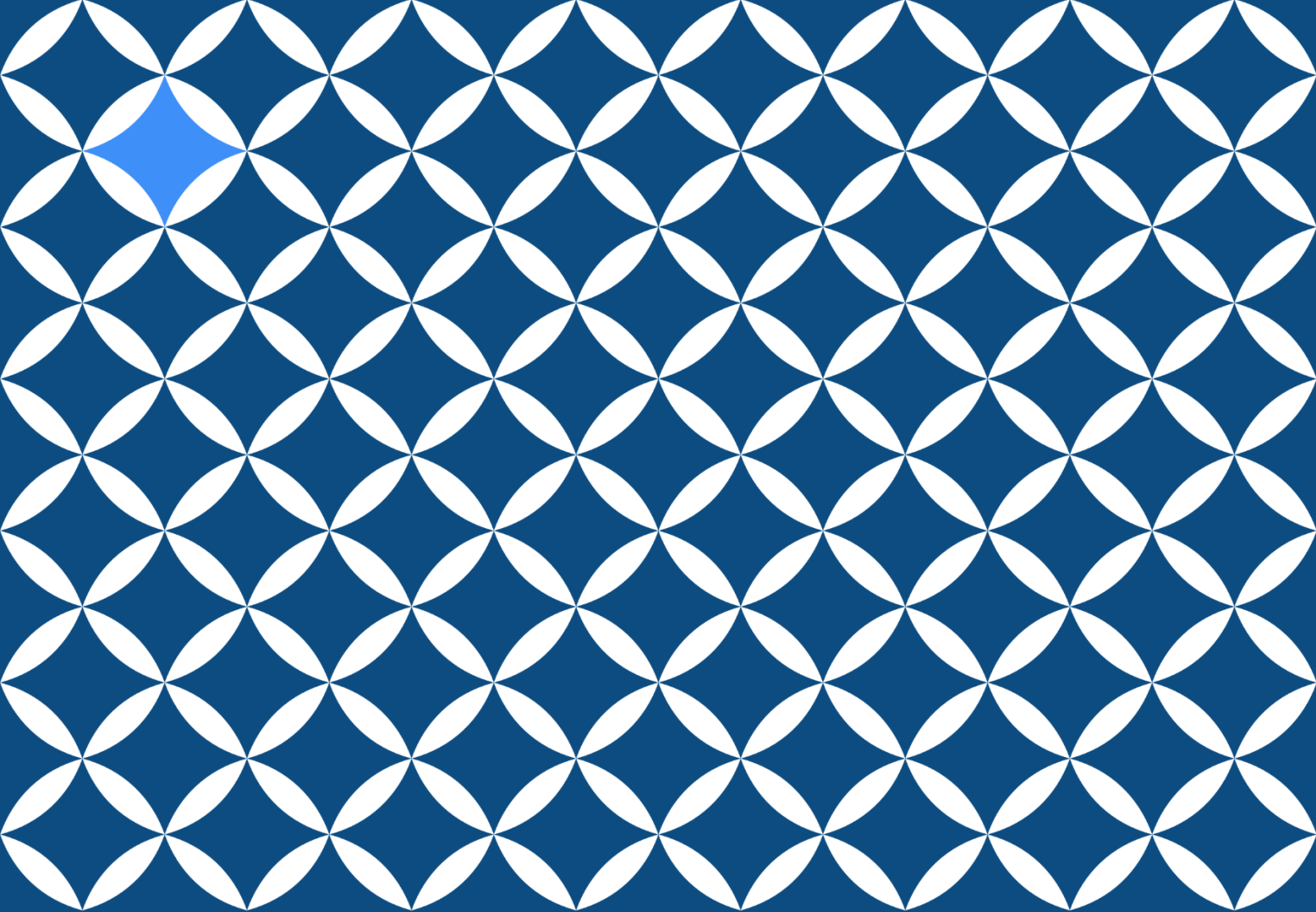




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Battery Storage Facility, Atworth, Melksham, Wiltshire

Environmental Noise Impact Assessment

P2523-REP03-BDH

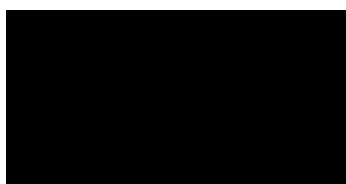
24 April 2025

PROJECT Battery Storage Facility, Atworth, Melksham,
Wiltshire
Environmental Noise Impact Assessment

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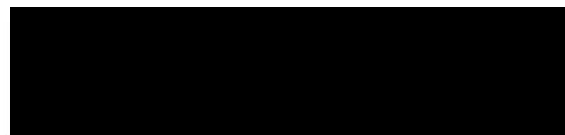
**DOCUMENT
REFERENCE** P2523-REP03-BDH

SIGNED



BRIAN HORNER

CHECKED



SIMON FERENCZI

DATE 24 / 04 / 2025

REVISIONS

Reviewer	Date	Description

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Name of Organisation Sol Acoustics Limited

Company Registration Number 4218702

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1 Executive Summary

- 1.1 Sol Acoustics Ltd ("Sol") has been appointed to provide an environmental noise impact assessment of the proposed Battery Energy Storage Site ("BESS") which is intended to be located off Bath Road in Atworth, Melksham SN12 8S (hereinafter referred to as the "Facility").
- 1.2 This acoustic assessment report considers the environmental noise impact that is predicted to be arising from the operation of all plant and processes associated with the intended Facility, at the nearest Noise Sensitive Receptors ("NSRs") during the proposed hours of operation (namely 24/7 operation).
- 1.3 The pre-existing environmental noise climate at the identified NSRs has been measured by Sol, between Thursday 31st October and Sunday 3rd November 2024 (inclusive).
- 1.4 The environmental noise emissions that are predicted to be arising from the operation of the complete plant have been quantified, modelled, and assessed using proprietary "CadnaA" 3D noise modelling software.
-  1.5 ***It is the conclusion of this environmental noise impact assessment that the total, aggregate environmental noise impact arising from the proposed operation of the Facility shall result in a low noise impact at the worst affected noise sensitive receptors, following the consideration of the context in which the sound occurs, all as assessed in accordance with British Standard BS4142: 2014+A1: 2019, provided also that the maximum permitted individual plant noise limits as specified herein are not exceeded in any instance, in actual practice.***
-  1.6 ***It must be noted that the outcome of this assessment does not demonstrate full compliance with Planning Condition 14 of the June 2022 Planning Consent (planning reference: PL/2021/08690) for the Facility. This is due to the fact that the predicted Rating Level shall exceed the measured Background Sound Level at some locations, primarily as due to the very low Background Sound Levels recorded in such instances. It will therefore be essential for others to agree a relaxation of the current wording of Planning Condition 14 with the Local Authority on this basis, prior to any finalisation of the scheme (and prior to any procurement of plant and equipment).***

2 Introduction

2.1 Sol Acoustics Ltd ("Sol") has been appointed to provide an environmental noise impact assessment for the proposed Battery Energy Storage Site ("BESS") that is proposed to be located off Bath Road in Atworth, Melksham SN12 8S (hereinafter referred to as the "Facility").

2.2 The purpose of this acoustic assessment is as follows:

- ◆ Identify the nearest pre-existing noise sensitive receptors ("NSRs") that are most likely to be affected by environmental noise arising from plant that is associated with the proposed Facility.
- ◆ Determine the prevailing, pre-existing baseline background noise climate at the worst affected NSR, through direct, environmental noise measurement.
- ◆ Identify all significant noise sources associated with the Facility.
- ◆ Calculate the resultant environmental noise level contribution and impact at the nearest NSRs to the Facility, taking factors such as distance to receptors, acoustic screening effects and other environmental features into consideration.
- ◆ Carry out an environmental noise assessment of the Facility in accordance with the assessment methodology that is prescribed in relevant Standards (e.g. British Standard 4142: 2014+A1: 2019) and other acoustic guidance, in order to determine the likely significance of the noise impact generated.

2.3 This acoustic report is structured as follows:

- ◆ Section 3 provides a basic description of the Facility and key surrounding NSRs.
- ◆ Section 4 provides summary details of the benchmark environmental noise survey undertaken in order to determine the pre-existing environmental noise climate at the identified NSRs.
- ◆ Section 5 provides the results of the benchmark environmental noise survey.
- ◆ Section 6 provides a summary of the pertinent acoustic Standards which has been used to assess the magnitude of the noise impact likely to be generated.
- ◆ Section 7 provides a summary of the proprietary 3D acoustic models constructed and acoustic calculations undertaken.
- ◆ Section 8 provides a BS4142: 2014+A1: 2019 acoustic assessment and provides a noise management plan in outline terms.
- ◆ Section 9 provides a conclusion statement.
- ◆ *Appendix A provides a glossary of acoustic terminology.*
- ◆ *Appendix B provides details of the noise surveys undertaken and a summary of the data obtained from these.*
- ◆ *Appendix C provides details of the 3D computer noise model as constructed for this project.*
- ◆ *Appendix D gives details and qualifications of contributing Sol's staff.*

3 Description of Site

3.1 General Overview and Noise Sensitive Receptors (NSRs)

- 3.1.1 The proposed Facility is to be located off Bath Road in Atworth, Melksham SN12 8SB in a rural setting.
The surrounding area is predominantly farmland. There is an existing solar farm to the southeast and industrial units to the north of the proposed Facility.
- 3.1.2 The nearest identified existing residential housing to the proposed BESS part of the Facility is as follows:
- A. Housing off Bath Road, c.340 metres distance to the north.
 - B. 10 Bath Road, c.250 metres distance to the northeast.
 - C. Studley Farm, located within the centre of the site.
 - D. Housing off Coombe Lane, c.350 metres distance to the southwest.
 - E. Housing on the Common, c.320 metres distance to the southeast.
- 3.1.3 Sol is not aware of any specific land designations (SSSI, AONB, Local Nature Reserves, RAMSAR etc.) or other ecological receptors in the vicinity of the Facility that are sensitive to noise. ***Others must advise Sol if any ecological receptor(s) are to be considered within the required scope of the environmental noise impact assessment, prior to any finalisation of the scheme.***
- 3.1.4 Figure 1 overleaf indicates the location of the Facility in relation to the identified residential NSRs, and also the corresponding locations of the noise monitoring positions that have been used in order to inform this acoustic assessment (all as discussed in Section 4 of this report).

