Ballydonagh Solar Farm

Amended Acoustic Impact Assessment

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Date	1st December 2025
Ref	04853-6226048

Contents

Revision History

Issue	Date	Name	Latest changes	File References
01	14/08/2023	Artem Khodov	First Created	04853-6222269
02	01/12/2025	Lucy Connor	Updated string inverter design	05682-12214863 05682-12271946

1 Introduction

This report provides an acoustic assessment of the amended site layout of the consented Ballydonagh Solar Farm (Galway County Council Planning Application Ref: 23/61049), referred to as 'the Proposed Development' herein, in terms of operational and construction impacts. 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**.

An operational assessment of the sound generated by the equipment installed as ancillary to the solar panels has been undertaken in accordance with generalised guidance applicable in the Republic of Ireland (RoI) and that provided by the World Health Organisation (WHO). The assessment also accounts for the cumulative impact of sound generated by the neighbouring revised Ballydonagh Solar Farm Extension (based on the amended site layout which is being submitted to Galway County Council as an amendment to planning application Ref: 24/61749), and the proposed Gortnalug 110kV substation (Strategic Infrastructure Development application to be submitted in early Q1 2026), with the resultant assessment being applicable to all sites in both an individual/isolative and a cumulative sense.

A discussion of the potential impacts resulting from the construction of the Proposed Development has been provided with reference to BS 5228-1:2009 'Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1' [1]. This will be further managed through a construction environmental management plan (CEMP).

2 Planning Policy, Guidance & Standards

There are no specific overarching national planning guidelines on limiting sound from industrial and/or renewable development in the Republic of Ireland (RoI). This particularly applies to the development of solar farms. However, there is some overarching guidance on controlling sound associated with the operation of wind farms. Typically, the relevant Local Planning Authority (LPA) has the remit of providing guidance as to the acceptability of sound levels from certain specific infrastructure/development within the bounds of its control.

In the absence of specific planning guidance on sound from solar facilities, reference has been made to various documentation, as normally referenced within planning applications for industrial and renewable development, such as that provided by the Environmental Protection Agency (EPA) and the World Health Organisation (WHO).

2.1 Guidance Note for Noise (NG4)

The Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) [2] provides guidance on operational sound levels from developments that require an Integrated Pollution Prevention Control (IPPC) licence to operate. This documentation is reasonably comprehensive in its approach to the assessment of sound associated with industrial development and certain aspects of this documentation are often referenced as part information supporting planning applications that do not require an EPA/IPPC license as a result.

The guidance provides a range of potential sound limits for various scenarios, which are broadly consistent with WHO guidance (see **Section 2.3**) in most instances, and also provides direction on issues relating to determining compliance with specified limits, propagation, complaints investigations, survey requirements, competent persons, references BS 4142 (see **Section 2.4**) and other relevant standards and provides various checklists as an aid to assessing and evaluating sound from licensed sites.

2.2 EPA Guidance Note for Noise Action Planning (NAP)

The EPA Guidance Note for Noise Action Planning (NAP) [3] aims to provide Local Planning Authorities (LPAs) or Action Planning Authorities (APAs) with a guide as to the legislative framework and relevant guidance that could be used in adopting Noise Action Plans for specific areas/counties of interest.

The document states that '… relevant guidance is set out in the EPA publication "Guidance Note for Noise in Relation to Scheduled Activities". This document contains suggested noise limits of 55 dB(A) $L_{Ar,T}$ for daytime and 45dB(A) $L_{Aeq,T}$ for night-time; with said limits to be applied to "sensitive locations". Whilst these limits have a very specific application, they have appeared in many different contexts and often form the basis for conditions in planning permissions'.

Furthermore, reference to the general guidance given by the World Health Organisation (WHO) is also provided and a list of relevant guideline levels thought to limit the impact of potential health effects and annoyance are shown, as discussed at **Section 2.3**.

Updates/revisions to the NAP are provided within a document released in 2018 [4] which contains reference to the overarching National Planning Framework 2040 [5], provides further reference to other WHO documentation and also refers to typical guidance used in the UK to mitigate sound impacts on new residential development.

2.3 World Health Organisation (WHO)

The WHO document Guidelines for Community Noise [6] provides guideline values for overall desirable internal and external sound levels for a variety of situations, which are intended to minimise health impacts for certain environments. The guidance informs many standards and general guidance relating to the protection of external and internal amenity in relation to the impacts of sound.

The guidelines state that overall internal night-time sound levels should not be above 30 dB L_{Aeq} within bedrooms such that people may sleep with minimal disturbance while the windows are open and it is stated that this corresponds to an external night-time sound level of 45 dB L_{Aeq}, when assuming a 15 dB attenuation externally to internally. Furthermore, the guidance recommends that daytime external sound levels should not exceed 50 dB L_{Aeq} to protect the majority of people from being moderately annoyed and that levels '…during the evening and night should be 5–10 dB lower than during the day'.

