Nuneham Solar Farm

Acoustic Impact Assessment

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Revision History

Issue	Date	Name	Latest Changes	File References
01	04/04/2024	Mike Craven	Finalised	04531-7603356 04531-7603357

1 Introduction

This report provides an acoustic assessment of the proposed Nuneham Solar Farm, referred to as 'the Proposed Development' herein, in terms of operational impacts. Three Members of the Institute of Acoustics (MIOA) have been involved in its production and details of their experience and qualifications can be found in **Appendix A**.

An assessment of the noise generated by the equipment installed as ancillary to the solar panels has been undertaken in accordance with BS 4142:2014 + A1:2019 'BS 4142 Methods for Rating and Assessing Industrial & Commercial Sound'.

2 Planning Policy, Guidance & Standards

2.1 National Planning Policy Framework (NPPF)

The treatment of noise is defined in the context of planning by the National Planning Policy Framework (NPPF) [1] which details the Government's planning policies and how these are expected to be applied. The NPPF provides advice on the role of the planning system in helping to prevent and limit potential adverse effects of noise, stating that planning policies and decisions should aim to avoid noise giving rise to significant adverse impacts, whilst at the same time mitigating and reducing other adverse impacts on health and quality of life to a minimum. The NPPF refers to the Noise Policy Statement for England (NPSE) which provides guidance on the categorisation of impact levels.

2.2 Noise Policy Statement for England (NPSE)

The Noise Policy Statement for England (NPSE) [2] sets out the long-term vision of Government noise policy which is to '… promote good health and quality of life through effective noise management within the context of sustainable development'. In order to weigh noise impacts against the economic and social benefits of the activity under consideration, the NPSE defines three categories of effect levels:

- No Observed Effect Level (NOEL) - noise levels below this have no detectable effect on health and quality of life;
- Lowest Observed Adverse Effect Level (LOAEL) - the level above which adverse effects on health and quality of life can be detected; and,
- Significant Observed Adverse Effect Level (SOAEL) - the level above which effects on health and quality of life become significant.

2.3 National Planning Practice Guidance (NPPG): Noise

National Planning Practice Guidance (NPPG) [3] on noise puts the effect levels defined by the NPSE into greater context by explaining how such noise levels might be perceived, providing examples of outcomes based on likely average response, and advising on appropriate actions. These are reproduced at **Table 1**.

Table 1 - Noise Exposure Hierarchy

Response	Examples of Outcomes	Increasing Effect Level	Action
Not present	No Effect	No Observed Effect	No specific measures required
	No Observed Effect Level (NOEL)		
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
	Lowest Observed Adverse Effect Level (LOAEL)		
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
	Significant Observed Adverse Effect Level (SOAEL)		
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

In addition to this guidance, which is applicable to all forms of environmental sound, specific guidance relating to nationally significant energy infrastructure has been published by the Department of Energy and Climate Change (DECC). Whilst the proposed development is not of a scale that would be deemed nationally significant, the relevant National Policy Statements (NPS) are informative in that they suggest an assessment methodology that would be considered appropriate for the type of development being proposed.

2.4 The Overarching National Policy Statement for Energy (EN-1)

The Overarching National Policy Statement for Energy (EN-1) [4] outlines the need for new electricity capacity from renewable sources as the country transitions to a low carbon electricity system. However, when referring to the NPSE, EN-1 recognises the potential for energy infrastructure to impact on health and quality of life if it results in excessive noise and goes on to state that where noise impacts are likely to arise, they should be assessed according to the principles of the relevant British Standards. Of the examples provided, the standard BS 4142 (see **Section 2.7**) relates to operational sound.

2.5 National Policy Statement for Renewable Energy Infrastructure (EN-3)

The National Policy Statement for Renewable Energy Infrastructure (EN-3) [5] refers back to EN-1 for the purposes of addressing sound impacts from renewable energy development on sensitive residential locations and provides additional general advice as to potential mitigation measures for additional specific instances.

2.6 The National Policy Statement for Electricity Networks Infrastructure (EN-5)

The National Policy Statement for Electricity Networks Infrastructure (EN-5) [6], relevant to the transmission and distribution parts of the electricity network along with any associated infrastructure, such as substations and converter stations, again points to the appropriateness of BS 4142 (discussed in **Section 2.7**) in assessing the operational acoustic impact of such projects.

