

Section 11
NOISE

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Appendix 11.1: Assessment

Section 11: Noise

Introduction

- 11.1.1 Hayes McKenzie Partnership Limited (HMPL) have undertaken a revised assessment of the potential noise levels resulting from the introduction of the proposed Scoop Hill Community Wind Farm, located in Dumfries & Galloway, on behalf of CWL Energy Limited (the Applicant). The revision incorporates an update to the layout assessed as part of the initial works supporting the planning application for the proposed Development, as detailed within Section 11 – Noise of the original Scoop Hill Environmental Impact Assessment Report (EIAR) which was submitted in November 2020.
- 11.1.2 This Section presents the revised findings of the assessment due to the changes in site design and refers back to Section 11 – Noise of the initial EIAR where appropriate. The revised assessment accords with the recommendations of ETSU-R-97, *The Assessment and Rating of Noise from Wind Farms*, and the best practice guidance published by the Institute of Acoustics, *A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise* (GPG) and its associated Supplementary Guidance documents, as previously detailed and referred to within web-based planning guidance provided by the Scottish Government.
- 11.1.3 Noise limits for properties neighbouring the proposed Development have been derived from data obtained during a survey of background noise levels at several dwellings neighbouring the development combined with corresponding on-site wind speed information in accordance with ETSU-R-97, as refined by the GPG. The results are presented within Section 11 of the original Scoop Hill EIAR.
- 11.1.4 Predictions of the noise levels associated with the operation of the proposed Development, as revised due to the change in site design, and based on the installation of Vestas V172 7.2 MW wind turbines, have been compared with the noise limits detailed within the original EIAR. Details of the assumptions used to undertake the predictions are also provided within Section 11 of the original EIAR.
- 11.1.5 In addition to the operational noise effects of the proposed wind turbines, potential noise effects associated with the proposed Battery Energy Storage System (BESS) has also been undertaken with reference to BS 4142:2014+A1:2019, *Methods for rating and assessing industrial and commercial sound*.
- 11.1.6 A discussion of the potential impacts relating to the construction of the Development, including from possible blasting within the proposed borrow pits, is provided in terms of relevant guidance within the original EIAR, the conclusions of which can equally be applied here and this is therefore not discussed in any further detail as a result.

Legislation, Policy & Guidelines

- 11.2.1 Section 11 of the original EIAR provides reference and discussion in respect of relevant planning policy and issues relating to noise from wind turbines which has not been repeated here. It should be noted that since the original EIAR was submitted in 2020 there have been a number of policy developments, most notably the release of Scottish Governments National Planning Framework 4 (NPF4) and the Onshore Wind Policy Statement 2022 (OWPS 2022).
- 11.2.2 The OWPS 2022 sets out the Scottish Governments ambitions to install 20 GW of onshore wind capacity in Scotland by 2030. It discusses how the impacts should be assessed and on noise (section 3.7) it reiterates that

ETSU-R-97 and the Institute of Acoustics GPG should be followed to assess and rate noise from wind energy developments. This is methodology that was followed in the original EIAR and therefore no amendments to the operational noise assessment methodology are required.

- 11.2.3 Noise from the proposed BESS is assessed in line with the recommendations of BS 4142:2014+A1:2019, *Methods for rating and assessing industrial and commercial sound*.
- 11.2.4 It is considered that if the noise levels are acceptable as assessed in line with the above guidance documents, then the requirements of Policy 11 in NPF4 will be met which seeks to ensure that noise impacts from energy developments are suitably addressed.

BS 4142:2014+A1:2019, Methods for rating and assessing industrial and commercial sound

- 11.2.5 BS 4142 provides an assessment methodology for rating noise immission levels from industrial and commercial sources at residential properties. The standard describes a method for determining the noise impact based on the difference between the existing background sound level (without the noise source), measured using the L_{A90} measurement index, and the noise immission level of the source at a receiver location (known as the specific sound level), measured or predicted using the L_{Aeq} index. If the specific sound level exhibits an identifiable character such as tonality or impulsiveness, then a variable penalty of up to 6 dB or 9 dB respectively is added to give the 'rating level'.
- 11.2.6 The difference between the background sound level and the rating level (rating minus background) is then used to assess the noise impact. BS 4142:2014 states that '*the lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact*'. In addition, in respect of low rating and background sound level it states that '*where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.*' The previous version of the standard considered low rating and background sound levels to be below about 35 dB $L_{Ar,Tr}$ and 30 dB L_{A90} respectively.
- 11.2.7 BS 4142 provides guidelines on noise impact according to Table 11.1.

Table 11.1 BS 4142 Guidance on noise impact

Excess of rating over background sound level	Assessment
Around +10 dB or more	Indication of a significant adverse impact
Around +5 dB	Indication of an adverse impact
<0 dB	Indication of a low impact

- 11.2.8 Whilst BS 4142 gives an indicative assessment of the impact on residential amenity, there are no specific guidelines on what may be acceptable in a given situation and, in this respect, the standard is left open to interpretation.

Consultation

- 11.3.1 A brief discussion of the scoping and pre-application consultation undertaken as part of the assessment process is contained in Section 11 of the original EIAR.

11.3.2 Further correspondence was received from Dumfries & Galloway Council's (DGC) Environmental Health Officer (EHO) since the original planning application was submitted. The EHO proposes planning conditions relating to noise associated with the construction and operation of the proposed Development. No other comments were received which indicates that DGC were content with the noise impacts assessed in the original assessment. The EHO will be reconsulted as part of the AI consultation process.

Assessment Methodology & Significance Criteria

11.4.1 The assessment, prediction methodology and determination of significance follows exactly the same process as detailed within Section 11 of the original EIAR, except as modified by the change in site design i.e. fully in accordance with ETSU-R-97 and the GPG.

11.4.2 There are still no other proposed, consented or operational wind farms in the vicinity of the proposed Development that would result in combined cumulative noise effects of any relevance.

11.4.3 The property, Finniegill, that was included in the original EIAR is financially involved in the proposed development and if consented, the property will not be inhabited for the operational period; it is therefore not assessed further.

11.4.4 The property, Wood Cottage, that was included in the original EIAR is financially involved in the proposed Development. It is infrequently inhabited and if consented, the property will not be inhabited for the operational period; it is therefore not assessed further.

11.4.5 The properties, Craigfield, Old Garwarshields, and Braefield, which were referred to in the original EIAR are derelict and uninhabitable. In addition, Braefield is under control of the applicant and is not in residential use and therefore none of these locations will be assessed further.

11.4.6 Table 11.2 shows the co-ordinates of the assessment locations used to represent residential properties, as considered within the original EIAR, and the corresponding location from which background noise information is available to represent each one (or group). This is provided for reference and further discussion can be found within Section 11 of the original EIAR.

Table 11.2 Assessment Locations & Applied Background/Baseline Noise Levels

Name	Easting	Northing	Representative Background Monitoring Location
Craigbeck Hope	313760	603615	Dryfe Lodge
Newbigging	311085	598452	Newbigging
Killbrook (FI)	311663	597160	Killbrook
Leithenhall Cottages (FI)	312918	596850	Dryfe Lodge
Leithenhall Farm (FI)	312963	596706	Dryfe Lodge
Kirkhill Farm (FI)	313489	596266	Dryfe Lodge
Kirkhill Cottages	313506	595955	2 Kirkhill Cottages
Laverhay (FI)	313966	598272	Dryfe Lodge
Laverhay Cottage (FI)	313964	598291	Dryfe Lodge
Laverhay Farm (FI)	314009	598093	Dryfe Lodge
Crowgill (FI)	313948	597684	Crowgill

Name	Easting	Northing	Representative Background Monitoring Location
Milne (FI)	313851	597220	Dryfe Lodge
Kirncleugh	314150	594432	Dryfe Lodge
Waterhead of Dryfe	318886	594313	Dryfe Lodge
Dryfe Lodge	318426	593651	Dryfe Lodge
Waterhead Cottage	318695	593928	Dryfe Lodge
Sandyford Cottage	320407	593787	Dryfe Lodge
Kilburn	320576	596006	Kilburn

11.4.7 The revised site layout used for this assessment has been provided by the Applicant and is shown in Table 11.3 for reference. The hub height used for this assessment has been calculated on the basis of meeting the proposed tip height with the candidate turbine with a rotor diameter of 172 m.

Table 11.3 Turbine Co-ordinates

ID	Easting	Northing	Hub	ID	Easting	Northing	Hub	ID	Easting	Northing	Hub
T11	313826	601870	94	T31	315812	598811	164	T55	318365	595445	94
T12	313887	601268	114	T32	314970	598596	114	T57	319126	595951	94
T13	313790	600764	114	T33	315350	598114	114	T58	318347	596321	114
T14	313656	600308	114	T34	315450	597585	114	T59	318973	597234	114
T15	314429	602335	94	T36	315442	596819	114	T60	319318	596764	114
T16	314745	601896	139	T39	315411	596015	114	T63	318073	596771	114
T17	316349	602807	114	T40	315974	596530	114	T64	318418	597447	164
T18	316345	602256	114	T41	315904	595769	114	T65	318298	597974	164
T19	316541	601754	164	T42	315574	595224	114	T66	318053	598453	164
T20	315887	601440	164	T43	316081	595222	114	T67	318172	599198	164
T21	316221	601040	164	T44	316113	598034	164	T68	317984	599770	164
T22	316515	600596	164	T45	316153	597268	114	T69	317962	600558	164
T23	315285	600882	164	T46	316703	597917	164	T70	317743	601134	164
T24	315709	600129	164	T47	316847	597220	114	T71	317265	600588	164
T25	314961	599964	114	T48	317624	597413	164	T72	317140	601105	164
T26	316244	599891	164	T49	316485	596382	114	T73	317453	601823	139
T27	316568	599470	164	T50	316566	595770	114	T74	317382	602590	114
T28	316881	599000	164	T51	316911	595207	94	T75	317142	603165	114
T29	315440	599190	114	T52	317338	596114	114	T76	313902	599837	114
T30	314623	599026	114	T53	317696	595735	94	T77	314649	600566	164

Baseline Conditions

11.5.1 The results of the baseline/background noise survey and the process by which noise limits were derived and applied to relevant dwellings is provided with Section 11 of the original EIAR. The resultant noise limits are shown at Table 11.4 for reference.

