

Appendix 9.11 Example Limit Apportionment



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9.1 Example Limit apportionment

9.1.1 Limit Locations

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Prior to determining this example limit apportionment, the receptors where those limits should apply have been identified. Inspection of **Section 9.2** of **Appendix 9.10 Operational Noise Assessment** of the Environmental Impact Assessment Report (EIAR) has identified the receptors where there is the greatest potential for the residual noise level limits to be exceeded as a result of the introduction of the three proposed windfarm developments (Carrick, Craiginmoddie, and Knockcronal). These are as detailed in **Table 9.11.1** and include a sample of receptors in all directions from the Proposed Development.

Residual Limits	Receptor
Blair Farm	Blair Farm
Glenalla	Glenalla
Genoch Cottage	Knockskae
Tairlaw Toll	Tairlaw Toll Cottage
White Row	White Row
Doughty Farm	Doughty Farm

Table 9.11.1 Proposed Noise Limit Locations

9.1.2 Approach

- Noise level limits determined in accordance with the Department of Trade and Industry's ETSU-R-97 document: The assessment and rating of noise from windfarms (ETSU-R-97), and the Institute of Acoustics': A good practice guide to the application of ETSU-R-97 for the assessment and rating of wind turbine noise (IoA GPG) apply to the cumulative wind turbine noise levels generated from all wind turbines.
- 3. In contrast, noise level limits included within any planning consent must apply to just the development being consented. This is because should any enforcement action be necessary in the future, the windfarm operator would only have control over the wind turbines that are the subject of the planning consent. *Planning Circular 4/1998: The use of conditions in planning permissions* sets out six tests for planning conditions, of which points 3 and 4 are that the condition must be "relevant to the development to be permitted", and "enforceable".
- 4. It is therefore necessary to first determine the total ETSU-R-97 noise levels limits, and then reduce these to account for the noise levels that could be generated by other local operational cumulative developments. The following approach has been adopted:
 - the operational windfarms in the vicinity of the Site have been identified;
 - the worst-case (highest) noise levels that these windfarms can generate when operating within their existing planning consents have been determined;
 - these identified receptor noise levels have then been appraised to determine whether they are sufficient to give rise to a cumulative effect with the Proposed Development. This has been identified to be the case at the property of Doughty Farm only, and only during the daytime (due to noise from the Hadyard Hill Windfarm); and
 - for the receptor identified above (Doughty Farm, daytime only), the noise levels generated by the operational development (Hadyard Hill Windfarm) have been subtracted from the total ETSU-R-97 noise level limits.
- 5. The above approach determines the remaining (residual) noise level limit that is available for subsequent windfarm development/s.
- 6. The residual limits have then been apportioned as follows:

- for each receptor, and for each period (daytime and night-time), the minimum margin of compliance has been identified between the residual limit and the noise level from the three developments operating simultaneously; and
- the apportioned limit for each development has been identified by lowering the residual limit until the noise levels from that development are complaint by the identified minimum margin.
- 7. Provided that each induvial windfarm complies with its apportioned limit, the cumulative windfarm noise level would not give rise to an exceedance of the total noise level limits.

9.1.3 Apportioned Limits and Assessment 9.1.3.1 Apportioned Limits

8. The resulting apportioned noise level limits are detailed in **Table 9.11.2** (daytime) and **Table 9.11.3** (night-time). Where noise levels from the induvial developments remain 10 decibels (dB) below the residual limit during both daytime and night-time periods, the apportioned limits have been presented in grey text to reflect that they may not warrant inclusion in any consent.