The Night Noise Guidelines for Europe [7] 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 which 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 WHO Environmental Noise Guidelines for the European Region [8] was published in 2018 and provides '… recommendations for protecting human health from exposure to environmental noise originating from various sources: transportation (road traffic, railway and aircraft) noise, wind turbine noise and leisure noise' and make a series of strong or conditional exposure recommendations for each based on the weight of evidence available at the time the report was being drafted. The document does not consider sound from industrial sources as the specific features of these sources are usually very localised and vary between different kinds of development.

2.4 BS 4142 Methods for Rating and Assessing Industrial & Commercial Sound

BS 4142 [9] describes methods for rating and assessing sound of an industrial or commercial nature. Outdoor sound levels are used to assess the likely effects on people who might be inside or outside a residential property via the comparison of the pre-existing background sound levels with the predicted/modelled levels associated with the introduction of a particular development, known as the 'rating' level, which also accounts for any distinguishing characteristics of the emitted sound.

The general procedures for assessing sound levels are somewhat similar in approach to that provided as part of the NG4 guidance (see **Section 2.1**) and 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.

To determine a value for the background sound level at a specific assessment point, a series of measurements are made at a location at, or representative of, a dwelling or receptor of interest. The standard requires that that the background sound measurements (dB $L_{A90,\,T}$ – the sound level exceeded for 90% of the time, or the lowest 10 % of sound, for the reference time period, T) should be measured during times when the source in question could or will be operating and that the individual measurement intervals should not normally be less than 15-minuites in length. The objective is then to determine a justifiable representative background sound level for time periods of interest via statistical analysis and/or observations of the data set collected. The standard states that the representative background level '… should not automatically be assumed to be either the minimum or modal value'.

The 'rating' level is defined as the 'specific' sound level (dB L_{Aeq} – the average sound level) plus any corrections for the presence 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 defined representative background sound level(s) and rating level(s) are then compared to determine the possible impact but with consideration of the context in which the industrial or commercial sound source to be introduced presents itself in respect of other sound sources and the existing character of the area. **Table 1** provides a summary of expected impacts when comparing background and rating levels.

Further to the above, it may not be appropriate or proportionate to undertake a full assessment in accordance with the BS 4142 standard, particularly when the sound level associated with the new source is particularly low at neighbouring receptors and/or is expected to be much lower than the existing background sound levels. The previous version of BS 4142 [10] stated that this version of the standard is not appropriate for use in instances where background and rating sound levels are very low and that '… background noise levels below about 30 dB and rating levels below about 35 dB are considered to be very low'.

Table 1 – BS 4142 Assessment Criteria

Rating Level	BS 4142 Assessment Criteria
Equal to or below background	'…an indication of the specific sound source having a low impact, depending on the context'.
Approximately +5 dB greater than the background noise level	'…an indication of an adverse impact, depending on the context'.
Approximately +10 dB or more greater than the background noise level	'…an indication of a significant adverse impact, depending on the context'.

2.5 Local Guidance & Proposed Limits

Galway County Council (GCC) do not have any specific or formal written guidance as to any preferred method of assessment or preferences regarding potential impacts associated with new sound generating development. As a result, the guidance detailed above is used to form the basis of assessment provided within this report and the proposed limits shown in **Table 2** are considered appropriate and consistent with WHO guidance.

Table 2 – Proposed Limits

Scenario	Daytime Noise Criterion, dB $L_{Ar,T}$ (07:00 - 19:00)	Evening Noise Criterion, dB $L_{Ar,T}$ (19:00 - 23:00)	Night-time Noise Criterion, dB $L_{Aeq,T}$ (23:00 - 07:00)
Potential Limits for the Proposed Development	50	45	40

3 Operational Sound Assessment

3.1 Proposed Equipment

The main sources of sound within the Proposed Development are the 15 transformer stations and associated string inverters. 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 perceptible to nearby receptors at night-time, however as an indicative and conservative approach, these have been included in the model.

The sound power level data for the proposed equipment is detailed in **Table 3**. These are based on information provided by equipment manufacturers and RES' experience of similar equipment. 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.