Table 11.4 Noise Limits, dB LA90

Location	Standardised 10 m Height Wind Speed (m/s)										
	3	4	5	6	7	8	9	10	11	12	
Night-time											
Craigbeck Hope	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
Newbigging	43.0	43.0	43.0	43.0	43.0	43.0	43.6	45.1	46.9	49.1	
Killbrook (FI)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	46.6	49.0	
Leithenhall Cottages (FI)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	
Leithenhall Farm (FI)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	
Kirkhill Farm (FI)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	
Kirkhill Cottages	43.0	43.0	43.0	43.0	43.0	43.0	43.3	43.8	44.4	45.1	
Laverhay (FI)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	
Laverhay Cottage (FI)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	
Laverhay Farm (FI)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	
Crowgill (FI)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	
Milne (FI)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	
Kirncleugh	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	
Waterhead of Dryfe	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	
Dryfe Lodge	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	
Waterhead Cottage	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	
Sandyford Cottage	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	
Kilburn	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	
Daytime											
Craigbeck Hope	40.0	40.0	40.0	40.0	40.0	40.0	40.0	41.2	43.9	47.5	
Newbigging	42.7	42.7	42.9	43.5	44.5	45.7	47.1	48.6	50.1	51.5	
Killbrook (FI)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	52.4	55.2	
Leithenhall Cottages (FI)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	47.5	
Leithenhall Farm (FI)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	47.5	
Kirkhill Farm (FI)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	47.5	
Kirkhill Cottages	43.2	43.2	43.2	43.2	43.3	43.7	44.6	46.1	48.4	51.7	
Laverhay (FI)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	47.5	
Laverhay Cottage (FI)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	47.5	
Laverhay Farm (FI)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	47.5	

Location	Standardised 10 m Height Wind Speed (m/s)									
	3	4	5	6	7	8	9	10	11	12
Crowgill (FI)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	46.4
Milne (FI)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	47.5
Kirncleugh	40.0	40.0	40.0	40.0	40.0	40.0	40.0	41.2	43.9	47.5
Waterhead of Dryfe	40.0	40.0	40.0	40.0	40.0	40.0	40.0	41.2	43.9	47.5
Dryfe Lodge	40.0	40.0	40.0	40.0	40.0	40.0	40.0	41.2	43.9	47.5
Waterhead Cottage	40.0	40.0	40.0	40.0	40.0	40.0	40.0	41.2	43.9	47.5
Sandyford Cottage	40.0	40.0	40.0	40.0	40.0	40.0	40.0	41.2	43.9	47.5
Kilburn	40.0	40.0	40.0	40.0	40.0	40.9	42.6	44.4	46.5	48.8

FI – Financially Involved Property

Potential Effects

Wind Farm Operational Potential Effects

- 11.6.1 Operational noise predictions have been carried out using the same methodology as set out within Section 11 of the original Scoop Hill EIAR, with the only changes being that the topographical barrier corrections have been applied on the basis of a 2 dB reduction for each turbine where the tip is not visible from the receptor location, and with the source sound power level for a different candidate turbine to that assessed in the original EIAR.
- 11.6.2 The source sound power level data for the candidate Vestas V172 7.2 MW turbine, with serrated trailing edges, is set out at Table 11.5 below. The source sound power level includes uncertainty added to the manufacturer’s specified values in line with the IOA Good Practice Guidance.

Table 11.5 Sound Power Levels for the Vestas V172 7.2 MW Turbine

Hub Height Wind Speed (m/s)	Octave Band Centre Frequency (Hz)								Overall
	63	125	250	500	1000	2000	4000	8000	
3	80.7	87.1	90.1	91.4	90.1	86.0	78.9	68.9	96.6
4	80.7	87.2	90.2	91.4	90.1	85.9	78.7	68.6	96.6
5	80.6	87.5	90.8	92.2	90.8	86.4	78.8	68.1	97.2
6	83.6	91.2	94.5	95.5	94.0	89.4	81.6	70.6	100.6
7	87.5	95.0	98.2	99.0	97.5	92.9	85.0	74.0	104.2
8	90.6	98.6	102.0	102.3	100.6	95.9	88.0	76.9	107.6
9	92.0	100.0	103.3	103.6	101.9	97.1	89.2	78.1	108.9
10	92.1	100.0	103.3	103.6	101.9	97.1	89.2	78.1	108.9
11	92.3	100.1	103.4	103.6	101.8	97.1	89.3	78.3	108.9
12	92.5	100.2	103.3	103.5	101.8	97.2	89.5	78.7	108.9
13	92.6	100.1	103.3	103.5	101.8	97.3	89.7	79.0	108.9
14	92.5	100.1	103.3	103.5	101.9	97.3	89.8	79.1	108.9

Hub Height Wind Speed (m/s)	Octave Band Centre Frequency (Hz)								Overall
	63	125	250	500	1000	2000	4000	8000	
15	92.4	100.0	103.3	103.5	101.9	97.4	89.9	79.2	108.9

- 11.6.3 Appendix 11.1 of this Assessment provides a comparison of the predicted operational turbine noise levels with the applied noise limits assuming that all the dwellings considered here are downwind of all turbines simultaneously and that the turbines are operating unrestricted (including for all relevant topographical corrections in terms of concave ground and barrier effects etc.).
- 11.6.4 AI Figure 11.1 shows the corresponding contour plot of the noise levels resulting from the proposed Development for the wind speeds where operational noise levels from the proposed turbines are at their maximum.
- 11.6.5 Table 11.6 shows the predicted noise levels associated with the proposed Development over a range of standardised 10 m height wind speeds for reference.

Table 11.6 Predicted Scoop Hill Turbine Noise Levels, dB L_{A90}

Location	Standardised 10 m Height Wind Speed (m/s)									
	3	4	5	6	7	8	9	10	11	12
Craigbeck Hope	24.1	27.4	32.7	36.1	36.4	36.5	36.4	36.4	36.4	36.3
Newbigging	20.1	23.5	28.9	32.2	32.5	32.6	32.6	32.5	32.4	32.4
Killbrook (FI)	21.4	24.7	30.1	33.4	33.7	33.8	33.8	33.7	33.7	33.6
Leithenhall Cottages (FI)	23.6	27.0	32.3	35.7	36.0	36.0	36.0	35.9	35.9	35.9
Leithenhall Farm (FI)	25.0	28.4	33.7	37.0	37.3	37.3	37.3	37.3	37.2	37.2
Kirkhill Farm (FI)	26.1	29.5	34.8	38.1	38.4	38.5	38.5	38.4	38.4	38.3
Kirkhill Cottages	25.6	28.9	34.3	37.6	37.9	38.0	37.9	37.9	37.9	37.8
Laverhay (FI)	30.3	33.7	39.0	42.3	42.6	42.6	42.6	42.6	42.5	42.5
Laverhay Cottage (FI)	30.4	33.8	39.1	42.4	42.6	42.7	42.6	42.6	42.6	42.6
Laverhay Farm (FI)	30.0	33.4	38.7	42.0	42.3	42.3	42.3	42.2	42.2	42.2
Crowgill (FI)	29.2	32.6	37.9	41.2	41.5	41.5	41.5	41.4	41.4	41.4
Milne (FI)	28.2	31.6	36.9	40.2	40.5	40.5	40.5	40.5	40.4	40.4
Kirncleugh	23.6	26.9	32.2	35.6	35.9	36.0	36.0	35.9	35.9	35.8
Waterhead of Dryfe	25.6	28.7	33.9	37.5	37.9	37.9	37.9	37.9	37.9	37.8
Dryfe Lodge	22.7	25.9	31.2	34.7	35.1	35.1	35.1	35.1	35.0	35.0
Waterhead Cottage	24.3	27.5	32.7	36.2	36.6	36.7	36.7	36.6	36.6	36.5
Sandyford Cottage	19.8	23.0	28.3	31.8	32.1	32.2	32.2	32.1	32.1	32.0
Kilburn	25.3	28.6	33.9	37.3	37.6	37.6	37.6	37.6	37.6	37.5

- 11.6.6 A comparison of the levels shown at Table 11.6 with the limits at Table 11.4 (as provided within Appendix 11.1) shows that predicted levels of operational noise are below the prescribed ETSU-R-97 criteria. As a result, operational noise is considered to be not significant.

BESS Potential Effects

- 11.1.1 The BESS facility is located at approximately BNG 311470 600650 to the northwest of the wind turbines. The nearest financially involved noise sensitive receptor (Poldean) is around 1 km away from the BESS site, and the nearest non-financially involved noise sensitive receptor (Woodfoot) is around 1.3 km away. The topography between the BESS site and receptor locations has been modelled. Where there is no line of sight between source and receiver, noise immission is reduced according to the barrier effects described in ISO 9613-2. This is seen clearly at Poldean, which is closer to the BESS, but has lower noise immissions than Woodfoot since Poldean is topographically shielded.
- 11.1.2 The primary noise sources related to BESS sites are usually heating, ventilation and air conditioning (HVAC) systems, inverters and transformers. Based on data for similar developments, battery inverters usually have a sound power level of approximately 80 dBA and 5 MVA transformers have a sound power level of approximately 76 dBA. The candidate battery energy storage containers are Tesla Megapack 4h units, which are battery containers with built in ventilation and cooling. These have a sound power level dependent on the fan duty cycle, i.e., how hard the fans have to operate to produce the required cooling during charging and discharging of the batteries. Tesla have reported that the fan duty cycle above 60% would rarely be required, under normal operations, since the units are designed to operate in higher ambient temperatures than would be expected in Scotland. To be conservative, the fan duty cycle of 70% has been used which adds 2.1 dB to the overall noise emission. The sound power level used in the model is given at Table 11.7 along with the sound power level at 60% fan duty cycle for comparison.

Table 11.7 Sound Power Levels for Tesla Megapack 4h (dBA)

Fan Duty Cycle	Octave Band Centre Frequency (Hz)								Overall
	63	125	250	500	1000	2000	4000	8000	
60%	63.0*	74.4	89.5	85.9	87.1	85.9	83.1	72.4	93.9
70%	64.6*	76.0	91.9	87.2	89.2	88.3	85.8	75.9	96.0

* Estimated based on a similar unit's spectrum shape in lieu of measured data

- 11.1.3 For the purposes of the predictions it has been assumed that there are 152 Tesla Megapack 4h units and 38 transformers. However, since the overall sound power levels from the Tesla Megapacks are 10 dB greater than the estimated sound power levels from the inverters and transformers, and there are many more Megapacks, the overall noise immissions from the inverters and transformers will be negligible and, as such, have not been included in the noise modelling.
- 11.1.4 The Tesla Megapack 4h have a height of 2.77 m and noise from each is modelled as point sources with a height of 3.27 m as suggested by Tesla. The noise sources are considered as operating continuously throughout day and night-time. Demand on the fans will vary during the day and night due to demand to charge or discharge the batteries, and due to ambient temperatures.
- 11.1.5 The rating level (dB, L_{A,r,Tr}) is the specific sound level (L_{Aeq}), as predicted by ISO 9613-2, plus an on-time correction and any applicable character penalties. As a worst case, it is assumed that the plant operates continuously and therefore no on-time correction is applied. It is possible that noise from these units exhibit some tonal component since the noise is generated by fans on top of the units. A tonal penalty of +2 dB has been included to account for the possibility that a tone is just perceptible at the noise receptor. No intermittency character correction has been included since the units operate in 4-hour cycles of charge or

discharge, as required for grid balancing, which is longer than either the day or night-time reference time interval, given in BS 4124.

11.1.6 Noise monitoring was carried out in March 2020 as part of the original EIAR for the proposed Development. The results of the noise monitoring campaign showed that, at night-time and for low windspeeds when noise levels are lowest, background noise was in the range 25-38 dB L_{A90} at the seven locations. The closest location to the critical noise sensitive receptors at which monitoring was carried out was Newbigging where the lowest background noise level was 36 dB L_{A90} . In this assessment the background sound level will be assumed to be 35 dB L_{A90} to build an additional 1 dB uncertainty. The reference time interval for the background noise measurements was 10-minutes, which is comparable to 15-minutes as required by BS 4142 for night-time assessment, so these measurements are considered to be suitably representative.

11.1.7 The results of the operational BESS noise predictions are shown in Table 11.8 for the nearest 5 receptor locations for the proposed BESS development. All other receptors are more distance and therefore operational noise levels would be lower. The results are also shown as a noise contour plot at AI Figure 11.2 which also shows the location of the nearest assessed receptors.

Table 11.8 BS 4142 noise assessment

Location	Background sound level (dB, L_{A90})	Rating level (dB, $L_{Ar,Tr}$)	Excess of rating over background sound level (dB)	Indication of impact
Newbigging	35	30	-5	Low
Woodfoot	35	34	-1	Low
Poldean (FI)	35	29	-6	Low
Breconside	35	32	-3	Low
Breconside Cottage	35	33	-2	Low

11.1.8 The assessment shows an indication of low impact at all receptor locations. The noise receptors are in rural locations which are unlikely to have any industrial noise sources present. The highest noise impact is predicted at Woodfoot which has an excess rating level over background sound of -1 dB. If the background sound level at Woodfoot is less than the assumed 35 dB L_{A90} , adverse impact would be possible. However, a specific sound level of 34 dB $L_{Ar,Tr}$ is considered very low by the previous version of BS 4142, and it would be unreasonably restrictive to require rating levels to be lower than this. Furthermore, the background noise levels considered were during the night-time when residents are likely to be in their houses sleeping and are therefore less likely to hear the sound, as 10+ dB of attenuation can be assumed inside a house with an open window. During the daytime, when residents might be out in their gardens, background noise levels are likely to be higher due to other noise sources such as birds, road traffic noise and farm machinery.