	Wind Speed Referenced to 10m Height (Standardised U ₁₀), m/s											
	2	3	4	5	6	7	8	9	10	11	12	
			Re	ceptor:	Blair Fa	rm						
Carrick Daytime Apportioned Limit	30.6	30.6	30.6	30.6	30.6	30.6	31.7	34.5	37.4	40.3	43.2	
Craiginmoddie Daytime Apportioned Limit	35.5	35.5	35.5	35.5	35.5	35.5	36.6	39.4	42.3	45.2	48.1	
Knockcronal Daytime Apportioned Limit	30.0	30.0	30.0	30.0	30.0	30.0	31.1	33.9	36.7	39.7	42.5	
			R	eceptor:	Glenall	a						
Carrick Daytime Apportioned Limit	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.7	38.4	40.3	42.6	
Craiginmoddie Daytime Apportioned Limit	29.6	29.6	29.6	29.6	29.6	29.6	29.6	30.3	32.0	33.9	36.2	
Knockcronal Daytime Apportioned Limit	30.7	30.7	30.7	30.7	30.7	30.7	30.7	31.4	33.1	35.1	37.3	
			Re	ceptor: I	Knocksk	ae						
Carrick Daytime Apportioned Limit	30.6	30.6	30.6	30.6	30.6	30.6	31.1	32.4	33.9	35.5	37.2	
Craiginmoddie Daytime Apportioned Limit	20.5	20.5	20.5	20.5	20.5	20.5	20.9	22.2	23.7	25.3	27.0	
Knockcronal Daytime Apportioned Limit	37.0	37.0	37.0	37.0	37.0	37.0	37.4	38.8	40.2	41.8	43.6	
			Recepto	or: Tairla	aw Toll (Cottage						
Carrick Daytime Apportioned Limit	35.1	35.2	35.5	36.0	36.7	37.5	38.5	39.6	40.9	42.3	43.8	
Craiginmoddie Daytime Apportioned Limit	17.9	18.0	18.4	18.9	19.5	20.4	21.4	22.5	23.8	25.2	26.7	
Knockcronal Daytime Apportioned Limit	36.2	36.4	36.7	37.2	37.8	38.7	39.7	40.8	42.1	43.5	45.0	
			Re	ceptor: \	White R	ow						
Carrick Daytime Apportioned Limit	34.2	34.2	34.2	34.2	34.2	34.2	34.5	35.9	37.7	39.7	41.9	

	Wind Speed Referenced to 10m Height (Standardised U_{10}), m/s												
	2	3	4	5	6	7	8	9	10	11	12		
Craiginmoddie Daytime Apportioned Limit	32.9	32.9	32.9	32.9	32.9	32.9	33.1	34.6	36.3	38.3	40.6		
Knockcronal Daytime Apportioned Limit	29.9	29.9	29.9	29.9	29.9	29.9	30.2	31.7	33.4	35.4	37.7		
			Rece	ptor: Do	ughty Fa	arm							
Carrick Daytime Apportioned Limit	30.1	29.5	29.5	29.5	29.5	29.3	29.1	29.5	32.0	34.4	36.7		
Craiginmoddie Daytime Apportioned Limit	37.1	36.5	36.5	36.5	36.5	36.4	36.1	36.6	39.0	41.4	43.7		
Knockcronal Daytime Apportioned Limit	21.7	21.1	21.1	21.1	21.1	20.9	20.7	21.1	23.6	26.0	28.3		
Grey text denotes that lim	nit may r	ot warra	ant inclu	sion in a	any cons	sent due	to pred	icted de	velopme	ent level	s being		

more than 10dB below the identified daytime and night-time residual limits

Table 9.11.2 Example apportioned Daytime Noise Level Limits, LA90, dB

	Wind	Speed	Referen	ced to	10m He	ight (St	andardi	sed U ₁₀), m/s				
	2	3	4	5	6	7	8	9	10	11	12		
Receptor: Blair Farm													
Carrick Night-time Apportioned Limit	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	36.0	38.6	41.0		
Craiginmoddie Night- time Apportioned Limit	40.5	40.5	40.5	40.5	40.5	40.5	40.5	40.5	40.9	43.5	45.8		
Knockcronal Night-time Apportioned Limit	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.3	37.9	40.3		
			R	eceptor:	Glenall	а							
Carrick Night-time Apportioned Limit	41.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0	41.2	42.8		
Craiginmoddie Night- time Apportioned Limit	34.6	34.6	34.6	34.6	34.6	34.6	34.6	34.6	34.6	34.8	36.4		
Knockcronal Night-time Apportioned Limit	35.7	35.7	35.7	35.7	35.7	35.7	35.7	35.7	35.7	35.9	37.6		
			Re	ceptor: I	Knocksk	ae							
Carrick Night-time Apportioned Limit	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	36.4		
Craiginmoddie Night- time Apportioned Limit	25.2	25.2	25.2	25.2	25.2	25.2	25.2	25.2	25.2	25.2	26.0		
Knockcronal Night-time Apportioned Limit	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.9		
			Recepto	or: Tairla	aw Toll (Cottage							
Carrick Night-time Apportioned Limit	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9	39.1	40.2	41.5		
Craiginmoddie Night- time Apportioned Limit	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.7	22.8	24.1		
Knockcronal Night-time Apportioned Limit	40.7	40.7	40.7	40.7	40.7	40.7	40.7	40.7	40.9	42.0	43.3		
			Re	ceptor: \	Nhite R	wc		÷					

