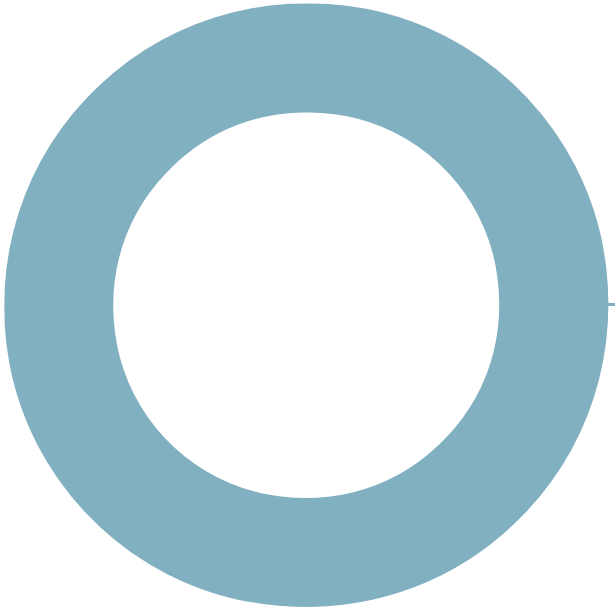
HOARE LEA

Euchanhead Renewable Energy Development.

AEI Technical Appendix 13.2 - Noise Assessment.

REVISION 5 – 07 JULY 2025

AUTHOR: Mark Jiggins MSc MIOA



Audit sheet.

Rev.	Date	Description	Prepared	Verified
1	24/04/2025	First version	MJ	MMC
2	30/04/2025	Revised following review	MJ	
3	19/05/2025	Revised following review	MJ	
4	02/07/2025	Revised following review	MJ	MMC
5	07/07/2025	Finalised	MJ	

Contents.

Executive Summary

Hoare Lea (HL) has been commissioned by ScottishPower Renewables (the Applicant) to undertake an update of the noise assessment for the construction and operation of the proposed Euchanhead Renewable Energy Development (proposed Development). This is an update of the noise assessment contained within the 2020 Euchanhead Renewable Energy Development Environmental Impact Assessment (EIA) Report. The updated noise assessment addresses changes since the Euchanhead Renewable Energy Development Section 36 (S36) application was made in 2020. Noise will be emitted by equipment and vehicles used during construction of the wind farm and by the turbines, substations, and energy storage during operation. The level of noise emitted by the sources and the distance from those sources to the receiver locations are the main factors determining levels of noise at receptor locations.

Construction Noise

Construction noise has been assessed by a desk-based study of a potential construction programme and by assuming the proposed Development is constructed using standard and good practice methods. Noise levels have been calculated for receiver locations closest to the areas of work and compared with guideline values. Construction noise, by its very nature, tends to be temporary and highly variable and therefore much less likely to cause adverse effects. Factors including in particular the restrictions of hours of working have been taken into consideration. It is concluded that noise generated through construction activities would have a minor impact.

Operational Noise

Operational turbines emit noise from the rotating blades as they pass through the air. This noise can sometimes be described as having a regular 'swish'. The amount of noise emitted tends to vary depending on the wind speed. When there is little wind, the turbine rotors will turn slowly and produce lower noise levels than during high winds when the turbine reaches its maximum output and maximum rotational speed. Background noise levels at nearby properties will also change with wind speed, increasing in level as wind speeds rise due to wind in trees and around buildings, etc.

Noise levels from operation of the turbines have been predicted for those locations around the site most likely to be affected by noise. Noise surveys for adjacent wind energy developments have already sufficiently established existing baseline noise levels at these properties. Noise limits have been derived from data about the existing noise environment following the method stipulated in national planning guidance. Predicted noise levels take full account of the potential combined effect of the noise from the proposed Development along with Afton Windfarm (operational), Harehill Windfarm (operational), Harehill Windfarm Extension (operational), Lorg Windfarm (consented but not built), proposed Lorg Windfarm (proposed), Sanqhuar Windfarm (operational), Sanquhar II Windfarm (consented and under construction), Whiteside Hill Windfarm (operational), Windy Rig Windfarm (consented and under construction) and Appin Windfarm (proposed). Sanquhar II Windfarm is being built and includes the area on which the Sanqhuar Six wind turbines would have been built, therefore the wind turbines on the Sanquhar Six Windfarm are no longer considered. Other, more distant windfarms were not considered as they do not make an acoustically relevant contribution to cumulative noise levels.

Predicted operational noise levels have been compared to the limit values to demonstrate that turbines of the type and size which would be installed can operate within the limits so derived. It is concluded therefore that operational noise levels from the proposed Development will be within levels recommended in national guidance for wind energy schemes.

The proposed Development would also include substations (with energy storage facilities), which would emit some noise during operation. Based on experience of similar installations and professional judgement, in conjunction with the large separation distances to the nearest receptor locations, the associated levels of operational noise from the substations and their associated energy storage facilities would have negligible noise impacts.

This Executive Summary contains an overview of the noise assessment and its conclusions. No reliance should be placed on the content of this Executive Summary until this report has been read in its entirety.

1. Introduction

1.1 This report presents an updated assessment of the potential construction and operational noise impacts of the proposed Development. This updated noise assessment addresses changes since the Euchanhead Renewable Energy Development Section 36 (S36) application was made in 2020. The changes consist of removal of two (turbines 20 and 21) of the original twenty one wind turbines and a reduction in the tip height from 230 to 200 metres for five of the wind turbines.

1.2 The noise assessment for the proposed Development was set out in Chapter 13 of the EIA Report[1] ('Original EIAR') and referenced an associated Hoare Lea Technical Report which formed Technical Appendix 13.1: Environmental Noise Assessment[2] ('Technical Appendix 13.1'). These documents will be referenced in this assessment as they set out relevant information, guidance, and methodologies, which remain valid for this Additional Environmental Information (AEI). This AEI will present those aspects which have changed and forms an update to the Original EIAR and Technical Appendix 13.1 to complete the assessment of noise and vibration from the proposed Development. An overview of environmental noise assessment and a glossary of noise terms are provided in Annex A of Technical Appendix 13.1.

2. Policy and Guidance Documents

2.1 Planning Policy and Advice Relating to Noise

2.1.1 Relevant policy and advice related to the assessment of noise and vibration from construction and operation of the proposed Development were set out in the Original EIAR and Technical Appendix 13.1 and remain valid.

2.1.2 Since the Original EIAR, the Scottish Government published the Onshore Wind Policy Statement 2022[3] which mentions the potential for the advice in ETSU-R-97[4] to be modified in future based on a review from the UK Government, but continues to support its use in the meantime, confirming the advice from the Online Renewables Planning Advice[5], as detailed in the Original EIAR. Although a report on this topic commissioned by the UK Government has been published (WSP BEIS Report)[6], its recommendations for updates to some aspects of the ETSU-R-97 methodology will need to be considered by the national governments. The WSP BEIS report does not provide a replacement or update to ETSU-R-97 and until it is replaced or updated, the Scottish Government has confirmed in the Onshore Wind Policy Statement 2022 that the ETSU-R-97 methodology continues to be applicable.

2.1.3 The National Planning Framework 4, published by the Scottish Government in February 2023[7] confirms the Scottish Government's overarching energy policy that renewable energy developments must demonstrate how impacts including noise are to be addressed through design and mitigation, going on to advise that *"In considering these impacts, significant weight will be placed on the contribution of the proposal to renewable energy generation targets and on greenhouse gas emissions reduction targets."*

1 Euchanhead Renewable Energy Development, Chapter 13 Noise, EIA Report, October 2020, ScottishPower Renewables.
2 Euchanhead Renewable Energy Development, EIA Report Technical Appendix 13.1 - Environmental Noise Assessment, Revision 8, 28 October 2020, Hoare Lea.
3 Scottish Government (2021) - Onshore wind - policy statement 2022, December 2022.
4 ETSU-R-97, The Assessment and Rating of Noise from Wind Farms, Final ETSU-R-97 Report for the Department of Trade & Industry. The Working Group on Noise from Wind Turbines, 1997.
5 Scottish Government, Online Renewables Planning Advice, Onshore Wind Turbines (http://www.gov.scot/Resource/0045/00451413.pdf). Updated May 28, 2014.
6 WSP, A Review of Noise Guidance for Onshore Wind Turbines, report for the UK Department for Business, Energy & Industrial Strategy, October 2022 (published 10 February 2023).
7 Scottish Government (2022) - National Planning Framework 4 - Part 2 – National Planning Policy.