11.1.9 It is a requirement of BS 4142 that the uncertainty associated with the assessment is evaluated. Uncertainty in the outcome of the assessment is associated with the uncertainty of the background sound levels, the uncertainty of the calculation of the specific sound level, and the uncertainty of any characteristic penalties included in the rating level. The uncertainty associated with the average measured background sound levels is estimated to be about +/- 2 dB. The specific sound levels are likely to be lower than predicted due to the conservative nature of the predictions. The BESS is likely to operate at 60% when required, which is less than the modelled 70% by 2 dB, and therefore the predicted impact can be considered to be conservative.

Nevertheless, as the predicted rating sound levels are below 35 dB L_{Ar} any uncertainty around the assumed background sound level can be considered to be insignificant as the overall impact is considered to be low.

11.1.10 Overall the predicted operational noise levels from the BESS are low, and the predicted impact is considered to be not significant.

Cumulative Assessment

11.7.1 As discussed within Section 11 of the original EIAR and at Paragraph 11.4.2 above, there are no cumulative operational impacts expected at this time. As a result, this aspect is considered to be not significant.

Mitigation

11.8.1 Similarly to that discussed within Section 11 of the original EIAR, the site has been designed such that predicted noise levels associated with the operation of the Proposed Development are expected to meet the requirements of ETSU-R-97 with all turbines operating unrestricted. As a result, no mitigation measures are prescribed here. No significant residual operational effects are predicted as operational noise levels meet the relevant derived noise limits.

11.8.2 The BS 4142 assessment has shown that noise from the BESS is likely to have low impact at all noise sensitive receptors in the area. Therefore, no further mitigation is required.

Residual Effects

Operational Noise

11.9.1 No significant residual effects are expected from the operation of the wind farm as predicted noise levels meet the relevant derived noise limits without mitigation/curtailment applied to the turbines, although it is entirely possible that noise from the proposed Development may be audible at dwelling locations at times. However, noise levels will meet planning guidelines.

11.9.2 No significant residual operational effects are expected from the operation of the BESS as the noise, without any subsequent mitigation, is predicted to be low impact at noise sensitive receptors.

11.9.3 Operational noise will be controlled via planning conditions which set out noise limits for the proposed Development.

Construction Noise

11.9.4 A discussion of the potential impacts relating to the construction of the Development, including from possible blasting within the proposed borrow pits, is provided in terms of relevant guidance within Section 11 of the original EIAR. This determines that noise associated with construction activities would not result in any significant impacts in planning terms. Although there has been some relocation of the borrow pits, this conclusion can equally be applied here.

Summary

- 11.10.1 A revised noise assessment has been carried out in order to determine whether the revised site meets typical planning requirements in respect of operational noise from wind turbines. The assessment takes in to account the methodologies set out within ETSU-R-97, *The Assessment and Rating of Noise from Wind Farms* (1996) and the Institute of Acoustic document, *A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise*.
- 11.10.2 The results of the operational noise assessment indicate that turbine noise levels meet the relevant noise limits and no specific mitigation is required. The operational noise impact is, therefore, determined to be not significant.
- 11.10.3 The noise from the BESS has been assessed according to *BS 4142:2014+A1:2019, Methods for rating and assessing industrial and commercial sound*. Low impact was predicted from the BESS as the rating level at all properties was predicted to be below the expected background noise levels in the area.
- 11.10.4 Noise associated with the construction of the BESS development is also not expected to have any significant effects in planning terms.

References

Department of Trade and Industry (1996). ETSU-R-97, *The Assessment and Rating of Noise from Wind Farms*. ETSU/DTI Available at: <https://webarchive.nationalarchives.gov.uk/+http://www.berr.gov.uk/files/file20433.pdf>

Institute of Acoustics (May 2013). *A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise*. IOA. Available at: <https://www.ioa.org.uk/publications/wind-turbine-noise>

Scottish Government (February 2023). *National Planning Framework 4*. Available at: <https://www.gov.scot/publications/national-planning-framework-4/>

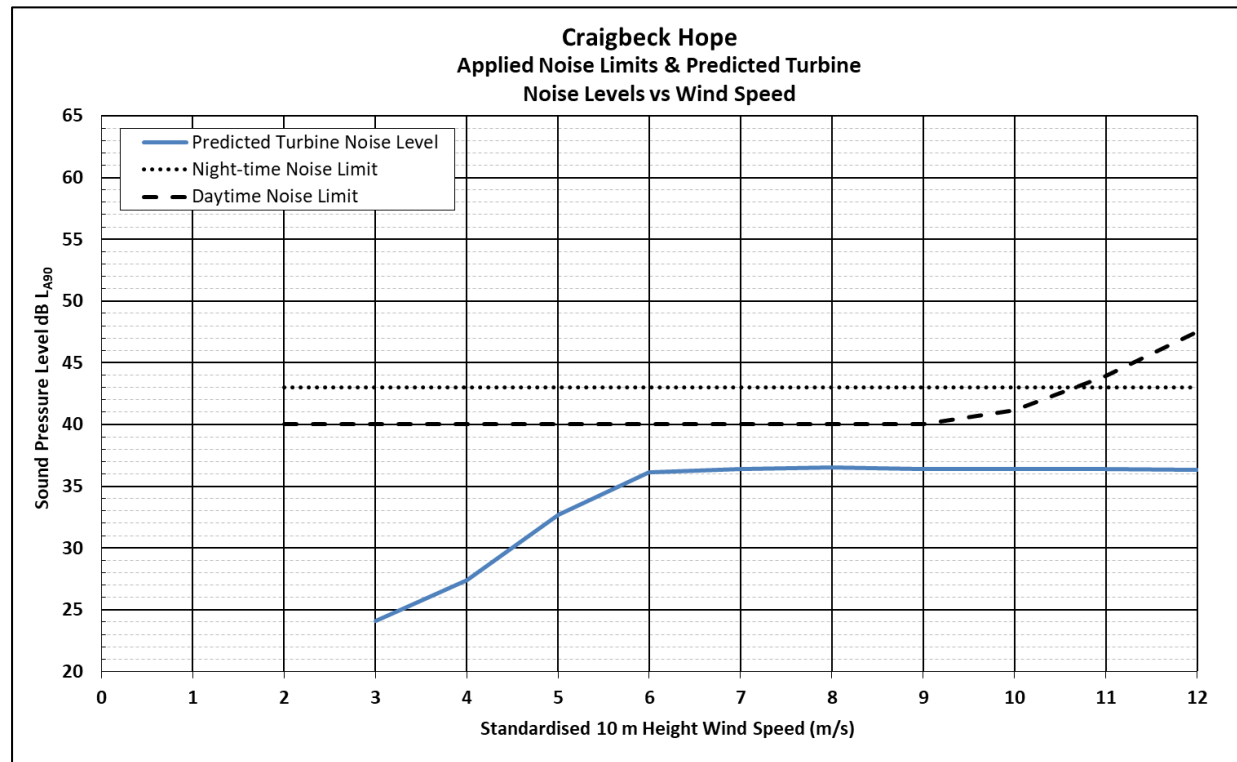
Scottish Government (May 2014). *Onshore Wind Turbines*. Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2014/05/onshore-wind-turbines-planning-advice/documents/9bfeeca0-9a06-4bb1-bc29-306c8f675656/9bfeeca0-9a06-4bb1-bc29-306c8f675656/govscot%3Adocument>

Scottish Government (December 2022). *Onshore Wind Policy Statement 2022*. Available at: <https://www.gov.scot/publications/onshore-wind-policy-statement-2022/documents/>

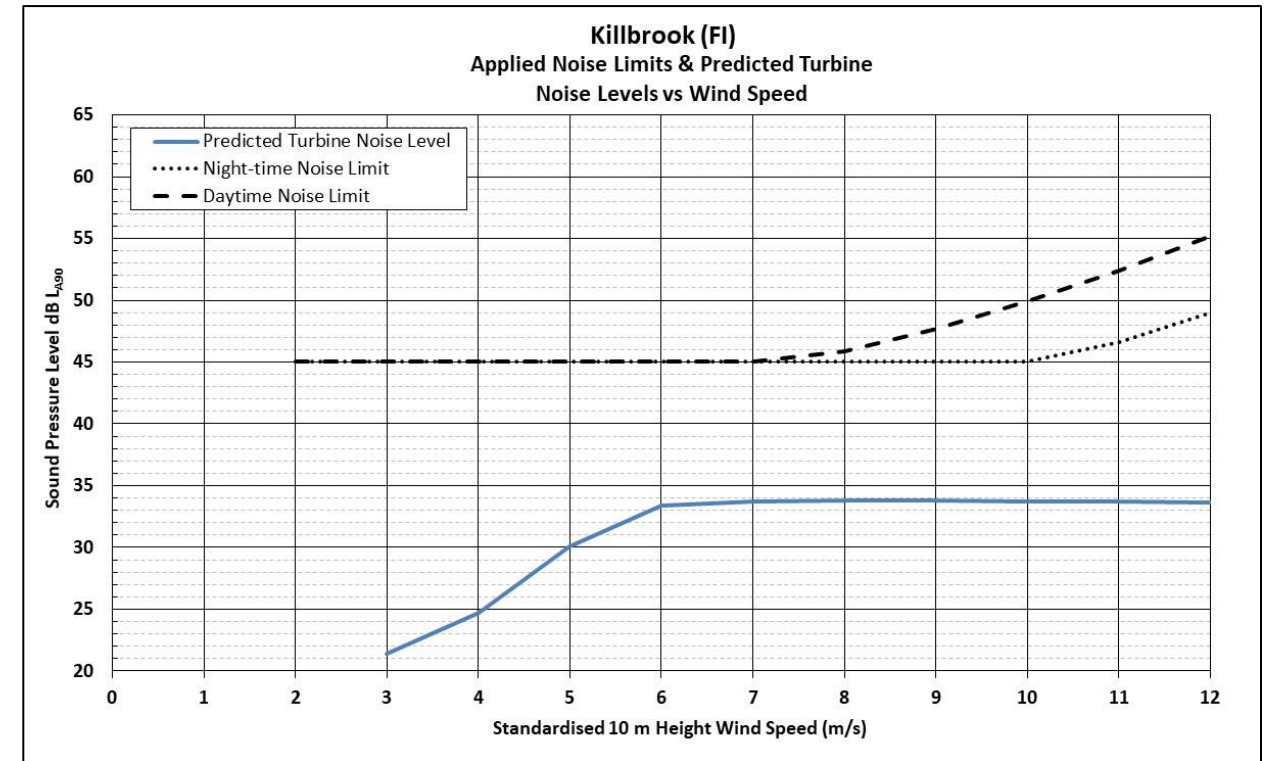
British Standards Institute (BSI 2019), *BS 4142:2014+A1:2019, Methods for rating and assessing industrial and commercial sound*.

