Technical Appendix 10.4: Cumulative Modelling Results

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Appendix 10.4. Cumulative Modelling Results

Introduction

A10.4.1 This technical appendix describes the cumulative noise modelling and assessment results using the input noise data presented in **Technical Appendix 10.3**. This technical appendix relates solely to the Proposed Development (as defined in **Chapter 4: Development Description** of the EIA Report). The Likely Grid Connection Route (as defined in **Chapter 4**) is addressed in **Chapter 10: Noise and Vibration** of the EIA Report.

Application of Noise Limits to Noise Sensitive Receptors

A10.4.2 The baseline-derived Total Noise Assessment Criteria (TNAC) have been applied to each noise sensitive receptor (NSR) assessed in the vicinity of the Proposed Development on the conservative basis of applying the lowest TNAC at each integer wind speed across (see **Technical Appendix 10.1**) the baseline measurement locations to all receptors.

Cumulative Noise Limits

A10.4.3 The TNAC (cumulative noise limits) applied to each of the NSRs are shown at **Table A10.4.1** which are based on the lowest limits at each integer wind speed measured across all baseline noise measurement locations (NMLs).

Table A10.4.1 Cumulative night and day TNAC (dB L_{A90})

Location	Standardised 10 m Height Wind Speed (m/s)							
	3	4	5	6	7	8	9	10
Night	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.5
Day	40.0	40.0	40.5	41.9	43.1	44.2	45.4	46.9

Cumulative Noise Modelling Results

A10.4.4 The results of the cumulative operational noise modelling (including the Proposed Development) for each assessed NSR are shown at **Table A10.4.2** below.

Table A10.4.2 Cumulative predicted downwind noise levels (dB L_{A90}) at each NSR

ID	Location	Standardised 10 m Height Wind Speed (m/s)							
		3	4	5	6	7	8	9	10
NSR1	Best Friends Cottage	26.9	27.5	31.7	36.1	37.8	38.1	38.2	38.3
NSR2	Blacklaw Cottage	29.7	29.9	31.6	34.7	35.8	36.2	36.5	36.8
NSR3	Blacklawhill Farm	33.9	33.9	34.6	36.8	37.9	38.5	38.9	39.1
NSR4	Blair Farm	27.6	28.3	32.6	36.9	38.2	38.5	38.7	38.9
NSR5	Corsehouse Cottage	27.2	27.9	31.6	35.6	36.7	37.0	37.2	37.5
NSR6	Corsehouse	27.0	27.7	31.3	35.3	36.5	36.7	37.0	37.2
NSR7	Crofthead of Gree Farm	23.9	24.3	28.0	32.3	33.9	34.3	34.5	34.6
NSR8	Dounne Law Cottage	29.4	29.7	31.4	34.5	35.6	36.0	36.3	36.6
NSR9	East Whitelee Farm	27.2	27.5	29.8	33.2	34.4	34.7	35.0	35.2
NSR10	Easter Blacklaw Farm	27.8	28.0	29.8	32.9	34.1	34.5	34.8	35.1