Table 3 – Sound Power Level of Sound Sources, L_{WA}

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

3.2 Prediction Methodology

A propagation model of the Proposed Development and the surroundings has been developed using CadnaA[1] modelling software. The ISO 9613-2 [11] propagation/prediction methodology has been employed to predict the sound levels resulting from the development at nearby residential properties, incorporating various assumptions which are considered appropriate for use here:

- Atmospheric attenuation corresponding to a temperature and relative humidity of 10°C and 70% respectively, as defined within ISO 9613-1 [12] which represents relatively low levels of sound absorption in the atmosphere;
- Ground absorption factor of 1 is used to account for absorption provided by porous ground between the sound sources and the noise sensitive receptors;
- A 4 m receiver height is used to provide for conservative assessment locations and minimise effects of ground reflections at the receiver location;
- Topography of the site is considered but the effect of surface features such as buildings are not included in the model for conservativism;
- The photovoltaic panels to be introduced as part of the development have not been included within the predicted model, to allow for more conservative predictions. In practice, these would provide some shielding of sound generated by the equipment to be installed at the Proposed Development where certain panels are located directly between residences and the respective plant.

Furthermore, 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 as part of this report would be regarded as conservative, i.e. greater than those likely to be experienced in practice.

[1] https://www.datakustik.com/

The daytime and night-time rating level (dB, $L_{Ar,T}$) is calculated by adding 5 dB to the predicted specific sound levels at the receptor (dB $L_{Aeq,\ T}$) to account for the potential character of sound generated by the Proposed Development in terms of potential tones.

3.3 Assessment Results

The sound levels associated with the operation of the Proposed Development, the neighbouring revised Ballydonagh Extension Solar Farm (based on the amended site layout which is being submitted to Galway County Council as an amendment to planning application Ref: 24/61749), and the proposed Gortnalug 110kV substation (Strategic Infrastructure Development application being submitted in Q1 2026) have been assessed against the proposed sound limits in **Section 2.5**.

Table 4 and Table 5 show the maximum predicted specific and overall cumulative rating sound levels relating to each development at the residential locations considered most sensitive, for daytime/evening and night-time periods, respectively. Coordinates of the properties are given according to the Irish Transverse Mercator system (EPSG code 2157).

Table 4 shows that predicted specific sound levels caused by the Proposed Development at neighbouring residences are no more than 38 dB $L_{Aeq,\ T}$ during the daytime/evening and therefore no more than a predicted rating sound level of 43 dB $L_{Ar,\ T}$. **Table 5** shows that predicted specific sound levels caused by the Proposed Development at neighbouring residences are no more than 23 dB $L_{Aeq,\ T}$ during the night-time and therefore no more than a predicted rating sound level of 28 dB $L_{Ar,\ T}$.

When considered in a cumulative setting with the neighbouring revised Ballydonagh Extension Solar farm and proposed Gortnalug Substation, the predicted rating sound levels at neighbouring residences are no more than 44 dB $L_{Ar,\ T}$ during the daytime/evening (as shown in **Table 4**) and 35 dB $L_{Ar,\ T}$ during the night-time (as shown in **Table 5**)

The proposed limits of 50 dB $L_{Ar,\ T}$ during the daytime, 45 dB $L_{Ar,\ T}$ during the evening and 40 dB $L_{Ar,\ T}$ at night-time are therefore met both cumulatively and in isolation.

Daytime/evening and night-time contour plots showing the isolative and cumulative predicted external specific sound levels are shown in **Figures 1, 2, 3 & 4**.

Table 4 – Daytime/Evening Predicted Operational Sound Levels, dB $L_{Ar/Aeq}$

House ID	Co-ordinates (ITM ESPG:2157)		Specific Sound Level, dB L_{Aeq}				Cumulative Rating Level, dB L_{Ar}
	X	Y	Proposed Development	Amended Ballydonagh Solar Farm Extension	Proposed Gortnalug 110kV Substation	Cumulative	
H1	583517	719952	35	24	17	35	40
H2	582675	720730	28	20	14	29	34
H3	583092	720126	32	33	16	35	40
H4	584899	720573	26	0	17	26	31

