Derrygrogan Little Solar Farm

Acoustic Impact Assessment

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Date	15th October 2025
Ref	05554-12011942

Contents

Revision History

Issue	Date	Name	Latest changes
01	15 Oct 2025	Lucy Connor	First created
02	19 Nov 2025	Lucy Connor	Amendments to Section 4

1 Introduction & Scope

This report contains an assessment of the acoustic impact of the proposed Derrygrogan Little solar farm. One Member and an Associate of the Institute of Acoustics have been involved in its production. Details of their experience and qualifications can be found in **Appendix A**.

The scope includes predicting sound levels due to the proposed development in order to assess whether relevant limits are met.

Construction noise is discussed and will be further managed through a final construction environmental management plan (CEMP) which will be submitted post consent.

2 Methodology

2.1 Propagation

The ISO 9613-2[1] propagation model shall be used to predict the specific sound levels due to the proposed development at nearby receivers. The propagation model takes account of sound attenuation due to geometric spreading and atmospheric absorption. The assumed temperature and relative humidity are 10 ˚C and 70 % respectively.

Ground effects are also taken into account by the propagation model, with a ground factor of 1 adopted to reflect a porous ground between the site and the assessment locations. A 4 m receiver height shall be used. Terrain shall be considered but the effect of surface features such as buildings and trees shall not be included in the model. There is a degree of conservatism built into the model as a result of the adoption of these settings.

ISO 9613-2 is a downwind propagation model. Where conditions less favourable to sound propagation occur, such as when the assessment locations are crosswind or upwind of the proposed development, the sound levels would be expected to be less and the downwind predictions presented here would be regarded as conservative, i.e. greater than those experienced in practice.

2.2 Assessment Guidance

The Guidance Note for Noise Action Planning[2], issued by the Environmental Protection Agency in 2009, refers to guidance produced under the auspices of the World Health Organisation (WHO)[3]. The Guidelines for Community Noise recommend sound levels intended to minimise health impacts in specific environments.

The WHO Guidelines for Community Noise recommend that outside sound levels at dwellings should not exceed 45 dB L_{Aeq} so that people may sleep with the windows open and not be disturbed. During the daytime

[1] International Organisation for Standardisation (2024) Acoustics - Attenuation of Sound During Propagation Outdoors, Part 2: General Method of Calculation
[2] Environmental Protection Agency (July 2009) Guidance Note for Noise Action Planning
[3] World Health Organisation (March 1999) Guidelines for Community Noise

the sound level should not exceed 50 dB L_{Aeq} to protect the majority of people from being moderately annoyed. The predicted sound levels due to the proposed development shall be assessed against these limits.

In addition to the Guidelines for Community Noise the WHO subsequently published the Night Noise Guidelines[4]. These guidelines are described as complementary to the Guidelines for Community Noise and recommend a limit of 40 dB $L_{night, outside}$. This is a yearly average night-time sound level so could potentially be exceeded on some nights of the year such that it is not necessarily inconsistent with the Guidelines for Community Noise if the sound levels do not exceed 45 dB L_{Aeq} on those nights. The predicted sound levels from the proposed development shall also be assessed against the limit recommended by the Night Noise Guidelines.

BS 4142[5] describes methods for rating and assessing sound of an industrial or commercial nature. Whilst the specific procedures and assessment requirements of BS 4142 are not considered to be applicable here, a general discussion has been provided for reference and completeness, with specific regard to the rating level.

The 'rating' level is defined as the 'specific' sound level (dB $L_{Aeq, T}$ – the average sound level) plus any corrections for the presence of tones (i.e. whines, whistles or hums) or other impulsive character (i.e. banging, crashing or tapping) in the sound generated by the source in question. In instances where the source is unlikely to have a specific character at the assessment location then the 'rating' level can be assumed to equal to the 'specific' sound level. Where tones are present a correction of 2 to 6 dB can be added to the 'specific' sound level to determine the 'rating' level and a further addition of up to 9 dB maybe added where the source is highly impulsive.

The predicted daytime and night-time rating levels ($L_{Ar, T}$) are calculated by adding 2 dB to the predicted specific sound levels at the receptor to account for the potential tonal character of sound generated by the proposed development.