ID	Location	Standardised 10 m Height Wind Speed (m/s)							
		3	4	5	6	7	8	9	10
NSR11	Easterhouse of Whitelee	27.0	27.3	29.7	33.1	34.3	34.6	34.9	35.2
NSR12	Floak	25.4	26.6	31.0	35.3	36.6	36.9	37.0	37.2
NSR13	Glen-a-Moor	27.1	27.3	29.2	32.4	33.5	33.9	34.3	34.5
NSR14	Glenouther Farm	26.9	27.5	31.1	35.1	36.3	36.6	36.8	37.1
NSR15	Gree Cottage	24.4	24.8	28.2	32.5	34.3	34.8	35.0	35.1
NSR16	Greelaw Farm	25.5	26.2	30.2	34.5	35.8	36.1	36.3	36.5
NSR17	Greenfinch	27.3	28.4	32.9	37.1	38.4	38.6	38.8	39.0
NSR18	Hairshaw Cottage	22.5	23.0	26.1	30.2	31.5	31.9	32.1	32.3
NSR19	Harelaw Farm	26.4	27.0	31.1	35.4	36.9	37.2	37.4	37.6
NSR20	High Clunch Farm	24.5	25.1	28.9	33.2	34.7	35.0	35.2	35.4
NSR21	Highfield Farm	25.1	28.5	33.1	37.2	38.5	38.7	38.8	38.8
NSR22	Kelvedon Cottage	26.8	27.1	29.3	32.6	33.8	34.2	34.5	34.7
NSR23	Kingswell Farm	26.6	27.4	32.2	36.6	38.2	38.5	38.6	38.7
NSR24	Laverockhall Cottage	29.0	29.3	31.1	34.2	35.4	35.7	36.1	36.3
NSR25	Lintbrae Cottage	23.5	24.0	27.2	31.5	33.3	33.8	34.0	34.1
NSR26	Lintbrae Farm	23.4	23.8	27.0	31.3	33.1	33.6	33.8	34.0
NSR27	Low Blacklaw	30.2	30.5	32.1	35.2	36.3	36.7	37.0	37.3
NSR28	Lowtoun of Blacklaw Farm	30.4	30.6	32.2	35.2	36.3	36.7	37.1	37.3
NSR29	Marramead	27.1	28.2	32.7	37.0	38.2	38.4	38.6	38.8
NSR30	Meadowlands Farm	28.7	28.9	30.7	33.8	35.0	35.4	35.7	35.9
NSR31	Mid Floak Bungalow	25.2	26.4	30.8	35.1	36.4	36.7	36.8	37.0
NSR32	Mid Floak Farm	25.1	26.2	30.7	34.9	36.2	36.5	36.7	36.8
NSR33	North Drumboy	27.4	28.5	32.9	37.2	38.4	38.6	38.8	39.0
NSR34	Owl Cottage Upper Hairshaw Farm	26.1	26.5	29.2	33.0	34.2	34.6	34.8	35.0
NSR35	Pebblebank East Whitelee	27.1	27.4	29.7	33.1	34.2	34.6	34.9	35.1
NSR36	Raithburn Farm	23.8	24.2	27.8	32.1	33.8	34.2	34.4	34.5
NSR37	Raithill Farm	25.1	25.7	29.5	33.8	35.4	35.7	35.9	36.1
NSR38	South Drumboy Farm	27.5	28.5	33.0	37.3	38.6	38.9	39.1	39.2
NSR39	Sunrise Lodge	27.0	28.2	32.7	36.9	38.2	38.4	38.6	38.8
NSR40	The Stables	27.2	28.3	32.8	37.1	38.3	38.5	38.7	38.9

ID	Location	Standardised 10 m Height Wind Speed (m/s)							
		3	4	5	6	7	8	9	10
NSR41	Townhead of Floak Bungalow	24.9	26.0	30.4	34.7	36.0	36.3	36.4	36.6
NSR42	Townhead Of Floak Farm	24.9	26.0	30.4	34.7	36.0	36.2	36.4	36.5
NSR43	Townhead of Gree Farm	24.1	24.6	28.1	32.4	34.1	34.5	34.7	34.9
NSR44	Upper Hairshaw Farm	26.1	26.5	29.2	32.9	34.2	34.5	34.8	35.0
NSR45	Windmill Cottage	26.6	26.9	28.8	32.0	33.2	33.6	33.9	34.1
NSR46	Windy-Yett Farm	24.1	24.8	28.5	32.6	33.8	34.1	34.3	34.5

Cumulative Assessment Results

A10.4.5 **Tables A10.4.3** and **A10.4.4** below show the margin between the predicted cumulative noise levels (including the Proposed Development) presented in **Table A10.4.2** above and the relevant derived day and night limits set out in **Table A10.4.1**. A positive number indicates that the cumulative noise limits are predicted to be met at each NSR A negative number indicates a predicted exceedance of the relevant noise limits.