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

BS 4142 [7] 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 sound associated with the introduction of a particular development, known as the 'rating' level, which also accounts for any distinguishing characteristics of the emitted sound.

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 sound 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 sound 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 adjustment for the characteristic features of 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 further adjustments may be added where the source has other applicable characteristics.

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 2** provides a summary of expected impacts when comparing background and rating levels.

Table 2 – 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 sound level	'…an indication of an adverse impact, depending on the context'.
Approximately +10 dB or more greater than the background sound level	'…an indication of a significant adverse impact, depending on the context'.

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 [8] stated that this version of the standard is not appropriate for use in instances where background and rating 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'.

2.8 Local Guidance & Consultation

South Oxfordshire and Vale of White Horse District Councils do not have any specific prescriptive planning guidance relating to operational sound impacts other than that they are minimised where necessary. However, the Environmental Health Officer (EHO) representing the councils was consulted as to the extent of assessment required for the Proposed Development.

A noise impact assessment was provided in support of a consented solar farm (Planning Reference P20/S4360/FUL) which is located to the east of the Proposed Development. This included the details of a noise survey, the results of which, are considered applicable for use here. The principle of this approach was agreed with the EHO dealing with the Proposed Development.

3 Baseline Environment

3.1 Sensitive Receptors

There are several scattered dwellings and a small conurbation neighbouring the Proposed Development. A list of locations considered representative of those closest to the site is provided in **Table 3** below, with some of these representing small groups of dwellings. The locations are also shown in **Figure 1**. The minimum distance between any sound generating plant and the neighbouring properties is approximately 300 m.

Table 3 - Sensitive Receptors / Assessment Locations

House ID	Co-ordinates		Approx. Distance to Nearest Power Conversion System (PCS), Transformer or Substation, m
	Easting	Northing	
H5	455240	200242	719
H6	455151	200312	706
H12	453708	200625	354
H16	453852	200808	464
H17	453948	198806	877
H19	453809	198868	925
H59	455216	199414	631
H62	454776	199415	306
H85	454427	198835	669
H88	453499	199048	1083
H89	453561	199014	1043
H92	454855	199436	366
H97	455175	199123	789

3.2 Existing Sources of Sound

The current sound environment at properties surrounding the site consists of vehicle movements along the A4074 and those typical of a rural environment, including farm stock, farm works and activities, localised human and animal activities, wind induced sound in the trees and foliage, birdsong and occasional aircraft passing overhead.

3.3 Existing Sound Levels

A survey of the existing ambient (dB L_{Aeq}) and background (dB L_{A90}) sound levels at two locations more than a kilometre to the east of the A4074 was undertaken in support of a planning application for a neighbouring solar farm on land to the east of the Proposed Development (Planning Reference. P20/S4360/FUL). The results of the survey and an impact assessment of the site are provided within a report attached to the application [9]. The relevant background and ambient sound levels are shown in **Table 4**.

The lower of the adopted background sound levels have been used as representative of the noise environment at locations neighbouring the Proposed Development, the majority of which are in much closer proximity to the A4074, where higher background sound levels would be expected, and it is considered that this approach represents a conservative basis of assessment as a result.

Table 4 - Background & Ambient Noise Levels

ID	Co-ordinates		Background Noise Level, dB L_{A90}		Ambient Noise Level, dB L_{Aeq}	
	Easting	Northing	Daytime	Night-time	Daytime	Night-time
L1	456008	200022	41	34	51	43
L2	455556	201221	42	36	48	43

4 Predictions

A model of the proposed solar farm and the surroundings has been developed using CadnaA[1] noise modelling software. The ISO 9613-2 [10] propagation/prediction methodology has been employed to predict the sound levels resulting from the development at nearby residential properties, incorporating various assumptions and factors which are considered appropriate for use here:

- The various plant to be installed as part of the development has been modelled as point sources with a height of 2 m;
- Soft ground conditions have been assumed (i.e. G=1) as representative of the farmland surrounding the Proposed Development. The ISO 9613-2 standard allows for a range of ground conditions to be applied, from porous ground conditions (G=1), which includes surfaces suitable for the growth of vegetation (i.e. farmland), to hard ground (G=0), such as paving, water and concrete;
- The receptors have been assigned a height of 1.5 m;
- Atmospheric attenuation corresponding to a temperature and relative humidity of 10 °C and 70 % respectively, as defined within ISO 9613-1 [11], which represents relatively low levels of sound absorption in the atmosphere;
- The topography of the site and surroundings has been included within the noise model; and,
- The photovoltaic panels to be introduced as part of the development have also been included within the prediction model as 'floating barriers', 0.75 m from the ground and with an overall height of 3 m. This provides some shielding of noise 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 upwind of the Proposed Development, the

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

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.

