



Cloud Hill Wind Farm

Technical Appendix 12.1 Cumulative Sound Power Levels

August 2023

Project No.: 0669769

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1. INTRODUCTION

The following sections present the noise emission data for each assessed cumulative development, including the adjustments made in accordance with the methodology described in Section 12.3.3.3 of the EIA Report.

2. WHITESIDE HILL

Table A12.1.1: Whiteside Hill¹ – GE 2.85-103 69.7 m Hub Height

	Standardised 10 m Wind Speed, ms ⁻¹									
	3	4	5	6	7	8	9	10	11	12
	Sound Power Level, dB(A)									
Sound Power Level, dB LWA, inc. uncertainty	-	95.3	99.1	102.7	106.4	107.0	107.0	107.0	107.0	107.0
Noise Limits at Controlling Property (Polgown)	-	37.8	38.0	38.0	38.8	39.4	40.1	41.0	42.0	43.1
Predicted Noise Level at Controlling Property	-	25.9	29.7	33.3	37	37.6	37.6	37.6	37.6	37.6
Additional Adjustment for Cumulative Assessment, dB	-	2.0	2.0	2.0	1.8	1.8	2.0	2.0	2.0	2.0
Adjusted Sound Power Level, dB LWA, for cumulative assessment	-	97.3	101.1	104.7	108.2	108.8	109.0	109.0	109.0	109.0

Table A12.1.2: Whiteside Hill Octave-band Spectra²

	Standardised 10 m Wind Speed, ms ⁻¹							
	63	125	250	500	1000	2000	4000	8000
	Sound Power Level, dB(A)							
Sound Power Level, dB, LWA, Scaled to 109.0 dB(A)	90.1	97.7	100.2	101.6	103.2	103.3	97.0	77.6

3. TWENTYSHILLING HILL

Table A12.1.3: Twentyshilling Hill Noise Emission Data³ – Vestas V117 4.2 MW, 81.5 m Hub Height

¹ Source: Whiteside Wind Farm Noise Impact Assessment – Table 4-3

² Source: Whiteside Wind Farm Noise Impact Assessment – Table 4-4

³ Source: Final Turbine Model - Twentyshilling Hill Discharge of Conditions (18/0206/FUL) – Turbine Details. Emission data: 0067-7064_V06 – Performance Specification V117-4.0_4.2MW Typhoon

	Standardised 10 m Wind Speed, ms ⁻¹									
	3	4	5	6	7	8	9	10	11	12
	Sound Power Level, dB(A)									
Sound Power Level, dB LWA, inc. uncertainty	93.0	95.8	99.9	103.7	105.8	106.0	106.0	106.0	106.0	106.0
Noise Limits at Controlling Property (Glenwhargen)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Predicted Noise Level at Controlling Property	18.7	21.5	25.6	29.4	31.5	31.7	31.7	31.7	31.7	31.7
Additional Adjustment for Cumulative Assessment, dB	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Adjusted Sound Power Level, dB LWA, for cumulative assessment	95.0	97.8	101.9	105.7	107.8	108.0	108.0	108.0	108.0	108.0

Table A12.1.4: Twentyshilling Hill Octave-band Spectra⁴

	Standardised 10 m Wind Speed, ms ⁻¹							
	63	125	250	500	1000	2000	4000	8000
	Sound Power Level, dB(A)							
Sound Power Level, dB, LWA, Scaled to 108.0 dB(A)	89.6	97.1	100.2	101.9	102.4	99.9	95.8	84.4

4. EUCHANHEAD WIND FARM

Table A12.1.5: Eucharhead Wind Farm Noise Emission Data⁵ – Vestas V150 5.6 MW 155 m Hub Height