Table A10.4.3 Margin between predicted cumulative operational noise and night TNAC for each NSR (dB)

ID	Location	Standardised 10 m Height Wind Speed (m/s)							
		3	4	5	6	7	8	9	10
NSR1	Best Friends Cottage	16.1	15.5	11.3	6.9	5.2	4.9	4.8	7.2
NSR2	Blacklaw Cottage	13.3	13.1	11.4	8.3	7.2	6.8	6.5	8.7
NSR3	Blacklawhill Farm	9.1	9.1	8.4	6.2	5.1	4.5	4.1	6.4
NSR4	Blair Farm	15.4	14.7	10.4	6.1	4.8	4.5	4.3	6.6
NSR5	Corsehouse Cottage	15.8	15.1	11.4	7.4	6.3	6.0	5.8	8.0
NSR6	Corsehouse	16.0	15.3	11.7	7.7	6.5	6.3	6.0	8.3
NSR7	Crofthead of Gree Farm	19.1	18.7	15.0	10.7	9.1	8.7	8.5	10.9
NSR8	Dounne Law Cottage	13.6	13.3	11.6	8.5	7.4	7.0	6.7	8.9
NSR9	East Whitelee Farm	15.8	15.5	13.2	9.8	8.6	8.3	8.0	10.3
NSR10	Easter Blacklaw Farm	15.2	15.0	13.2	10.1	8.9	8.5	8.2	10.4
NSR11	Easterhouse of Whitelee	16.0	15.7	13.3	9.9	8.7	8.4	8.1	10.3
NSR12	Floak	17.6	16.4	12.0	7.7	6.4	6.1	6.0	8.3
NSR13	Glen-a-Moor	15.9	15.7	13.8	10.6	9.5	9.1	8.7	11.0
NSR14	Glenouther Farm	16.1	15.5	11.9	7.9	6.7	6.4	6.2	8.4
NSR15	Gree Cottage	18.6	18.2	14.8	10.5	8.7	8.2	8.0	10.4
NSR16	Greelaw Farm	17.5	16.8	12.8	8.5	7.2	6.9	6.7	9.0
NSR17	Greenfinch	15.7	14.6	10.1	5.9	4.6	4.4	4.2	6.5