The predominant sources of sound to be introduced as part of the Proposed Development are the ancillary inverters (PCS units) and transformers attached to the photovoltaic panels, as located at several positions across the developable area, and the proposed substation.

The site has been designed on an iterative basis with a view to minimising, as far as practicably possible, the projected operational sound levels with due regard to the relative sensitivity of neighbouring premises and all other site constraints.

The assumed sound power data for the equipment to be installed as part of the Proposed Development are provided in **Table 5**. The overall levels correspond to the expected maximum sound output for each of the respective plant, as advised by the candidate manufacturers. The propagation modelling therefore represents a conservative scenario and the actual sound levels would be expected to be less when the site is not operating at maximum capacity.

The inverters (PCS units) are assumed not to be operational during the night. However, the site may start becoming operational in early hours of the morning during particularly bright summer months although this will occur very rarely and this equipment will be operating under a much-reduced electrical load during these periods, substantially reducing the expected sound levels as compared to the daytime scenario.

Table 5 – Overall Sound Power Levels, dB L_{WA}

Equipment & ID	Sound Power Level, dB L_{WA}
Power Conversion System (PCS)	96
Transformer (TRA)	79
Substation (SUB)	99

The source noise data is further supplemented by the level of sound in octave bands, as provided in **Table 6**. This information is based on a combination of manufacturers data and RES experience of similar plant.

Table 6 – Octave Band Sound Power Levels, dB L_{WA}

ID	Overall, dB L_{WA}	Centre of Octave Band (A-Weighted), Hz							
		63	125	250	500	1k	2k	4k	8k
PCS	96	70	80	91	88	89	88	85	79
TRA	79	45	63	74	77	67	61	54	53
SUB	99	64	83	94	97	87	80	74	72

The combination of assumptions detailed above are considered to provide a conservative prediction/modelling basis overall. The various equipment has been located at the associated hard standings relating to each inverter/transformer combination. The results of the predictions at the various residences surrounding the Proposed Development are shown in **Section 5**.

The sound emitted by the various equipment to be introduced as part of the Proposed Development can have distinctive tonal character (i.e. a whine, whistle or hum). Under the subjective method described in BS 4142, a correction of 2 dB has been applied to account for this feature. However, the assessed specific and rating sound levels detailed in **Section 5** are particularly low and any potential tonal component in the sound emitted from the various plant may well be masked by existing sources of sound in the area.

5 Assessment

The predicted daytime and night-time specific sound and corresponding rating levels (i.e. including a 2 dB penalty for tones) at the properties located nearest to the Proposed Development are shown in **Table 7**. The rating level is compared to the adopted background levels for daytime and night-time periods to provide the associated impact at each residential location.

The inverters to be installed as part of the Proposed Development are assumed not to be operating during the night. Whilst they may start to become operational during particularly bright early summer mornings, they will not be operating near maximum capacity during these periods and the corresponding levels would not alter the conclusions of this report.

The lowest background levels, as taken from the assessment in support of the consented solar farm to the east of the Proposed Development, have been used to represent each residential location referenced herein and is considered to provide a conservative basis of assessment (see **Section 3.3**).

The resultant impact is described as 'negligible' if the rating level is 10 dB or more below the background sound level; 'low' if less than or equal to the background sound level; 'minor' if not more than 5 dB above; 'moderate' if not more than 10 dB above and 'major' if more than 10 dB above. These criteria compare to the categories defined by the NPSE (see **Section 2.2**), with rating levels less than or equal to background sound level representing the NOEL, 5 dB above background representing the LOAEL and 10 dB above background the SOAEL.

The assessment indicates that the predicted impacts from the Proposed Development at the nearest neighbouring residences are typically negligible or close-to-negligible during the day and negligible-to-low during the night-time. Furthermore, the predicted specific and rating levels are low, to the point at which the 1997 version of BS4142 considered the standard was not appropriate for use (see **Section 2.7**).

