9.3	-9.2	-9.2	-9.2	-9.2	-9.2
Leadhills (south)	-22.9	-19.3	-14.2	-11.1	-10.9	-10.8	-10.8	-10.8	-10.8	-10.8
Dentercleuch	-23.2	-19.7	-14.6	-11.5	-11.3	-11.3	-11.3	-11.3	-11.3	-11.3
Snar Farm	-20.4	-17.1	-12.2	-9.3	-9.0	-9.0	-10.1	-12.2	-12.2	-12.2
Glendouran Farm	-19.2	-16.0	-11.3	-8.5	-8.0	-8.0	-9.1	-11.2	-11.2	-11.2
Strancleugh Farm	-20.2	-17.1	-12.5	-9.6	-9.1	-9.0	-10.1	-12.3	-12.3	-12.3

5.6.7 The above comparisons were completed by assuming all receptors were simultaneously downwind of all wind turbines. It can be seen that the predicted cumulative levels are below the derived limits at all receptors during the night and exceed marginally at 6-7 m/s at South Shortcleugh and Waterhead Toll Cottage during daytime. Typically, an excess of 0.4 dB(A) or below is not acoustically important and is unlikely to be perceptible, therefore, a theoretical excess of 0.4 dB to the ETSU-R-97 criteria is considered negligible. Furthermore, such an excess is unlikely to occur in practice, given the conservative assumption that the receptors considered are downwind from all wind turbines simultaneously.

- 5.6.8 For example, the exceedance of 0.7 dB at South Shortcleugh at 6 m/s daytime is further investigated using directional predictions. The above assessment assumed downwind propagation from all turbines, which will not be the case in practice as Clyde turbines are located to the east and northeast of South Shortcleugh while the Proposed Development is located to north and northwest. Directional predictions are therefore undertaken for the Proposed Development and Clyde wind turbines, as other windfarms (Middle Muir, Andershaw, and M74 West Renewable Energy Park) are more than 8 km away from South Shortcleugh and will have negligible acoustic contributions at this receptor.
- 5.6.9 Figure G1 in Annex G shows predicted levels at South Shortcleugh when considering the effects of wind direction, and it can be seen that the total predicted cumulative levels reach a maximum of 37.5 dB(A) at 6 m/s when accounting for wind direction but only in a narrow northerly wind sector (350° to 15°). The associated predictions are based on conservative assumptions, and this exceedance is unlikely to occur in practice; furthermore, a 0.5 dB change in noise levels is unlikely to be perceptible. Based on these factors, the predicted excess at South Shortcleugh is considered negligible and cumulative levels are therefore compliant with the derived ETSU-R-97 limits.
- 5.6.10 It is finally concluded that predicted noise immission levels from the Proposed Development in isolation and cumulatively with Clyde Windfarm, Middle Muir Windfarm, Andershaw Windfarm and M74 West Renewable Energy Park are compliant with the ETSU-R-97 criteria at all locations and all wind speeds. This outcome has been achieved through use of turbine constraints applied to T2, T20, and T21 turbines of the Proposed Development and assuming worst-case downwind predictions.
- 5.6.11 It can be seen that where the derived ETSU-R-97 noise limits (as set out in Table 7 and Table 8) for the Proposed Development in isolation are achieved, the higher cumulative limits are also achieved. Satisfactory control of cumulative noise immission levels would therefore be achieved through enforcement of the individual consent limits for the Proposed Development. Compliance of the Proposed Development with these noise limits in isolation would maintain the conclusion of the cumulative assessment and result in cumulative levels considered acceptable.
- 5.6.12 The selection of the final turbine to be installed at the Site should be made on the basis of enabling the relevant ETSU-R-97 derived limits in Table 7 and Table 8 to be achieved at the surrounding properties.
- 5.7 Low Frequency Noise, Vibration and Amplitude Modulation from Wind Turbines
- 5.7.1 Low frequency noise and vibration resulting from the operation of wind farms are issues that have been attracting a certain amount of attention over recent years. Consequently, Annex A includes a detailed discussion of these topics. This shows that ground-borne vibration and very low frequency noise (infrasound) from wind turbines are below the threshold of human perception. In summary of the information provided therein, the current recommendation is that ETSU-R-97 should continue to be used for the assessment and rating of operational noise from wind farms.
- 5.7.2 Annex A also discusses the published research on the subject of wind turbine blade swish Amplitude Modulation (or AM). As a consequence of the combined results of this research, and in particular the development by the IOA of an objective technique for identifying and quantifying AM noise, as well as a review of the subjective response to AM noise by a Government-commissioned research group, a penalty-type approach to account for instances of increased AM outside what is expected from ‘normal’ blade swish has been proposed. Some uncertainty remains at this stage over the application of such a penalty, and this will be subject to a period of testing and review over the next few years. However, the ETSU-R-97 method continues to be applicable in the absence of further guidance.
- 5.8 Operational noise from non-turbine sources
- 5.8.1 The main noise sources associated with the substation are likely to be the power transformers and their cooling fans. The transformer noise is generally fairly constant, once energised, whereas the