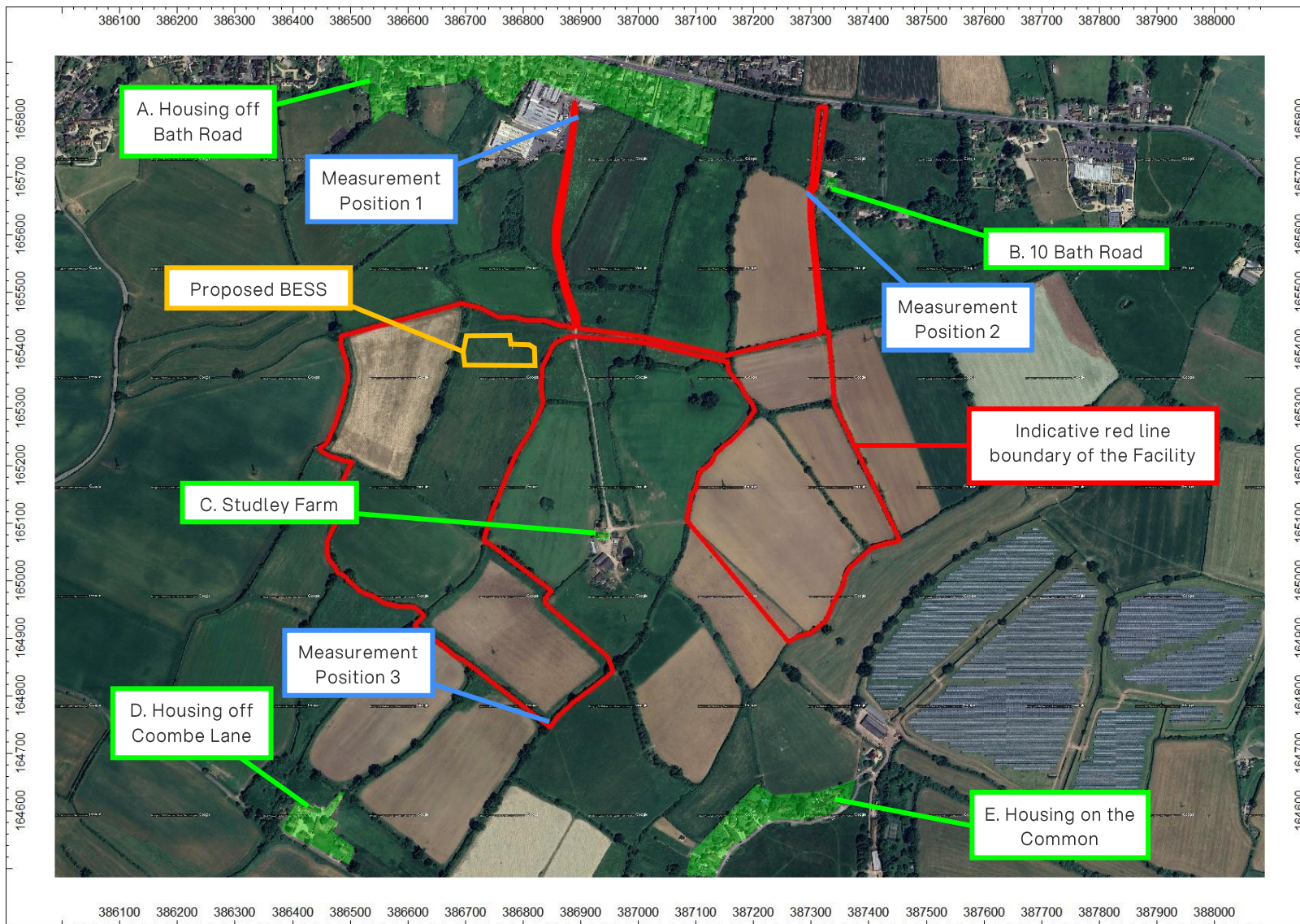


Figure 1: Aerial photo overlaid with noise sensitive receptors and monitoring locations in relation to the Facility (Google 2024)

3.2 Characteristics of the BESS Facility

3.2.1 The proposed BESS Facility will be located on land off Bath Road in Atworth, Melksham. The Facility comprises of the following key elements:

- ◆ 26 no. DC batteries
- ◆ 13 no. AC skids
- ◆ Inverters
 - ◇ 52 no. PV string inverters
 - ◇ 3 no. MV inverters
- ◆ 1 no. auxiliary transformers
- ◆ 1 no. substation

3.2.2 Figure 2 provides an annotated site plan of the complete proposed Facility.

Site Deliveries and Collections

3.2.3 No site traffic is typically expected to occur at the Facility.

Anticipated Noise Level Emissions

3.2.4 Verdant Energy has provided Sol with noise data for the battery DC containers, AC skid, PV inverters and MV inverters. This information is summarised in Tables 1 to 4. (in all instances: the daytime operation is defined as 07:00 – 23:00 hours, and nighttime operation is defined as 23:00 – 07:00 hours):

Noise Source	Operation	Unweighted (Linear) Sound Power Level, L_w dB @ Octave Band Centre Frequency, Hz									Broadband A-weighted Sound Power Level dB L_{WA}
		31.5	63	125	250	500	1k	2k	4k	8k	
Battery DC container	Daytime 50% power	80	75	71	81	78	74	70	65	58	80
	Nighttime 30% power	82	76	70	77	72	69	64	59	53	74

Table 1: Supplier derived sound power level of the DC battery containers

Noise Source	Operation	Unweighted (Linear) Sound Power Level, L_w dB @ Octave Band Centre Frequency, Hz									Broadband A-weighted Sound Power Level dB L_{WA}
		31.5	63	125	250	500	1k	2k	4k	8k	
AC Skids	Daytime 100% load	75	73	75	76	75	69	64	65	67	76
	Nighttime 100% load	75	73	75	76	75	69	64	65	67	76

Table 2: Supplier derived sound power level of the AC skid

Noise Source	Operation	Broadband A-weighted Sound Power Level dB L_{WA}
PV String Inverters	Daytime 100% load	84
	Nighttime 50% load	67

Table 3: Supplier derived sound power level of the PV string inverters

Noise Source	Operation	Broadband A-weighted Sound Power Level dB L_{WA}
MV Inverters	Daytime	83
	Nighttime	75

Table 4: Maximum permissible sound power level for the MV inverters

3.2.5 Sol has been advised that the aux transformer and plant substation are not expected to generate significant levels of noise.