3. Scope and Methodology

3.1 Assessment Methodology, Criteria and Scope

3.1.1 The methodologies, criteria for assessing construction noise, operational wind turbine noise and operational noise from sources other than the wind turbines were set out in Sections 3.1, 3.2 and 3.3 respectively in the Original EIAR and Technical Appendix 13.1 and remain applicable to the assessment of the proposed Development. Similarly, the scope of the assessment was detailed in Section 3.7 in the Original EIAR and Technical Appendix 13.1 and remain applicable to the assessment of the proposed Development. Sanquhar II Windfarm is being built and includes the area on which the Sanqhuar Six Windfarm wind turbines would have been built, therefore the Sanquhar Six Windfarm is no longer considered.

3.1.2 Section 5 of Technical Appendix 13.1 of the Original EIAR set out the assessment of noise during construction of the proposed Development from construction activities on Site as well as construction related traffic, resulting in minor impacts, which were considered not significant. The previous noise assessment was based on the closest distance to each construction activity which would not change. Consequently, the impact of construction of the proposed Development is considered to be similar as the assessment shown in Technical Appendix 13.1, concluding impacts would be minor. Accordingly, construction related impacts are not discussed further.

3.1.3 Operational noise from the substation and related energy storage were assessed in Technical Appendix 13.1, concluding that the large separation distance (approximately 2.4 km or more) from receptor locations would result in operational noise being negligible and not significant. The distance to receptors will be the same, consequently the impact of operational noise from the substation and related energy storage is considered to be the same as the assessment shown in Technical Appendix 13.1, accordingly, operational related impacts from the substation and related energy storage are not discussed further.

3.2 Consultation

3.2.1 Consultation responses were received for the Original EIAR, with those responses covering the topic of noise summarised below:-

- The East Ayrshire Council (EAC) Planning Committee Report[8] concluded that: construction noise would be suitably managed and there would be no unacceptable impacts on properties, and for operational wind turbine noise, that no East Ayrshire properties will exceed ETSU-R-97 noise limits and that appropriate noise limits be applied.
- Dumfries and Galloway Council (D&GC) Environmental Health responded[9], recommending a set of conditions be applied to control construction and operational noise. In outline: that construction times be limited to 08:00 – 18:00 on Monday to Friday inclusive, 09:00 – 12:00 on Saturdays and that detailed blasting and vibration plan for borrow pit blasting requires to be submitted and approved. With regard to operational wind turbine noise, this should be controlled through use of ETSU-R-97 based noise limits applied to control cumulative noise levels.

8 East Ayrshire Council, Planning Committee – 21 May 2021, Report by the Head of Planning and Economic Development, Economy and Skills. Subject: application for Section 36 for application under Section 36 of the Electricity Act 1989 for the proposed Euchanhead Renewable Energy Development at Euchanhead, near Sanquhar (20/0002/S36).

9 Dumfries & Galloway Council, Communities - Environmental Health, Internal Memo (ref 20/1942/S36). Richard Proctor, Environmental Health Officer to Area Planning Manager, 22 Dec 2020.

- A formal objection from Community Windpower[10] (CWP), the developers of the adjacent Sanquhar II Windfarm, questioning some aspects and assumptions of the environmental noise impact assessment. This objection follows the outcome of the appeal and granting of consent for the Sanqhuar II Windfarm and the comments from, and conditions imposed by the Reporter[11] related to operational noise. In the Original EIAR, assumptions about the status of relevant receptor locations: Dalgonar and Polgown being taken out of use should Sanquhar II Windfarm be built, Polskeoch being taken out of use should the proposed Development be built and Lorg being taken out of use should Lorg Windfarm be built. In their objections, CWP suggest that because the receptor locations Dalgonar and Polgown would no longer be considered to be taken out of residential use during the life of Sanquhar II Windfarm, that the Original EIAR assessment at these two receptors is inconsistent with the consent for Sanquhar II Windfarm. Furthermore, CWP consider that, based on the way the Reporter dealt with the Dalgonar and Polgown properties in the case of Sanquhar II Windfarm, this precludes other receptor locations being taken out of use during the life of any other windfarm, specifically in relation to receptor locations Polskeoch and Lorg.

3.2.2 With regard to the consultation responses from EAC and D&GC, satisfactory management of the construction phase of the proposed Development would be through use of a Construction Environmental Management Plan (CEMP) and Construction Traffic Management Plan (CTMP) as set out in the Original EIAR. As discussed above, the impacts related to construction activities have already been assessed in the Original EIAR and Technical Appendix 13.1, with the changes to the proposed Development likely to result in impacts being similar or marginally lower than assessed in the Original EIAR.

3.2.3 D&GC proposed that operational noise be controlled through use of noise limits which apply to cumulative noise levels only. This is not recommended as cumulative levels would rely in part on operational noise from other projects which are outside the control of the Applicant. Satisfactory control of operational wind turbine noise should instead be achieved through the use of site-specific noise limits, which are derived from the ETSU-R-97 noise limits and would apply to control noise from the proposed Development alone. These site-specific limits account for the other neighbouring projects in such way that controlling noise from the Proposed Development using this method would result in total noise levels remaining within the total ETSU-R-97 noise limits based on this updated noise assessment, This is discussed further below.

3.2.4 The objection from CWP discussed four receptor locations, suggesting the assessment in the Original EIAR in Technical Appendix 13.1 was insufficient at Polgown, Dalgonar, Lorg and Polskeoch. Polgown was assessed in the Original EIAR in Technical Appendix 13.1 acknowledging it would be taken out of use should Sanqhuar II Windfarm be built. However, the criteria used to assess the proposed Development in the Original EIA were stringent criteria set 10 dB below the total ETSU-R-97 noise limits, on the basis that meeting such a stringent criteria would result in the proposed Development making no acoustically important contribution to cumulative noise levels. These stringent criteria remain applicable for assessment of the proposed Development at this receptor location.

3.2.5 The receptor location of Dalgonar was assessed in the Original EIA on the basis of being taken out of use should Sanqhuar II Windfarm be built (as stated in the Sanqhuar II Windfarm noise assessment). Consequently, the assessment in the Original EIA considered cumulative noise levels without a contribution from Sanqhuar II Windfarm at this receptor location. Given this receptor will no longer be

10 Letter from Gilliam Cooper, Projects Director, Community Windpower Ltd to Ruth Findlay, Head of Energy Consents Unit, Euchanhead Renewable Energy Development, 12 Jan 2024.

11 The Scottish Government Energy and Climate Change Directorate, Energy Consents Unit, Letter to Community Windpower, 31 Aug 2023 granting consent under Section 36 of the Electricity Act 1989 and deemed planning permission under Section 57(2) of the Town and Country Planning (Scotland) Act 1997 for the construction and operation of Sanquhar II Community Wind Farm in the planning authority areas of Dumfries and Galloway Council and East Ayrshire Council. Annex 4 – Supplementary Public Inquiry Report (WIN-170-2006), Reporter as appointed by Scottish Ministers, Christopher Warren, 20 Feb 2023.

taken out of residential use during operation of Sanqhuar II Windfarm, appropriate assessment criteria will be derived which accounts for operation of Sanqhuar II Windfarm.