	Standardised 10 m Wind Speed, ms ⁻¹									
	3	4	5	6	7	8	9	10	11	12
	Sound Power Level, dB(A)									
Sound Power Level, dB LWA, inc. uncertainty	95.1	99.1	103.6	106.0	106.9	106.9	106.9	106.9	106.9	106.9
Noise Limits at Controlling Property (Dalgonar)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Predicted Noise Level at Controlling Property	21.4	25.4	29.9	32.2	33.2	33.2	33.2	33.2	33.2	33.2
Additional Adjustment for Cumulative Assessment, dB	2.0	2.0	2.0	2.0	1.8	1.8	1.8	1.8	1.8	1.8

⁴ Source: 0067-7064_V06 – Performance Specification V117-4.0_4.2MW Typhoon

⁵ Source: Eucharhead Renewable Energy Development – Technical Appendix TA13.1 - Annex B

	Standardised 10 m Wind Speed, ms ⁻¹									
	3	4	5	6	7	8	9	10	11	12
	Sound Power Level, dB(A)									
Adjusted Sound Power Level, dB L _{WA} , for cumulative assessment	97.1	101.1	105.6	108.0	108.7	108.7	108.7	108.7	108.7	108.7

Table A12.1.6: Eucharhead Wind Farm Octave-band Spectra⁶

	Standardised 10 m Wind Speed, ms ⁻¹							
	63	125	250	500	1000	2000	4000	8000
	Sound Power Level, dB(A)							
Sound Power Level, dB, L _{WA} , Scaled to 108.7 dB(A)	89.4	97.2	102.0	103.9	102.7	98.6	91.5	81.4

5. SANQUHAR WIND FARM

Table A12.1.7: Sanquhar Wind Farm Noise Emission Data⁷ – Vestas V112 3.6 MW 74 m Hub Height

	Standardised 10 m Wind Speed, ms ⁻¹									
	3	4	5	6	7	8	9	10	11	12
	Sound Power Level, dB(A)									
Sound Power Level, dB L _{WA} , inc. uncertainty	95.3	97.3	101.5	105.4	107.6	107.6	107.6	107.6	107.6	107.6
Noise Limits at Controlling Property (Euchar Water Filter Station)	40.0	40.0	40.0	40.0	40.0	41.0	41.0	43.0	45.0	48.0
Predicted Noise Level at Controlling Property	19.5	21.5	25.7	29.6	31.8	31.8	31.8	31.8	31.8	31.8
Additional Adjustment for Cumulative Assessment, dB	2	2	2	2	2	2	2	2	2	2
Adjusted Sound Power Level, dB L _{WA} , for cumulative assessment	97.3	99.3	103.5	107.4	109.6	109.6	109.6	109.6	109.6	109.6

Table A12.1.8: Sanquhar Wind Farm - Octave-band Spectra⁸

⁶ Source: Eucharhead Renewable Energy Development – Technical Appendix TA13.1 - Annex B

⁷ Source: Sanquhar 2 Environmental Impact Statement – Table 11.5

⁸ Source: Sanquhar 2 Environmental Impact Statement – Table 11.6

	Standardised 10 m Wind Speed, ms ⁻¹							
	63	125	250	500	1000	2000	4000	8000
	Sound Power Level, dB(A)							
Sound Power Level, dB, LWA, Scaled to 109.6 dB(A)	88.3	99.1	102.0	104.6	103.5	100.8	95.5	79.5

6. SANQUHAR SIX WIND FARM

Table A12.1.9: Sanquhar Six Noise Emission Data⁹ – Senvion MM92 80 m Hub Height

	Standardised 10 m Wind Speed, ms ⁻¹									
	3	4	5	6	7	8	9	10	11	12
	Sound Power Level, dB(A)									
Sound Power Level, dB LWA, inc. uncertainty	-	94.1	98.6	102.3	104.6	104.8	104.8	104.8	104.8	104.8
Noise Limits at Controlling Property (Glenglas)	-	36.0	37.0	39.0	41.0	42.0	44.0	46.0	47.0	49.0
Predicted Noise Level at Controlling Property	-	18.2	22.7	26.4	28.7	28.9	28.9	28.9	28.9	28.9
Additional Adjustment for Cumulative Assessment, dB	-	2	2	2	2	2	2	2	2	2
Adjusted Sound Power Level, dB LWA, for cumulative assessment	-	96.1	100.6	104.3	106.6	106.8	106.8	106.8	106.8	106.8