Table 7 – BS4142 Assessment

House ID	Specific Level, dB L_{Aeq}	Rating Level, dB L_{Ar}	Background Level, dB L_{A90}	L_{Ar} – L_{A90}, dB	Potential Impact
			Daytime		
H5	25	27	41	-14	Negligible
H6	26	28	41	-13	Negligible
H12	31	33	41	-8	Low
H16	29	31	41	-10	Negligible
H17	23	25	41	-16	Negligible
H19	23	25	41	-16	Negligible

House ID	Specific Level, dB L_{Aeq}	Rating Level, dB L_{Ar}	Background Level, dB L_{A90}	L_{Ar} - L_{A90}, dB	Potential Impact
H59	25	27	41	-14	Negligible
H62	31	33	41	-8	Low
H85	23	25	41	-16	Negligible
H88	23	25	41	-16	Negligible
H89	23	25	41	-16	Negligible
H92	31	33	41	-8	Low
H97	23	25	41	-16	Negligible
		Night-time			
H5	16	18	34	-16	Negligible
H6	17	19	34	-15	Negligible
H12	29	31	34	-3	Low
H16	26	28	34	-6	Low
H17	14	16	34	-18	Negligible
H19	14	16	34	-18	Negligible
H59	15	17	34	-17	Negligible
H62	19	21	34	-13	Negligible
H85	14	16	34	-18	Negligible
H88	15	17	34	-17	Negligible
H89	15	17	34	-17	Negligible
H92	18	20	34	-14	Negligible
H97	13	15	34	-19	Negligible

A further assessment has been undertaken to establish the overall impact of the Proposed Development operating at the same time as the neighbouring solar farm (i.e. cumulatively).

The specific sound levels from the South Oxfordshire Solar Farm for daytime (maximum capacity) periods have been extracted from the report supporting the application for the consented site [10] and the corresponding night-time noise levels have been assumed to be 5 dB lower than this as a conservative basis of assessment. Where the precise level has not been reported for the residence of interest listed in this report, this has been inferred from the noise mapping supplied.

The predicted specific sound levels from each site have been added logarithmically, an overall 2 dB penalty has been applied and the overall rating level is compared with the adopted background noise levels in the same manner as for the isolative assessment.

Table 8 shows the specific sound level from the Proposed Development, the neighbouring site and the combined total. The resultant assessment is provided in **Table 9**.

Table 8 - Specific Sound Levels, dB L_{Aeq}

House ID	Proposed Development, dB L_{Aeq}		South Oxfordshire Solar Farm, dB L_{Aeq}		Total, dB L_{Aeq}	
	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time
H5	25	16	26	21	29	22
H6	26	17	26	21	29	22
H12	31	29	17	12	31	29
H16	29	26	18	13	29	26
H17	23	14	10	5	23	15
H19	23	14	10	5	23	15
H59	25	15	15	10	26	16
H62	31	19	14	9	31	19
H85	23	14	12	7	24	15
H88	23	15	9	4	23	15
H89	23	15	9	4	23	15
H92	31	18	15	10	31	19
H97	23	13	13	8	24	15

Table 9 - Cumulative BS4142 Assessment

House ID	Specific Level, dB L_{Aeq}	Rating Level, dB L_{Ar}	Background Level, dB L_{A90}	L_{Ar} - L_{A90}, dB	Potential Impact
			Daytime		
H5	29	31	41	-10	Negligible
H6	29	31	41	-10	Negligible
H12	31	33	41	-8	Low
H16	29	31	41	-10	Negligible
H17	23	25	41	-16	Negligible
H19	23	25	41	-16	Negligible
H59	26	28	41	-13	Negligible
H62	31	33	41	-8	Low
H85	24	26	41	-15	Negligible
H88	23	25	41	-16	Negligible
H89	23	25	41	-16	Negligible
H92	31	33	41	-8	Low
H97	24	26	41	-15	Negligible
			Night-time		
H5	22	24	34	-10	Negligible
H6	22	24	34	-10	Negligible