3.2.6 The Lorg Windfarm was consented[12] without including the receptor location of Lorg (266850, 600875) in the list of those with noise limits, consistent with the Lorg Windfarm noise assessment[13] ('Lorg 2015') which confirmed the Lorg receptor would be taken out of residential use should Lorg Windfarm be built. Furthermore, the more recently submitted application for Lorg Windfarm[14] ('Lorg 2022') remains consistent with the existing consent in regard to the Lorg receptor, which is not included in the more recent assessment[15]. Contrary to the suggestion by CWP, the Lorg receptor location was assessed in the Original EIAR and Technical Appendix 13.1, which was assessed on the basis of no contribution from Lorg Windfarm, consistent with the assessments and consent for Lorg Windfarm. The approach and derived assessment criteria in Technical Appendix 13.1 for the Lorg receptor remain applicable to assessment of the proposed Development at this receptor.

3.2.7 The receptor location of Polskeoch was not assessed in the Original EIA and Technical Appendix 13.1 on the basis this receptor would be taken out of use: *"Polskeoch (268688, 602320) will be under the ownership and management of ScottishPower Renewables and will be removed from residential use for the life of the proposed Development based on current project programme and contracted grid connection dates, therefore this location has not been considered as a receptor for the purposes of this assessment"*. The recent Lorg 2022 assessment is consistent with that approach when considering Polskeoch, with the Lorg 2022 assessment excluding a contribution from the proposed Development when assessing cumulative noise. The Reporter hearing the appeal for Sanqhuar II Windfarm (as discussed above) did so on the basis of the information before them, as presented by CWP to support their application. The Reporter's decision does not state that the commentary and conclusions reached in relation to Sanqhuar II must apply to all other windfarms. Polskeoch (268688, 602320) will be under the ownership and management of ScottishPower Renewables and will be removed from residential use for the life of the proposed Development. Accordingly, Polskeoch has not been considered as a receptor for the purposes of this updated assessment, consistent with the Original EIAR.

4. Baseline & Assessment Criteria

4.1 General Description, Baseline and ETSU-R-97 Assessment Criteria

4.1.1 The area of the proposed Development and baseline environment remains similar to that discussed in Section 4 of Technical Appendix 13.1. Section 4 (and Annex C) of Technical Appendix 13.1 also set out details of a review of adjacent windfarm assessments, their baseline background noise levels and consents from which criteria were derived for assessment of the proposed Development. The basis for these assessment criteria remain applicable but have been updated where necessary to reflect the

12 Planning Permission, Dumfries & Galloway Council, 18 Jul 2019. Erection of wind farm comprising 9 wind turbines (6 at max height 130m to blade tip and 3 at max height 149.9m to blade tip), 1 permanent anemometer mast (max height 100m), control building and substation and formation of access tracks, hardstanding, temporary construction compounds and borrow pit and associated works at land encompassing Lorg, Altry Hill, Craigstewart and Alwhat, approximately 12.5km south-west of Sanquhar. This permission specifies noise limits shall apply at five receptor locations and does not include the Lorg receptor.

13 Lorg Wind Farm Environmental Statement, E.on, Oct 2015, Chapter 13 Geology, Hydrology and Hydrogeology, paragraph 13.4.59 states *"In addition, and although this property is uninhabited and the supply is unused, the presence of a PWS [private water supply] at Lorg Farmhouse has been confirmed by the landowner. It has been confirmed that this property would not be occupied for the construction, operation or decommissioning phases of the Proposed Development"*

14 Lorg Wind Farm (Generating station of >100 <200 MW Capacity), Scottish Government, Energy Consents Unit application 21 Nov 2022, ECU Ref ECU00003283 (https://www.energyconsents.scot/ApplicationDetails.aspx?cr=ECU00003283).

15 Lorg Wind Farm Section 36 Application, Environmental Impact Assessment Report, Volume 1 Main Report, Chapter 7 Noise, RWE/WSP, Nov 2022. Noise is assessed at five receptor locations and does not include the Lorg receptor. Furthermore the assessment states that *"The residential receptors considered further in this assessment are detailed in Table 7.12. A review of the Development Site using current Ordnance Survey mapping and Aerial Photography has not identified any new receptors from the 2015 ES and 2017 FEI"*

consent[11] for the adjacent Sanquhar II Windfarm, the assessment submitted for the 2022 application for Lorg Windfarm[15] and the 2025 application submitted for Appin Windfarm[16].

4.1.2 The Lorg Windfarm has been amended in the Lorg 2022 assessment to change the layout and increase the size of the turbines, with the latest assessment removing the 'Western Cluster' (turbines 11-15). For the assessment of noise the Lorg 2022 assessment adopted a Vestas V162-5.6 MW (122.5 m hub height) candidate turbine whereas the Lorg 2015 assessment used a representative 'envelope' for noise emissions for a 133 m rotor diameter and 82 m hub height. The layout of the turbines and differences between the applications are indicated on the mapping shown in Figure A1 and A2 of Annex A.

4.1.3 Appin Windfarm is to the south of the proposed Development, with the application supported by an assessment of operational noise[17]. The layout for Appin Windfarm consists of nine Vestas V162-7.2 MW turbines with serrated trailing edge blades and a hub height of 119 m. The noise assessment included the results of a background noise survey at three locations and an operational noise assessment at thirteen assessment locations. Two of those assessment locations (Cairnhead and Shinnelhead) are relevant assessment locations for the proposed Development and are discussed further below.

4.1.4 Consistent with Technical Appendix 13.1, this assessment has considered operational noise from the proposed Development at ten assessment locations (see Table 1). All locations are shown on the plan in Figure B1 of Technical Appendix 13.1 Annex B. This approach is consistent with the guidance provided by ETSU-R-97 and current good practice as set out in the IOA GPG[18]. For each of the assessment location, Table 1 specifies whether the assessment criteria set out in Technical Appendix 13.1 are referenced or whether revised / reviewed for this updated assessment.

Table 1 - Assessment properties in the vicinity of the proposed Development

Property	Easting	Northing	Approximate Distance to Closest Turbine (m)	Closest Turbine (ID)	Assessment Criteria Source
Cairnhead	270133	597200	2183	EUC19	Technical Appendix 13.1
Corlae	265835	597727	3840	EUC19	Technical Appendix 13.1
Craig	263442	606454	3776	EUC05	Technical Appendix 13.1
Dalgonar	270038	603129	1874	EUC13	Revised (see below)
Euchanbank Cottage	270530	606420	2082	EUC01	Technical Appendix 13.1
Hillend	268201	608890	2378	EUC01	Technical Appendix 13.1
Lorg	266850	600875	1037	EUC11	Reviewed (see below)
Polgown	271866	603844	3347	EUC13	Technical Appendix 13.1
Shinnelhead	272926	599169	2294	EUC18	Revised (see below)
Upper Holm of Dalquhairn	265565	599279	3075	EUC11	Technical Appendix 13.1

4.1.5 Assessment criteria which apply up to a wind speed of 12 m/s and required to complete an ETSU-R-97 noise assessment are shown in Table 2 (day-time) and Table 3 (night-time). In all cases, these assessment criteria are used to assess noise from the proposed Development alone. For most receptor locations, these reference the assessment criteria as shown in Technical Appendix 13.1 as indicated in

16 Appin Wind Farm (Generating station of >50 < 100 MW Capacity), Scottish Government, Energy Consents Unit application, 12 Jun 2025, Ref ECU00003447 (https://www.energyconsents.scot/ApplicationDetails.aspx?cr=ECU00003447).
17 Appin Wind Farm, EIA Report, Chapter 10: Noise. TNEI on behalf of Statkraft, 16th May 2025.
18 A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise, M. Cand, R. Davis, C. Jordan, M. Hayes, R. Perkins, Institute of Acoustics, May 2013.

the right-hand column of Table 1. For Dalgonar, Lorg and Shinnelhead, further discussion is provided below to detail how the assessment criteria were derived.

4.1.6 For Dalgonar, a detailed consideration of the relevant assessment criteria is set out in Annex C, resulting in assessment criteria that are suitable to assess noise from the proposed Development alone. These assessment criteria account for the consented noise limits contained in the consent for the Sanqhuar II Windfarm.