3 Assessment

The main sources of sound within the proposed solar development are the string inverters and associated transformer stations. The string inverters are assumed not to be operational during the night-time and are therefore excluded from the model during this period. In practice, the transformer stations may not always be audible/perceptible to nearby receptors at night-time, however as an indicative and conservative approach, these have been included in the model.

Sound power level data for the proposed equipment is detailed in **Table 1**. The data corresponds to the maximum sound power level for each unit as advised by the manufacturer. Predictions based on this data therefore represent the worst case and the sound levels would be expected to be less when the site is not operating at maximum capacity.

[4] World Health Organisation (2009) *Night Noise Guidelines for Europe*
[5] BS 4142:2014+A1:2019 (2019) *Methods for rating and assessing industrial and commercial sound*

Table 1 - Acoustic Emission Data

Equipment	Sound Power Level, dB L_{WA}
String Inverter	84
Transformer Station	79

Predicted sound levels at nearby properties during daytime and night-time are detailed in **Table 2** and an illustrative sound footprint for the proposed development is provided in **Figure 1** and **Figure 2** (**Appendix B**). Coordinates of the properties are given according to the Irish Transverse Mercator system (EPSG code 2157). The maximum predicted specific sound level due to the proposed facility is 33 dB $L_{Aeq, T}$, with the corresponding rating level being 35 dB $L_{Ar, T}$.

Table 2 - Predicted Sound Levels

House ID	Co-ordinate X	Co-ordinate Y	Predicted Specific Level, dB $L_{Aeq, T}$		Predicted Rating Level, dB $L_{Ar, T}$	
			Daytime	Night-time	Daytime	Night-time
H01	640445	729070	31	15	33	17
H02	640428	729004	31	15	33	17
H03	640430	729093	31	15	33	17
H04	640433	729136	31	15	33	17
H05	640375	729124	29	14	31	16
H06	640250	729031	27	12	29	14
H07	640199	728995	26	11	28	13
H08	640171	728976	26	11	28	13
H09	640147	728967	26	10	28	12
H10	640118	728951	25	10	27	12
H11	640092	728941	25	10	27	12
H12	640064	728928	24	9	26	11
H13	640039	728906	24	9	26	11
H14	640332	729302	28	13	30	15
H15	640393	729491	28	12	30	14
H16	640473	729682	27	12	29	14
H17	640230	729415	26	11	28	13
H18	640688	729446	33	17	35	19
H19	640718	729474	33	17	35	19
H20	640751	729498	33	17	35	19
H21	640794	729530	33	17	35	19
H22	639791	728639	20	6	22	8
H23	640346	728858	28	13	30	15
H24	640609	728790	33	16	35	18
H25	640692	728570	30	14	32	16
H26	640881	729595	33	17	35	19
H27	641352	728441	27	12	29	14

House ID	Co-ordinate X	Co-ordinate Y	Predicted Specific Level, dB $L_{Aeq, T}$		Predicted Rating Level, dB $L_{Ar, T}$	
			Daytime	Night-time	Daytime	Night-time
H28	640709	728541	29	13	31	15
H29	640731	728498	29	13	31	15
H30	640757	728470	28	13	30	15
H31	640320	729197	28	13	30	15
H32	640177	729495	25	10	27	12
H33	640086	729443	24	9	26	11
H34	640001	729528	23	8	25	10
H35	639840	729507	21	7	23	9
H36	639839	729603	21	6	23	8
H37	640926	729732	31	15	33	17

The limits recommended by the WHO Guidelines for Community Noise are met by significant margins of greater than or equal to 15 dB(A) during the daytime and 26 dB(A) at night-time. The limit recommended by the WHO Night Noise Guidelines is met by a margin of 21 dB(A), noting that this is a conservative assessment as the maximum predicted sound level is being compared to an annual average limit.

A level of conservatism, in the form of propagation model settings which are expected to result in predicted sound levels greater than those experienced for the majority of the time in practice, has been built into the assessment to compensate for the potential impact of uncertainty.