cooling fans operate as needed, depending on load and ambient temperature. The noise from the transformers is usually tonal in nature with most energy contained within discrete frequency components at 100 Hz and harmonics thereof. The cooling fans are likely to be broad-band in nature but switch on and off. Battery storage facilities also have a combination of electrical plant as well as temperature control equipment but are less likely overall to have a noise which includes tones at low frequencies²⁹.

- 5.8.2 The proposed main onsite substation is located approximately 900 m from the nearest residential property: Lettershaws Farm. The specifications of the transformer(s) likely to be used for the substation are not defined at this stage; however, it is considered likely based on experience of similar installations (with a total equipment sound power of 85 dB L_{WA}) that the noise levels from the substation at the property would be 10 dB L_{Aeq}.
- 5.8.3 This specific sound level at the nearest residential property has been calculated based on the ISO 9613-2³⁰ method. The ISO 9613-2 method predicts the sound level at a receptor by taking the octave band sound power level spectrum of the source (or representative spectrum thereof) and applying a number of attenuation factors, such as, atmospheric and ground absorption, to determine the resulting sound level at the receptor location. The calculation has been undertaken assuming soft ground propagation conditions (except near the source) but neglecting any screening effects from the terrain or buildings/barriers which may reduce actual levels in practice, and therefore predicted level presented is conservative and worst-case
- 5.8.4 Initial design considerations, based on a potential storage capacity of around 50 MWh, suggested that the battery energy storage area (located south of the substation) could potentially include around 12 energy storage units, each with an associated Power Conversion Systems unit (PCS) and container. Each storage unit generally includes cooling elements which typically represent the main source of noise for such installations along with the inverters, with noise from the associated PCS units, and small-scale transformers being substantially lower. Based on representative equipment specifications, an upper collective sound power level of 104 dB(A) L_{WA} was assumed. The associated transformers would be expected to have negligible contribution. At the nearest residential property (Lettershaws Farm) 1050 m away, a level of 27 dB L_{Aeq} was calculated, using the same propagation method and parameters as those used for the substation, and neglecting any screening effects.
- 5.8.5 This represents total noise levels of 27 dB L_{Aeq} from the substation and battery storage equipment combined which would be dominated by noise from the energy storage area that is mainly broadband in nature. Therefore, with the addition of a penalty of 2 dB(A) for a potential tonal or other character in the noise, corrected or “rated” levels of no more than 29 dB L_{A,r} would be expected. Furthermore, these noise levels are expected to be lower in practice when considering screening effects due to the terrain.
- 5.8.6 As the rated noise level does not exceed 35 dB, it can be considered low in absolute terms (see section 3.3) and the rating accounts for the potential character of the noise. Considering all these factors in the round, it is concluded that the predicted impact from this source of operational noise would be minor at most according to BS 4142.
- 5.8.7 With some properties potentially exposed to noise from the plant considered in this section and from wind turbine noise, it is relevant to consider whether there could be additional in-combination noise impacts. However, both types of noise are assessed under different guidance documents. The predicted levels from the proposed wind turbines would likely arise when receptors are downwind from the turbines and would only tend to be produced during windy conditions. Furthermore, the maximum levels predicted from the wind turbines are nearly 10 dB above absolute noise levels