4.1.7 For the Lorg receptor location, the assessment criteria shown in Technical Appendix 13.1 of the Original EIAR were adopted from those which applied at Polskeoch, which were derived from baseline background noise levels shown in the Lorg 2015 assessment, set at the lowest value of 40 dB(A) day-time and 43 dB(A) night-time at all wind speeds (to account for any potential wind shear effects and taller wind turbines). These assessment criteria are consistent with those which were used at Polskeoch, as total ETSU-R-97 noise assessment criteria, in the 2022 Lorg Windfarm assessment. Table 13 of Technical Appendix 13.1 provided predicted noise levels from the wind turbines on Sanquhar II which confirms that noise levels at the Lorg receptor from Sanqhuar II are predicted to be at least 10 dB below the lowest of these criteria (maximum predicted noise levels are 28.6 dB, which is at least 10 dB below the 40 dB criteria) and would therefore be sufficiently low that noise from Sanquhar II need not be included in the assessment at the Lorg receptor. This would also be the case for other more distant windfarms. As already discussed above, Lorg Windfarm would remove the Lorg receptor should it be built. Consequently, the total ETSU-R-97 assessment criteria can be used to assess noise from the proposed Development alone at the Lorg receptor.

4.1.8 For the Shinnelhead receptor location, the assessment criteria shown in Technical Appendix 13.1 were adopted from those set out in the noise assessments for the Sanquhar II Windfarm and which are now contained in the tabular limits in the consent for Sanquhar II Windfarm at Shinnelhead. Due to the site-specific noise limits applying to Sanqhuar II being set at the same values as the total ETSU-R-97 noise limits at Shinnelhead[19], it is relevant to assess the proposed Development against stringent criteria set 10 dB(A) below the total ETSU-R-97 noise limits, so that noise from the proposed Development would not make an acoustically important contribution[20]. This approach is consistent with the principle on which the stringent assessment criteria were derived for other locations, as discussed in Technical Appendix 13.1.

4.1.9 However, Shinnelhead is also a relevant assessment location for the Appin Windfarm. At Shinnelhead, the Appin Windfarm noise assessment presents results of a background noise survey completed at Shinnelhead, and from these total ETSU-R-97 noise limits (day-time and night-time)[21] are derived. However, as discussed above, total ETSU-R-97 noise limits have already been defined for Shinnelhead, as contained within the consent for Sanqhuar II Windfarm, which were derived from background noise survey results completed for the Sanquhar II Windfarm noise assessment at Shinnelhead. On a precautionary basis, site-specific assessment criteria to be used to assess the proposed Development have been derived, set 10 dB below the lower at each wind speed of either the Sanquhar II or Appin total noise limits (see further details in Annex D).

4.1.10 Cairnhead is also a relevant assessment location for the Appin Windfarm. For Cairnhead, this assessment adopts site-specific criteria to be used for assessment of the proposed Development alone, presented in Appendix 13.1. These are set 10 dB below the lowest of the day-time and night-time fixed parts of the total ETSU-R-97 noise limits (fixed at 30 dB day-time and 33 dB night-time at all wind

19 The consent for Sanqhuar II contains tabular limits which apply to cumulative noise levels and site-specific limits which apply to just Sanquhar II windfarm. For the receptor location of Shinnelhead, the site-specific noise limits are the same as those which apply to the cumulative total.

20 The IOA GPG suggests that where noise from adjacent developments differ by more than 10 dB(A) then this represents effectively negligible effects and that cumulative effects need not be considered. Two noise sources which differ by 10 dB(A) gives rise to total 0.4 dB(A) higher than the greater source. Accordingly it is generally assumed that increases of 0.4 dB(A) or less are not acoustically important.

21 Table 10.9 day-time and Table 10.10 night-time of the Appin Wind Farm, EIA Report, Chapter 10: Noise. TNEI on behalf of Statkraft, 16th May 2025.

speeds to account for any potential wind shear effects), so that noise from the proposed Development would not make an acoustically important contribution. These assessment criteria are at least 10 dB below the total cumulative ETSU-R-97 noise limits defined in the noise assessment for Appin Windfarm at this location.

4.1.11 At all other assessment locations, predicted noise levels from Appin Windfarm (see Table E4 of Annex E) are at least 10 dB below the total ETSU-R-97 noise limit[22] and would not make an acoustically important contribution. Accordingly cumulative assessment of the noise from operation of Appin Windfarm is not required at any of the other noise assessment locations relevant to the proposed Development.

Table 2 - Day time L_{A90} (dB) noise assessment criteria derived from the baseline noise data according to ETSU-R-97.

Survey Property	Standardised Ten Metre Wind Speeds (m/s)											
	1	2	3	4	5	6	7	8	9	10	11	12
Cairnhead	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Corlae	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Craig	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Dalgonar	35.7	35.7	35.7	35.7	35.7	35.7	35.7	35.7	35.7	34.1	33.4	37.1
Euchanbank Cottage	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Hillend	31.2	31.2	31.2	31.2	31.2	31.2	31.2	31.2	31.2	31.2	31.2	31.2
Lorg	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Polgown	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Shinnelhead	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	32.0	34.0	35.3
Upper Holm of Dalquhairn	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0

Table 3 - Night time L_{A90} (dB) noise assessment criteria derived from the baseline noise data according to ETSU-R-97.

Survey Property	Standardised Ten Metre Wind Speeds (m/s)											
	1	2	3	4	5	6	7	8	9	10	11	12
Cairnhead	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
Corlae	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
Craig	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
Dalgonar	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1
Euchanbank Cottage	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
Hillend	31.2	31.2	31.2	31.2	31.2	31.2	31.2	31.2	31.2	31.2	31.2	31.2
Lorg	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
Polgown	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
Shinnelhead	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.8
Upper Holm of Dalquhairn	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0

22 With a total ETSU-R-97 day-time noise limit of 40 dB or 5 dB above background being applicable, a criteria set 10 dB below this would have minimum value of 30 dB. Maximum predicted noise levels shown in Table E4 of Annex E are below 30 dB(A) at all locations except Shinnelhead and Cairnhead.

5. Noise Impact Assessment

5.1 Operational Wind Turbine Emissions Data and Noise Propagation Model

5.1.1 The exact model of turbine to be used at the site will be the result of a future tendering process and therefore a representative turbine model has been assumed for this noise assessment. This operational noise assessment remains based upon the noise specification of the Vestas V150-5.6 MW wind turbine with a hub height of 155 metres, consistent with the Original EIAR. Turbine coordinates for the proposed Development are provided in Technical Appendix 13.1 (Table B1 of Annex B), which indicated all wind turbines had a 155 metre hub height (230 m tip height for the Vestas V150-5.6 MW wind turbine). For this updated noise assessment, turbines 9, 10, 11, 18 and 19 have a 125 metre hub height (200 m tip height for the Vestas V150-5.6 MW wind turbine) and turbines 20 and 21 are removed.

5.1.2 Annex B in Technical Appendix 13.1 provided relevant turbines sound power levels shown in Tables B3 and B4 for the candidate Vestas V150-5.6 MW wind turbine. On a precautionary basis, sound power levels for the 125 m hub height for these five wind turbines adopts those specified for the 155 m hub height (as shown in Technical Appendix 13.1). Noise emission levels would be marginally less for turbines with a shorter hub height at lower wind speeds but reach the same values for wind speeds of 8 m/s and above.

5.1.3 The ISO 9613-2 model[23] has been used to calculate the noise immission levels at the noise assessment locations, which accounts for the attenuation due to geometric spreading, atmospheric absorption, and barrier and ground effects. Predictions have been made assuming downwind propagation from every turbine to every receptor at the same time as a worst-case. The approach to noise modelling and parameters are consistent with those used and defined in the Original EIAR Technical Appendix 13.1. Table B1 of Annex B provides calculated propagation corrections factors for the five wind turbines which have been changed to a shorter hub height.

5.2 Predicted Wind Farm Operational Noise Immission Levels

5.2.1 Table 4 shows predicted noise immission levels at each of the selected assessment locations for each wind speed over the range of wind speeds where source noise emission level data are available for the proposed Development. All wind farm noise immission levels in this report are presented in terms of the L_{A90} noise indicator in accordance with the recommendations of the ETSU-R-97 report, obtained by subtracting 2 dB(A) from the calculated L_{Aeq} noise levels based on the turbine sound power levels discussed above.