4 Cumulative Assessment

The nearby consented Derrygrogan solar farm (Offaly County Council Planning Application Ref: 22378) located approximately 500m Southwest of the proposed development and Derries solar and BESS facility (Offaly County Council Planning Application Ref: 218) located approximately 900m North of the proposed development are to be included in a cumulative assessment.

Ballyteige solar farm (based on the amended site layout which is being submitted to Offaly County Council as an amendment planning application to Ref:2198) and the proposed Colehill substation (Strategic Infrastructure Development application) are located approximately 2km Southwest of the proposed development. These sites do not have receptors in common with the proposed development and therefore have not been included in this cumulative assessment.

The main sources of sound are the proposed inverters and associated transformers at each of the nearby consented sites.

Predicted sound levels at nearby properties for the cumulative effect of the Derrygrogan Little solar farm, Derrygrogan solar farm, and Derries solar and BESS facility at both daytime and night-time are detailed in **Table 3** and **Table 4**, respectively. The maximum predicted cumulative sound level is 36 dB L_{Aeq}, with the corresponding rating levels being 38 dB L_{Ar}.

Note that the Derrygrogan Little acoustic assessment has only four receptors in common with Derrygrogan, and two with Derries. Only common receptors are considered in this cumulative assessment.

Table 3 - Cumulative Predicted Sound Levels - Daytime

House ID	Daytime Specific Level, dB $L_{Aeq, T}$				Cumulative Daytime Rating Level, dB $L_{Ar, T}$
	Derrygrogan Little Solar Farm	Derrygrogan Solar Farm	Derries Solar & BESS Facility	Cumulative	
H22	20	36	-	36	38
H23	28	34	-	35	37
H24	33	33	-	36	38
H25	30	33	-	35	37
H16	27	-	30	32	34
H37	31	-	30	33	35

Table 4 - Cumulative Predicted Sound Levels - Night-time

House ID	Night-time Specific Level, dB $L_{Aeq, T}$				Cumulative Night-time Rating Level, dB $L_{Ar, T}$
	Derrygrogan Little Solar Farm	Derrygrogan Solar Farm	Derries Solar & BESS Facility	Cumulative	
H22	6	36	-	36	38
H23	13	34	-	34	36
H24	16	33	-	33	35
H25	14	33	-	33	35
H16	12	-	30	30	32
H37	15	-	30	30	32

The limits recommended by the WHO Guidelines for Community Noise are met by significant margins of greater than or equal to 12 dB(A) during the daytime and 7 dB(A) at night-time. The limit recommended by the WHO Night Noise Guidelines is met by a margin of 2 dB(A), noting that this is a conservative assessment as the maximum predicted sound level is being compared to an annual average limit.

A level of conservatism, in the form of propagation model settings which are expected to result in predicted sound levels greater than those experienced for the majority of the time in practice, has been built into the assessment to compensate for the potential impact of uncertainty.

5 Construction

5.1 Scope

A qualitative assessment of the acoustic impact associated with the construction of the solar farm has been undertaken with reference to BS 5228-1:2009[6] in order to predict the likely impact upon the nearest residential properties during the construction period. The properties considered are the same as those detailed in **Section 3.**

The sources of sound during the construction period are temporary and will vary both in location and duration. Sound will arise through the operation of large items of plant and due to traffic movements entering and travelling on the site itself. Further details of the activities during the construction period are provided in the Outline Construction Environmental Management Plan (OCEMP) and Construction Traffic Management Plan (CTMP). Primary activities creating sound during the construction period include the construction of the site tracks, the creation of temporary construction compound, the construction of hard standings for the transformers, piling for the PV array supports and excavation of trenches. Sound from vehicles on local roads and site tracks would also arise due to the delivery of components and construction materials. Activities and traffic movements will be limited to the hours of 07:00-18:00 Monday to Friday and 08:00 - 16.00 on Saturdays (except for remedial works required in an emergency).

Annex E of BS 5228-1:2009 discusses the 'ABC method', which sets daytime, evening/weekend and night-time limits of 65, 55 and 45 dB $L_{Aeq,\ T}$ respectively, for instances where existing ambient sound levels are relatively low.

