



Great Harmeston Solar Farm Noise Assessment



PRELIMINARY NOISE ASSESSMENT

**GREAT HARMESTON SOLAR FARM
LAND SOUTH OF UPPER HARMESTON, PEMBROKESHIRE**

ARISE RENEWABLE ENERGY UK LIMITED

FEBRUARY 2026

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Revision	Prepared By	Date
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1. Introduction

LF Acoustics Ltd have been appointed by Arise Renewable Energy UK Limited to undertake a noise assessment for the proposed Great Harmeston Solar Farm, to be located on land to the south of Upper Harmeston, Pembrokeshire.

The solar farm would be constructed across several fields, with a proposed substation to be located within the south-eastern area of the site.

This report presents a preliminary desktop assessment of the noise levels attributable to the operation of the solar farm at surrounding noise sensitive properties.

The following section of this report presents an overview of the relevant standards and guidelines applicable when assessing noise from this type of facility. Section 3 provides a description of the site, its surroundings and proposed operation, with an assessment of the existing noise environment provided in Section 4. The calculation and assessment of noise levels associated with the operation of the solar farm is provided in Section 5. Finally, Section 6 provides a summary of the assessment.

2. Standards and Guidelines

A description of the noise units referred to in this report is provided in Appendix A.

2.1. Planning Policy Wales

Planning Policy Wales (PPW) revised in February 2024 [1], sets out the Government's planning policies for Wales and how these should be applied. The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales.

With regards renewable and low carbon developments, PPW advises:

Planning authorities should also identify and require suitable ways to avoid, mitigate or compensate adverse impacts of renewable and low carbon energy development. The construction, operation, decommissioning, remediation and aftercare of proposals should take into account:

- *the need to minimise impacts on local communities, such as from noise and air pollution, to safeguard quality of life for existing and future generations.*

A number of Technical Advice Notes (TAN) accompany PPW. TAN 11 [2] relates to noise. For noise generating development, TAN 11 advises:

Local planning authorities must ensure that noise generating development does not cause an unacceptable degree of disturbance. They should also bear in mind that if subsequent intensification or change of use results in greater intrusion, consideration should be given to the use of appropriate conditions.

For industrial and commercial developments, TAN 11 advises that BS 4142 should be adopted to assess potential impacts. The 1990 revision of the Standard is indicated within the document, has been withdrawn and consideration has therefore been given to the current revision of the Standard within this assessment.

2.2. British Standard BS 4142:2014+A1:2019

BS 4142 [3] is the British Standard for rating and assessing noise of a commercial or industrial nature and is relevant to the noise associated with the operation of the proposed plant.

BS 4142 is a comparative standard in which the estimated noise levels from the proposed development are compared to the representative / typical background noise level from existing uses.

BS 4142 relates the likelihood of adverse impact to the difference between the Rating Level of the noise being assessed and the background noise level.

The background noise level is the L_{A90} noise level, usually measured in the absence of noise from the source being assessed, but may include other existing industrial or commercial sounds. The background noise levels should generally be obtained from a series of measurements each of not less than 15-minute duration.

The Rating Level of the noise being assessed is defined as its L_{Aeq} noise level (the 'specific noise level'), with the addition of appropriate corrections should the noise exhibit a marked impulsive and/or tonal component or should the noise be irregular enough in character to attract attention. The extent of the correction is dependent upon the degree of tonality or character in the noise

and is determined either by professional judgement, where the plant is not operational at present, or by measurement.

Where the noise is tonal in nature, the standard imposes the following penalties when assessing the rating level:

- 2 dB for a tone which is just perceptible;
- 4 dB where the tone is clearly perceptible; and
- 6 dB where the tone is highly perceptible.

Methods for identifying whether noise is tonal in nature are provided within BS 4142.

Where noise exhibits other sound characteristics, the Standard advises a penalty of 3 dB should be applied.

During the daytime, the specified noise levels are determined over a reference time interval of 1 hour, with a 15 minute reference period adopted when assessing night-time noise (applicable to the early morning daylight periods, when the solar farm would start to operate).

If the Rating Level of the noise being assessed exceeds the background level by 10 dB or more BS 4142 advises that there is likely to be an indication of a significant adverse impact, depending upon context. A difference between background level and Rating Level of around 5 dB is likely to be an indication of an adverse impact, depending upon context. The lower the Rating Level is, relative to the background noise level, the less likely the specific source will have an adverse or significant adverse impact. Where the Rating Level does not exceed the background noise level is an indication of a low impact, depending upon context.

The assessment method outlined above is intended for the assessment of external noise levels and is not intended to assess the extent of impact at internal locations.