House ID	Specific Level, dB L_{Aeq}	Rating Level, dB L_{Ar}	Background Level, dB L_{A90}	L_{Ar} - L_{A90}, dB	Potential Impact
H12	29	31	34	-3	Low
H16	26	28	34	-6	Low
H17	15	17	34	-17	Negligible
H19	15	17	34	-17	Negligible
H59	16	18	34	-16	Negligible
H62	19	21	34	-13	Negligible
H85	15	17	34	-17	Negligible
H88	15	17	34	-17	Negligible
H89	15	17	34	-17	Negligible
H92	19	21	34	-13	Negligible
H97	15	17	34	-17	Negligible

The cumulative assessment indicates that overall operational levels are, similarly to the isolative assessment, typically negligible or close-to-negligible during the day and negligible-to-low during the night-time. The predicted specific and rating levels also remain low, to the point at which the 1997 version of BS4142 considered the standard was not appropriate for use.

Overall, based on the noise modelling assumptions and assessment results presented here, the sound emitted by the Proposed Development, operating in isolation and in a cumulative context, can be considered 'present and not intrusive' in terms of government policy and guidance provided within the NPSE & NPPG (see **Sections 2.2 & 2.3** respectively). This corresponds to the 'No Observed Effect Level' (NOEL) and no specific action is required to mitigate operational noise associated with the introduction of the site. As a result, it is considered that the site should not be refused planning permission on the grounds of potential sound levels emitted by the development proposals.

Illustrative sound footprints for the Proposed Development showing the predicted specific sound levels (dB L_{Aeq}) for daytime and night-time periods respectively are provided in **Figures 1 & 2**.

The wording for a suggested planning condition that would restrict noise/sound associated with the introduction of the Proposed Development, should the site gain planning consent, is provided in **Appendix B**.

6 Conclusions

An assessment of the acoustic impact of the proposed Nuneham Solar Farm has been undertaken. The results indicate that sound from the site, operating in isolation and cumulatively with a consented solar farm to the east, is typically negligible or close-to-negligible during the day and negligible-to-low during the night.

Overall, the predicted levels can be considered 'present and not intrusive' in terms of government policy and guidance provided within the NPSE & NPPG.