House ID	Co-ordinates (ITM ESPG:2157)		Specific Sound Level, dB L_{Aeq}				Cumulative Rating Level, dB L_{Ar}
	X	Y	Proposed Development	Amended Ballydonagh Solar Farm Extension	Proposed Gortnalug 110kV Substation	Cumulative	
H5	583382	718617	25	29	0	31	36
H6	582611	720415	27	25	13	29	34
H7	584600	720201	29	14	18	30	35
H8	582895	720262	30	31	15	34	39
H9	583214	721376	30	12	18	30	35
H10	583533	720457	38	20	23	38	43
H11	583277	720110	33	28	17	34	39
H12	582481	720476	26	23	12	28	33
H13	582741	720411	29	26	14	31	36
H14	584604	720423	31	11	19	31	36
H15	583460	719975	34	25	17	35	40
H16	582688	720745	29	20	14	29	34
H17	584608	720163	29	14	17	29	34
H18	582990	718611	25	38	0	38	43
H19	583220	718695	27	33	0	34	39
H20	584342	720871	33	10	26	34	39
H21	584229	721004	32	10	27	33	38
H22	582969	720943	35	17	17	35	40
H23	583143	720738	38	20	19	39	44
H24	584573	720554	32	10	21	32	37
H25	584634	720339	30	12	19	30	35
H26	582505	720470	26	23	13	28	33
H27	584178	720962	33	10	29	35	40
H28	582563	720668	27	21	13	28	33
H29	582442	720498	25	22	12	27	32
H30	582389	720493	25	21	12	26	31
H31	583488	719964	34	24	17	35	40
H32	584393	719621	26	21	14	28	33
H33	582465	720364	25	24	12	28	33
H34	584615	720336	30	12	19	30	35
H35	582862	721969	20	4	12	21	26
H36	582245	720654	23	18	11	24	29
H37	582237	720612	23	19	11	25	30

House ID	Co-ordinates (ITM ESPG:2157)		Specific Sound Level, dB L_{Aeq}				Cumulative Rating Level, dB L_{Ar}
	X	Y	Proposed Development	Amended Ballydonagh Solar Farm Extension	Proposed Gortnalug 110kV Substation	Cumulative	
H38	585460	720032	18	8	11	19	24
H39	583589	718561	24	30	0	31	36
H40	582927	718605	24	38	0	38	43
H41	582164	718726	19	27	0	27	32
H42	584711	721535	22	0	16	23	28
H43	582056	721206	19	12	9	20	25
H44	584338	718733	20	37	0	37	42
H45	584519	718727	19	35	0	35	40
H46	584546	719208	22	24	11	27	32
H47	581965	718230	14	21	0	22	27
H48	584021	718588	21	37	0	37	42
H49	584782	721318	23	0	17	24	29
H50	584688	718638	17	31	0	31	36
H51	582086	718708	18	25	0	26	31
H52	584715	718650	17	30	0	31	36
H53	584332	717781	10	32	0	32	37
H54	584031	718931	24	29	10	30	35
H55	584864	719057	19	24	9	25	30
H56	582205	718699	19	28	0	28	33
H57	584670	719289	22	23	11	25	30
H58	583387	717921	16	27	0	27	32
H59	582348	721328	22	12	11	23	28
H60	584617	719286	22	23	11	26	31
H61	583494	718577	24	29	0	30	35
H62	583583	718579	24	30	0	31	36
H63	582384	718677	21	32	0	32	37

Table 5 - Night-time Predicted Operational Sound Levels, dB $L_{Ar/Aeq}$

House ID	Co-ordinates (ITM ESPG:2157)		Specific Sound Level, dB L_{Aeq}				Cumulative Rating Level, dB L_{Ar}
	X	Y	Proposed Development	Amended Ballydonagh Solar Farm Extension	Proposed Gortnalug 110kV Substation	Cumulative	
H1	583517	719952	20	8	17	22	27
H2	582675	720730	14	4	14	17	22
H3	583092	720126	17	14	16	20	25
H4	584899	720573	11	0	17	18	23
H5	583382	718617	9	13	0	15	20
H6	582611	720415	13	8	13	17	22
H7	584600	720201	14	0	18	19	24
H8	582895	720262	15	13	15	19	24
H9	583214	721376	15	0	18	20	25
H10	583533	720457	23	4	23	26	31
H11	583277	720110	19	10	17	21	26
H12	582481	720476	12	6	12	16	21
H13	582741	720411	14	9	14	18	23
H14	584604	720423	16	0	19	21	26
H15	583460	719975	19	8	17	22	27
H16	582688	720745	14	4	14	17	22
H17	584608	720163	14	0	17	19	24
H18	582990	718611	9	17	0	18	23
H19	583220	718695	11	17	0	18	23
H20	584342	720871	18	0	26	26	31
H21	584229	721004	17	0	27	28	33
H22	582969	720943	20	1	17	22	27
H23	583143	720738	23	4	19	24	29
H24	584573	720554	17	0	21	22	27
H25	584634	720339	15	0	19	20	25
H26	582505	720470	12	7	13	16	21
H27	584178	720962	18	0	29	30	35
H28	582563	720668	13	5	13	16	21
H29	582442	720498	11	6	12	15	20
H30	582389	720493	11	5	12	15	20
H31	583488	719964	20	8	17	22	27
H32	584393	719621	11	6	14	16	21