Appendix 11.1: Assessment

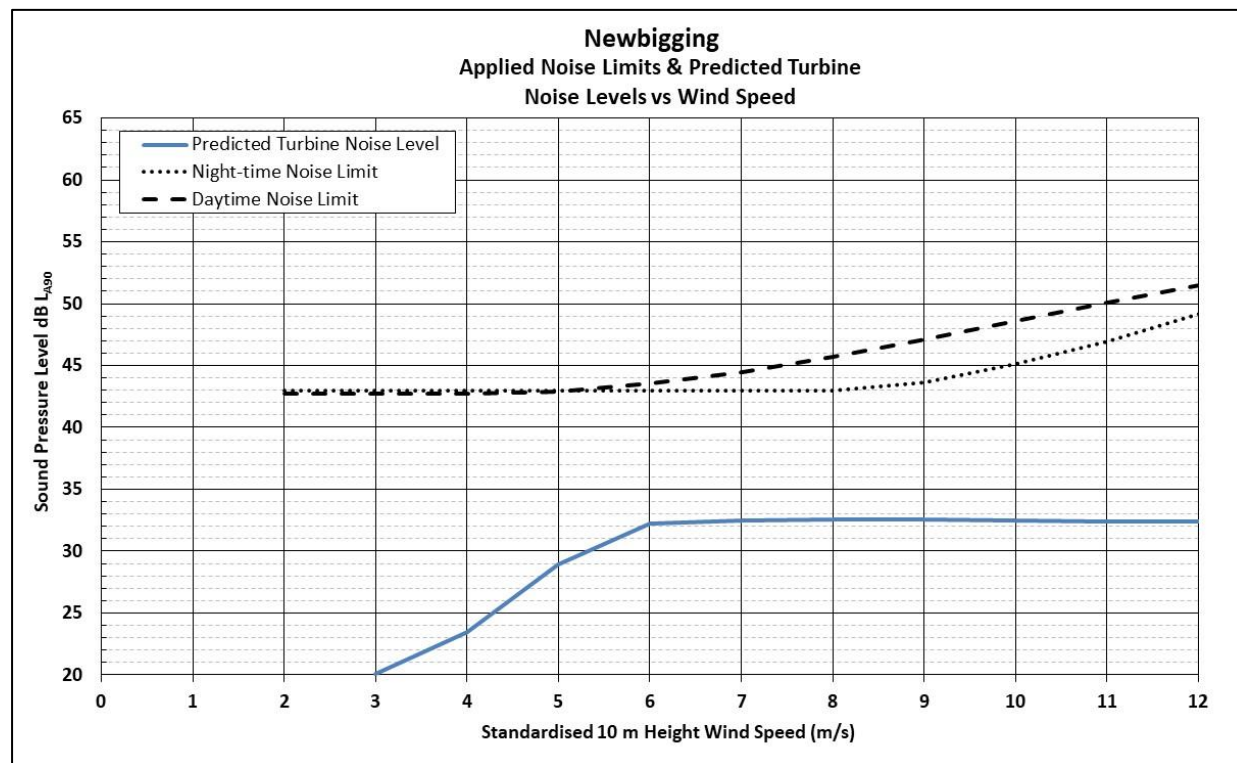
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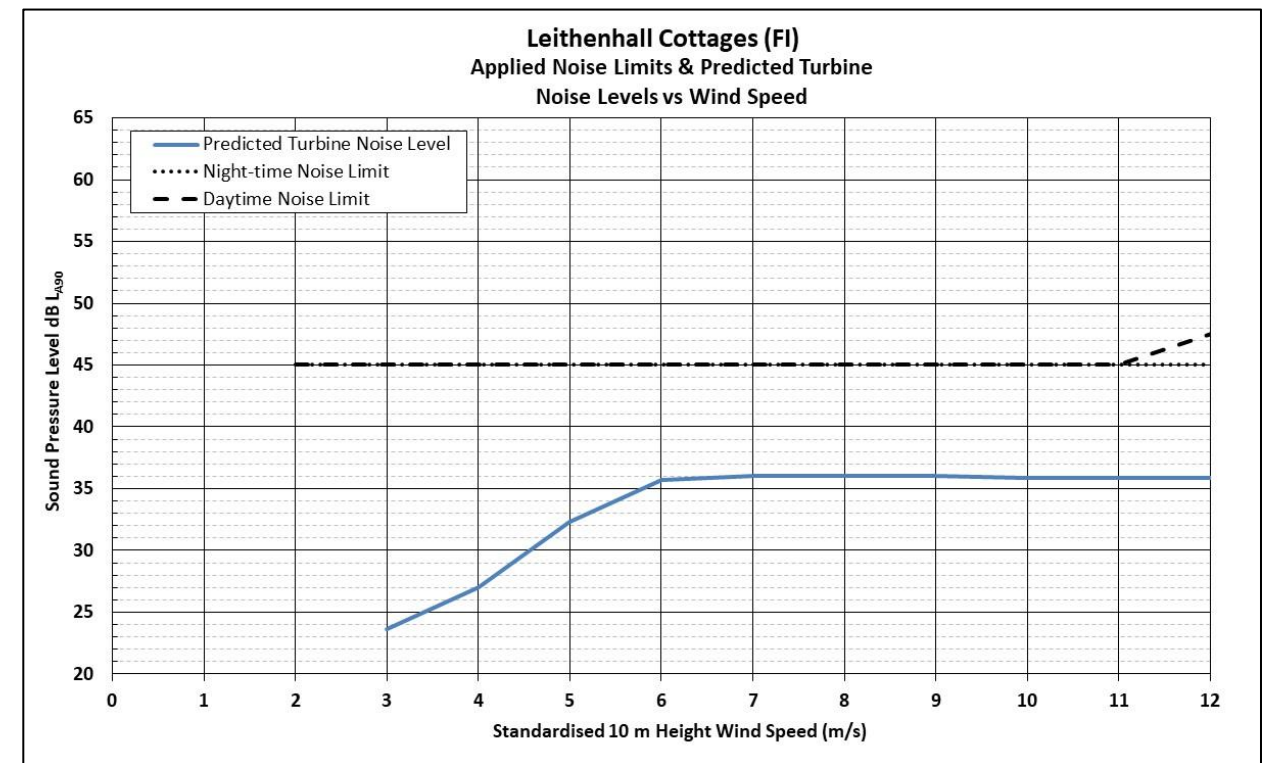
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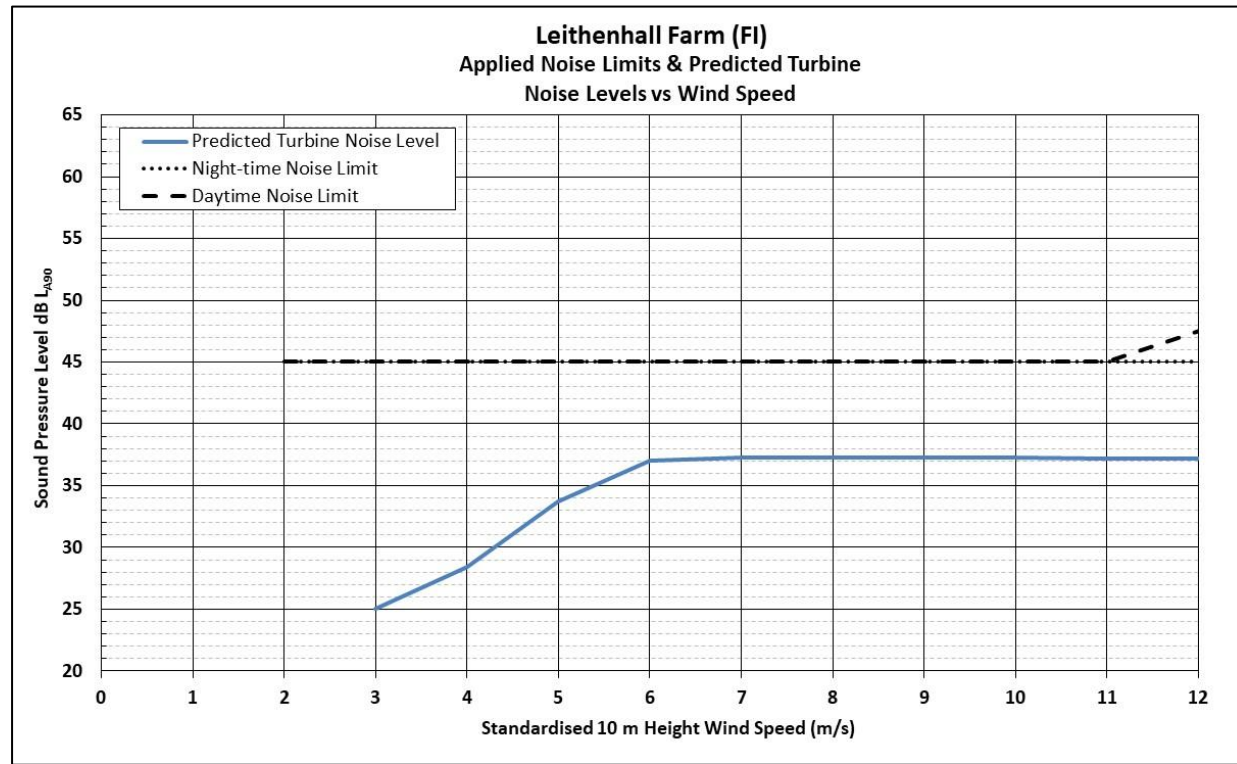
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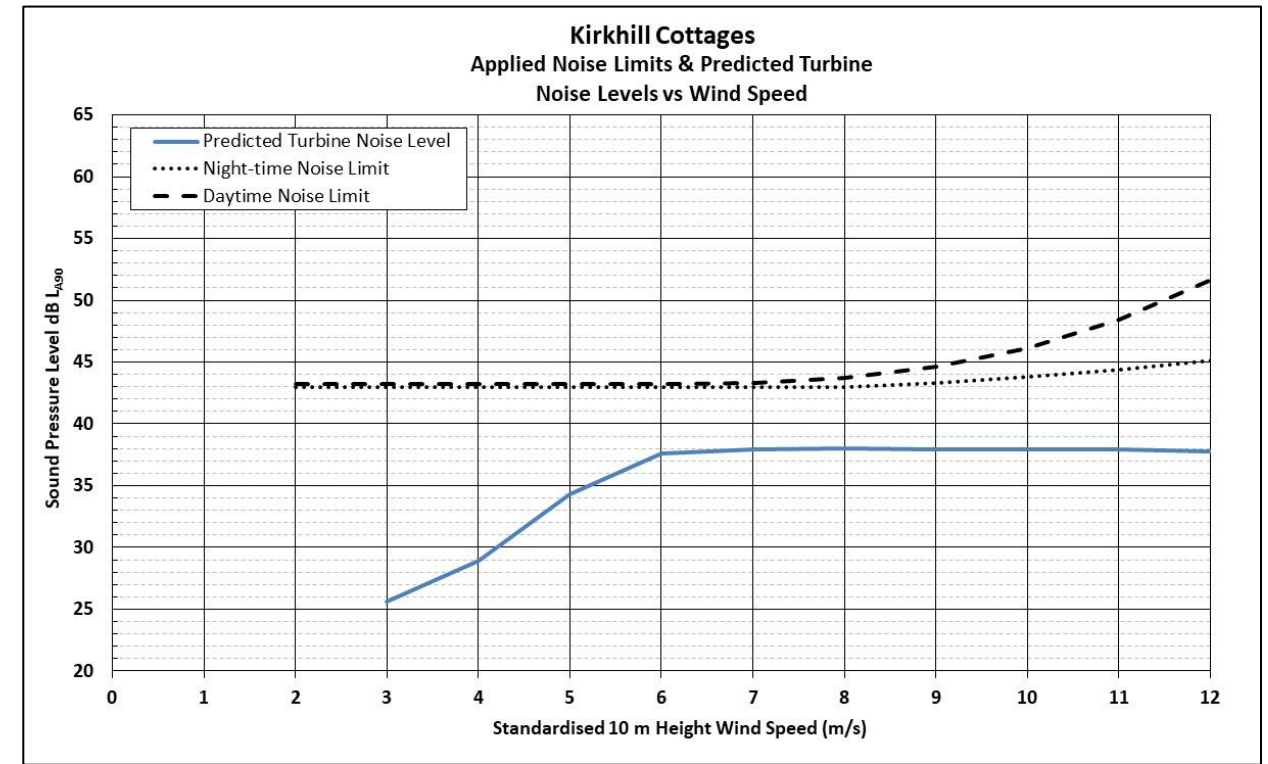