23 ISO 9613-2:1996 'Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation', International Standards Organisation, 1996.

Table 4 - Predicted L_{A90} (dB) wind farm noise immission levels at each of the noise assessment locations as a function of standardised wind speed for the **proposed Development** alone.

Property	Standardised Ten Metre Wind Speeds (m/s)											
	1	2	3	4	5	6	7	8	9	10	11	12
Cairnhead	-	-	15.2	19.2	23.7	26.1	27.0	27.0	27.0	27.0	27.0	27.0
Corlae	-	-	14.0	18.0	22.5	24.9	25.8	25.8	25.8	25.8	25.8	25.8
Craig	-	-	10.7	14.7	19.2	21.6	22.5	22.5	22.5	22.5	22.5	22.5
Dalgonar	-	-	21.6	25.6	30.1	32.5	33.4	33.4	33.4	33.4	33.4	33.4
Euchanbank Cottage	-	-	16.1	20.1	24.6	27.0	27.9	27.9	27.9	27.9	27.9	27.9
Hillend	-	-	12.9	16.9	21.4	23.8	24.7	24.7	24.7	24.7	24.7	24.7
Lorg	-	-	24.1	28.1	32.6	35.0	35.9	35.9	35.9	35.9	35.9	35.9
Polgown	-	-	14.8	18.8	23.3	25.7	26.6	26.6	26.6	26.6	26.6	26.6
Shinnelhead	-	-	16.4	20.4	24.9	27.3	28.2	28.2	28.2	28.2	28.2	28.2
Upper Holm of Dalquhairn	-	-	14.5	18.5	23.0	25.4	26.3	26.3	26.3	26.3	26.3	26.3

5.3 ETSU-R-97 Assessment

5.3.1 The approach to the assessment of noise immission levels uses the criteria of Table 3 (day-time) and Table 4 (night-time), which are applicable to assessment of the proposed Development alone. These were determined to result in cumulative noise levels remaining within the total ETSU-R-97 noise limits at each of the assessment locations (as set out in Section 4) or with negligible differences. The assessment (shown in tabular form in Table 5 day-time and Table 6 night-time) shows that the predicted noise immission levels from the proposed Development (in isolation) meet these noise criteria, under all wind speeds and at all locations.

5.3.2 The ETSU-R-97 noise limits assume that the wind turbine noise contains no audible tones. Where tones are present a correction is added to the measured or predicted noise level before comparison with the recommended limits. The audibility of any tones can be assessed by comparing the narrow band level of such tones with the masking level contained in a band of frequencies around the tone called the critical band. The ETSU-R-97 recommendations suggest a tone correction which depends on the amount by which the tone exceeds the audibility threshold and should be included as part of the consent conditions. The turbines to be used for this the proposed Development will be chosen to ensure that the noise emitted will comply with the requirements of ETSU-R-97 including any relevant tonality corrections.

5.3.3 Satisfactory control of cumulative noise immission levels would be achieved through enforcement of the individual consent limits for each of the individual wind farms. Site-specific noise limits which apply to the proposed Development in isolation are set out in Table 3 (day-time) Table 4 (night-time). The resulting noise limits are such that compliance of the proposed Development with these noise limits would maintain the conclusion of the cumulative assessment and result in cumulative levels which do not exceed the derived total ETSU-R-97 noise criteria. The selection of the final turbine to be installed at the site should be made on the basis of enabling the relevant site-specific noise limits in Table 3 (day-time) Table 4 (night-time) to be achieved at the surrounding properties.

Table 5 – Difference between the day-time noise assessment criteria (Table 2) and the predicted L_{A90} (dB) wind farm noise immission levels at each noise assessment location for the **proposed Development alone** (Table 4). A negative value indicates the noise immission level is below the assessment criteria.

Property	Standardised Ten Metre Wind Speeds (m/s)											
	1	2	3	4	5	6	7	8	9	10	11	12
Cairnhead	-	-	-14.8	-10.8	-6.3	-3.9	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Corlae	-	-	-16.0	-12.0	-7.5	-5.1	-4.2	-4.2	-4.2	-4.2	-4.2	-4.2
Craig	-	-	-19.3	-15.3	-10.8	-8.4	-7.5	-7.5	-7.5	-7.5	-7.5	-7.5
Dalgonar	-	-	-14.1	-10.1	-5.6	-3.2	-2.3	-2.3	-2.3	-0.8	0.0	-3.8
Euchanbank Cottage	-	-	-13.9	-9.9	-5.4	-3.0	-2.1	-2.1	-2.1	-2.1	-2.1	-2.1
Hillend	-	-	-18.3	-14.3	-9.8	-7.4	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5
Lorg	-	-	-15.9	-11.9	-7.4	-5.0	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1
Polgown	-	-	-15.2	-11.2	-6.7	-4.3	-3.4	-3.4	-3.4	-3.4	-3.4	-3.4
Shinnelhead	-	-	-13.6	-9.6	-5.1	-2.7	-1.8	-1.8	-1.8	-3.8	-5.8	-7.1
Upper Holm of Dalquhairn	-	-	-15.5	-11.5	-7.0	-4.6	-3.7	-3.7	-3.7	-3.7	-3.7	-3.7

Table 6 – Difference between the night-time noise assessment criteria (Table 3) and the predicted L_{A90} (dB) wind farm noise immission levels at each noise assessment location for the **proposed Development alone** (Table 4). A negative value indicates the noise immission level is below the assessment criteria.

Property	Standardised Ten Metre Wind Speeds (m/s)											
	1	2	3	4	5	6	7	8	9	10	11	12
Cairnhead	-	-	-17.8	-13.8	-9.3	-6.9	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0
Corlae	-	-	-19.0	-15.0	-10.5	-8.1	-7.2	-7.2	-7.2	-7.2	-7.2	-7.2
Craig	-	-	-22.3	-18.3	-13.8	-11.4	-10.5	-10.5	-10.5	-10.5	-10.5	-10.5
Dalgonar	-	-	-14.6	-10.6	-6.1	-3.7	-2.8	-2.8	-2.8	-2.8	-2.8	-2.8
Euchanbank Cottage	-	-	-16.9	-12.9	-8.4	-6.0	-5.1	-5.1	-5.1	-5.1	-5.1	-5.1
Hillend	-	-	-18.3	-14.3	-9.8	-7.4	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5
Lorg	-	-	-18.9	-14.9	-10.4	-8.0	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1
Polgown	-	-	-18.2	-14.2	-9.7	-7.3	-6.4	-6.4	-6.4	-6.4	-6.4	-6.4
Shinnelhead	-	-	-16.6	-12.6	-8.1	-5.7	-4.8	-4.8	-4.8	-4.8	-4.8	-5.6
Upper Holm of Dalquhairn	-	-	-18.5	-14.5	-10.0	-7.6	-6.7	-6.7	-6.7	-6.7	-6.7	-6.7

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. Several residential receptor locations near the proposed Development have been selected as being representative of those in the area around the proposed Development. Noise assessments have been undertaken at these receptors 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 from the existing background noise levels at surrounding properties, as derived from measurements made for adjacent wind energy schemes.

6.1.2 The construction noise assessment (including noise associated with construction traffic) has determined that associated levels are expected to be audible at various times throughout the construction programme but remain with acceptable limits such that their temporary impacts are considered of minor magnitude.

6.1.3 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 Windfarms'. This document provides a robust basis for assessing the operational noise of a wind farm, as recommended by The Scottish Government's Online Renewables Planning Advice on Onshore wind turbines.

6.1.4 It has been demonstrated that both the day-time and night-time ETSU-R-97 noise limits can be satisfied at all assessment properties across all wind speeds. This analysis accounted for cumulative effects of neighbouring wind farms in line with ETSU-R-97 and current good practice. This assessment has been based on the use of the manufacturer's warranted sound power data for the Vestas V150-5.6 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.