²⁹ Although inverters may produce high-frequency tonal noise above 2 kHz, this is more likely to be absorbed by the atmosphere.

³⁰ ISO 9613-2:2024–‘Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation’

predicted for the substation and battery storage at the receptor, which would represent an increase of less than <1 dB which is unlikely to be perceptible. There is therefore on balance, based on professional judgement and considering the above factors in terms of levels of noise exposure, unlikely to be any significant additional impacts expected when considering these operational noise sources in combination.

6. Summary of Key Findings and Conclusions

- 6.1.1 This report has presented an assessment of the impacts of construction and operational noise from the Proposed Development on the residents of nearby dwellings.
- 6.1.2 Several residential properties lying around the wind farm have been selected as being representative of the closest located properties to the wind farm. Noise assessments have been undertaken at these properties by comparing predicted construction and operational noise levels with relevant assessment criteria. In the case of construction noise, relevant assessment criteria are in the form of absolute limit values derived from a range of environmental noise guidance. In relation to operational noise, the limits have been derived at 24 locations (Table 4) using baseline data from eight locations (Table 3). These baseline data were derived from historical baseline data at seven locations and measured background noise levels at one property, as derived from measurements made over at least 4 weeks at this location.
- 6.1.3 The construction noise and vibration assessment has determined that associated levels are expected to be perceived at various times throughout the construction programme but remain with acceptable limits such that their temporary impacts are considered of minor to negligible magnitude, except at Lettershaws Farm near the site entrance where site access construction will result in short-term moderate impacts in the absence of mitigation. This could however be mitigated to a minor impact magnitude through measures such as acoustic screening, minimising activity noise and/or duration at the closest point and noise monitoring at the receptor location throughout works when undertaken within 65 m of the receptor. Impacts are then expected to reduce as the construction work along the site track progresses and moves further away from the receptor.
- 6.1.4 Operational noise from the wind farm has been assessed in accordance with the methodology set out in ETSU-R-97, ‘The Assessment and Rating of Noise from Wind farms.’ This document provides a robust basis for assessing the operational noise of a wind farm as recommended in the Scottish Government’s Onshore Wind Policy Statement 2022.
- 6.1.5 It has been demonstrated that both the day-time and night-time noise limits can be satisfied at all assessment properties across all wind speeds. This outcome may be achieved through use of turbine constraints applied to some of the proposed turbines (see paragraph 5.3.3). Specifically, this assessment has determined that the limits for the Proposed Development in isolation (Table 7 and Table 8) can also be achieved cumulatively for day and night time periods at all wind speeds. This assessment has been based on the use of the manufacturer’s specified sound power data for the Vestas V172-7.2 MW wind turbine which is typical of the type and size of turbine which may be considered for this site, and assuming worst case downwind propagation.
- 6.1.6 The impact of the proposed substation and battery storage have been considered on a precautionary basis and determined via simplified assessment based on the large separation distance to correspond to negligible impacts. The addition of these sources to that of the wind turbines would not affect the outcome of the above assessment and operational noise would remain a minor impact.
- 6.1.7 In summary, the overall levels of construction noise are considered to represent a short-term minor impact. At some locations under some wind conditions and for a certain proportion of the time, the wind farm noise may be audible; however, operational noise immission levels comply with the criteria of the guidance commended by planning policy for the assessment of wind farm noise.