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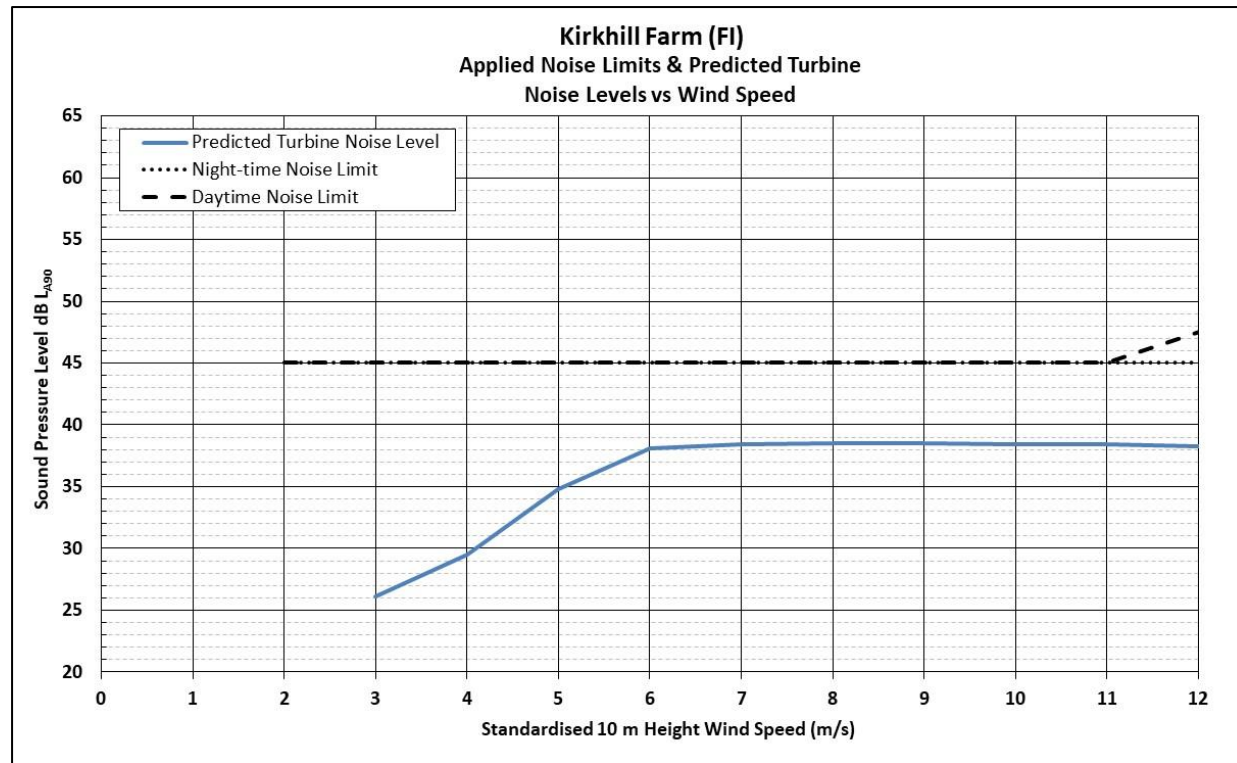
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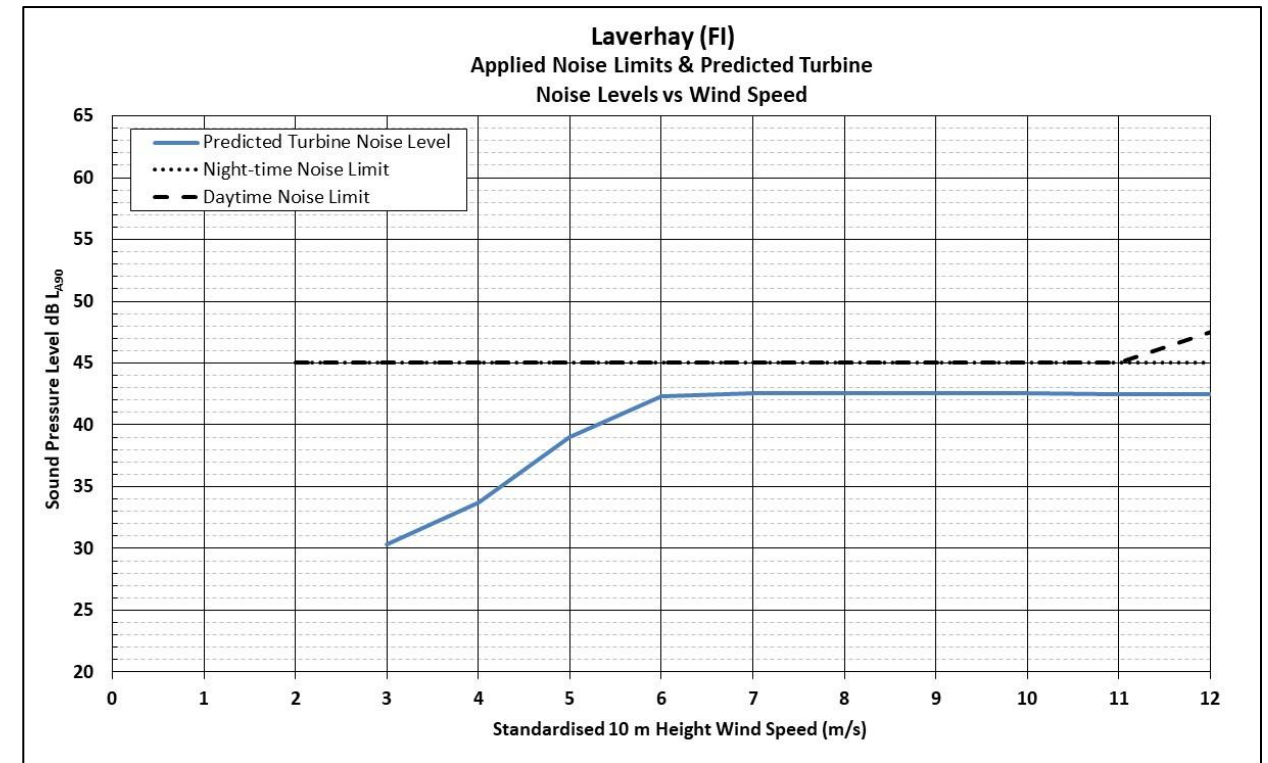
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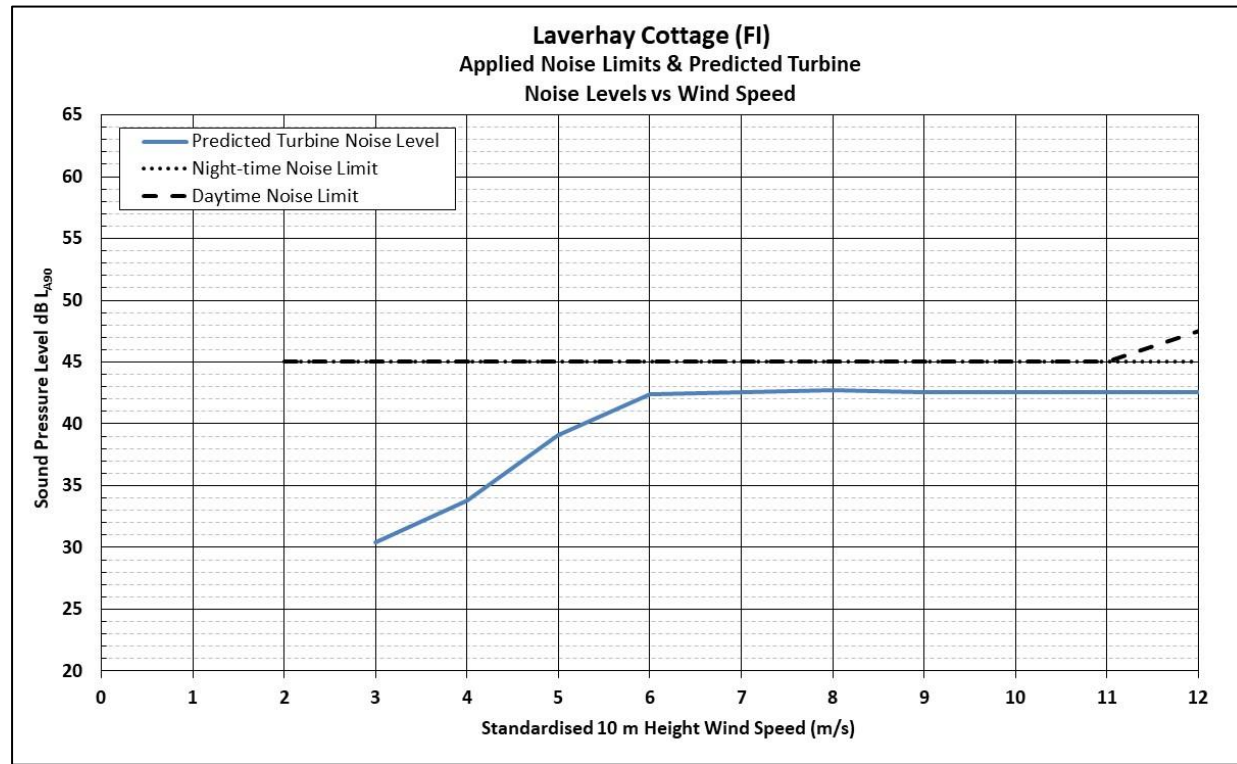
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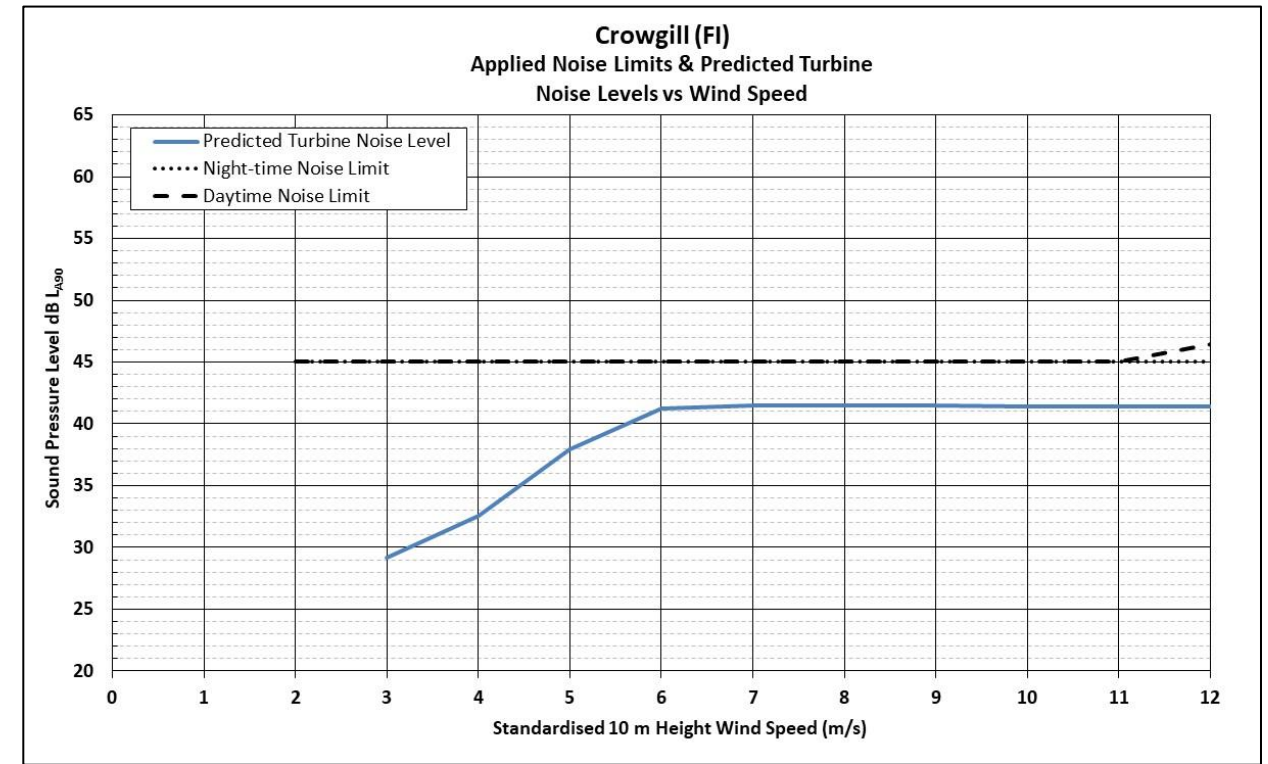
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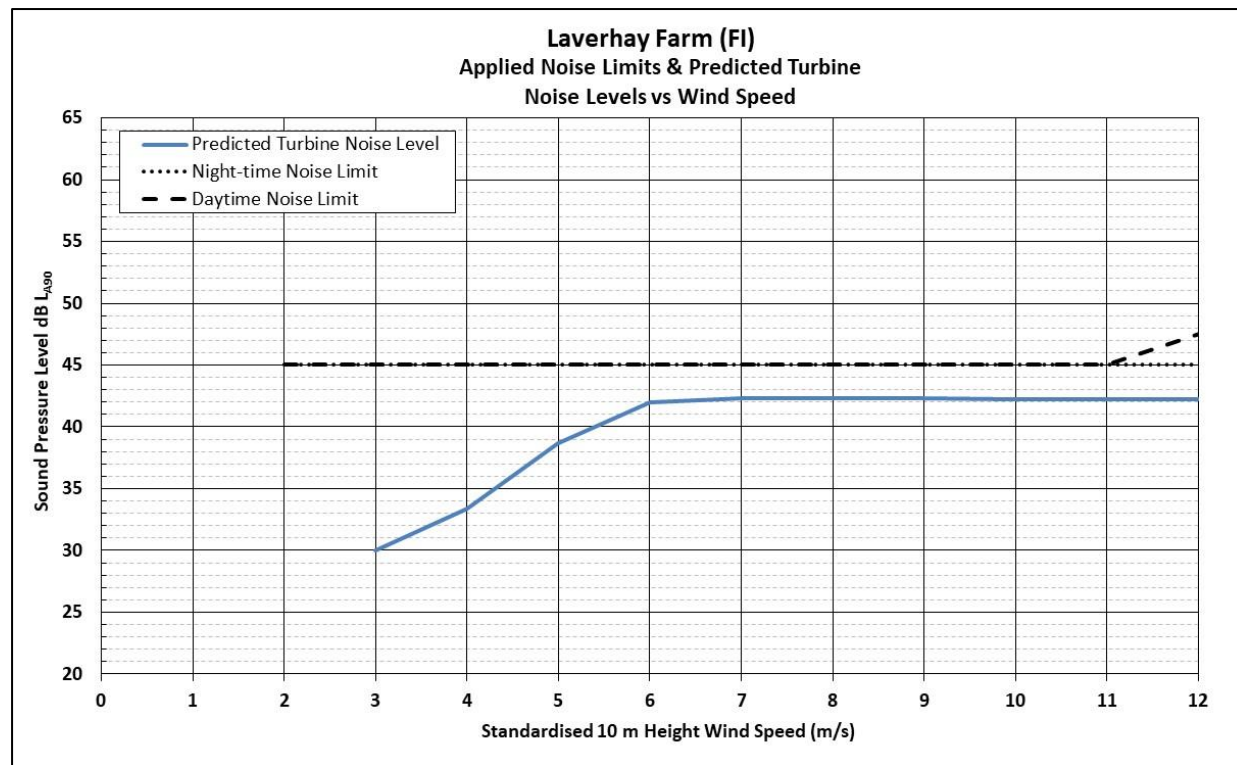