ID	Location	Standardised 10 m Height Wind Speed (m/s)							
		3	4	5	6	7	8	9	10
NSR18	Hairshaw Cottage	20.5	20.0	16.9	12.8	11.5	11.1	10.9	13.2
NSR19	Harelaw Farm	16.6	16.0	11.9	7.6	6.1	5.8	5.6	7.9
NSR20	High Clunch Farm	18.5	17.9	14.1	9.8	8.3	8.0	7.8	10.1
NSR21	Highfield Farm	17.9	14.5	9.9	5.8	4.5	4.3	4.2	6.7
NSR22	Kelvedon Cottage	16.2	15.9	13.7	10.4	9.2	8.8	8.5	10.8
NSR23	Kingswell Farm	16.4	15.6	10.8	6.4	4.8	4.5	4.4	6.8
NSR24	Laverockhall Cottage	14.0	13.7	11.9	8.8	7.6	7.3	6.9	9.2
NSR25	Lintbrae Cottage	19.5	19.0	15.8	11.5	9.7	9.2	9.0	11.4
NSR26	Lintbrae Farm	19.6	19.2	16.0	11.7	9.9	9.4	9.2	11.5
NSR27	Low Blacklaw	12.8	12.5	10.9	7.8	6.7	6.3	6.0	8.2
NSR28	Lowtoun of Blacklaw Farm	12.6	12.4	10.8	7.8	6.7	6.3	5.9	8.2
NSR29	Marramead	15.9	14.8	10.3	6.0	4.8	4.6	4.4	6.7
NSR30	Meadowlands Farm	14.3	14.1	12.3	9.2	8.0	7.6	7.3	9.6
NSR31	Mid Floak Bungalow	17.8	16.6	12.2	7.9	6.6	6.3	6.2	8.5
NSR32	Mid Floak Farm	17.9	16.8	12.3	8.1	6.8	6.5	6.3	8.7
NSR33	North Drumboy	15.6	14.5	10.1	5.8	4.6	4.4	4.2	6.5
NSR34	Owl Cottage Upper Hairshaw Farm	16.9	16.5	13.8	10.0	8.8	8.4	8.2	10.5
NSR35	Pebblebank East Whitelee	15.9	15.6	13.3	9.9	8.8	8.4	8.1	10.4
NSR36	Raithburn Farm	19.2	18.8	15.2	10.9	9.2	8.8	8.6	11.0
NSR37	Raithill Farm	17.9	17.3	13.5	9.2	7.6	7.3	7.1	9.4
NSR38	South Drumboy Farm	15.5	14.5	10.0	5.7	4.4	4.1	3.9	6.3
NSR39	Sunrise Lodge	16.0	14.8	10.3	6.1	4.8	4.6	4.4	6.7
NSR40	The Stables	15.8	14.7	10.2	5.9	4.7	4.5	4.3	6.6
NSR41	Townhead of Floak Bungalow	18.1	17.0	12.6	8.3	7.0	6.7	6.6	8.9
NSR42	Townhead Of Floak Farm	18.1	17.0	12.6	8.3	7.0	6.8	6.6	8.9
NSR43	Townhead of Gree Farm	18.9	18.4	14.9	10.6	8.9	8.5	8.3	10.6
NSR44	Upper Hairshaw Farm	16.9	16.5	13.8	10.1	8.8	8.5	8.2	10.5
NSR45	Windmill Cottage	16.4	16.1	14.2	11.0	9.8	9.4	9.1	11.4
NSR46	Windy-Yett Farm	18.9	18.2	14.5	10.4	9.2	8.9	8.7	11.0

Table A10.4.4 Margin between predicted cumulative operational noise and day TNAC (dB) for each NSR

ID	Location	Standardised 10 m Height Wind Speed (m/s)							
		3	4	5	6	7	8	9	10
NSR1	Best Friends Cottage	13.1	12.5	8.8	5.8	5.3	6.1	7.2	8.6
NSR2	Blacklaw Cottage	10.3	10.1	8.9	7.2	7.3	8.0	8.9	10.1
NSR3	Blacklawhill Farm	6.1	6.1	5.9	5.1	5.2	5.7	6.6	7.8
NSR4	Blair	12.4	11.7	7.9	5.0	4.9	5.8	6.8	8.0
NSR5	Corsehouse Cottage	12.8	12.1	8.9	6.3	6.4	7.3	8.2	9.4
NSR6	Corsehouse Farm	13.0	12.3	9.2	6.6	6.6	7.5	8.5	9.7
NSR7	Crofthead of Gree Farm	16.1	15.7	12.5	9.6	9.2	10.0	11.0	12.3
NSR8	Dounne Law Cottage	10.6	10.3	9.1	7.4	7.5	8.2	9.1	10.3
NSR9	East Whitelee Farm	12.8	12.5	10.7	8.7	8.7	9.5	10.4	11.7
NSR10	Easter Blacklaw Farm	12.2	12.0	10.7	9.0	9.0	9.7	10.6	11.9
NSR11	Easterhouse of Whitelee	13.0	12.7	10.8	8.8	8.8	9.6	10.5	11.7
NSR12	Floak	14.6	13.4	9.5	6.6	6.5	7.4	8.4	9.8
NSR13	Glen-a-Moor	12.9	12.7	11.3	9.5	9.6	10.3	11.2	12.4
NSR14	Glenouther Farm	13.1	12.5	9.4	6.8	6.8	7.7	8.6	9.8
NSR15	Gree Cottage	15.6	15.2	12.3	9.4	8.8	9.4	10.5	11.8
NSR16	Greelaw Farm	14.5	13.8	10.3	7.5	7.3	8.1	9.1	10.4
NSR17	Greenfinch	12.7	11.6	7.6	4.8	4.7	5.6	6.7	7.9
NSR18	Hairshaw Cottage	17.5	17.0	14.4	11.8	11.6	12.3	13.3	14.6
NSR19	Harelaw Farm	13.6	13.0	9.4	6.5	6.2	7.0	8.0	9.4
NSR20	High Clunch Farm	15.5	14.9	11.6	8.7	8.4	9.2	10.2	11.5
NSR21	Highfield Farm	14.9	11.5	7.4	4.7	4.6	5.5	6.7	8.2
NSR22	Kelvedon Cottage	13.2	12.9	11.3	9.3	9.3	10.0	11.0	12.2
NSR23	Kingswell Farm	13.4	12.6	8.3	5.3	4.9	5.7	6.8	8.2
NSR24	Laverockhall Cottage	11.0	10.7	9.4	7.7	7.7	8.5	9.4	10.6
NSR25	Lintbrae Cottage	16.5	16.0	13.3	10.4	9.8	10.5	11.5	12.8
NSR26	Lintbrae Farm	16.6	16.2	13.5	10.6	10.0	10.6	11.6	12.9
NSR27	Low Blacklaw	9.8	9.5	8.4	6.8	6.8	7.5	8.4	9.6
NSR28	Lowtoun of Blacklaw Farm	9.6	9.4	8.3	6.7	6.8	7.5	8.4	9.6
NSR29	Marramead	12.9	11.8	7.8	4.9	4.9	5.8	6.8	8.1