The movement of vehicles associated with the site's construction, including heavy goods vehicles (HGVs), along site tracks, local roads and access routes may be noticeable to residents adjacent to these in terms of sound. These movements are highly unlikely to exceed the threshold values defined as part of the 'ABC method'. However, the individual events may well be noticeable to residents, with resulting levels for individual events being similar to that created by existing HGV movements.

The exact methodology and timing of construction activities have not yet been defined, and a reliable assessment of expected construction noise levels is not possible as a result. Where relatively intense construction activities are expected and/or are to be undertaken near neighbouring residences, specific attention to potential for enhanced mitigation measures to reduce the level of noise from these activities will be considered as and when necessary. Typical construction noise mitigation measures are provided in **Section 5.2**.

5.2 Mitigation Measures

For all activities, measures will be taken to reduce construction sound levels with due regard to practicality and cost as per the concept of 'best practicable means' as defined in Section 72 of the Control of Pollution Act 1974[7].

[6] The British Standards Institution (February 2014) BS 5228-1:2009 + A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise
[7] (1974) Control of Pollution Act: Section 72

BS 5228-1:2009 states that the 'attitude of the contractor' is important in minimising the likelihood of complaints and therefore consultation with the local authority along with letter drops are advised to inform residents of intended activity. Non-acoustic factors, which influence the overall level of complaints such as mud on roads and dust generation, would also be controlled through construction practices adopted on the site and managed via a Construction Environmental Management Plan (CEMP). Furthermore, the following noise mitigation options could be implemented where appropriate to ensure non-exceedance of the threshold values and to minimise noise as far as reasonably practicable and/or reasonable:

- Consideration would be given to acoustic emissions when selecting plant and equipment to be used at the site;
- All plant and equipment should be used in accordance with the manufacturer's instructions, maintained in good working order and fitted with the appropriate silencers, mufflers or acoustic covers where applicable;
- Steps would be taken to control sound at source. For example, by avoiding unnecessary engine revving, switching off equipment when not required, using rubber linings to minimise impact sound, minimising the drop height of materials, starting up plant sequentially rather than simultaneously and consideration of alternative reversing alarms and procedures;
- Where sound generated from a specific activity is expected to be directional, steps would be taken to orientate the equipment such that sound is directed away from any noise sensitive areas;
- Consideration would be given to reducing the number of construction activities occurring simultaneously;
- Stationary sound sources would be sited as far away as reasonably possible from residential properties and consideration given as to whether it is necessary to install acoustic barriers to provide screening;
- The movement of vehicles to and from the site would be controlled and employees instructed to ensure compliance with the noise control measures adopted; and
- Consideration would be given to restricting activities being performed within a certain distance of noise sensitive locations.

There are many strategies to reduce construction sound by the limitation of activities that would result in the sound levels being lower than the threshold values. Any strategy that would reasonably be expected to reduce the level of construction noise by the required amount should be considered adequate rather than the options being limited to the measures suggested here. Appropriate noise mitigation measures and construction practices will be included within the final CEMP.

6 Conclusions

An assessment of the acoustic impact of the proposed Derrygrogan Little solar site in isolation and in a cumulative sense has been undertaken. The results show that relevant limits would be met during both daytime and night-time periods.

7 Appendix A – Experience & Qualifications

Author:

Name	Lucy Connor
Experience	Acoustic Specialist, Renewable Energy Systems (RES), 2024-Present
Qualifications	AMIOA, Associate Member of the Institute of Acoustics MSc Acoustics and Music technology, University of Edinburgh BSc Mathematics and Statistics, University of Strathclyde

Checker:

Name	Stuart Hill
Experience	Senior Acoustic Specialist, Renewable Energy Systems (RES), 2024-Present Senior Acoustic Consultant, Mabbett, 2022-2024 Senior Environmentalist (Acoustics), Amey, 2021-2022 Associate Consultant – Acoustics, Noise & Vibration, SLR Consulting, 2017-2020 Technical Analyst/Senior Acoustic Analyst, RES, 2013-2017
Qualifications	MIOA, Member of the Institute of Acoustics MInstP, Member of the Institute of Physics MSc Principles and Applications of Radiation in Industry, the Environment and Medicine, University of St Andrews BEng Electronics Engineering, University of Aberdeen