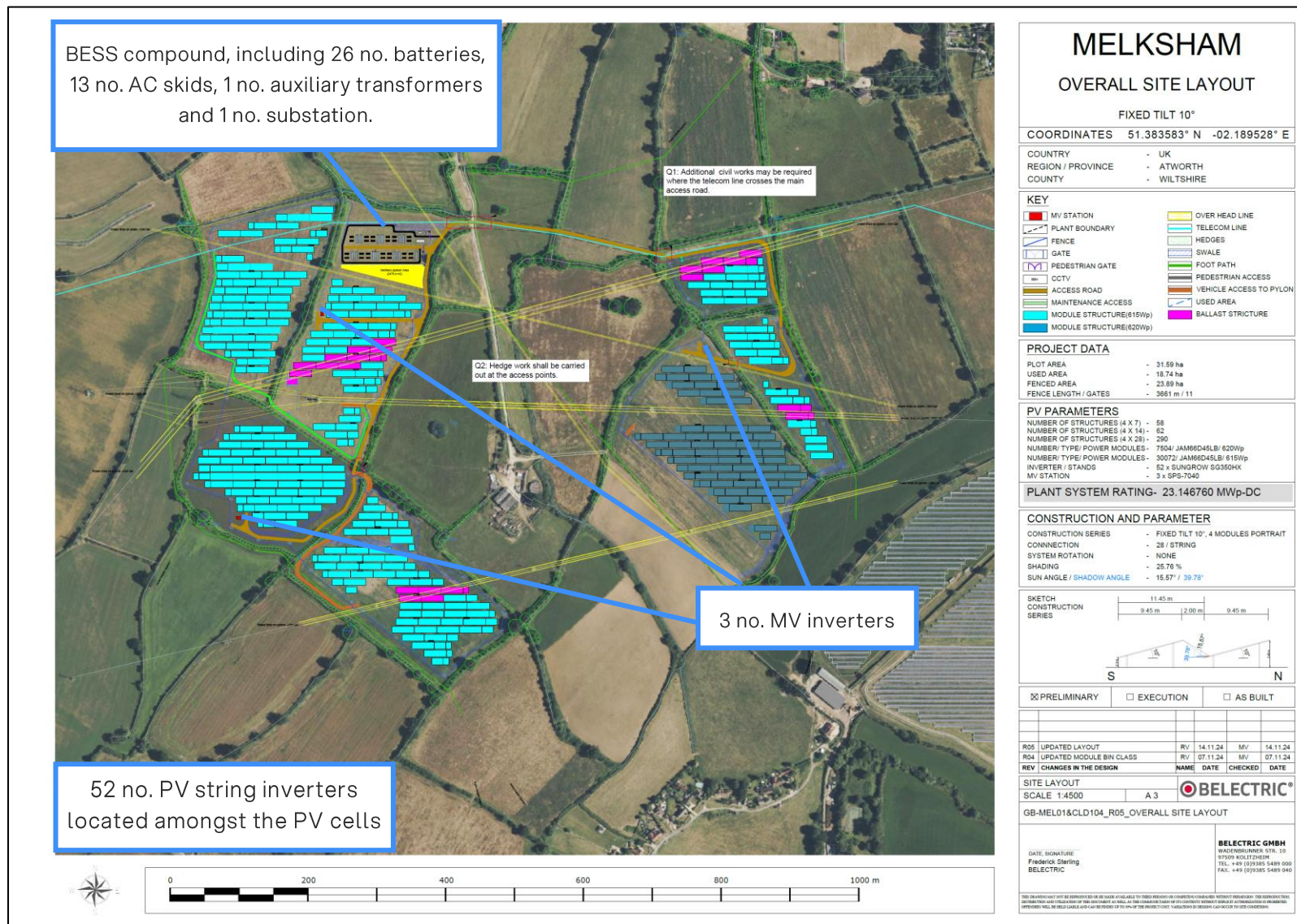


Figure 2: Proposed site plan of the Facility

4 Details of Investigation

4.1 Pre-Existing Environmental Noise Climate

- 4.1.1 In order to inform this environmental noise impact assessment, an environmental noise survey has been conducted by Sol between c.13:30 hours during Thursday 31st October and c.10:30 hours during Sunday 3rd November 2024. The purpose of the noise survey was to determine the prevailing pre-existing Background Sound Levels at the nearest NSRs to the Facility, as during typical weekdays and weekends - including daytime and nighttime periods for environmental noise benchmarking and subsequent acoustic impact assessment purposes.
- 4.1.2 The environmental noise survey consisted of three environmental noise measurement positions, as follows:
- ◆ **Noise Monitoring Position 1:** Mast-mounted microphone at c.2.2 metres above local ground level and c.30 metres distance to the housing off Bath Road. The microphone was mounted in "free field" acoustic conditions. Key noise sources included road traffic noise from Bath Road and some distant construction noise.
 - ◆ **Noise Monitoring Position 2:** Tripod-mounted microphone at c.1.8 metres above local ground level and c.35 metres distance to the housing at 10 Bath Road. The microphone was again mounted in free-field acoustic conditions. Key noise sources included road traffic noise from Bath Road and noise from trees.
 - ◆ **Noise Monitoring Position 3:** Tripod-mounted microphone at c.1.8 metres above local ground level and c.320 metres distance to the housing located on Studley Farm and c.400 metres distance to the housing located off Coombe Lane. The microphone was again mounted in free-field acoustic conditions. Key noise sources included some road traffic noise from the nearby roads and noise from trees.
- 4.1.3 The location of the noise monitoring positions in relation to key existing environmental noise sources is shown in Figure 1. *The full measurement results are as presented in Appendix B.*
- 4.1.4 The noise survey was conducted using Type 1 Precision Grade noise monitoring equipment. The complete sound measuring systems were field calibrated immediately prior to and following the noise survey periods in each case. (Full details of all the instrumentation used are retained on file by Sol, including traceable calibration records; these are available for review if needed).
- 4.1.5 Meteorological data was recorded at Noise Monitoring Position 3 for the duration of the noise survey, as using a Professional Grade Vaisala type "WXT530" weather station. The average rainfall remained below 1mmh⁻¹ and the average wind speed remained below 5ms⁻¹ for the entirety of the survey.
- 4.1.6 Notwithstanding the weather conditions recorded, the microphone system was entirely weatherproofed and fitted with all-weather environmental windshield, with bird spike also.

5 Environmental Noise Survey Results

5.1 Pre-Existing Environmental Noise Climate

- 5.1.1 Appendix B provides fully detailed time history information for the environmental noise levels as recorded for the duration of the environmental noise survey.
- 5.1.2 Table 5 below provides a basic summary of the typical overall, A-weighted noise levels measured at the various noise measurement positions, in $L_{Aeq,T}$ and $L_{A90,15min}$ terms. The specific, measured noise levels pertinent to the required BS 4142: 2014+A1: 2019 environmental noise assessment are as highlighted in ***bold, italic*** text:

Measurement Position	Date	Daytime (07:00 – 23:00 Hours)		Nighttime (23:00 – 07:00 Hours)	
		dB $L_{Aeq,T}$	dB $L_{A90,15min}$ (Typical)	dB $L_{Aeq,T}$	dB $L_{A90,15min}$ (Typical)
1	Thursday 31 October 2024	57*	38	39	21
	Friday 1 November 2024	52	39	39	<i>23</i>
	Saturday 2 November 2024	60	<i>33</i>	37	<i>23</i>
	Sunday 3 November 2024	43*	35	-	-
2	Thursday 31 October 2024	44*	35	35	20
	Friday 1 November 2024	46	39	35	<i>23</i>
	Saturday 2 November 2024	52	<i>33</i>	34	<i>23</i>
	Sunday 3 November 2024	43*	35	-	-
3	Thursday 31 October 2024	40*	31	32	20
	Friday 1 November 2024	41	34	31	21
	Saturday 2 November 2024	55	<i>33</i>	31	<i>22</i>
	Sunday 3 November 2024	40*	31	-	-

Table 5: Summary of typical, measured broadband environmental noise levels

6 Environmental Noise Performance Specification Requirements

6.1 National Planning Policy Framework 2024

- 6.1.1 The National Planning Policy Framework ("NPPF") sets out the UK Government's requirements for the planning system. Paragraph 187 advises:

'... Planning policies and decisions should contribute to and enhance the natural and local environment by... e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of... noise pollution... Development should, wherever possible, help to improve local environmental conditions ...'

- 6.1.2 With specific regard to noise, paragraph 198 states that:

*'... Planning policies and decisions should aim to...mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
... identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason ...'*

6.2 National Planning Policy Framework (Proposed Reforms Consultation) (England)

- 6.2.1 During July 2024, a consultation on the NPPF was released, seeking views on the governments proposed approach to revising the NPPF in order to achieve sustainable growth in our planning system. They are also seeking views on a series of wider policy proposals. These include seeking to strengthen the operation of the presumption for sustainable development and reintroducing mandatory housing targets through a revised standard method to calculate housing need.
- 6.2.2 The adoption of the NPPF adoption is anticipated before the end of the year 2024; until such time, only very limited weight can be given to these changes in deciding any planning application.

6.3 Noise Policy Statement for England

6.3.1 The Noise Policy Statement for England ("NPSE") was issued in 2010 and was published by the Department for Environment, Food and Rural Affairs ("DEFRA"). The purpose of the NPSE is to '*... Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development ...*' The aims of the NSPE are as follows:

- ◆ Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise (which includes noise from industrial site) as within the context of Government policy on sustainable development.
- ◆ Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
- ◆ Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

6.3.2 The NPSE effect levels that relate to the likelihood of significant adverse effects on health and quality of life are as follows:

- ◆ NOEL – "No Observed Effect Level": The level below which no effect can be detected
- ◆ LOAEL – "Lowest Observed Adverse Effect Level": The level above which adverse effects on health and quality of life can be detected; and
- ◆ SOAEL – "Significant Observed Adverse Effect Level": The level above which significant adverse effects on health and quality of life occur.

6.3.3 The NPSE states that a "single objective" noise (or vibration) based measure applicable to all sources and receptors that defines the onset of LOAEL and SOAEL is not possible. However, the thresholds for the onset of each of the effect levels can be defined based upon relevant policy, available Standards, and technical guidance.

6.4 Planning Practice Guidance on Noise 2019

6.4.1 The Planning Practice Guidance on Noise ("PPG-N") was published in March 2014 and updated in July 2019. It advises on how planning can manage potential noise impacts in new development. The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation. These factors include:

- *'... the source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day – this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;*
- *for a new noise making source, how the noise from it relates to the existing sound environment;*
- *for non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;*
- *the spectral content of the noise (i.e. whether or not the noise contains particular high or low frequency content) and the general character of the noise (i.e. whether or not the noise contains particular tonal characteristics or other particular features), and;*
- *the local arrangement of buildings, surfaces and green infrastructure, and the extent to which it reflects or absorbs noise ...'*

6.4.2 More specific factors to consider when relevant include:

- *'... the cumulative impacts of more than one source of noise;*
- *whether any adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time (and the effect this may have on living conditions). In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations.*
- *In cases where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in the overall noise level may result in a significant adverse effect occurring even though little to no change in behaviour would be likely to occur.*
- *Noise Action Plans (where these exist), and, in particular the Important Areas identified through the process associated with the Environmental Noise Directive and corresponding regulations should be taken into account. Defra's website has information on Noise Action Plans and Important Areas. Local authority environmental health departments will also be able to provide information about Important Areas.*
- *the effect of noise on wildlife. Noise can adversely affect wildlife and ecosystems. Particular consideration needs to be given to the potential effects of noisy development on international, national and locally designated sites of importance for biodiversity;*

- *where external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.*
- *some commercial developments including restaurants, hot food takeaways, night clubs and public houses can have particular impacts, not least because activities are often at their peak in the evening and late at night. Local planning authorities will wish to bear in mind not only the noise that is generated within the premises but also the noise that may be made by customers in the vicinity ...'*

6.4.3 The Observable Adverse Effect Level terms presented in the NPSE are adopted in the Government's PPG-N which presents a table of example outcomes to help characterise the level of effect is reproduced in Table 6.