6.1.5 In summary, the overall levels of construction noise are considered to represent a 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 ETSU-R-97 guidance, commended by planning policy for the assessment of wind farm noise.

Annex A - Location Maps

Figure A1 - Map showing the layout of the turbines on the proposed Development, the other windfarms considered in the noise assessment as well as the nearby receptor locations. This shows the consented Lorg 2015 Windfarm and proposed Appin Windfarm. The receptor Polskeoch is shown only for information and is not included in the assessment (see main text).

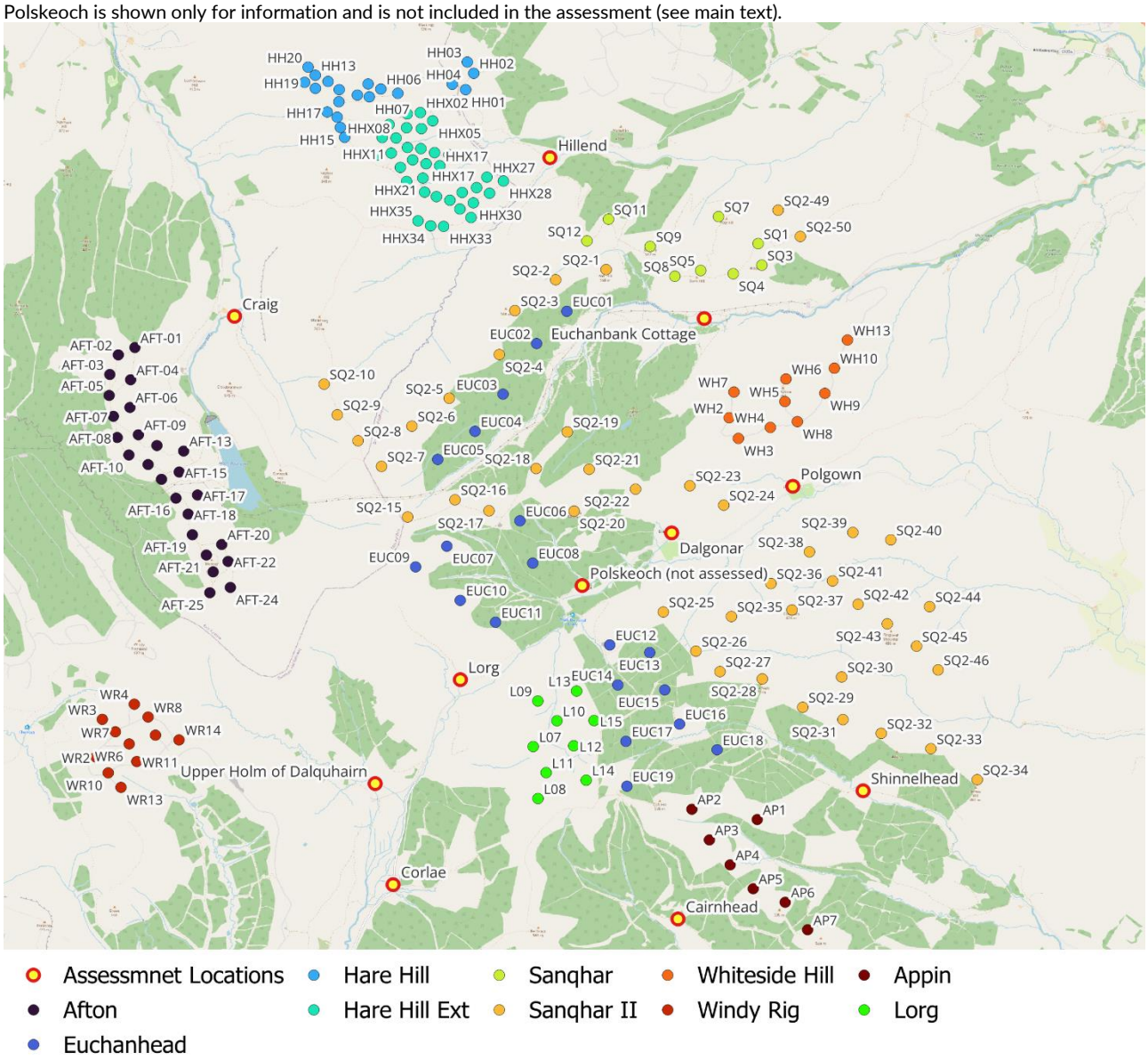
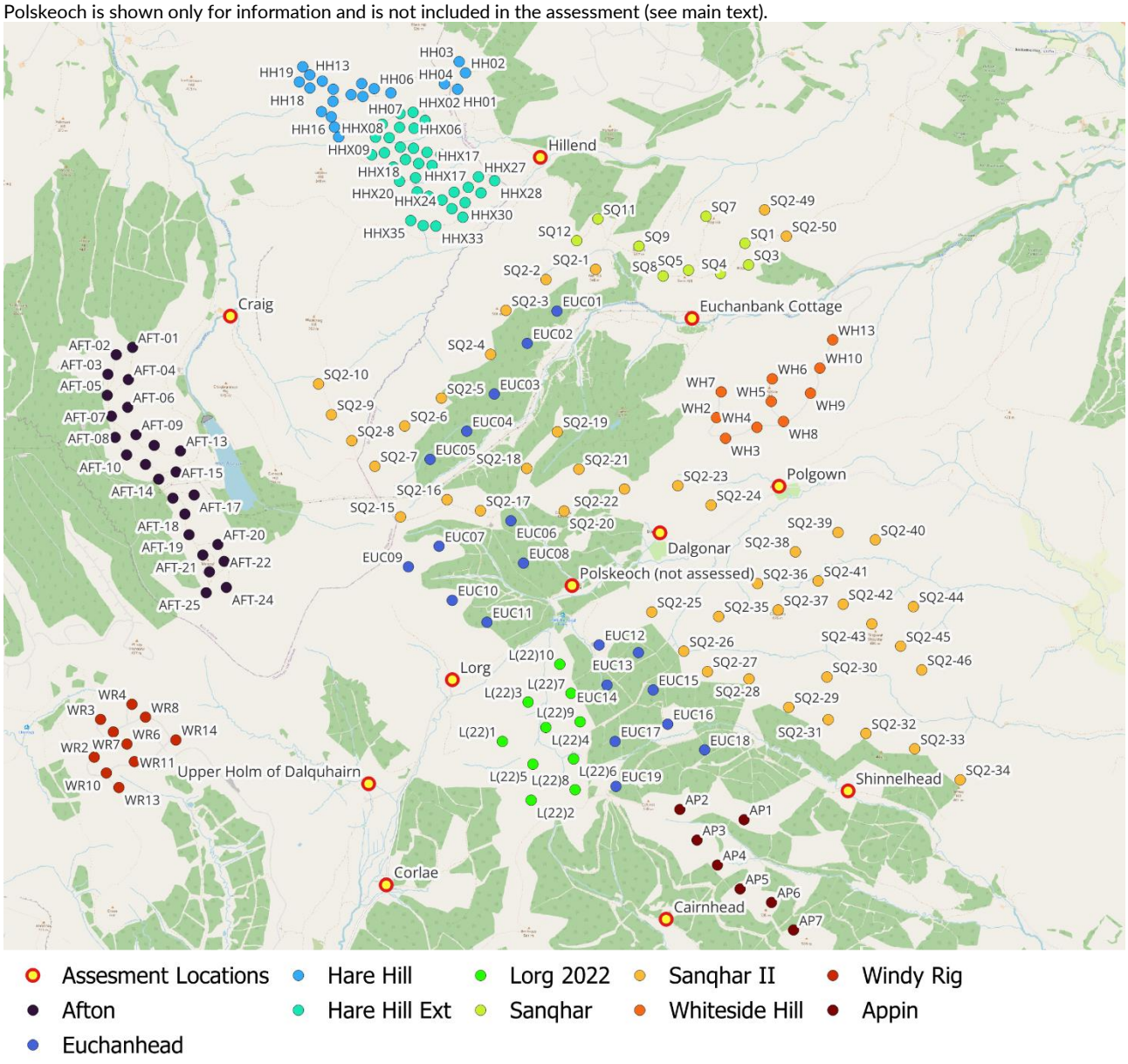


Figure A2 - Map showing the layout of the turbines on the proposed Development, the other windfarms considered in the noise assessment as well as the nearby receptor locations. This shows the proposed Lorg 2022 Windfarm and proposed Appin Windfarm. The receptor Polskeoch is shown only for information and is not included in the assessment (see main text).