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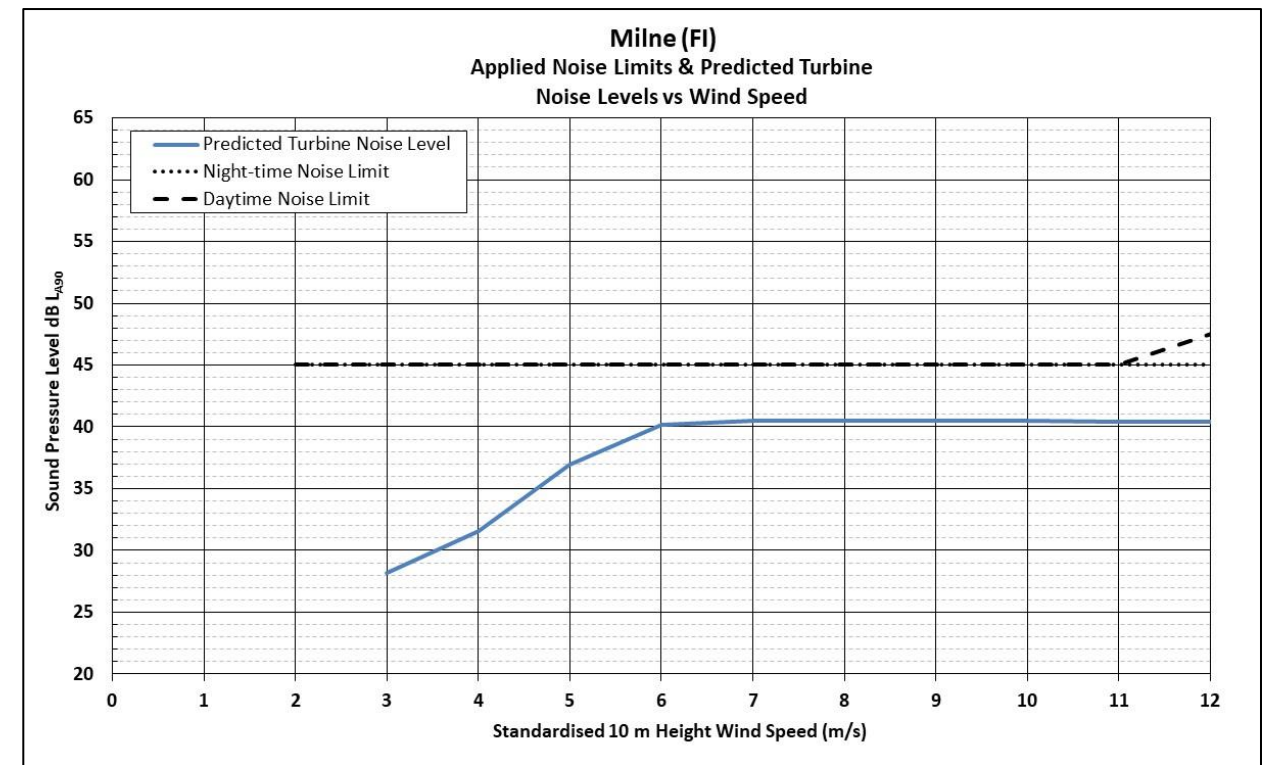
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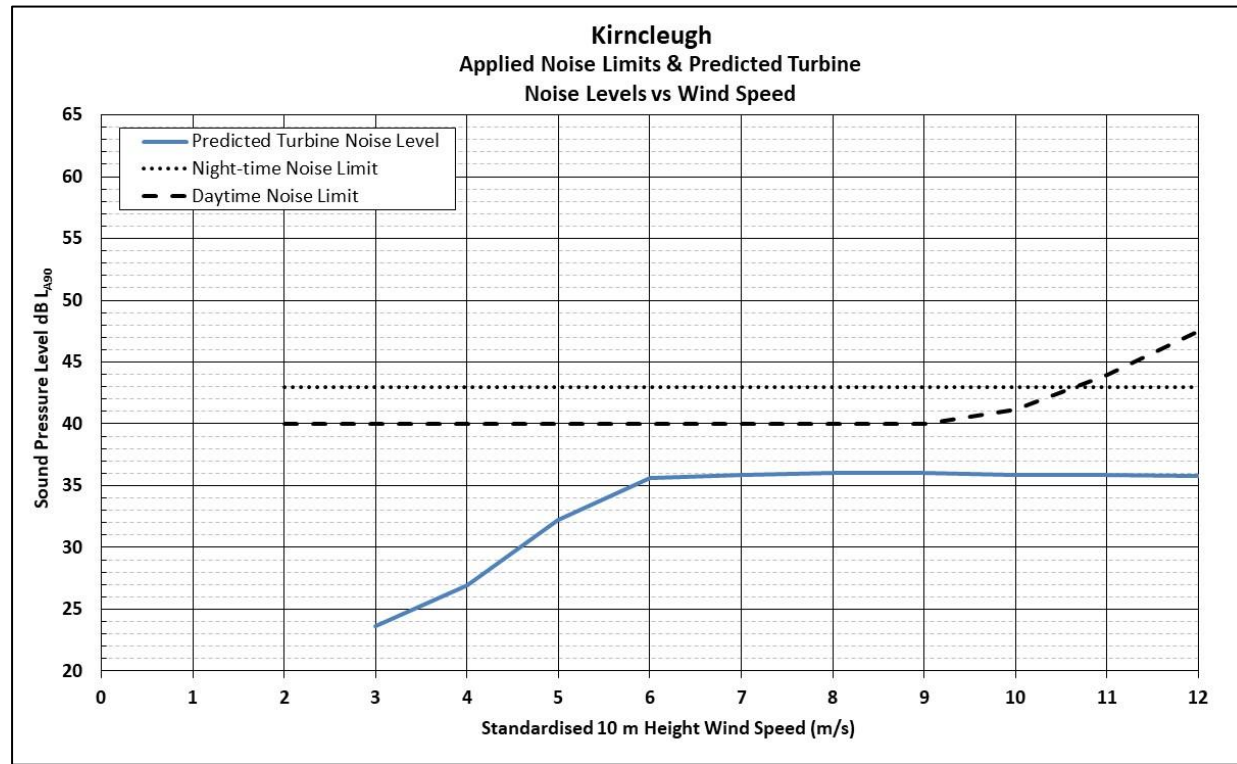
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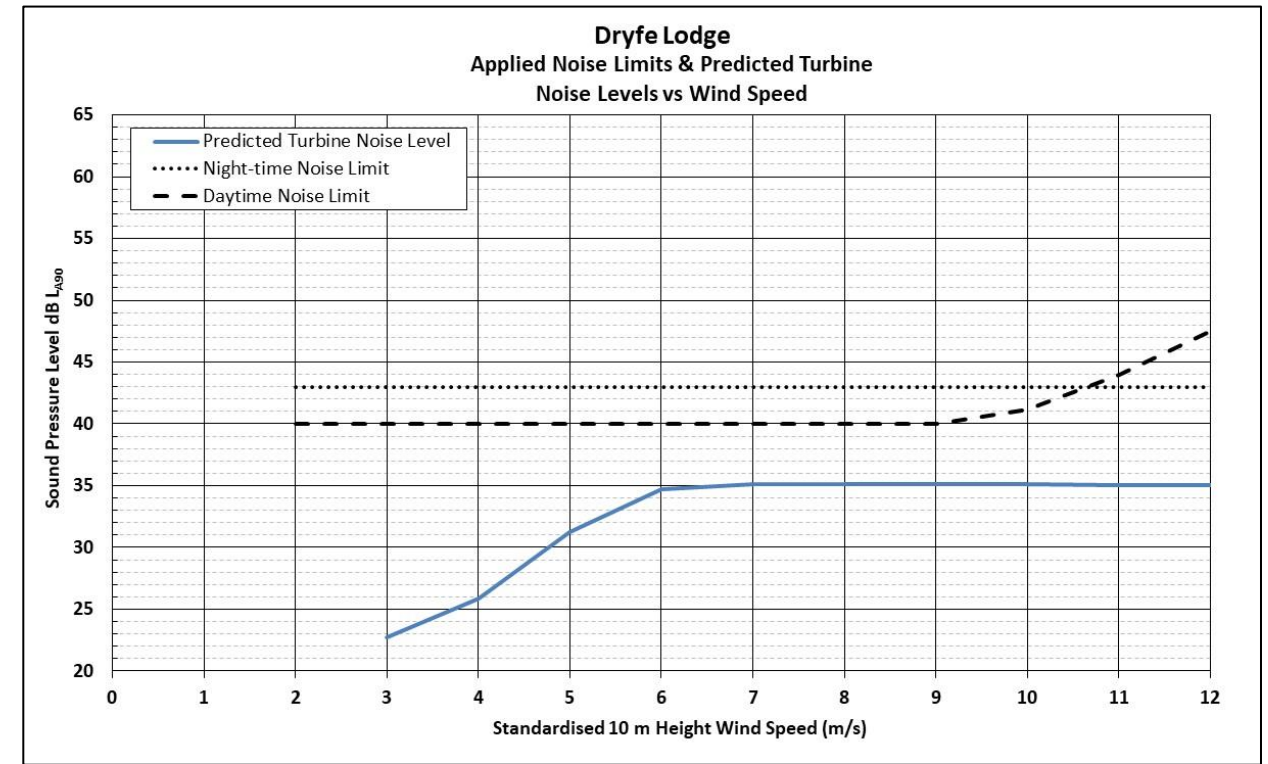
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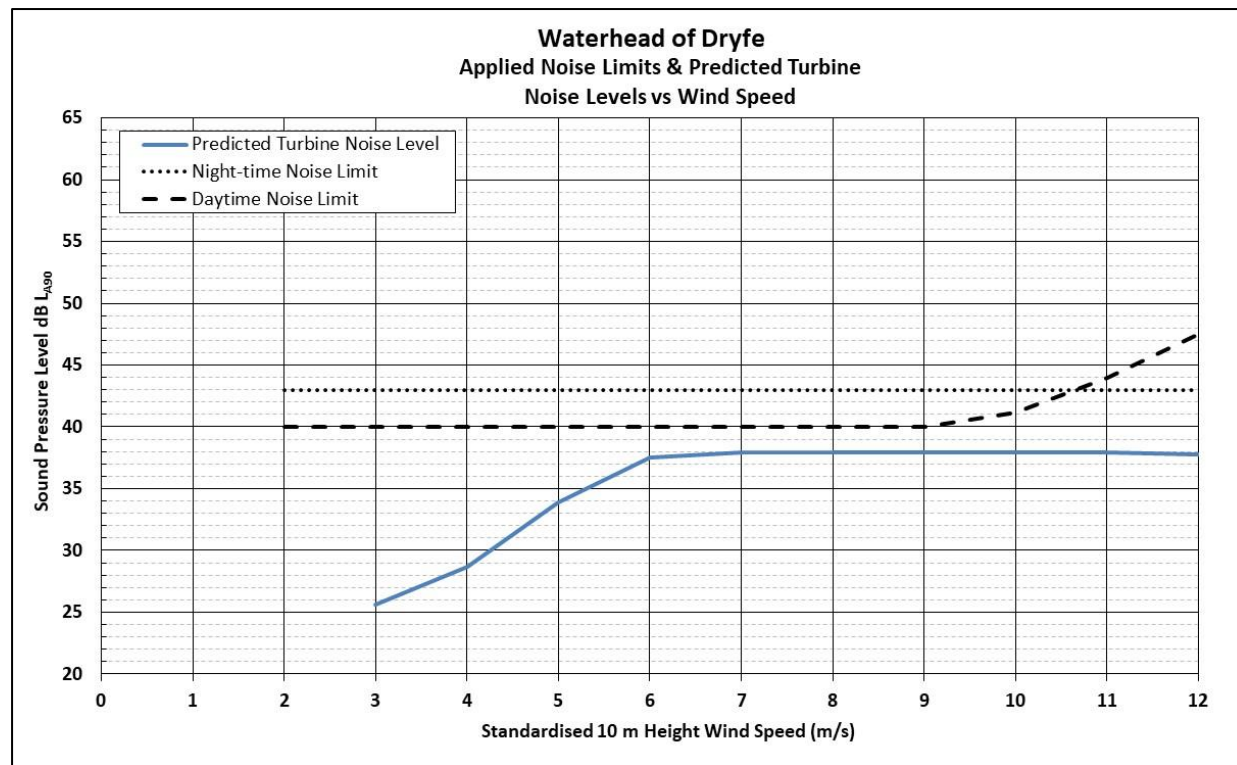