Figure 1 – Daytime Sound Contour Plot, dB L_{Aeq}

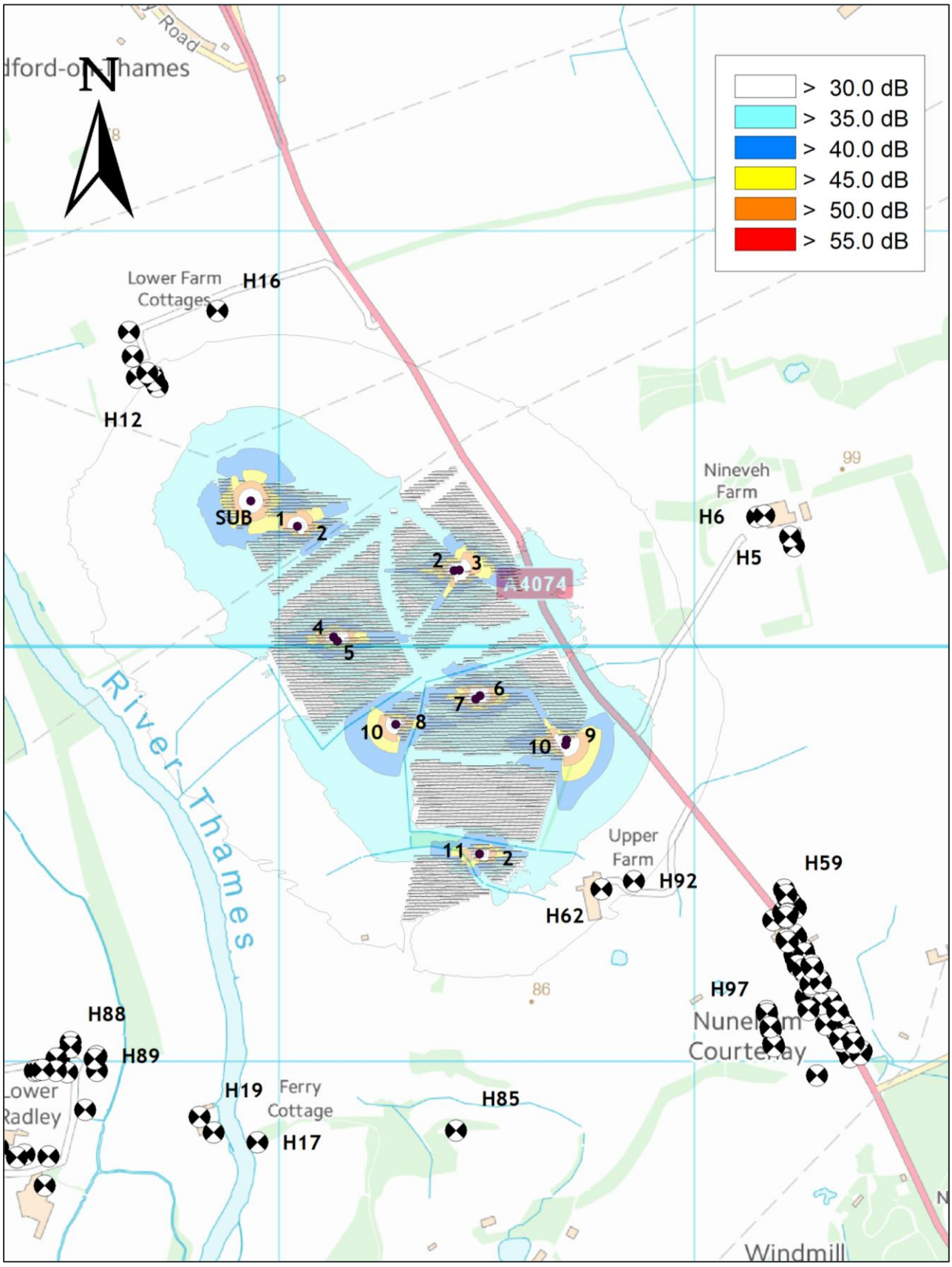
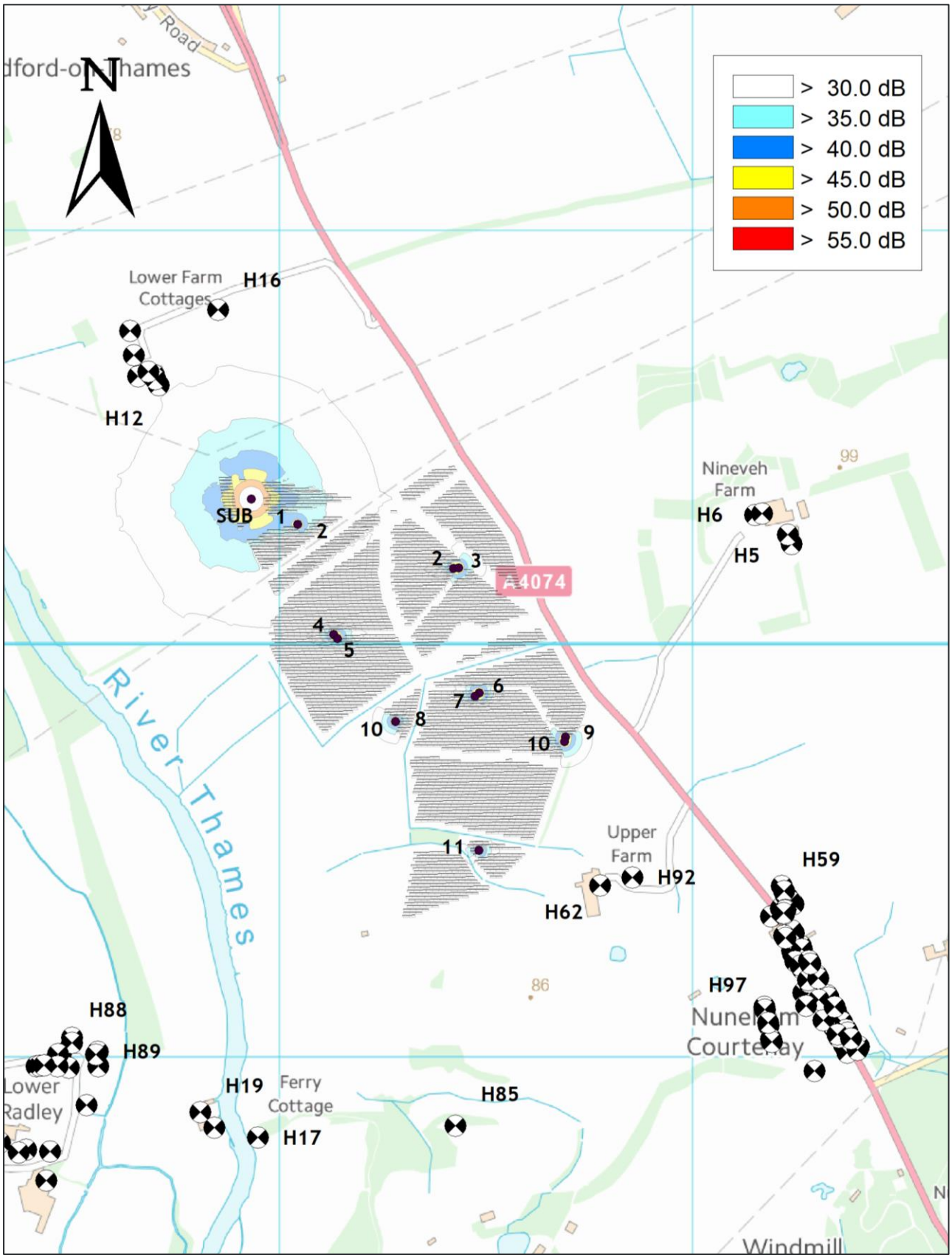