ID	Location	Standardised 10 m Height Wind Speed (m/s)							
		3	4	5	6	7	8	9	10
NSR30	Meadowlands Farm	11.3	11.1	9.8	8.1	8.1	8.8	9.7	11.0
NSR31	Mid Floak Bungalow	14.8	13.6	9.7	6.8	6.7	7.6	8.6	9.9
NSR32	Mid Floak Farm	14.9	13.8	9.8	7.0	6.9	7.7	8.8	10.1
NSR33	North Drumboy	12.6	11.5	7.6	4.7	4.7	5.6	6.6	7.9
NSR34	Owl Cottage Upper Hairshaw Farm	13.9	13.5	11.3	8.9	8.9	9.7	10.6	11.9
NSR35	Pebblebank East Whitelee	12.9	12.6	10.8	8.8	8.9	9.6	10.5	11.8
NSR36	Raithburn Farm	16.2	15.8	12.7	9.8	9.3	10.0	11.1	12.4
NSR37	Raithill Farm	14.9	14.3	11.0	8.1	7.7	8.5	9.5	10.8
NSR38	South Drumboy Farm	12.5	11.5	7.5	4.6	4.5	5.3	6.4	7.7
NSR39	Sunrise Lodge	13.0	11.8	7.8	5.0	4.9	5.8	6.9	8.1
NSR40	The Stables	12.8	11.7	7.7	4.9	4.8	5.7	6.7	8.0
NSR41	Townhead of Floak Bungalow	15.1	14.0	10.1	7.2	7.1	7.9	9.0	10.3
NSR42	Townhead Of Floak Farm	15.1	14.0	10.1	7.2	7.1	8.0	9.0	10.4
NSR43	Townhead of Gree Farm	15.9	15.4	12.4	9.5	9.0	9.7	10.7	12.0
NSR44	Upper Hairshaw Farm	13.9	13.5	11.3	9.0	8.9	9.7	10.6	11.9
NSR45	Windmill Cottage	13.4	13.1	11.7	9.9	9.9	10.6	11.6	12.8
NSR46	Windy-Yett Farm	15.9	15.2	12.0	9.3	9.3	10.1	11.1	12.4