Response	Example of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not Present	No Effect	No Observed Effect	No Specific Measures Required
No Observed Adverse Effect Level			
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			
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 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			
Present and Disruptive	The noise causes a material change in the 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 on 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

Table 6: PPG-N noise exposure hierarchy table

6.5 Wiltshire Core Strategy, Adopted January 2015

6.5.1 The Wiltshire Core Strategy was adopted during January 2015. Core Policy 42 considers the potential impact from new renewable energy installations development on existing noise sensitive receptors and states the following:

'... Core Policy 42

Standalone renewable energy installations

Proposals for standalone renewable energy schemes will be supported subject to satisfactory resolution of all site specific constraints. In particular, proposals will need to demonstrate how impacts on the following factors have been satisfactorily assessed, including any cumulative effects, and taken into account:

- i. The landscape, particularly in and around AONBs*
- ii. The Western Wiltshire Green Belt*
- iii. The New Forest National Park*
- iv. Biodiversity*
- v. The historic environment including the Stonehenge and Avebury World Heritage Site and its setting*
- vi. Use of the local transport network*
- vii. Residential amenity, including noise, odour, visual amenity and safety*
- viii. Best and most versatile agricultural land.*

Applicants will not be required to justify the overall need for renewable energy development, either in a national or local context ...'

6.6 Noise Related Planning Conditions

6.6.1 Planning Permission for the Facility was granted by Wiltshire Council during 9th June 2022 (planning references: PL/2021/08690). Planning Condition 14 relates to noise and is reproduced below:

- '...14
- i) *No development shall commence until an assessment of the acoustic impact arising from the likely operation of the solar farm has been undertaken in accordance with BS 4142: 2019 and submitted to the Local Planning Authority and agreed in writing. This assessment shall include where necessary, a scheme of attenuation measures to demonstrate the rated level of noise shall be at or below the measured background and is protective of local amenity. Background levels are to be taken as a 15 minute LA90 at the boundary of the nearest residential noise-sensitive receptors.*
 - ii) *A post installation noise assessment shall be carried out within 3 months of completion of the development to confirm compliance with the noise criteria and additional steps required to achieve compliance shall be taken, as necessary. The details as approved shall be submitted to and agreed in writing by the LPA. The approved details will be implemented and thereafter be permanently retained.*

REASON: The matter is required to be agreed with the Local Planning Authority before development commences in order that the development is undertaken in an acceptable manner, such that appropriate levels of amenity are achievable ...'

6.7 BS4142: 2014+A1: 2019 'Method for rating and assessing industrial and commercial sound'

6.7.1 BS 4142: 2014+A1: 2019: 'Method for rating and assessing industrial and commercial sound' is intended to be used to assess noise of an industrial nature, which includes sound from fixed installations comprising of mechanical and/or electrical plant and equipment. The methods prescribed in this British Standard use outdoor sound levels in order to assess the likely effects of sound on people who might be inside or outside a dwelling or premises that is used for residential purposes upon which sound is incident.

6.7.2 The procedure contained in BS 4142: 2014+A1: 2019 for assessing environmental noise impact is to compare the measured or predicted noise level from the source in question - the "Specific Sound Level" immediately outside the noise sensitive premises - with the corresponding "Background Sound Level". Where the noise contains attention attracting characteristics such as tonal, impulsive and/or intermittent elements, it may be appropriate to apply a correction to the Specific Sound Level in order to obtain the "Rating Level."

6.7.3 BS 4142:2014+A1:2019 states that the significance of sound arising from an industrial and/or commercial nature depends upon both the margin by which the Rating Level of the specific sound source exceeds the Background Sound Level, and also the context in which the sound occurs:

- a) Typically, the greater this difference, the greater the magnitude of the impact;
- b) A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- c) A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context;
- d) The lower the Rating Level is relative to the measured Background Sound Level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the Rating Level does not exceed the Background Sound Level, this is an indication of the specific sound source having a low impact, depending on the context.

6.7.4 For the daytime, the assessment is conducted over a one-hour period, and over a 15-minute period at night. The daytime and nighttime periods are defined as occurring between 07:00 hours to 23:00 hours, and 23:00 hours to 07:00 hours, respectively.

6.7.5 For BS 4142:2014+A1:2019 assessment purposes, it is necessary to determine the typical Background Sound Level as occurring during each assessment period. Section 8.1 of BS 4142:2014+A1:2019 states the following:

'... In using the background sound level in the method for rating and assessing industrial and commercial sound it is important to ensure that values are reliable and suitably represent both the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods ...'

6.7.6 The typical Background Sound Level has been determined based upon statistical analysis of the full, measured dataset (in histogram form, and considering the modes and median of the data sets).

6.7.7 Table 7 specifies the *typical* Background Sound Levels at each of the identified NSRs:

Noise Sensitive Receptors	Representative Noise Measurement Position	Typical Background Sound Level at Each Assessed NSR, dB $L_{A90,15min}$	
		Daytime (07:00 – 23:00 hours)	Nighttime (23:00 – 07:00 hours)
A. Housing off Bath Road, (c.340 metres to the north)	1	33	23
B. 10 Bath Road (c.250 metres to the north east)	2	33	23
C. Studley Farm, (centre of the site)	3	33	22
D. Housing off Combe Lane, (c.350 metres to the south west)	3	33	22
E. Housing on the Common, (c.320 metres to the south east)	3	33	22

Table 7: Typical Background Sound Level at each assessed NSR

6.7.8 It shall be noted that the intended operation of the Facility is for a continuously running, 24/7 basis. Accordingly, therefore, it is the nighttime typical Background Sound Levels that are most pertinent (and most onerous) for the purposes of noise impact assessment.

6.8 BS8233: 2014

- 6.8.1 British Standard 8233:2014: 'Guidance on sound insulation and noise reduction for buildings' provides guidance for the control of noise in and around buildings. This guidance is applicable to the design of new buildings and also refurbished buildings undergoing a change of use, but not for the purposes of assessing the effects of changes in the external noise levels to occupants of an existing building.
- 6.8.2 The guidance provided includes appropriate internal and external noise level criteria which are applicable to dwellings for steady external noise sources. It is stated that it is desirable that the internal ambient noise level does not exceed the criteria reproduced from the Standard in Table 8:

BS8233: 2014 – Indoor ambient noise levels for dwellings			
Activity	Location	07:00 to 23:00 Hours	23:00 to 07:00 Hours
Resting	Living room	35dB $L_{Aeq,16hours}$	-
Dining	Dining room / area	40dB $L_{Aeq,16hours}$	-
Sleeping (daytime resting)	Bedroom	35dB $L_{Aeq,16hours}$	30dB $L_{Aeq,8hours}$

Table 8: Indoor ambient noise levels for dwellings (BS8233)

- 6.8.3 With respect to external amenity space such as gardens and patios, it is stated that it is desirable that the noise level does not exceed 50dB $L_{Aeq,T}$, with an upper guideline value of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments.

- 6.8.4 The Standard also advises that higher external noise criteria may be appropriate under certain circumstances, such as within city centres, urban areas and/or locations adjoining the strategic network etc., where it may be necessary to compromise between elevated noise levels and other factors such as convenience of living, and efficient use of land resource. (However, such aspects are not considered to be unduly pertinent to this project).
- 6.8.5 The assessment methodology described within BS8233 considers the predicted (or measured) Indoor Ambient Noise Level. *"Indoor Ambient Noise"* is defined by the Standard as the '*... noise in a given situation at a given time, usually composed of noise from many sources, inside and outside the building, but excluding noise from activities of the occupants ...*'
- 6.8.6 In short, therefore, the BS8233-defined Indoor Ambient Noise Level includes noise from all environmental noise sources, including road traffic, industrial noise etc., as well as noise from any building services equipment (i.e. mechanical ventilation and/or plant including any serving the assessed habitable room spaces), in addition to noise specifically arising from the normal operation of the Facility. It specifically excludes noise arising from occupants, televisions, audio equipment, household appliances etc.
- 6.8.7 It shall be noted that the Indoor Ambient Noise Level as presented within Table 8 only applies to noise from "anonymous" noise sources, such as that arising from road traffic etc. Section 7.7.1 of BS8233 states the following:

'... This subclause applies to external noise as it affects the internal acoustic environment from sources without a specific character, previously termed "anonymous noise." Occupants are usually more tolerant of noise without a specific character than, for example, that from neighbours which can trigger complex emotional reactions. For simplicity, only noise without character is considered in [Table 8]. For dwellings, the main considerations are:

- a) for bedrooms, the acoustic effect on sleep; and*
- b) for other rooms, the acoustic effect on resting, listening and communicating.*

NOTE Noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate ...'

- 6.8.8 BS8233 does not provide any further information or guidance for appropriate noise criteria applicable for "non-anonymous" noise such as that as generated by the Facility. Furthermore, BS8233 specifically advises that lower noise level limits may be appropriate if the sound contains a specific acoustic character but otherwise does not specify how this is to be taken into consideration.