Where the initial assessment of impact, based upon and assessment of the external noise levels, needs to be modified due to the context, all pertinent factors should be taken into account, including:

- The absolute level of sound;
- 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; and
- The sensitivity of the receptor and whether the premises will already incorporate measures to ensure good internal and/or external acoustic conditions.

The current revision of BS 4142 does not define low background or rating levels. The previous revisions of the Standard described very low background sounds as being less than 30 dB L_{A90} and low rating levels as being less than 35 dB $L_{Aeq,T}$. The Association of Noise Consultants have prepared a technical note to accompany the current revision of BS 4142 [4]. The document advises that it would not be unreasonable to adopt similar lower limits when assessing noise levels against the current revision of the Standard.

2.3. British Standard BS 8233

British Standard BS 8233 [5] principally provides design guidance for new buildings. For residential premises, the guidance advises for steady external noise sources, levels of noise internally not exceeding 30 dB $L_{Aeq, 8 \text{ hour}}$ within bedrooms at night are desirable, with a level of 35 dB $L_{Aeq, 16 \text{ hour}}$ representing a desirable standard of noise within living rooms and bedrooms for resting purposes during daytime periods.

Externally within gardens and amenity spaces, the guidance recommends a general limit of 50 dB $L_{Aeq, T}$.

2.4. World Health Organisation Guidelines

The World Health Organisation guidance [6] provides additional guidance upon potential effects in relation to noise.

The guidance advises:

- few people are moderately annoyed by noise levels of below 50 dB L_{Aeq} during the daytime;
- for a good night's sleep, noise levels within bedrooms should not exceed 30 dB L_{Aeq} , with individual noise events not exceeding 45 dB L_{Amax} ; and
- special attention should be given to noise sources in an environment with low background noise levels and to noise sources with low frequency components.

Assuming an open window provides a reduction in noise levels of between 10 – 15 dB(A), during the night-time the WHO guidance indicates that external noise levels should remain below 40 – 45 dB L_{Aeq} to maintain the restorative processes of sleep.

The WHO produced additional noise guidance in relation specifically to night-time noise in 2009 [5], which is generally considered to be the most noise sensitive period. The night-noise guidance is applicable to the early morning periods, principally during summer months, when the solar farm would become operational prior to 07:00 hours.

This report provides a description of the no observed adverse effect level (which is equivalent to a No Observed Effects Level, NOEL) and advises for night-time noise (which is considered to be the most sensitive period of the day) that this concept is less useful, as the adversity of effects are less clear. Instead, it advises the use of the observed effects thresholds, above which an effect starts to occur or shows itself to be dependent upon the exposure level.

The guidance is presented in terms of external and internal recommendations to minimise any potential adverse effects. Externally, the guidance advises that an average night-time noise level L_{night} (the $L_{Aeq, 8 \text{ hour}}$) of 40 dB is equivalent to the Lowest Observed Adverse Effect Level (LOAEL) and advises this guideline value is recommended for the protection of public health from night-noise. However, below this level there was no change in the small number of awakenings identified and hence a reason for considering that the NOEL was not an appropriate descriptor in noise terms for identifying adverse effects and hence recommend the use of the observed effects threshold as an appropriate descriptor to identify the potential for the onset of adverse effects.

The guidance, however, advises that an external night-time noise level of 30 $L_{Aeq, 8 \text{ hour}}$ would be equivalent to the NOEL, as their research indicated that there were no detectable effects on sleep observed below this level.

The potential for Significant Observed Adverse Effects (SOAEL) were identified to occur at levels considerably above 40 dB $L_{Aeq, 8 \text{ hour}}$.

3. Site Description and Identification of Potentially Affected Dwellings

The location of the proposed solar farm and surrounding noise sensitive properties is indicated on Figure 1.

An initial site layout has been prepared at this stage. This indicates the proposed locations of the solar panels and main items of plant to be installed (including the Inverter/ Transformer Stations and substation). The layout is indicated on Figure 2.

As indicated on Figure 2, the solar farm would be spread across a number of fields with noise sensitive receptors in the surrounding area.

The solar panels would be connected to string inverters, which would be distributed around the site and positioned beneath the solar panels. At this stage, the locations for the string inverters have not been identified and this assessment has been based upon the inverters being distributed around the site proportionally.

The inverters would be operational during daylight periods when the solar panels were generating electricity. The inverters would be actively cooled, with the operation of the fans being temperature controlled, and would only operate at full speed (i.e. generating the highest levels of noise) when the temperatures were high, which would occur during the middle of the day when solar generation was at a peak. Typically, the individual solar inverters would switch in and out during the day, thus generally not all of the inverters would be operating concurrently. During the early morning and late evening periods, when solar energy was lower, the fans would generally not be operating or only running at very low speeds, thus generating lower levels of noise.