Annex B - Propagation Details: Proposed Development

Table B1 - Propagation attenuation effects due to terrain (dB) – the proposed Development (changed turbines only) – Positive numbers are due to terrain shielding barrier effects (e.g. 2), representing a decrease in noise levels, and negative numbers (e.g. -3) represent an increase in predicted noise levels due to concave ground effects. Where there is a zero shown, neither terrain shielding nor concave ground were found.

Turbine	Property									
	Cairnhead	Corlae	Craig	Dalgonar	Euchanbank Cottage	Hillend	Lorg	Polgwyn	Shinnelhead	Upper Holm of Dalquhairn
EUC09	2	-3	2	2	2	2	0	2	-3	2
EUC10	2	-3	2	0	2	2	0	2	0	2
EUC11	2	-3	2	-3	2	2	0	2	0	2
EUC18	2	2	2	2	2	2	2	2	0	2
EUC19	2	0	2	2	2	2	2	0	2	2

Annex C - Assessment Criteria - Dalgonar Receptor

C.1 The consent for Sanquhar II Windfarm[24] stipulates noise limits which apply to control noise from only Sanqhuar II Windfarm (site-specific noise limits), as well as those which apply to control cumulative noise levels (total ETSU-R-97 noise limits). Table C1 shows the noise limit value taken from all four tables of limits in the consent which apply at the receptor location of Dalgonar. Table C1 shows that the site-specific Sanquhar II noise limits are lower at all wind speeds than those specified to control cumulative noise levels, except during the day-time at 11 m/s where the values are the same, which is likely to be an anomaly resulting from all numbers being rounded to whole decibels.

C.2 The difference between the cumulative and site-specific noise limits allows calculation of a 'remaining noise budget' in which to operate other windfarms, whilst still resulting in overall cumulative noise limits being met. This remaining noise budget is calculated by logarithmic subtraction of the site-specific noise limit from the total noise limit at each wind speed. Figures D7 and D8 of Technical Appendix 13.1 of the Original EIAR demonstrate that the levels of noise from all other wind farms at Dalgonar are at least 10 dB below the total ETSU-R-97 noise limits during both day-time and night-time periods, apart from the proposed Development (and Sanqhuar II), therefore representing a negligible contribution which suggests the remaining noise budget would be available in full to the proposed Development.

C.3 Since Technical Appendix 13.1 was produced, a revised application has been submitted for Lorg Windfarm, with an amended layout using different wind turbines. Given that Polskeoch was the nearest relevant assessment location, predicted noise levels for Dalgonar were provided in the assessment for the revised Lorg Windfarm as it is further from Lorg Windfarm. Accordingly, using data provided in the revised Lorg Windfarm 2022 EIAR[25], noise levels have been predicted for Dalgonar (shown in Table C3): these predictions confirm that noise levels for the Lorg 2022 Windfarm at Dalgonar are also at least 10 dB below the total ETSU-R-97 noise limits given in the Sanqhuar II Windfarm consent. This confirms the remaining noise budget would be available to the proposed Development.

Table C1 – Noise limits from the consent for Sanquhar II Windfarm related to standardised wind speeds.

Description	Standardised Wind Speed (m/s)											
	1	2	3	4	5	6	7	8	9	10	11	12
Sanqhuar II noise limit at Dalgonar (day)	*38*	*38*	38	38	38	38	38	38	38	40	42	43
Cumulative noise limit at Dalgonar (day)	*40*	*40*	40	40	40	40	40	40	40	41	42	44
Sanqhuar II noise limit at Dalgonar (night)	*42*	*42*	42	42	42	42	42	42	42	42	42	42
Cumulative noise limit at Dalgonar (night)	*43*	*43*	43	43	43	43	43	43	43	43	43	43
Values at 1 m/s and 2 m/s are set to be the same as those given at 3 m/s.												

24 The Scottish Government Energy and Climate Change Directorate, Energy Consents Unit, Decision Letter (including Annex 1 and Annex 2) to Community Windpower, 31 Aug 2023 granting consent under Section 36 of the Electricity Act 1989 and deemed planning permission under Section 57(2) of the Town and Country Planning (Scotland) Act 1997 for the construction and operation of Sanquhar II Community Wind Farm in the planning authority areas of Dumfries and Galloway Council and East Ayrshire Council.

25 Lorg Wind Farm Section 36 Application, Environmental Impact Assessment Report, Volume 1 Main Report, Chapter 7 Noise, RWE/WSP, Nov 2022. Table 7.7 and 7.8 of the Lorg 2022 EIAR provide sound power levels for the Vestas V162-5.6MW wind turbine and have been used to predict noise levels at Dalgonar.

C.4 Calculation of the remaining noise budget (different day and night) would enable Sanqhuar II Windfarm to operate within the consented site-specific noise limits (fully utilising those site-specific noise limits if necessary) and for the proposed Development to utilise the remaining noise budget. The remaining noise budget values are shown in Table C3. As noted above, at 11 m/s day-time there is no apparent difference between the total and site-specific noise limits which are given in the Sanqhuar II consent, likely due to rounding effects. At this wind speed, the remaining noise budget calculation cannot be performed, with the value shown in Table C2 set at 10 dB below the total noise limit at 11 m/s, on the basis that this would make a negligeable contribution[26] to total noise levels.

Table C2 - Predicted L_{A90} dB noise immission levels at Dalgonar as a function of standardised wind speed for the 2022 revised Lorg Windfarm.

Property	Standardised Wind Speed (m/s)											
	1	2	3	4	5	6	7	8	9	10	11	12
Dalgonar	-	-	-	21.4	25.5	28.7	29.4	29.4	29.4	29.4	29.4	29.4

Table C3 - Remaining noise budget calculated from the total and site-specific noise limits shown in Table C1 during both day-time and night-time periods, related to standardised wind speeds.

Description	Standardised Wind Speed (m/s)											
	1	2	3	4	5	6	7	8	9	10	11	12
Day-time	35.7	35.7	35.7	35.7	35.7	35.7	35.7	35.7	35.7	34.1	32.0	37.1
Night-time	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1

C.5 Predicted noise level from the proposed Development exceed the remaining budget value of Table C3 at 11 m/s by approximately 1.4 dB and would require constraints to be applied. Accordingly, the assessment criterion at 11 m/s being derived through this process is overly stringent at this single wind speed, an artificial result of the rounding assumptions discussed above. Were the assessment criterion at 11 m/s day-time increased by 1.4 dB, this would allow the proposed Development to be operated without constraints being required at that wind speed during the day-time. The consequence of increasing the assessment criteria by 1.4 dB would in theory be to cause total noise levels to be increased by 0.6 dB[27] at that one wind speed. However, had the stringent criteria been set at 32 dB at 11 m/s, as given in Table C3, then the total theoretical excess above the noise limit would have been 0.4 dB, a value which is considered sufficiently small to be ignored. A difference of 0.6 dB is therefore also considered to be sufficiently small that it can be ignored in practice, as it would be unlikely to be perceptible. These calculations are also pessimistic, as they assume downwind propagation from all wind turbines to the receptor location, whereas in practice some reduction in noise levels would occur and the 0.6 dB excess unlikely to arise in practice. Table C4 therefore presents revised criteria for the proposed Development derived on the basis of the above considerations.

Table C4 - Assessment criteria to be used at Dalgonar during both day-time and night-time periods, related to standardised wind speeds. Value in bold shows the modified value from that given in Table C3.