	Wind Speed Referenced to 10m Height (Standardised U_{10}), m/s												
	2	3	4	5	6	7	8	9	10	11	12		
Carrick Night-time Apportioned Limit	39.2	39.2	39.2	39.2	39.2	39.2	39.2	39.2	39.2	39.2	40.0		
Craiginmoddie Night- time Apportioned Limit	37.9	37.9	37.9	37.9	37.9	37.9	37.9	37.9	37.9	37.9	38.6		
Knockcronal Night-time Apportioned Limit	34.9	34.9	34.9	34.9	34.9	34.9	34.9	34.9	34.9	34.9	35.7		
			Rece	ptor: Do	ughty F	arm							
Carrick Night-time Apportioned Limit	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	35.6		
Craiginmoddie Night- time Apportioned Limit	42.4	42.4	42.4	42.4	42.4	42.4	42.4	42.4	42.4	42.5	44.7		
Knockcronal Night-time Apportioned Limit	24.3	24.3	24.3	24.3	24.3	24.3	24.3	24.3	24.3	24.3	26.6		
Grey text denotes that limit may not warrant inclusion in any consent due to predicted development levels being more than 10dB below the identified daytime and night-time residual limits													

Table 9.11.3 Example apportioned Night-time Noise Level Limits, LA90, dB

Limit compliance at other properties can be checked by applying the most appropriate noise limits selected from **Table 9.11.2** and Table **9.11.3**. The IoA GPG provides the following example text to address this scenario:

"Where a dwelling to which a complaint is related is not listed in the tables attached to these conditions, the wind farm operator shall submit to the Local Planning Authority for written approval proposed noise limits selected from those listed in the Tables to be adopted at the complainant's dwelling for compliance checking purposes. The proposed noise limits are to be those limits selected from the Tables specified for a listed location which the independent consultant considers as being likely to experience the most similar background noise environment to that experienced at the complainant's dwelling. The rating level of noise immissions resulting from the combined effects of the wind turbines when determined in accordance with the attached Guidance Notes shall not exceed the noise limits approved in writing by the Local Planning Authority for the complainant's dwelling."

9.1.3.2 Assessment

Graphs 9.11.1 to **9.11.12** below show how the predicted noise levels from each of the three individual proposed developments complies with their individual apportioned limits.

Blair Farm



Graph 9.11.1 Blair Farm - Apportioned Daytime Limit Assessment, dB(A)

Night-time Apportioned Limit Assessment – Blair Farm



Graph 9.11.2 Blair Farm – Apportioned Night-time Limit Assessment, dB(A)

Glenalla





Graph 9.11.3 Glenalla – Apportioned Daytime Limit Assessment, dB(A)

Night-time Apportioned Limit Assessment – Glenalla



Graph 9.11.4 Glenalla – Apportioned Night-time Limit Assessment, dB(A)

Knockskae



Graph 9.11.5 Knockskae - Apportioned Daytime Limit Assessment, dB(A)

Night-time Apportioned Limit Assessment – Knockskae



Graph 9.11.6 Knockskae – Apportioned Night-time Limit Assessment, dB(A)

Tairlaw Toll Cottage





Graph 9.11.7 Tairlaw Toll Cottage - Apportioned Daytime Limit Assessment, dB(A)

Night-time Apportioned Limit Assessment – Tairlaw Toll Cottage



Graph 9.11.8 Tairlaw Toll Cottage – Apportioned Night-time Limit Assessment, dB(A)

White Row

Daytime Apportioned Limit Assessment - White Row



Graph 9.11.9 White Row - Apportioned Daytime Limit Assessment, dB(A)

Night-time Apportioned Limit Assessment – White Row



Graph 9.11.10 White Row – Apportioned Night-time Limit Assessment, dB(A)

Doughty Farm





Graph 9.11.11 Doughty Farm - Apportioned Daytime Limit Assessment, dB(A)

Night-time Apportioned Limit Assessment – Doughty Farm



Graph 9.11.12 Doughty Farm – Apportioned Night-time Limit Assessment, dB(A)

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