The inverters would be connected to a number of Inverter / Transformer stations, distributed around the site. This plant would also be fan cooled, with the fans temperature controlled.

There are a number of noise sensitive properties surrounding the proposed solar farm that have the potential to be affected by noise attributable to its operation. Those identified and considered in detail within this assessment are indicated on Figure 1.

4. Baseline Noise Assessment

At this stage, a desktop assessment has been prepared to identify areas where potential adverse noise impacts would be likely at neighbouring noise sensitive receptors and to identify potential constraints.

The findings of this assessment will be used to assist in finalising the layout and potential mitigation measures for the solar farm. Areas will also be identified where baseline noise monitoring will be undertaken to enable a detailed assessment to be undertaken, which would be included within the noise assessment that accompanies the main application.

As advised previously and indicated on Figure 1, there are a number of noise sensitive properties surrounding the application site that have been considered within this assessment.

Based upon a review of mapping for the surrounding area, noise levels at the noise sensitive properties are primarily likely to be attributable to road traffic noise from vehicles travelling along the A477 and the A4076. Traffic using the roads is likely to influence both the ambient (L_{Aeq}) and background (L_{A90}) noise levels in the surrounding area.

There is also a railway line passing through the Application Site that runs to Milford Haven. There are typically 1 – 2 trains using the line per hour during the daytime that are likely to influence ambient (L_{Aeq}) noise levels within the surrounding area.

Taking account of the main source of noise and based upon observations of similar locations, background noise levels are anticipated to be in the region of 30 – 35 dB L_{A90} during the early morning periods, when the solar farm plant would commence operation and between 35 – 40 dB L_{A90} during the daytime periods.

These levels have been used for the purpose of this assessment, to identify potential constraints and areas where potential impacts would be likely. Baseline noise monitoring will be carried out at representative locations and included within the final assessment.

5. Calculation and Assessment of Noise from the Operation of the Solar Farm

5.1. Proposed Plant and Equipment

The solar panels would be connected to a number of string inverters that would be distributed across the site at positions where appropriate connections could be made to the solar arrays. The string inverters would be positioned at the end of the rows of solar panels and mounted beneath the panels. The inverters would be connected to a number of Inverter/ Transformer stations that would be distributed around the site.

The main substation for the solar farm (incorporating a transformer) would be located within the south-eastern part of the site, where the connections from the Inverter / Transformer Stations would be made.

Source term noise levels for the plant proposed to be used on the site have been obtained from manufacturers' specifications and are provided in Table 5.1 below.

Plant	No. Required	Sound Power Level SWL [dB(A)]	Octave Band Sound Power Level SWL [dB]						
			63	125	250	500	1k	2k	4k
String Inverter (Normal Operating Condition)	200	76	68	65	65	76	71	66	63
Inverter / Transformer Station	90	85	82	95	91	81	71	57	54
Substation Transformer	1	92	90	102	98	89	78	64	61

Table 5.1 Source Term Noise Levels

5.2. Calculation of Noise Levels

As indicated above, the main noise-generating elements of the proposed development would be attributable to the operation of the string inverters and Inverter / Transformer Stations.

Calculations of the noise levels attributable to the operation of the site have been made using the SoundPlan computer modelling package, which implements the calculation methodology from ISO 9613-2 [7].

The calculations have taken account of the land formation around the solar farm based upon Lidar mapping, with the ground absorption across the surrounding fields assumed to be soft.

Calculations have been prepared on the basis of all plant fully operational, which represents the likely worst-case conditions during the peak daytime periods. This approach will provide an overestimate of the noise levels during the early morning and evening periods whilst the solar inverters would be operating at a lower power.

The operation of the cooling fans within the plant and equipment is temperature controlled. During the early morning periods, when temperatures are lower and solar energy low, it is less likely that the fans would need to operate and if so, they would only operate at very low speed, thus generating lower levels of noise. The fans would be most likely to operate at full speed during the mid-part of the day when the sun is at its highest level and thus generating the maximum energy. During the evening periods, the output from the solar panels would reduce as the sun sets and thus the requirement for the cooling fans to operate would gradually reduce

later into the evening. As indicated previously, there would be no requirement for the fans on the solar inverters to operate overnight, during hours of darkness.

During the early morning periods, the manufacturer specifications indicate that the solar inverters would generate noise levels 10 dB(A) lower than during the normal daytime operation.

Noise levels have been calculated on the basis of the site layout indicated on Figure 2.