7 Environmental Noise Model

7.1 Methodology and Basis of 3D Environmental Noise Models

- 7.1.1 In order to predict the likely noise levels impinging on the surrounding noise sensitive receptors, proprietary 3D computer noise models were created using the DataKustik "CadnaA" noise mapping software. The following assumptions have been made when generating the noise model:
- (a) The noise model was set up to apply the noise prediction methodology set out in ISO 9613-2: 'Acoustics – Attenuation of Sound propagation outdoors – Part 2: General Method of Calculation'.
 - (b) The model was set to include third order reflected noise from solid structures.
 - (c) Ground absorption, as defined in ISO 9613-2, has been taken into consideration. The base ground absorption for the model has been set to $G=1.0$ (soft ground). The ground absorption for large tarmacked areas has been set to $G=0.0$ (hard ground).
 - (d) The existing land topography of the site and surrounding area up to and including the nearest NSR has been taken into consideration in the assessment. Third party topographical information has been obtained from open source data as available from DEFRA.
 - (e) The noise impact as expected the surrounding residential receptors has typically been modelled at a height of 1.5 metres (ground floor level) and 4 metres (first floor level) above local ground level.
 - (f) All externally sited plant noise sources have been modelled as point, line, or area sources, as appropriate, as based on physical size of the plant.
- 7.1.2 Figure 3 provides a three-dimensional visualisation of the noise model used to inform the noise impact assessment. *Appendix C provides further information in respect of the 3D computer environmental noise model.*

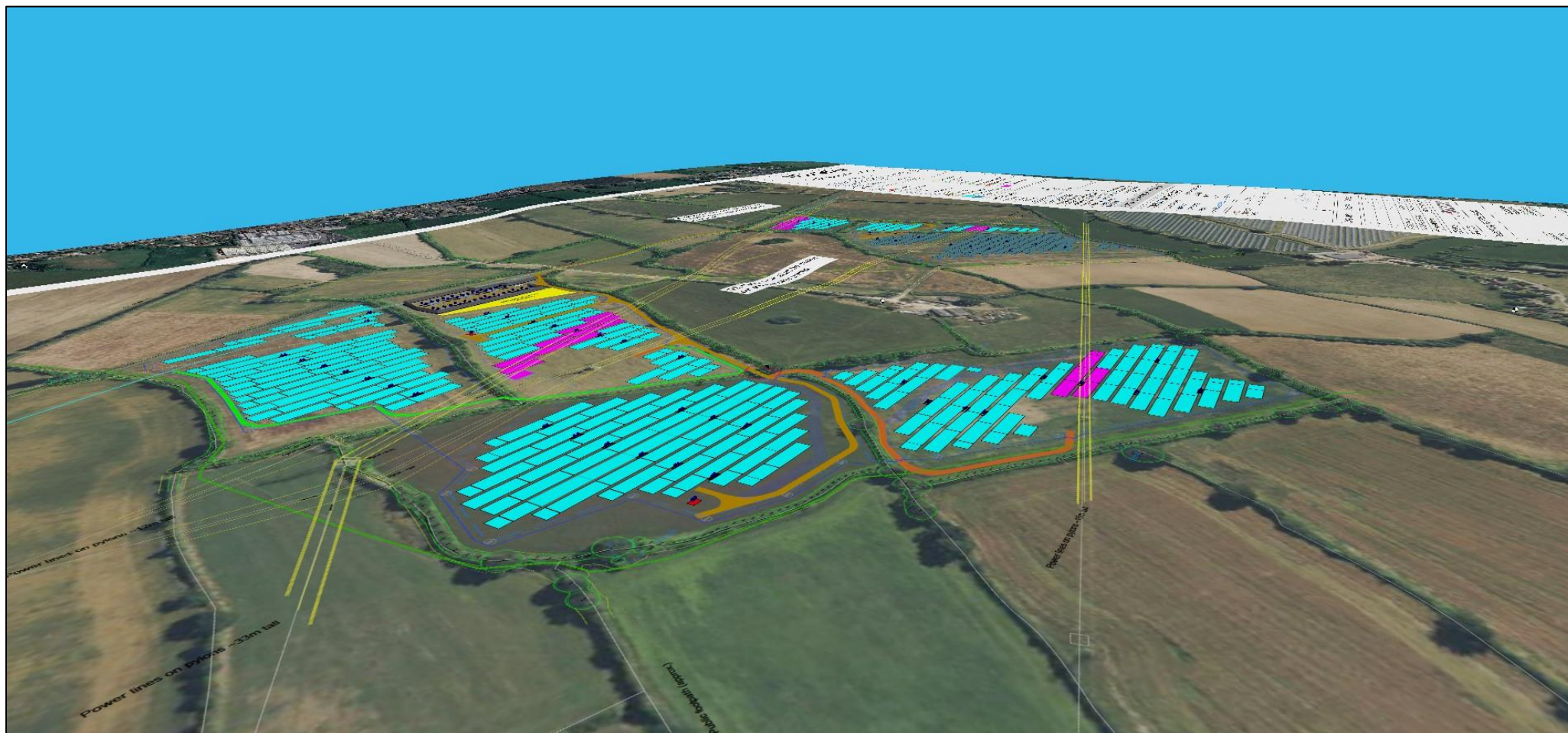


Figure 3: 3D view of the noise model of the Facility (Google 2025)

8 Environmental Noise Impact Assessment

8.1 Noise Impact Assessment (As Proposed)

- 8.1.1 Table 9 and Table 10 overleaf presents the predicted Specific Sound Level at each assessed NSR for the currently proposed Facility during the daytime and nighttime periods, based upon the acoustic specification as presented in Section 3.2 (colour coded according to severity, from green to red).
- 8.1.2 *Appendix C provides the CadnaA noise map of the complete Facility.*

No.	Equipment Name	Predicted Daytime (07:00 – 23:00 hours) Specific Sound Level, dB $L_{Aeq,T}$				
		A. Housing off Bath Road	B. 10 Bath Road	C. Studley Farm	D. Housing off Coombe Lane	E. Housing on the Common
26	Battery DC Containers	25.7	19.0	26.0	16.0	15.6
13	AC Skids	18.6	12.2	19.0	9.2	8.9
52	PV Inverters	22.7	23.2	30.3	23.7	24.0
3	MV Inverters	11.3	12.2	17.4	12.8	10.9
94	Total Specific Sound Level	28.1	25.1	32.1	24.8	24.9

Table 9: Predicted daytime Specific Sound Level at each assessed NSR – at first floor level (4 metres above local ground level)

No.	Equipment Name	Predicted Nighttime (23:00 – 07:00 hours) Specific Sound Level, dB $L_{Aeq,T}$				
		A. Housing off Bath Road	B. 10 Bath Road	C. Studley Farm	D. Housing off Coombe Lane	E. Housing on the Common
26	Battery DC Containers	20.4	13.7	20.6	10.7	10.4
13	AC Skids	18.6	12.2	19.1	9.2	8.9
52	PV Inverters	5.7	6.2	13.4	6.7	7.0
3	MV Inverters	3.3	4.2	9.5	4.8	2.9
94	Total Specific Sound Level	22.7	16.7	23.6	14.4	14.1

Table 10: Predicted nighttime Specific Sound Level at each assessed NSR – at first floor level (4 metres above local ground level)

- 8.1.3 The BS4142:2014+A1:2019 defined Rating Level has been derived from the predicted Specific Sound Level by applying a correction for the acoustic character of the sound. Table 11 presents the BS4142:2014+A1:2019 defined acoustic character which has been used to inform this assessment:

Acoustic Character Classification	Comment / Observation	Acoustic Character Correction Applied, dB
Tonality	The predicted noise emissions from site are dominated by noise from the Battery DC Containers, inverters or skids which are expected to generate noise with a tonal acoustic character. The Specific Sound Level from the Facility is expected to just be similar to the pre-existing Background Sound Level at the worst affected receptor. Thus, the tonal character from the batteries and inverters could be expected to be "just perceptible" at the surrounding NSRs.	+2
Impulsivity	Noise emissions from the Facility are not deemed to be impulsive.	+0
Intermittency	The assessment assumes that the full plant is operating continuously during the daytime and nighttime assessment period. Whilst individual plant may switch on/off as required, it is considered that the acoustic characteristics associated with individual batteries/inverters etc. switching on/off is only expected to be discernible when there are few/no other batteries or inverters operating. In such instances, the resultant Specific Sound Level generated by only a few batteries or inverters operating would be expected to be much lower and would therefore negate the effect any acoustic character correction applied for intermittent operation. Therefore, no correction has been applied.	+0
Other	This correction is not applicable in this instance as the Specific Sound includes tonal and interment characteristics.	+0
Acoustic character correction applied:		+2

Table 11: BS4142:2014+A1:2019 defined Acoustic Character Correction to be applied

- 8.1.4 Table 12 overleaf provides a preliminary BS4142:2014+A1:2019 assessment of each of the identified NSRs.