Description	Standardised Wind Speed (m/s)											
	1	2	3	4	5	6	7	8	9	10	11	12
Day-time	35.7	35.7	35.7	35.7	35.7	35.7	35.7	35.7	35.7	34.1	**33.4**	37.1
Night-time	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1

26 The IOA GPG suggests that where noise from adjacent developments differ by more than 10 dB(A) then this represents effectively negligible effects and that cumulative effects need not be considered. Two noise sources which differ by 10 dB(A) gives rise to total 0.4 dB(A) higher than the greater source. Accordingly it is generally assumed that increases of 0.4 dB(A) or less are not acoustically important.

27 The Sanquhar total noise limit day-time at 11 m/s is 42 dB(A), adding to the contribution from the proposed Development at a value of 33.4 dB(A) results in a total theoretical predicted noise level of 42.6 dB(A), which is 0.6 dB(A) above the total noise limit of 42 dB(A).

Annex D - Assessment Criteria - Shinnelhead Receptor

D.1 As discussed in Annex C above, the consent for Sanquhar II Windfarm contains total ETSU-R-97 cumulative noise limits as well as site-specific noise limits that apply to only Sanquhar II Windfarm. The total ETSU-R-97 noise limits which apply at Shinnelhead taken from the Sanquhar II consent are shown in Table D1, during both day-time and night-time periods. Also shown in Table D1 are the total cumulative ETSU-R-97 noise limits derived in the operational noise assessment for Appin Windfarm[28], again for both day-time and night-time periods.

Table D1 – Total cumulative ETSU-R-97 noise limits at Shinnelhead from the consent for Sanquhar II Windfarm and the EIA noise assessment for Appin Windfarm, related to standardised wind speeds.

Description	Standardised Wind Speed (m/s)											
	1	2	3	4	5	6	7	8	9	10	11	12
Sanqhuar II noise limit (day-time)	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	42.0	45.0	47.0
Appin noise limit (day-time)	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.5	42.3	44.0	45.3
Sanqhuar II noise limit (night-time)	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.0
Appin noise limit (night-time)	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.8

D.2 At most wind speeds there are no differences between the noise limits which derive from the Sanquhar II and Appin assessments, except at higher wind speeds where slight differences occur due to variations in background noise levels. On a precautionary basis, site-specific assessment criteria to be used to assess noise levels from only the proposed Development are shown in Table D2. These are set at 10 dB below the lowest of either of these total noise limits, on the basis that by meeting these criteria the proposed Development would make a negligeable contribution to total noise levels.

Table D2 – Site-specific assessment criteria to be used at Shinnelhead during both day-time and night-time periods, related to standardised wind speeds.

Description	Standardised Wind Speed (m/s)											
	1	2	3	4	5	6	7	8	9	10	11	12
Day-time	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	32.0	34.0	35.3
Night-time	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.8

28 Table 10.9 day-time and Table 10.10 night-time of the Appin Wind Farm, EIA Report, Chapter 10: Noise. TNEI on behalf of Statkraft, 16th May 2025.

Annex E – Appin Windfarm Predicted Noise Levels

Table E1 - Propagation attenuation effects due to terrain (dB) – the Appin Windfarm – positive numbers are due to terrain shielding barrier effects (e.g. 2), representing a decrease in noise levels, and negative numbers (e.g. -3) represent an increase in predicted noise levels due to concave ground effects. Where there is a zero shown, neither terrain shielding nor concave ground were found.

Turbine	Property									
	Cairnhead	Corlae	Craig	Dalgonar	Euchanbank Cottage	Hillend	Lorg	Polgown	Shinnelhead	Upper Holm of Dalquhairn
AP1	2	2	2	-3	2	2	2	2	0	2
AP2	2	2	2	2	2	2	2	2	0	2
AP3	2	2	2	2	2	2	2	2	2	2
AP4	2	2	2	2	2	2	2	2	2	2
AP5	0	2	2	2	2	2	2	2	0	2
AP6	0	2	2	2	2	2	2	2	0	2
AP7	0	2	2	2	2	2	2	2	2	2
AP8	0	2	2	2	2	2	2	2	2	2
AP9	0	2	2	2	2	2	2	2	2	2

Table E2 - Wind turbine sound power levels (dB L_{Aeq}) used in the noise assessment – Appin Windfarm.

Turbine make / model	Standardised Wind Speed (m/s)											
	1	2	3	4	5	6	7	8	9	10	11	12
Vestas V162-7.2 MW MODE PO7200				101.5	104.9	107.3	107.7	107.8	108.0	108.3	108.3	108.3
The Appin Windfarm noise assessment did not provide sound power levels at each wind speed, providing only a maximum for unconstrained operation in Table A7.1, stated as 108.3 dB. Sound power levels at each wind speed were calculated from this maximum value, by using the relative difference between maximum predicted noise levels and those at each lower wind speed, for the assessment location of 'NAL13 – Cairnhead'.												

Table E3 - Octave band sound power spectrum (dB L_{Aeq}) for reference wind speed conditions (v_{10} = 8 m/s) – Appin Windfarm.

Turbine make / model	Octave Band Centre Frequency (Hz)								
	63	125	250	500	1000	2000	4000	8000	A
Vestas V162-7.2 MW	81.3	88.8	93.3	95.1	94.0	90.0	83.3	73.6	100.0
The Appin Windfarm noise assessment did not provide sound power level spectra for the candidate wind turbine. A spectrum was used from data available to ourselves for the Vestas V162-6.2 MW, from document ref. 0105-5200_00, 21/04/2022. Table 1: V162-PO6200, expected 1/3 octave band performance, (Blades with serrated trailing edges). Frequency spectrum was converted from 1/3 octaves given by Vestas at a hub height wind speed of 11 m/s and normalised to 100 dB(A). This turbine has the same rotor diameter and is of the same 'variant' as the higher power output Vestas V162-7.2 MW used in the Appin Windfarm noise assessment and the frequency spectrum is considered to be sufficiently representative.									

Table E4 – Predicted L_{A90} (dB) wind farm noise immission levels at each of the noise assessment locations as a function of standardised wind speed for the **Appin Windfarm** alone.

Property	Standardised Wind Speed (m/s)											
	1	2	3	4	5	6	7	8	9	10	11	12
Cairnhead				28.6	32.0	35.5	37.2	37.2	37.2	37.2	37.2	37.2
Corlae				12.2	15.6	19.1	20.8	20.8	20.8	20.8	20.8	20.8
Craig				2.0	5.4	8.9	10.6	10.6	10.6	10.6	10.6	10.6
Dalgonar				14.1	17.5	21.0	22.7	22.7	22.7	22.7	22.7	22.7
Euchanbank Cottage				6.2	9.6	13.1	14.8	14.8	14.8	14.8	14.8	14.8
Hillend				2.2	5.6	9.1	10.8	10.8	10.8	10.8	10.8	10.8
Lorg				12.8	16.2	19.7	21.4	21.4	21.4	21.4	21.4	21.4
Polgown				11.1	14.5	18.0	19.7	19.7	19.7	19.7	19.7	19.7
Shinnelhead*				24.8	28.2	31.7	33.4	33.4	33.4	33.4	33.4	33.4
Upper Holm of Dalquhairn				11.3	14.7	18.2	19.9	19.9	19.9	19.9	19.9	19.9

* The Appin Windfarm noise assessment stated that predicted noise levels include mitigation and used constrained (lower noise) modes of wind turbine operation for predicted noise levels at the Shinnelhead assessment location only. However, the sound power levels for all modes, including these lower noise modes, were not detailed in the Appin Windfarm noise assessment. Predicted noise immission levels shown above for all locations assume the wind turbines on Appin Windfarm operate unconstrained (using sound power levels shown in Tables E2 & E3), an approach consistent with that used to calculate predicted noise levels in the Appin Windfarm noise assessment Table A6.3.

HOARE LEA

Mark Jiggins MSc MIOA
ASSOCIATE

+44 1556 670052
markjiggins@hoarelea.com

HOARELEA.COM

155 Aztec West
Almondsbury
Bristol
BS32 4UB
England