Figure 3 presents likely worst-case calculated daytime operational noise levels in graphical format and additionally provides the calculated façade noise levels in numerical form at the properties potentially most likely to be affected by the operation of the site.

As indicated above, during the evening and early morning periods, the requirements for the fans to operate to cool the plant and equipment would be reduced, as the solar energy generated would be considerably lower. During these periods, the noise levels generated by the operation of the solar farm plant would be at least 5 dB(A) lower than during the peak daytime period. To provide a reasonable worst-case assessment for these periods, the calculated noise levels presented on Figure 3 have been reduced by 5 dB(A) to account for the reduced operating times.

The calculated noise levels at the potentially most affected properties are additionally summarised in Table 5.2 below.

Location	Calculated Daytime Façade Noise Level [dB L _{Aeq,T}]
1 – Bwlford	34
2 – Milford Road	35
3 – Hayston View	35
4 – Fairview	36
5 – Ashdale	35
6 – Upper Harmeston	36
7 – Auberon House	36
8 – Chapel Cottage	35
9 – Redstock	30
10 – Deemshill	31

Table 5.2 Peak Daytime Noise Levels Generated by Operation of Proposed Solar Farm

5.3. Assessment Criteria

As indicated previously, background noise levels in the vicinity are mainly influenced by road traffic on the surrounding roads, with traffic noise audible throughout the day and night-time periods.

The solar panels and inverters would only be operational during daylight hours, potentially between 05:30 and 22:00 hours during summer months.

The assessment has therefore been based upon the noise levels attributable to the full daytime operation for the peak daytime period, early morning (05:30 – 07:00 hours) and evening (19:00 – 22:00 hours) periods.

BS 4142 advises that the significance of sound of an industrial / commercial nature depends upon both the margin by which the rating level of noise exceeds the background noise levels and the context in which the sound occurs.

An initial estimate of the potential impacts associated with the operation of the proposed solar farm has been made in accordance with the guidance within BS 4142 by subtracting the assumed background noise levels from the calculated rating level of noise.

BS 4142 advises where the initial assessment needs to be modified due to the context, all pertinent factors should be taken into consideration. This includes the absolute levels of noise and in situations where background and rating levels are low, as at this site, the absolute noise levels might be as, or more, appropriate, than the amount the rating level exceeds the background noise levels, which is especially true at night.

For night-time noise, which is relevant to the early morning periods, consideration has therefore also been given to absolute noise level criteria contained within BS 8233 and by the WHO, which provides guidance on absolute noise levels to ensure potential adverse impacts are minimised.

BS 8233 advises for steady state external noise sources, such as those associated with the operation of the solar farm, it is desirable that the internal ambient noise level does not exceed a level of 35 dB $L_{Aeq,16\text{ hour}}$ during the daytime period within living rooms and bedrooms and 30 dB $L_{Aeq,8\text{ hour}}$ within bedrooms at night. On the basis of an open window typically providing a sound reduction of between 10 – 15 dB(A), equivalent external levels below 45 dB $L_{Aeq,16\text{ hour}}$ daytime and 40 dB $L_{Aeq,8\text{ hour}}$ night-time, would ensure an acceptable noise environment was maintained within the surrounding properties.

Additionally, for steady state noise, the WHO night-noise guidance advises that an external level of 40 dB $L_{Aeq,8\text{ hour}}$ represents the Lowest Observed Adverse Effect Level (LOAEL) overnight, which is equivalent to the BS 8233 guidance for night noise, assuming an open window. The guidance advises a level of 30 dB $L_{Aeq,8\text{ hour}}$ externally would represent the No Observed Effects Level (NOEL).

5.4. Preliminary Assessment

As indicated previously, noise would only be generated from the operation of the inverters associated with the solar panels during daylight hours, when the panels are producing electricity.

As discussed, the highest noise levels that have been calculated would only occur during the mid-daytime periods whilst the solar panels were operating at full capacity. At other times, during the early morning and evening periods, when solar generation is lower, noise levels attributable to the operation of the solar farm would be lower.

With the exception of areas very close to the inverters (typically, within 25 metres), where high frequency noise from the operation of the inverters is likely to be clearly audible, the noise generated by the string inverters and inverter / transformer stations would be principally associated with the operation of the cooling fans, which generate broadband noise. At the large distances between the inverters and neighbouring properties, any high frequency components of the noise would be effectively mitigated, as the higher frequencies attenuate at a higher rate over distance compared to lower frequencies.

The operation of the substation, located within the south-eastern corner of the site would have a potential to generate lower frequency noise, with peaks typically at 100Hz and 200 Hz. The substation would be located well away from neighbouring noise-sensitive properties and thus any potential tonal noise associated with the operation of the substation transformer would be unlikely to be audible at the properties.