Figure 2 - Night-time Sound Contour Plot, dB L_{Aeq}



7 References

[1] Department for Levelling Up, Housing and Communities (September 2023) National Planning Policy Framework

[2] Department for Environment, Food and Rural Affairs (March 2010) Noise Policy Statement for England

[3] Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government (July 2019) National Planning Practice Guidance: Noise

[4] Department for Energy Security & Net Zero (November 2023) Overarching National Policy Statement for Energy (EN-1)

[5] Department for Energy Security & Net Zero (November 2023) National Policy Statement for Renewable Energy Infrastructure (EN-3)

[6] Department for Energy Security & Net Zero (November 2023) National Policy Statement for Electricity Networks Infrastructure (EN-5)

[7] British Standards Institution (2019) BS 4142:2014 + A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound

[8] British Standards Institution (1997) BS 4142:1997 Rating Industrial Noise Affecting Mixed Residential and Industrial Areas

[9] inacoustic (November 2020) South Oxfordshire Solar Farm - Noise Impact Assessment

[10] International Organisation for Standardisation (December 1996) ISO 9613-2:1996 Acoustics - Attenuation of Sound During Propagation Outdoors - Part 2: General Method of Calculation

[11] International Organisation for Standardisation (June 1993) ISO 9613-1:1993 Acoustics - Attenuation of Sound During Propagation Outdoors - Part 1: Calculation of the Absorption of Sound by the Atmosphere

Appendix A – Experience & Qualifications

Table A.1 - Author

Name	Mike Craven
Experience	Senior Acoustic Specialist, Renewable Energy Systems (RES), 2023-Present Principal Acoustic Consultant, Hayes McKenzie Partnership Limited (HMPL), 2019-2022 Senior Acoustic Consultant, HMPL, 2013-2019 Acoustic Consultant, HMPL, 2011-2013 Acoustic Consultant, URS/Scott Wilson, 2008-2011 Acoustic Consultant, HMPL, 2004-2008
Qualifications	MIOA, Member of the Institute of Acoustics BSc Audio Technology, University of Salford

Table A.2 - Checker

Name	Stuart Hill
Experience	Senior Acoustic Specialist, 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	AMIOA, Associate 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	Dr Jeremy Bass
Experience	Head of Specialist Services/Senior Technical Manager, RES, 2000-Present Technical Analyst/Senior Technical Analyst, RES, 1990-2000 Foreign Exchange Researcher, Mechanical Engineering Laboratory, Tsukuba, Japan, 1989-1990 Research Associate, Energy Research Unit, Rutherford Appleton Laboratory, 1986-1989
Qualifications	MIOA, Member of the Institute of Acoustics MInstP, Member of the Institute of Physics PhD, The Potential of Combined Heat & Power, Wind Power & Load Management for Cost Reduction in Small Electricity Supply Systems, Department of Applied Physics, University of Strathclyde BSc Physics, University of Durham

Appendix B – Suggested Planning Condition Wording

The solar farm shall be designed and operated to ensure that the rating sound level, determined using the BS 4142:2014 methodology external to a property not associated with the development, shall not exceed the pre-existing background sound level for both daytime and night-time periods.