Noise Sensitive Receptor	Assessment Period	3D Noise Model Predicted Specific Level, dB $L_{Aeq,T}$	Acoustic Character Correction, dB	Predicted Rating Level, dB $L_{A,T}$	Typical Background Sound Level, dB L_{A90}	Rating Level sub. Background $\pm$ dB
A. Housing off Bath Road, (c.340 metres to the north)	Daytime (07:00hrs – 23:00hrs) Ground Floor / Gardens	25	+2	27	33	-6
	Daytime (07:00hrs – 23:00hrs) First Floor	28	+2	30	33	-3
	Nighttime (23:00hrs – 07:00hrs) First Floor	23	+2	25	23	+2
B. 10 Bath Road (c.250 metres to the north east)	Daytime (07:00hrs – 23:00hrs) Ground Floor/ Gardens	21	+2	23	33	-10
	Daytime (07:00hrs – 23:00hrs) First Floor	25	+2	27	33	-6
	Nighttime (23:00hrs – 07:00hrs) First Floor	17	+2	19	23	-4
C. Studley Farm, (centre of the site)	Daytime (07:00hrs – 23:00hrs) Ground Floor/ Gardens	28	+2	30	33	-3
	Daytime (07:00hrs – 23:00hrs) First Floor	32	+2	34	33	+1
	Nighttime (23:00hrs – 07:00hrs) First Floor	24	+2	26	22	+4
D. Housing off Combe Lane, (c.350 metres to the south west)	Daytime (07:00hrs – 23:00hrs) Ground Floor/ Gardens	21	+2	23	33	-10
	Daytime (07:00hrs – 23:00hrs) First Floor	25	+2	27	33	-6
	Nighttime (23:00hrs – 07:00hrs) First Floor	14	+2	16	22	-6
E. Housing on the Common, (c.320 metres to the south east)	Daytime (07:00hrs – 23:00hrs) Ground Floor/ Gardens	21	+2	23	33	-10
	Daytime (07:00hrs – 23:00hrs) First Floor	25	+2	27	33	-6
	Nighttime (23:00hrs – 07:00hrs) First Floor	21	+2	23	22	+1
* Key Green: low impact (less than or equal to 0dB) Amber: sub-adverse impact to adverse impact (i.e. +1dB to +5dB) Red: adverse to significant adverse impact (+6dB or higher)						

Table 12: BS4142:2014+A1:2019 preliminary assessment, as proposed

8.1.5 Table 12 shows that the predicted Rating Level from the Facility during the daytime at ground floor level is not expected to exceed the Background Sound Level, which is an indication of a '*... low impact, depending on the context ...*' in BS4142 terms. The predicted Rating Level from the Facility during the daytime at first floor level is expected to exceed the Background Sound Level by 1dB, which is just above the threshold for an indication of a '*... low impact, depending on the context ...*' in BS4142 terms. The predicted Rating Level from the Facility during the nighttime is expected exceed the Background Sound Level by up to +4dB, which is just below the threshold for an indication of an '*... adverse impact, depending on the context ...*' in BS4142 terms.

8.1.6 The predicted magnitude of the impact is subject to the consideration of context. BS4142 states the following with regards to context:

'... Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following.

- 1) *The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.*

Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night ...'

8.1.7 The predicted worst case Specific Sound Level at ground floor level is 28dB $L_{Aeq,T}$. As a reasonable worst case would be for occupants to be located externally in garden areas. The predicted Specific Sound Level is significantly below the BS8233 defined "desirable" noise level of 50dB $L_{Aeq,T}$ for gardens and patios and therefore unlikely to be an issue.

8.1.8 As a worst case scenario it shall be assumed that occupants of the worst affected NSRs are located at first floor level (higher levels of noise are predicted at first floor height) and that bedrooms windows are open. The level of sound reduction afforded by an open window can vary depending on the open area; this can range from c.5dB for a fully open window (assuming the window open area is equivalent to 13% of the floor area) up to c.15dB for to partially open window (in line with guidance as presented in BS8233: 2014). Higher levels of sound insulation would be expected to be achieved when windows are fully closed.

8.1.9 With regards to the daytime, the predicted noise level within the worst affected dwelling with windows open at first floor level could therefore be within the range from c.17dB to 27dB $L_{Aeq,15min,r}$ depending on extent of the window opening, during night time periods. Notwithstanding the non-anonymous nature of the sound, the predicted internal noise level is significantly below the BS8233:2014 defined desirable daytime indoor ambient noise level limit of 35dB $L_{Aeq,8hour}$ for resting and sleeping within dwellings (see Table 8 of Section 6.8).

8.1.10 With regards to the nighttime, the predicted noise level within the worst affected dwelling with windows open at first floor level could therefore be within the range from c.9dB to 19dB $L_{Aeq,15min}$, depending on extent of the window opening, during night time periods. Notwithstanding the non-anonymous nature of the sound, the predicted internal noise level is significantly below the BS8233:2014 defined desirable night time indoor ambient noise level limit of 30dB $L_{Aeq,8hour}$ for resting and sleeping within dwellings (see Table 8 of Section 6.8).



8.1.11 ***Therefore, taking the context in which the sound occurs into consideration, noise from the Facility is expected to result in a low noise level impact.***



8.1.12 ***It must be noted that the outcome of this assessment does not demonstrate full compliance with Planning Condition 14 of the June 2022 Planning Consent planning reference: PL/2021/08690) for the site as the predicted Rating Level shall exceed the measured Background Sound Level at some locations, primarily due to the "very low" measured Background Sound Levels.***

8.2 Uncertainty

8.2.1 Section 10 of BS4142: 2014 states the following with regards to uncertainty:

'... Consider the level of uncertainty in the data and associated calculations. Where the level of uncertainty could affect the conclusion, take reasonably practicable steps to reduce the level of uncertainty. Report the level and potential effects of uncertainty...'

8.2.2 In accordance with the requirements of BS4142, Sol has undertaken the following steps to limit the level of uncertainty in the acoustic assessment:

1. All noise measurements have been carried out using Type 1 Precision Grade noise mounting equipment. All noise measuring instruments have traceable laboratory calibration certification.
2. All noise measurements were accompanied by continuous meteorological measurements as conducted at, or close to, the measurement position in order to ensure that the measurement data was not adversely affected by unfavourable weather conditions.
3. Calculations have been conducted in line with appropriate and nationally recognised acoustic standards (ISO 9613-2, BS12354: 2000), and using proprietary 3D noise modelling software, CadnaA.
4. The assessment assumes downwind propagation in all cases as this represents the worst case.

9 Conclusion

- 9.1 Sol has been appointed to provide an environmental noise impact assessment for a new BESS that is proposed to be located off Bath Road in Atworth, Melksham SN12 8JN.
- 9.2 The pre-existing environmental noise climate has been determined by direct measurement at the existing noise sensitive receptors (NSRs). Using this benchmark environmental noise measurement data, it has been possible to set appropriate environmental noise limits for the proposed Facility, all as based on applicable BS 4142:2014+A1: 2019 guidance.
- 9.3 The pre-existing environmental noise climate at the identified NSRs has been measured by Sol, between Thursday 31st October and Sunday 3rd November 2024 (inclusive).
- 9.4 The environmental noise emissions that are predicted to be arising from the operation of the complete plant have been quantified, modelled, and assessed using proprietary "CadnaA" 3D noise modelling software.



- 9.5 ***It is the conclusion of this environmental noise impact assessment that the total, aggregate environmental noise impact arising from the proposed operation of the plant, albeit assuming full compliance with the additional noise mitigation requirements as specified and presented herein, shall result in a low noise impact at the worst affected noise sensitive receptors, following the consideration of the context in which the sound occurs, all as assessed in accordance with British Standard BS4142: 2014+A1: 2019, provided that the maximum permitted individual plant noise limits as specified herein are not exceeded in any instance, in practice.***



- 9.6 ***It must be noted that the outcome of this assessment does not demonstrate full compliance with Planning Condition 14 of the June 2022 Planning Consent (planning reference: PL/2021/08690) for the Facility. This is due to the fact that the predicted Rating Level shall exceed the measured Background Sound Level at some locations, primarily as due to the very low Background Sound Levels recorded in such instances. It will therefore be essential for others to agree a relaxation of the current wording of Planning Condition 14 with the Local Authority on this basis, prior to any finalisation of the scheme (and prior to any procurement of plant and equipment).***

APPENDIX A

Glossary of Acoustic Terms

Term	Abbreviation	Description
Decibel	dB	A scale for comparing the ratios of two quantities, including sound pressure and sound power.
A-weighting	dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the change in sensitivity of the human ear at varying frequencies.
Sound Pressure Level	L_{pA}	A measure of the sound pressure at a particular location. Typically expressed in dB(A) referenced to 2×10^{-5} Pascals.
Equivalent Continuous Sound Level	$L_{Aeq,T}$	The steady level of sound over a prescribed period of time which would contain the same total sound energy as the actual fluctuating noise under consideration in the same period of time.
Statistical Sound Levels	L_{A10} and L_{A90}	The level of noise exceeded for a percentage of the time period being sampled, namely 10% or 90% respectively.
Background Sound Level	$L_{A90,T}$	The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of the time period being sampled.
Maximum Sound Level	L_{Amax}	The maximum sound or noise level determined with instrumentation set to either a fast time weighting, L_{AFmax} , or a slow time weighting, L_{Asmax} , as occurring during the time period being sampled.
Sound Power Level	L_{WA}	A measure of the total sound energy radiated from a source. Like sound pressure levels, this is also expressed in dB(A) terms, but it is referenced to 1×10^{-12} W.
Broadband		Sound sampled over a wide range of frequencies.
Narrow band		Sound sampled over a specific, restricted frequency range. Used to ascertain the amplitude and significant of individual, audible tones, and to assist in identifying particular sources of noise within a complex, multi-source soundscape environment.
Ambient Sound	$L_{eq,T}$	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, both near and far.
Specific Sound Level	$L_{eq,T}$	The Equivalent Continuous A-Weighted Sound Level at an assessment position produced by a specific sound over a given reference time interval, T_r
Rating Level	L_{Ar,T_r}	The Specific Sound Level plus any adjustment for the acoustic characteristic features of the noise (e.g. intermittency, tones etc.).
Residual Noise	$L_{Aeq,T}$	The ambient sound remaining at given position in a given situation, when the specific sound source is suppressed to such an extent that it no longer contributes to the ambient sound.
Sound Reduction Index	SRI	The reduction in sound energy when transmitted through a panel or similar planar element, typically used in relation to single octave or one-third octave frequency band values.
Weighted Sound Reduction Index	R_w	The Sound Reduction Index expressed as a single figure, as expressed against a reference curve.
Dynamic Insertion Loss	DIL	Reduction in acoustic energy resulting from the insertion of a noise control element (e.g. an attenuator, acoustic enclosure etc.).
Free Field		Noise measuring location that is free from the presence of sound reflecting objects (except the ground), usually taken to mean being at least 3.5 metres distance from reflective surface(s) or greater.