Table A12.1.10: Sanquhar Six Octave-band Spectra¹⁰

	Standardised 10 m Wind Speed, ms ⁻¹							
	63	125	250	500	1000	2000	4000	8000
	Sound Power Level, dB(A)							
Sound Power Level, dB, LWA, Scaled to 106.8 dB(A)	87.7	95.9	101.5	103.2	101.2	95.5	88.8	85.6

⁹ Source: Sanquhar “Six” Community Wind Farm – Environmental Statement – Table 11.3(a)

¹⁰ Source: Sanquhar “Six” Community Wind Farm – Environmental Statement – Table 11.3(b)

7. SANQUHAR II WIND FARM

Table A12.1.11: Sanquhar II Wind Farm Noise Emission Data¹¹ – Enercon E-138 4 MW 125 m Hub Height and Enercon E115 4 MW 93 m Hub Height

	Standardised 10 m Wind Speed, ms ⁻¹									
	3	4	5	6	7	8	9	10	11	12
	Sound Power Level, dB(A)									
Enercon E-138 4 MW 125 m Hub Height										
Sound Power Level, dB LWA, inc. uncertainty	95.9	101.8	103.1	104.1	104.7	105.3	106.0	106.0	106.0	106.0
Noise Limits at Controlling Property (Polskeoch) ¹²	38.0	38.0	38.0	38.0	38.0	38.0	40.0	43.0	45.0	48.0
Predicted Noise Level at Controlling Property	26.2	32.1	33.4	34.4	35.0	35.6	36.3	36.3	36.3	36.3
Additional Adjustment for Cumulative Assessment, dB	2	2	2	2	2	2	2	2	2	2
Adjusted Sound Power Level, dB LWA, for cumulative assessment	97.9	103.8	105.1	106.1	106.7	107.3	108.0	108.0	108.0	108.0
Enercon E-115 4 MW 93 m Hub Height										
Sound Power Level, dB LWA, inc. uncertainty	90.3	95.7	100.6	104.6	106.7	107.3	108.0	108.0	108.0	108.0
Noise Limits at Controlling Property (Polskeoch)	38.0	38.0	38.0	38.0	38.0	38.0	40.0	43.0	45.0	48.0
Predicted Noise Level at Controlling Property	26.2	32.1	33.4	34.4	35.0	35.6	36.3	36.3	36.3	36.3
Additional Adjustment for Cumulative Assessment, dB	2	2	2	2	2	2	2	2	2	2
Adjusted Sound Power Level, dB LWA, for cumulative assessment	92.3	97.7	102.6	106.6	108.7	109.3	110.0	110.0	110.0	110.0

Table A12.1.12: Octave-band Spectra¹³

	Standardised 10 m Wind Speed, ms ⁻¹							
	63	125	250	500	1000	2000	4000	8000
	Sound Power Level, dB(A)							
Sound Power Level (Enercon E-138), dB, LWA, Scaled to 108.0 dB(A)	91.8	97.7	100.4	102.4	102.2	99.8	91.3	70.5
Sound Power Level (Enercon E-115), dB, LWA, Scaled to 110.0 dB(A)	93.3	99.3	102.2	104.4	104.3	102.1	94.6	77.7

¹¹ Source: Sanquhar 2 Environmental Impact Statement – Table 11.5

¹² Source: Sanquhar 2 Environmental Impact Statement – Table 11.10

¹³ Source: Sanquhar 2 Environmental Impact Statement – Table 11.6

8. SANDY KNOWE WIND FARM INCL. VARIATION AND EXTENSION

Table A12.1.13: Sandy Knowe variation and extension Noise Emission Data¹⁴ – Vestas V112 3.6 MW STE 69 m Hub Height and 94 m Hub Height