House ID	Co-ordinates (ITM ESPG:2157)		Specific Sound Level, dB L_{Aeq}				Cumulative Rating Level, dB L_{Ar}
	X	Y	Proposed Development	Amended Ballydonagh Solar Farm Extension	Proposed Gortnalug 110kV Substation	Cumulative	
H33	582465	720364	11	8	12	15	20
H34	584615	720336	15	0	19	20	25
H35	582862	721969	7	0	12	13	18
H36	582245	720654	9	3	11	14	19
H37	582237	720612	9	3	11	14	19
H38	585460	720032	5	0	11	12	17
H39	583589	718561	8	13	0	14	19
H40	582927	718605	8	17	0	18	23
H41	582164	718726	3	9	0	11	16
H42	584711	721535	8	0	16	17	22
H43	582056	721206	6	0	9	11	16
H44	584338	718733	6	19	0	19	24
H45	584519	718727	5	17	0	17	22
H46	584546	719208	8	9	11	14	19
H47	581965	718230	0	4	0	7	12
H48	584021	718588	6	21	0	21	26
H49	584782	721318	9	0	17	18	23
H50	584688	718638	3	14	0	15	20
H51	582086	718708	3	8	0	9	14
H52	584715	718650	3	14	0	14	19
H53	584332	717781	0	14	0	14	19
H54	584031	718931	9	13	10	16	21
H55	584864	719057	5	8	9	12	17
H56	582205	718699	4	10	0	11	16
H57	584670	719289	8	7	11	14	19
H58	583387	717921	1	10	0	11	16
H59	582348	721328	8	0	11	13	18
H60	584617	719286	8	8	11	14	19
H61	583494	718577	8	13	0	14	19
H62	583583	718579	8	13	0	14	19
H63	582384	718677	5	14	0	14	19