Approver:

Name	Karen Anne Hutton
Experience	Technical Director, Renewable Energy Systems (RES), 2023–Present Head of Repowering & Life Extension, RES, 2019-2023 Head of Innovation & Optimisation, RES, 2018-2019 Transformation Manager, RES, 2016-2018 Initiatives Manager, RES, 2015-2016 Prospecting & Development Data Manager, RES, 2012-2015 Technical Manager, RES, 2009-2012 Senior Wind Analyst, RES, 2007-2009 Wind Analyst, RES, 2001-2007
Qualifications	MEng Civil Engineering, Heriot-Watt University

8 Appendix B – Figures

Figure 1 – Predicted Sound Footprint - Daytime

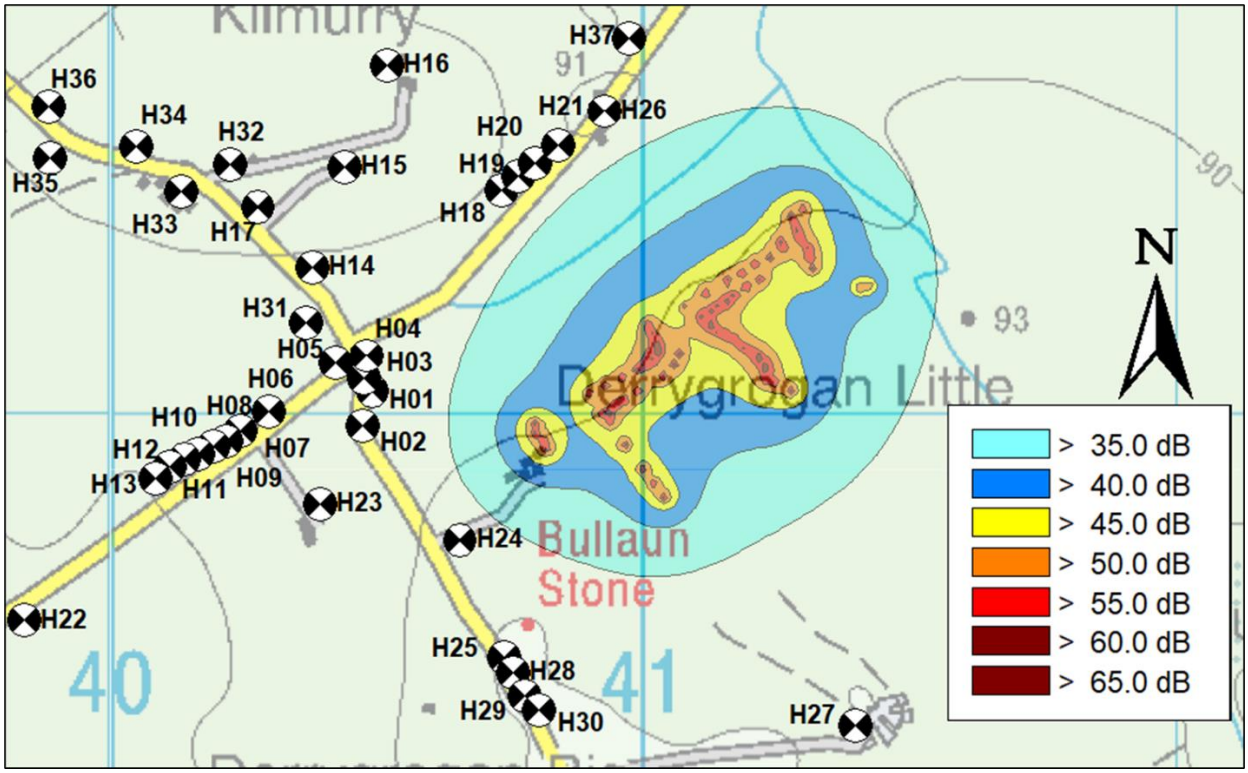

Figure 2 – Predicted Sound Footprint – Night-time