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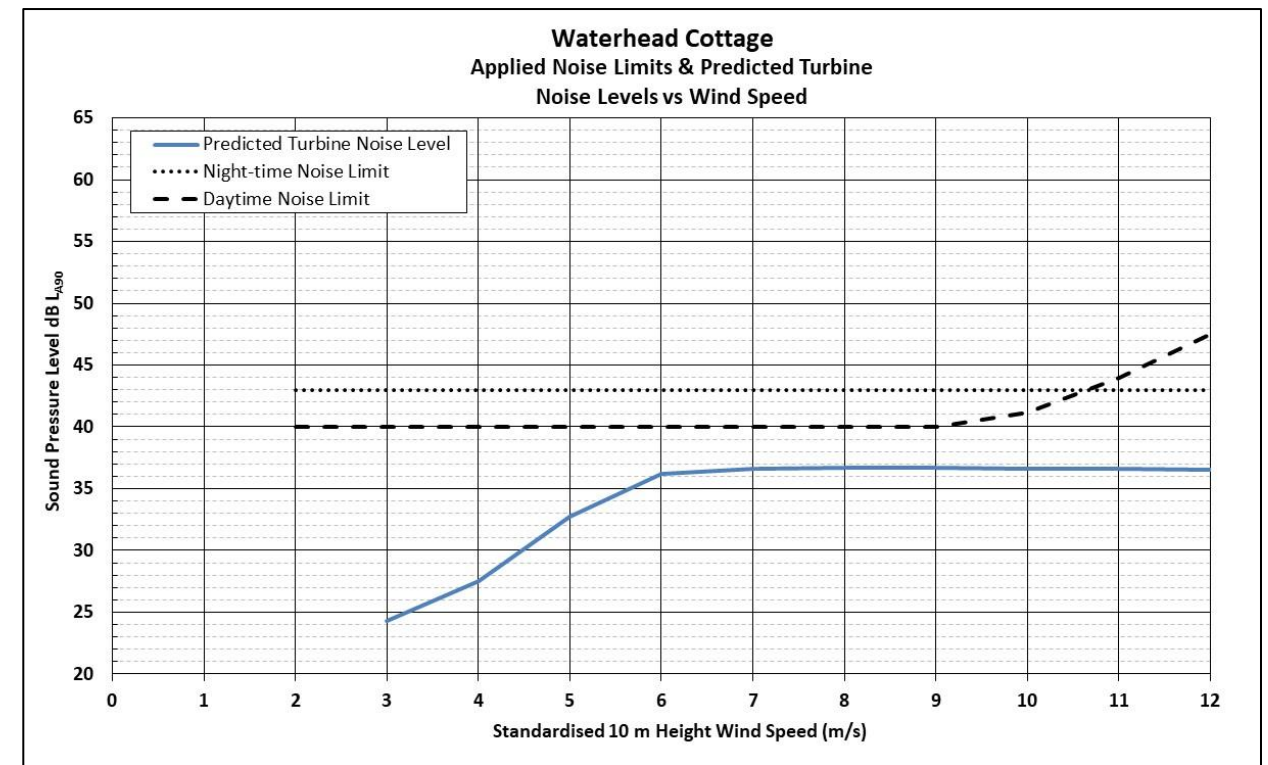
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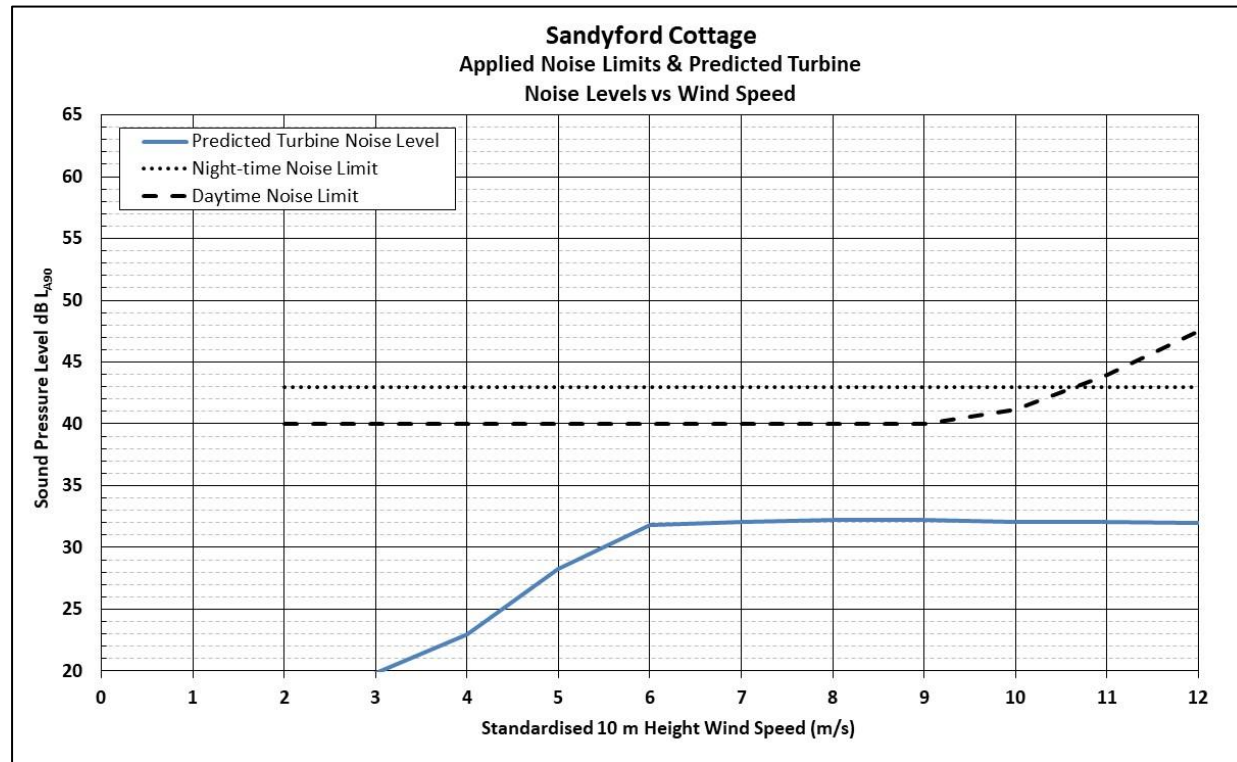
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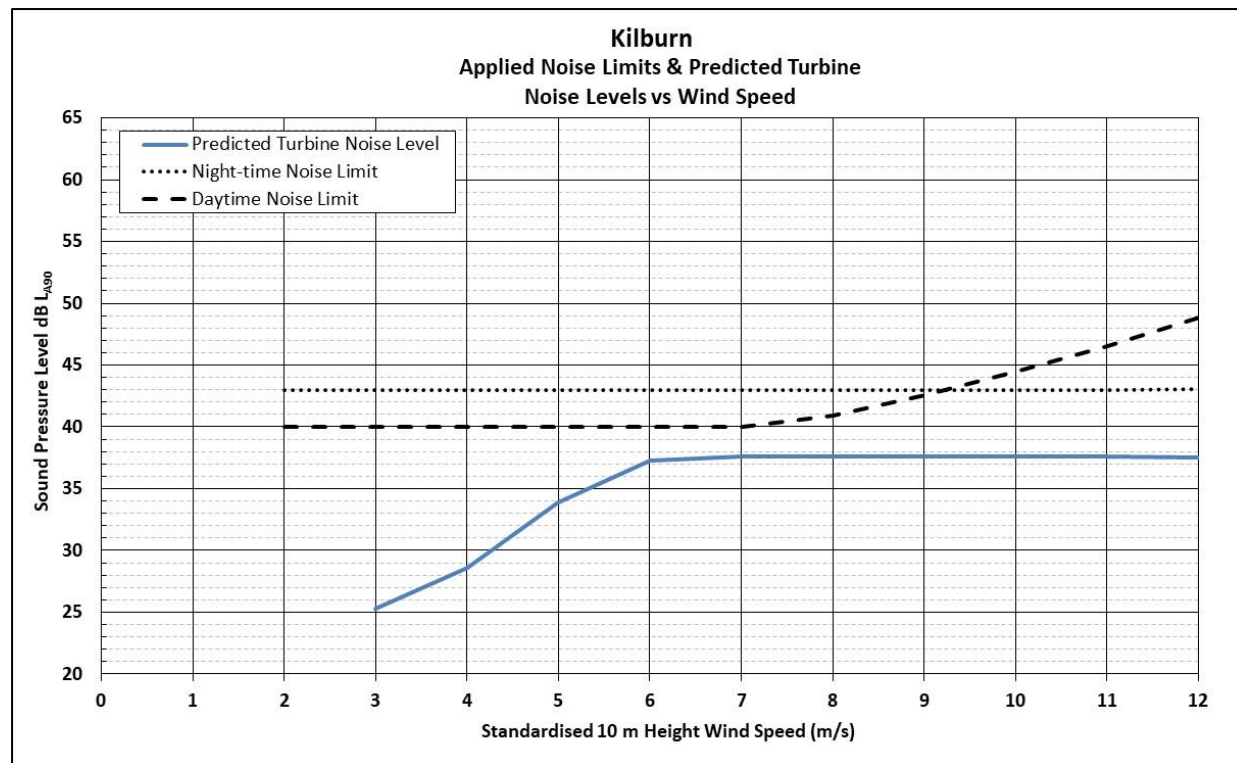
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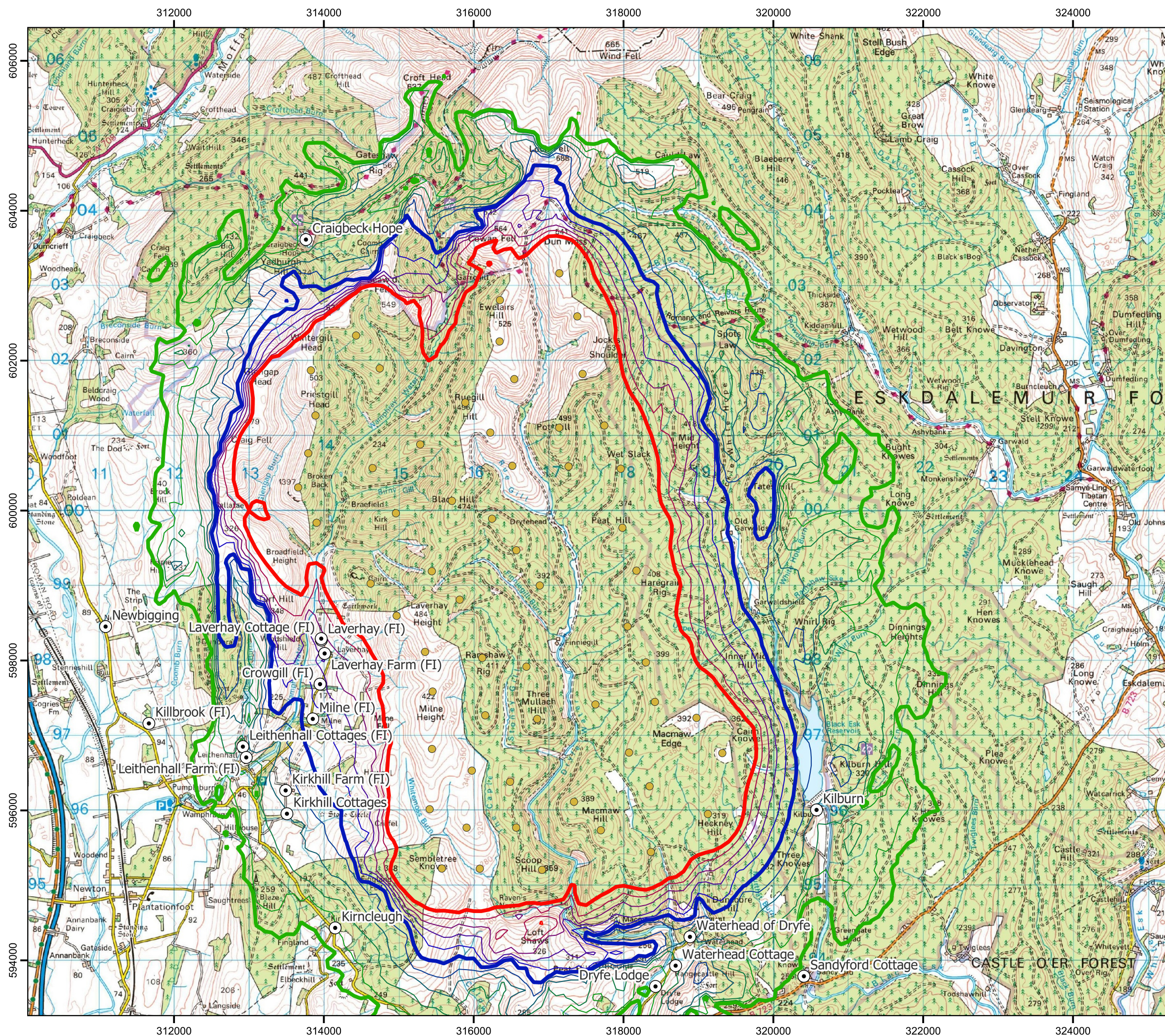