Figure 1 – Proposed Development Daytime/Evening Contour Plot, dB L_{Aeq}

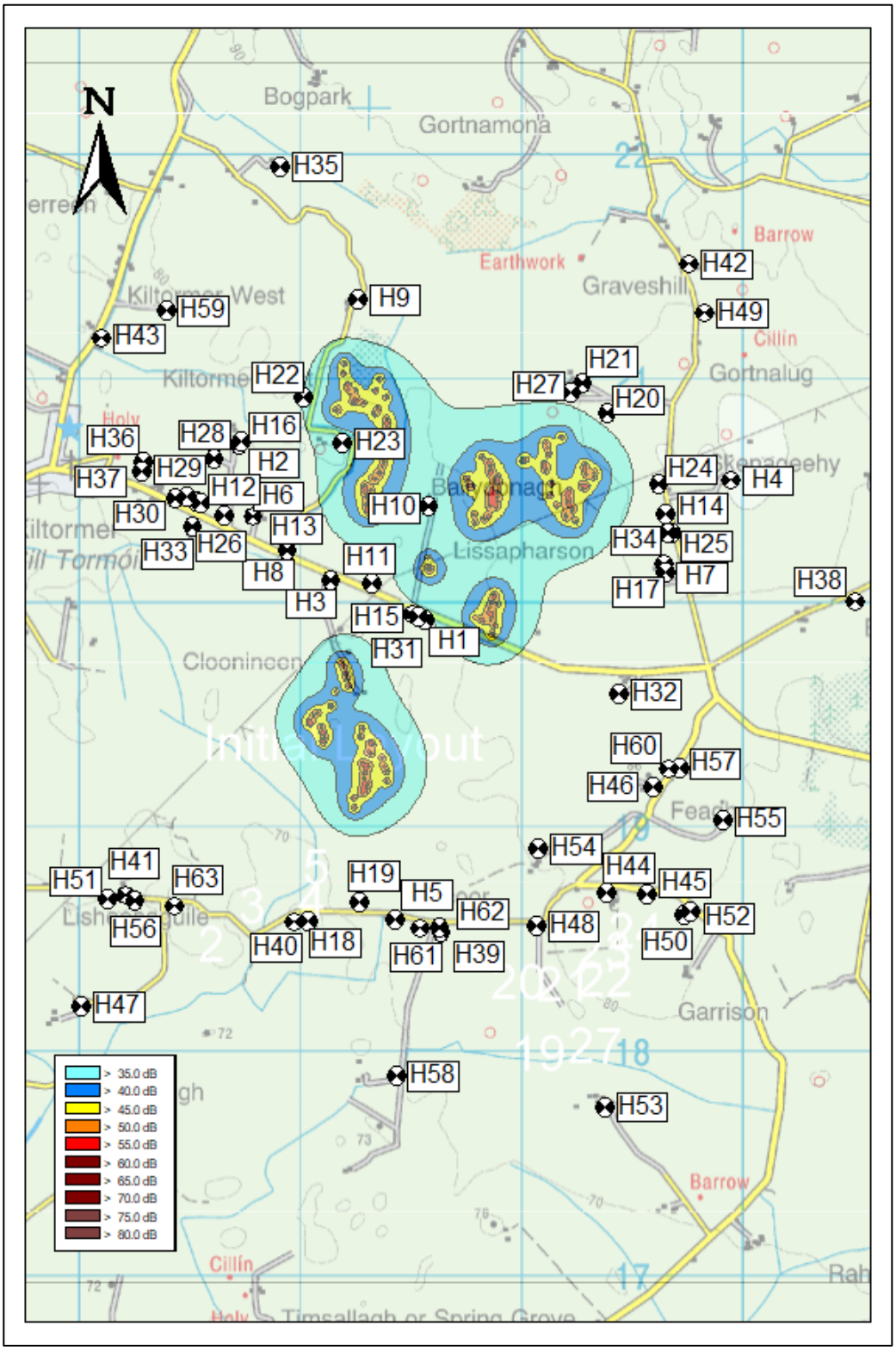


Figure 2 – Proposed Development Night-time Contour Plot, dB L_{Aeq}

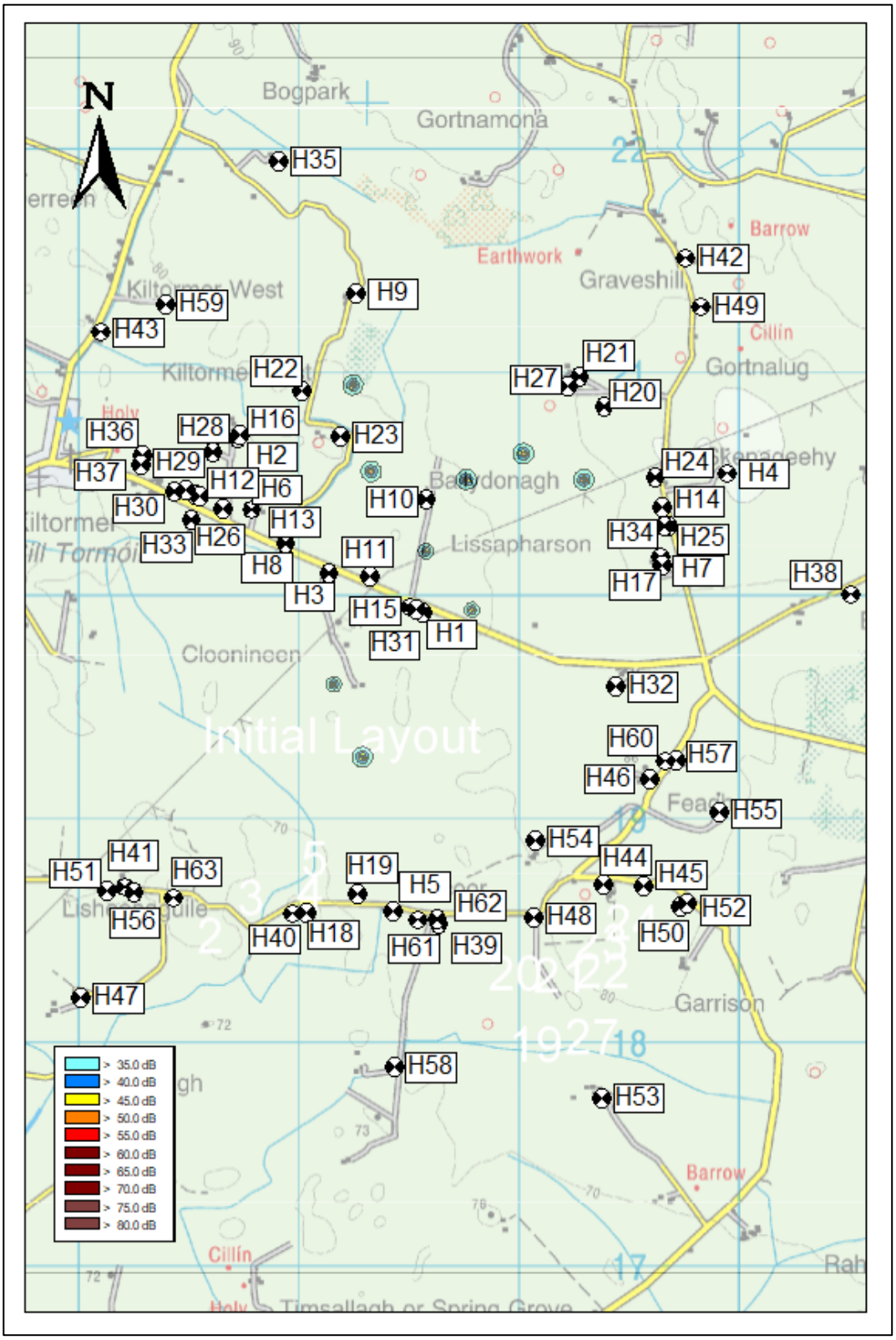


Figure 3 – Cumulative Daytime/Evening Contour Plot, dB L_{Aeq}

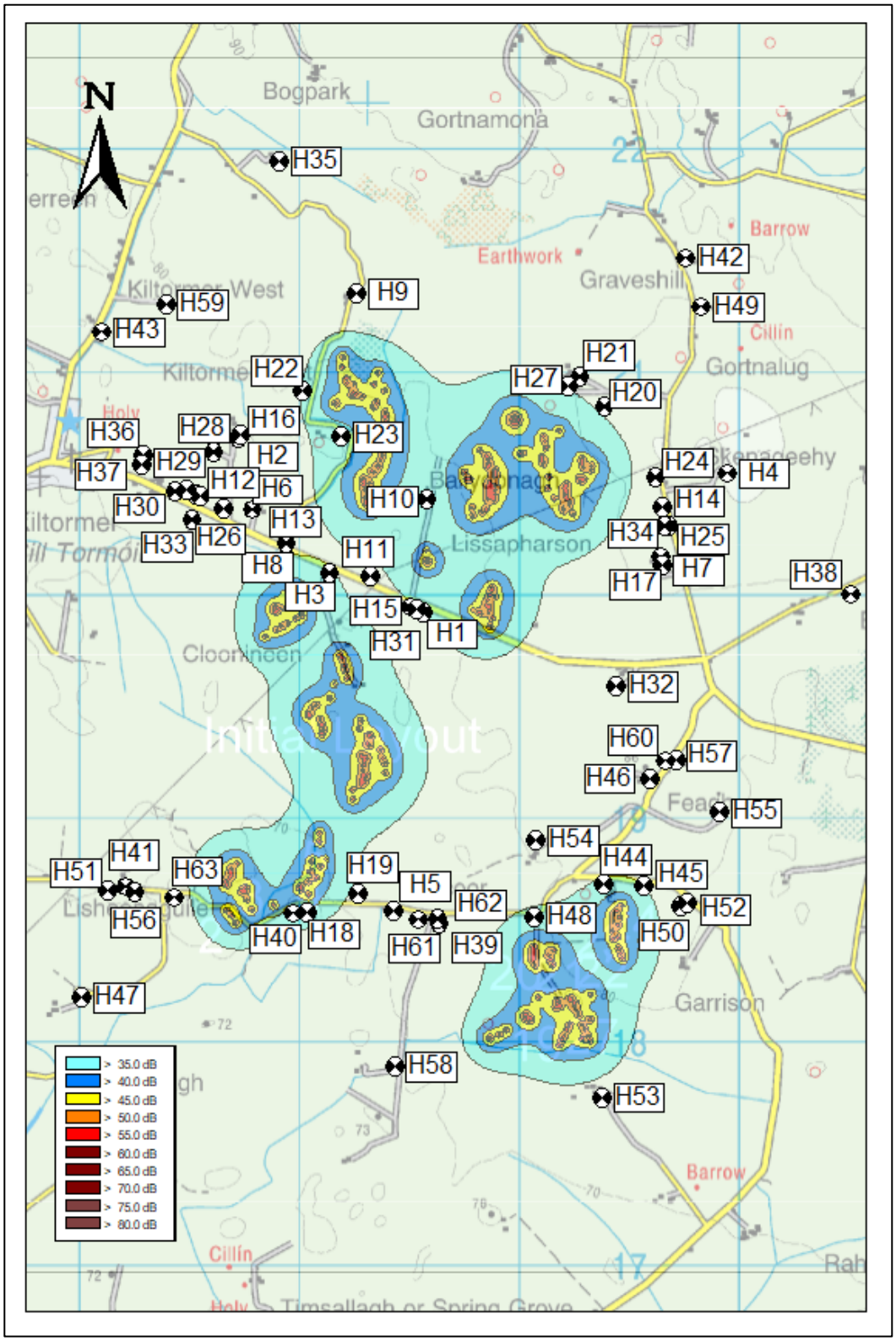
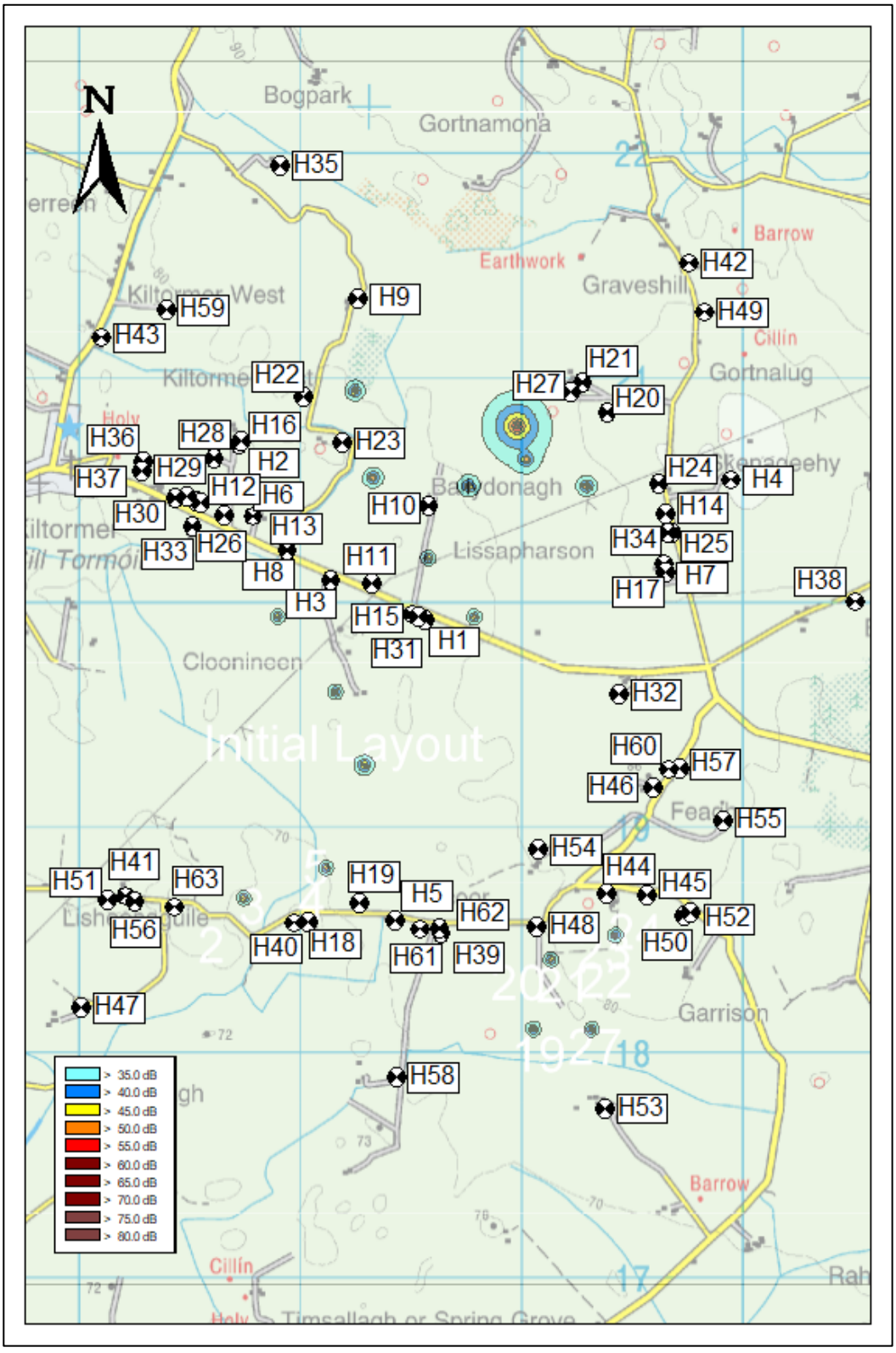


Figure 4 – Cumulative Night-time Contour Plot, dB L_{Aeq}



4 Construction Sound

4.1 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 [1] 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 07:00-19:00 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 4.2**.

4.2 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 [13].

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.

5 Conclusions

An assessment of the acoustic impact of the Proposed Development, including the revised amended Ballydonagh Solar Farm Extension, and proposed Gortnalug 110kV substation has been undertaken and the results show that overall predicted sound levels, individually and cumulatively, will meet proposed daytime, evening and night-time limits determined from relevant guidance.

6 References

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[11] International Organisation for Standardisation, *Acoustics - Attenuation of Sound During Propagation Outdoors, Part 2: General Method of Calculation ISO 9613-2:2024,* 2024.

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[13] "Control of Pollution Act: Section 72," 1974.

Appendix A – Experience & Qualifications

Table A.1 - 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

Table A.2 - 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

Table A.3 - Approver

Name	Karen Anne Hutton
Experience	Vice President Group Technical, Renewable Energy Systems (RES), 2025-Present Technical Director, RES, 2023-2025 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