APPENDIX B

Noise Survey Details and Summary Results

Location

Melksham, Wiltshire

Dates, Times and Weather Conditions

Date	Daytime (07:00 hours – 23:00 Hours)				Nighttime (23:00 hours – 07:00 hours)			
	Temp, °C	Rain, mm/h	Wind Direction	Mean Wind Speed, ms ⁻¹	Temp, °C	Rain, mm/h	Wind Direction	Mean Wind Speed, ms ⁻¹
31/10/2024	11	0	S	0.3	10	0	SE	0.3
01/11/2024	12	0	N	1.1	11	0	SE	0.4
02/11/2024	12	0	SE	0.6	11	0	SE	0.5
03/11/2024	11	0	SE	0.6	-	-	-	-

Personnel

Tom Hunt – Sol Acoustics

Instrumentation

Measurement Position 1

01dB Cube Sound level meter (serial no. 11114)
01dB Pre22 Microphone preamplifier (serial no. 1610399)
GRAS 40CD Microphone capsule (serial no. 260807)
Cirrus CR:515 acoustic calibrator (serial no. 97067)

Measurement Position 2

01dB Cube Sound level meter (serial no. 11117)
01dB Pre22 Microphone preamplifier (serial no. 1610404)
GRAS 40CD Microphone capsule (serial no. 260827)
Cirrus CR:515 acoustic calibrator (serial no. 97067)

Measurement Position 3

01dB Cube Sound level meter (serial no. 11228)

01dB Pre22 Microphone preamplifier (serial no. 1610782)

GRAS 40CD Microphone capsule (serial no. 287832)

Cirrus CR:515 acoustic calibrator (serial no. 97067)

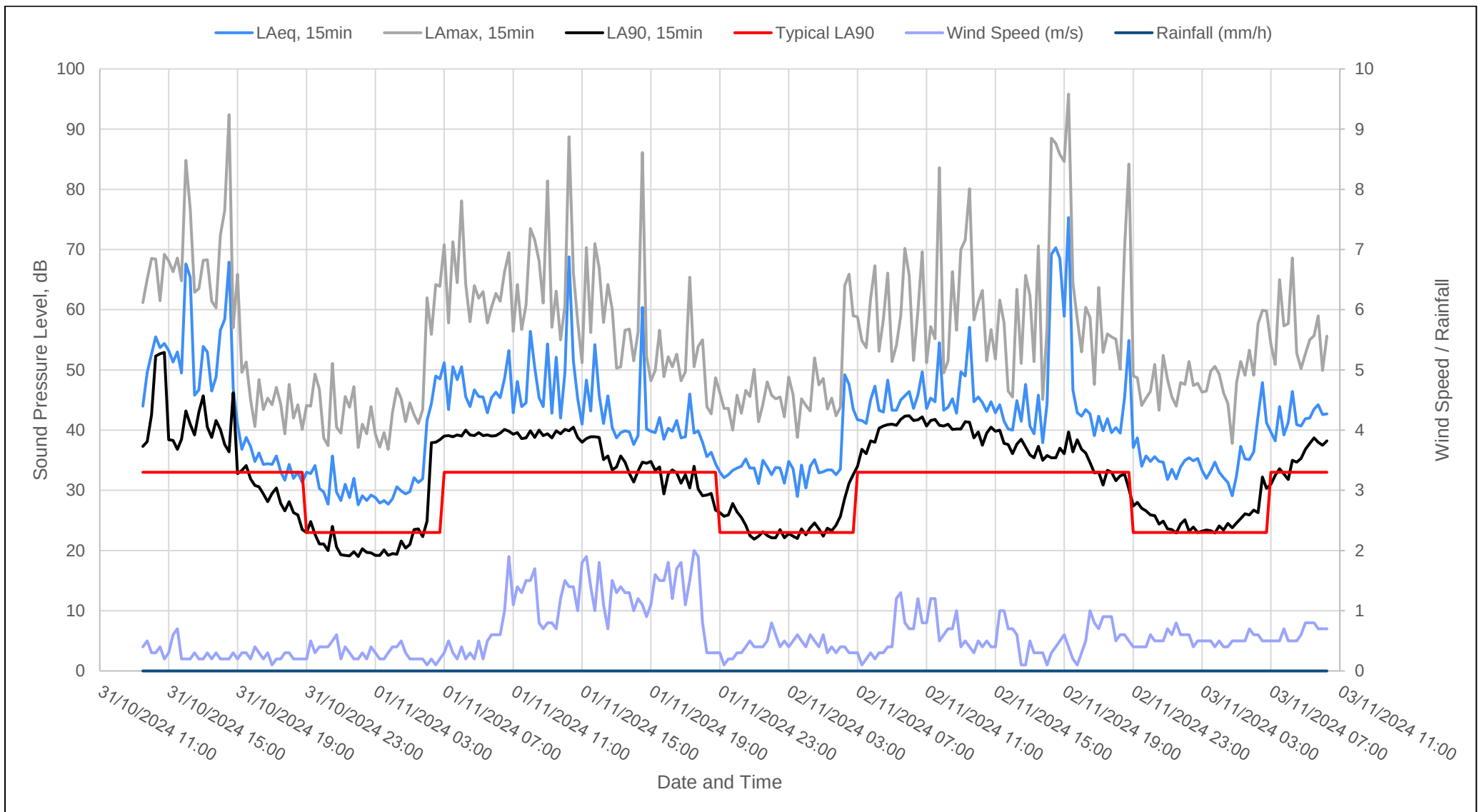
Vaisala WXT520 Weather Station

Methodology

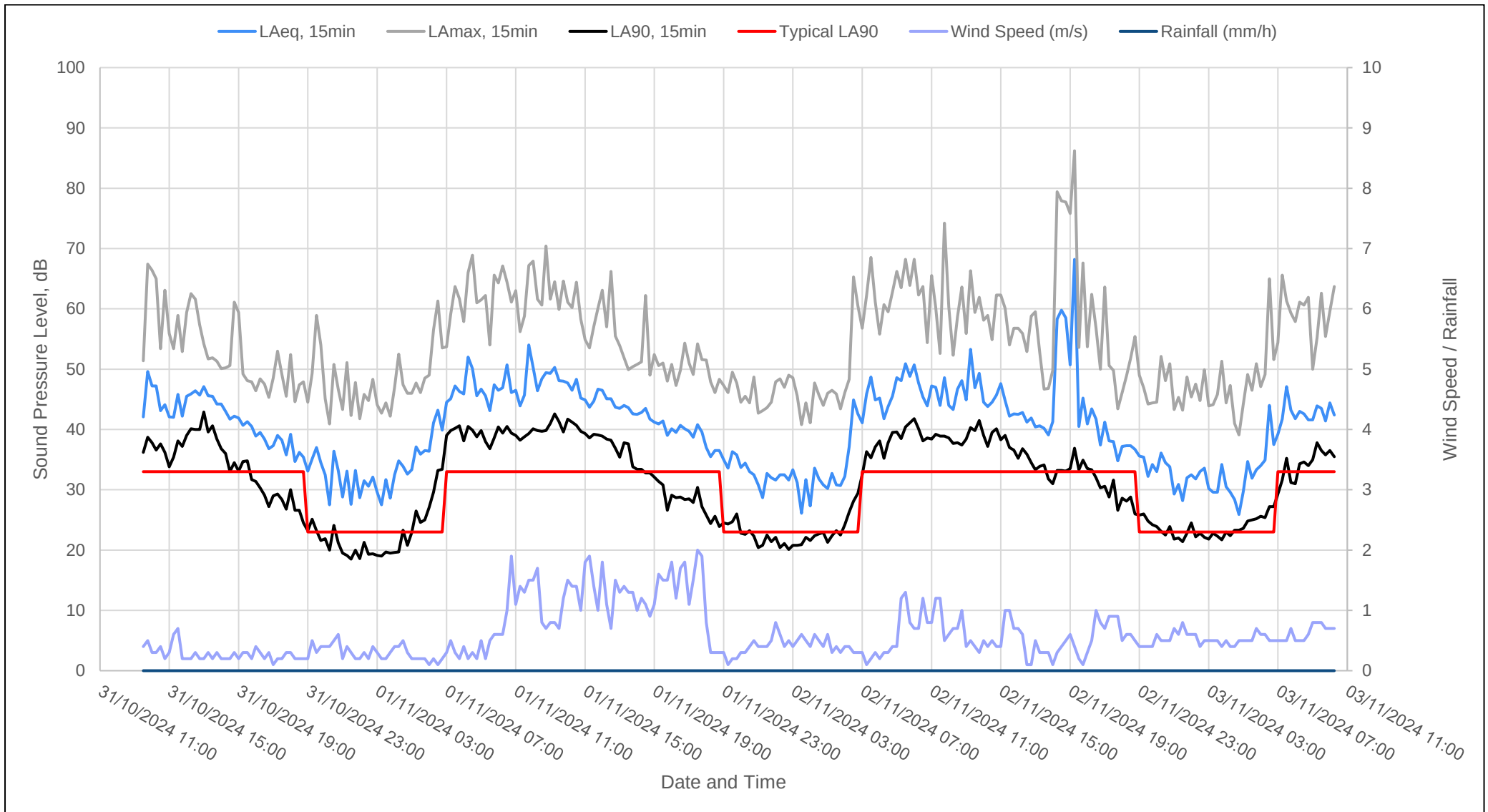
Before and after the measurements the noise monitoring equipment was calibrated to an accuracy of ± 0.1 dB using the Cal 21 Calibrator. The calibrator produces a sound pressure level of 94dB re 2×10^{-5} Pa @ 1kHz.