	Standardised 10 m Wind Speed, ms ⁻¹									
	3	4	5	6	7	8	9	10	11	12
	Sound Power Level, dB(A)									
69 m Hub Height										
Sound Power Level, dB LWA, inc. uncertainty	-	97.1	101.3	105.2	107.6	107.6	107.6	107.6	107.6	107.6
Noise Limits at Controlling Property (Hillend)	-	32.6	35.9	39.2	41.1	41.8	40.4	43.8	46.3	48.2
Predicted Noise Level at Controlling Property	-	30.0	34.2	38.4	40.4	40.4	40.4	40.4	40.4	40.4
Additional Adjustment for Cumulative Assessment, dB	-	2	1.7	0.8	0.7	1.4	0	2	2	2
Adjusted Sound Power Level, dB LWA, for cumulative assessment	-	99.1	103.0	106.0	108.3	109.0	107.6	109.6	109.6	109.6
94 m Hub Height										
Sound Power Level, dB LWA, inc. uncertainty	-	97.8	102.1	107.6	107.6	107.6	107.6	107.6	107.6	107.6
Noise Limits at Controlling Property (Hillend)	-	32.6	35.9	39.2	41.1	41.8	40.4	43.8	46.3	48.2
Predicted Noise Level at Controlling Property	-	30.0	34.2	38.4	40.4	40.4	40.4	40.4	40.4	40.4
Additional Adjustment for Cumulative Assessment, dB	-	2	1.7	0.8	0.7	1.4	0	2	2	2
Adjusted Sound Power Level, dB LWA, for cumulative assessment	-	99.8	103.8	108.4	108.3	109.0	107.6	109.6	109.6	109.6

Table A12.1.14: Sandy Knowe variation and extension Octave-band Spectra¹⁵

	Standardised 10 m Wind Speed, ms ⁻¹							
	63	125	250	500	1000	2000	4000	8000
	Sound Power Level, dB(A)							
Sound Power Level (Hub Height 69 m), dB, LWA, Scaled to 109.6 dB(A)	97.0	100.9	100.8	103.1	103.9	101.2	95.7	79.3
Sound Power Level (Hub Height 94 m), dB, LWA, Scaled to 109.0 dB(A)	97.0	100.9	100.8	103.1	103.9	101.2	95.7	79.3

¹⁴ Source: Sandy Knowe Wind Farm Extension Environmental Impact Assessment – Table 11.2

¹⁵ Source: Sandy Knowe Wind Farm Extension Environmental Impact Assessment – Table 11.3

9. HARE HILL WIND FARM

Table A12.1.15: Hare Hill Noise Emission Data¹⁶ – Vestas V47 40 m Hub Height

	Standardised 10 m Wind Speed, ms ⁻¹									
	3	4	5	6	7	8	9	10	11	12
	Sound Power Level, dB(A)									
Sound Power Level, dB LWA, inc. uncertainty	-	99.0	99.5	99.9	100.4	100.8	101.3	101.7	102.2	102.6
Noise Limits at Controlling Property (Hillend)	-	30.0	30.0	30.0	30.0	30.1	30.6	31.0	31.5	31.9
Predicted Noise Level at Controlling Property	-	28.3	28.8	29.2	29.7	30.1	30.6	31.0	31.5	31.9
Additional Adjustment for Cumulative Assessment, dB	-	1.7	1.2	0.8	0.3	0.9	1.4	1.0	0.5	0.1
Adjusted Sound Power Level, dB LWA, for cumulative assessment	-	100.7	100.7	100.7	100.7	101.7	102.7	102.7	102.7	102.7

Table A12.1.16: Hare Hill Octave-band Spectra¹⁷

	Standardised 10 m Wind Speed, ms ⁻¹							
	63	125	250	500	1000	2000	4000	8000
	Sound Power Level, dB(A)							
Sound Power Level, dB, LWA, Scaled to 102.7 dB(A)	80.0	87.9	91.6	97.0	98.8	94.7	89.7	71.0