AI Figure 11.1.17



AI Figure 11.1.18





Project:
3357 Scoop Hill Wind Farm
 Additional Information

Title:
AI Figure 11.1: Predicted Operational Noise Levels Vestas V172 7.2 MW STE 108.9 dB LWA

Key

- Receptor Locations
- Layout: 374-220912-9022-B

Noise Contour Level (dB LA90)

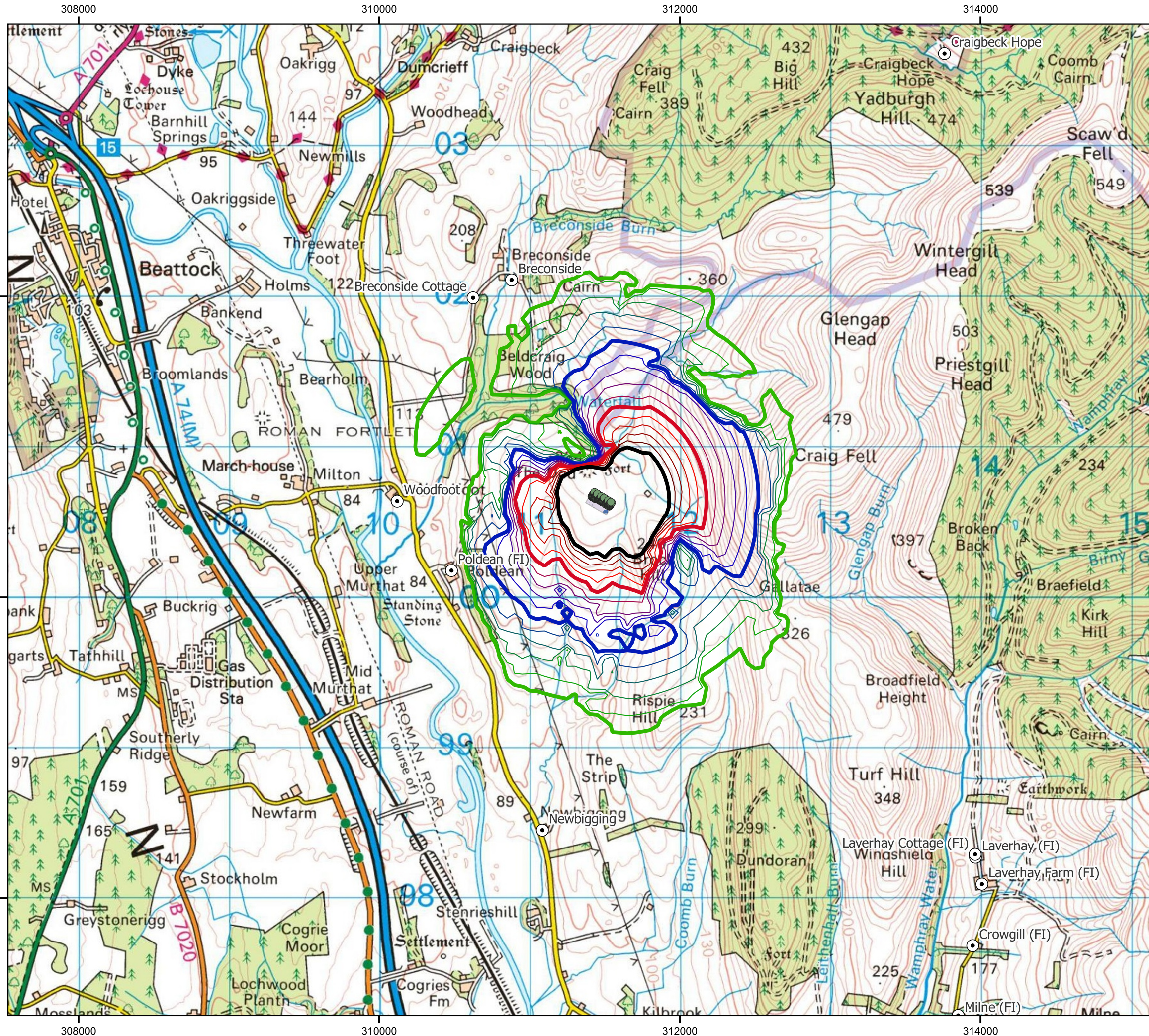
- 35
- 40
- 45

Scale @ A3: 1:50,000
 Coordinate System: British National Grid

Date: 12-06-23	Prepared by: RES	Checked by: APM
Ref: 3357_ASS04_DRAFT	EXT2	

Drawing by:
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Hayes McKenzie
 Consultants in Acoustics



Project:
3357 Scoop Hill Wind Farm

Title:
AI Figure 11.2: Predicted Operational Noise Levels - BESS

- Key
- BESS container locations
 - ⊙ Receptors 2023-04-26
- Rating level contours, (dB, LAeq,T)
- 35
 - 40
 - 45
 - 50

Scale @ A3: 1:25,000
 Coordinate System: British National Grid

0 1 km

Date: 12-06-23 Prepared by: RES Checked by: APM

Ref: 3357_ASS04_DRAFT EXT1

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