Measurement Results

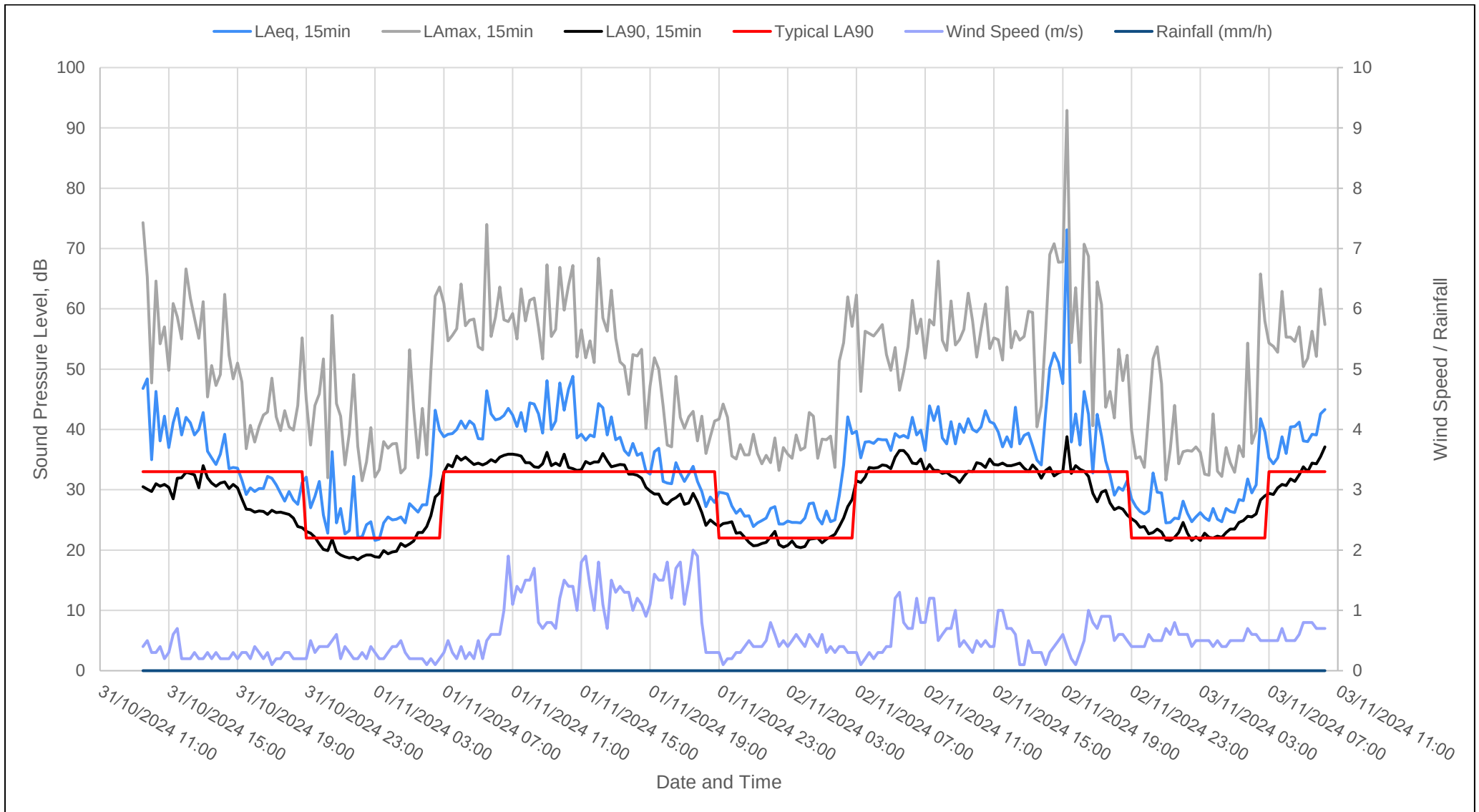
Graphs B1, B2 and B3 summarise the broadband A-weighted results obtained at Measurement Positions 1, 2 and 3 respectively



Graph B1: A-weighted environmental noise levels at Noise Monitoring Position 1, 31 October to 3 November 2024



Graph B2: A-weighted environmental noise levels at Noise Monitoring Position 2, 31 October to 3 November 2024



Graph B3: A-weighted environmental noise levels at Noise Monitoring Position 3, 31 October to 3 November 2024

APPENDIX C

Environmental Noise Modelling Results



Figure C1: Predicted Daytime Specific Sound Level, $L_{Aeq,1hour}$, at 4 metres grid height (Google 2025)

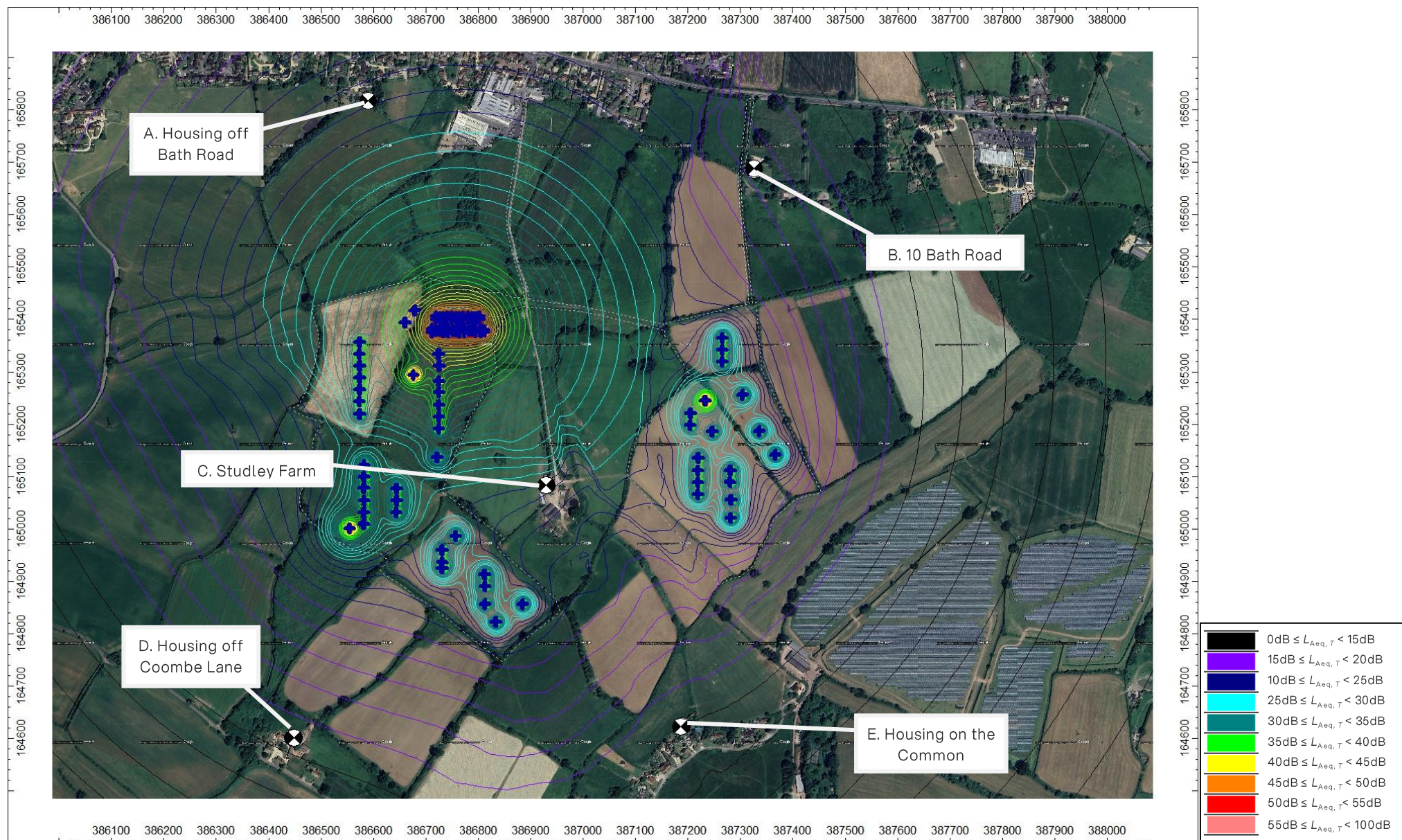


Figure C2: Predicted Nighttime Specific Sound Level, $L_{Aeq,1hour}$, at 4 metres grid height (Google 2025)

APPENDIX D

Details and Professional Qualifications of Contributing Sol Staff

Company Details

Name of Organisation: Sol Acoustics Limited

Status: Private Limited Company

Address: Unit 11, Brunel Court,
Gadbrook Park
CW9 7LP

Telephone Number: 01565 632535

E-Mail: info@solacoustics.co.uk

Nature of Business: Acoustic Consultancy

Directors: Simon Ferenczi

Company Registration Number: 4218702

Key Technical Personnel & Qualifications

Simon Ferenczi	Institute of Acoustics Diploma (with additional modules), MIOA
Brian Horner	BSc (Hons), MIOA
Chris Downing	MMaths

Company Accreditations

Sol Acoustics is a member of The Association of Noise Consultants (ANC) and is qualified to perform sound insulation testing under the ANC's accredited testing scheme to demonstrate compliance with the requirements of Approved Document E of the Building Regulations.