10. HARE HILL EXTENSION

Table A12.1.17: Hare Hill Extension Noise Emission Data¹⁸ – Gamesa G52-850 kW 44 m Hub Height, 55 m Hub Height, and 65 m Hub Height

	Standardised 10 m Wind Speed, ms ⁻¹									
	3	4	5	6	7	8	9	10	11	12
	Sound Power Level, dB(A)									
44 m Hub Height										
Sound Power Level, dB LWA, inc. uncertainty	-	92.7	96.8	100.9	102.7	103.6	103.8	103.8	103.8	103.8
Noise Limits at Controlling Property (Hillend)	-	41.2	41.2	41.2	41.2	41.2	41.2	44.8	47.0	48.7

¹⁶ Source: Sanquhar 2 Hare Hill Extension Environmental Impact Statement – Table 4

¹⁷ Source: Sanquhar 2 Hare Hill Extension Environmental Impact Statement – Table 5

¹⁸ Source: Sanquhar 2 Hare Hill Extension Environmental Impact Statement – Table 6

	Standardised 10 m Wind Speed, ms ⁻¹									
	3	4	5	6	7	8	9	10	11	12
	Sound Power Level, dB(A)									
Predicted Noise Level at Controlling Property	-	30.3	34.6	38.5	39.9	40.6	40.6	40.6	40.6	40.6
Additional Adjustment for Cumulative Assessment, dB	-	2	2	2	1.3	0.6	0.6	2	2	2
Adjusted Sound Power Level, dB L _{WA} , for cumulative assessment	-	94.7	98.8	102.9	104.0	104.2	104.4	105.8	105.8	105.8
55 m Hub Height										
Sound Power Level, dB L _{WA} , inc. uncertainty	-	93.2	97.5	101.5	103.0	103.8	103.8	103.8	103.8	103.8
Noise Limits at Controlling Property (Hillend)	-	41.2	41.2	41.2	41.2	41.2	41.2	44.8	47.0	48.7
Predicted Noise Level at Controlling Property	-	30.3	34.6	38.5	39.9	40.6	40.6	40.6	40.6	40.6
Additional Adjustment for Cumulative Assessment, dB	-	2	2	2	1.3	0.6	0.6	2	2	2
Adjusted Sound Power Level, dB L _{WA} , for cumulative assessment	-	95.2	99.5	103.5	104.3	104.4	104.4	105.8	105.8	105.8
65 m Hub Height										
Sound Power Level, dB L _{WA} , inc. uncertainty	-	93.6	98.0	101.8	103.1	103.8	103.8	103.8	103.8	103.8
Noise Limits at Controlling Property (Hillend)	-	41.2	41.2	41.2	41.2	41.2	41.2	44.8	47.0	48.7
Predicted Noise Level at Controlling Property	-	30.3	34.6	38.5	39.9	40.6	40.6	40.6	40.6	40.6
Additional Adjustment for Cumulative Assessment, dB	-	2	2	2	1.3	0.6	0.6	2	2	2
Adjusted Sound Power Level, dB L _{WA} , for cumulative assessment	-	95.6	100.0	103.8	104.4	104.4	104.4	105.8	105.8	105.8

Table A12.1.18: Sandy Knowe variation and extension Octave-band Spectra¹⁹

	Standardised 10 m Wind Speed, ms ⁻¹							
	63	125	250	500	1000	2000	4000	8000
	Sound Power Level, dB(A)							
Sound Power Level (44 m, 55 m, and 65 m Hub Height), dB, L _{WA} , Scaled to 105.8 dB(A)	85.6	92.1	99.8	99.6	100.2	97.2	91.7	80.6

¹⁹ Source: Sandy Knowe Wind Farm Extension Environmental Impact Assessment – Table 11.2

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