The operation of the fans within the main plant has a potential to generate noise which is characteristic in nature compared to the existing noise environment. On this basis, a 3 dB other character correction has been applied when assessing the noise levels against the BS 4142 methodology to determine the rating level of noise.

Uncertainties in the calculations have been considered. Given that the assessment has been based upon all plant and equipment fully operational, which is considered unlikely, particularly during the most sensitive early morning periods, the calculations are likely to have overestimated the noise levels at the dwellings and thus cover any uncertainty in the noise levels attributable to the operation of the plant or within the calculation methodology. It is additionally noted that the source data used represents the maximum design level for the plant.

The calculated noise levels have been assessed against the guidance within BS 4142, BS 8233 and the WHO guidance to evaluate the likelihood of potential adverse effects.

The assessment of the noise levels at the potentially most affected dwellings are provided below. Noise levels at other surrounding properties would be lower and thus any potential for adverse impact at those properties would also be reduced.

The assessment at this stage, has been prepared to identify potential constraints and to identify areas where noise levels attributable to the operation of the plant would have a potential for adverse noise impacts. This approach enables the layout of the site to be fully developed and to target baseline noise monitoring into areas where there would be a potential for adverse noise impacts. As indicated previously, a full assessment, which will include baseline noise surveys will be prepared to accompany the main application.

Early Morning / Evening Periods

The initial assessment of the operational noise levels for the early morning and evening periods is provided below. For the purposes of the initial assessment, the overall operational noise levels have been assumed to be 5 dB(A) lower than during the peak daytime period (noting that the inverters would generate noise levels 10 dB(A) lower).

	Assessment			
	Rating Level	Assumed Background Noise Level [dB L _{A90}]	Excess of Rating Over Background Level	Likelihood of Impact
1 – Bwlford	32	30	+2	Indication of Low Impact
2 – Milford Road	33	30	+3	Indication of Low Impact
3 – Hayston View	33	30	+3	Indication of Low Impact
4 – Fairview	34	30	+4	Indication of Low Impact
5 – Ashdale	33	30	+3	Indication of Low Impact
6 – Upper Harmeston	34	30	+4	Indication of Low Impact
7 – Auberon House	34	30	+4	Indication of Low Impact
8 – Chapel Cottage	33	30	+3	Indication of Low Impact
9 – Redstock	28	30	-2	Indication of Low Impact
10 – Deemshill	29	30	-1	Indication of Low Impact

Table 5.3 Initial BS 4142 Assessment – Early Morning

The initial assessment for the early morning periods indicates a low potential for adverse impact, when assessed against the assumed background noise levels in accordance with BS 4142. Note that the assumed background levels are considered to be low.

Considering the context during this period, the overall noise levels generated by the operation of the plant during this period, would remain low and below a level which would have the potential to result in adverse noise impacts internally, when assessed against absolute noise standards.

Peak Daytime Periods

The highest noise levels attributable to the operation of the solar farm would be during the peak daytime periods, when solar generation was at a maximum.

The initial assessment of the operational noise levels for these periods is provided below.

	Assessment			
	Rating Level	Assumed Background Noise Level [dB L _{A90}]	Excess of Rating Over Background Level	Likelihood of Impact
1 – Bwlford	37	35	+2	Indication of Low Impact
2 – Milford Road	38	35	+3	Indication of Low Impact
3 – Hayston View	38	35	+3	Indication of Low Impact
4 – Fairview	39	35	+4	Indication of Low Impact
5 – Ashdale	38	35	+3	Indication of Low Impact
6 – Upper Harmeston	39	35	+4	Indication of Low Impact
7 – Auberon House	39	35	+4	Indication of Low Impact
8 – Chapel Cottage	38	35	+3	Indication of Low Impact
9 – Redstock	33	35	-2	Indication of Low Impact
10 – Deemshill	34	35	-1	Indication of Low Impact

Table 5.4 Initial BS 4142 Assessment – Daytime

The initial assessment for the peak daytime periods indicates a low potential for adverse impact, when assessed against the assumed daytime background noise levels in accordance with BS 4142. At this stage, the assumed background noise levels are considered to be appropriate for the surrounding area, given that the noise environment is influenced by road traffic noise on the main roads that pass to the north and through the Application Site.

The preliminary assessments above indicate that the noise levels attributable to the operation of the proposed solar farm would not result in a potential for adverse impacts at neighbouring noise sensitive receptors.

As indicated previously, baseline noise surveys are to be undertaken at positions representative of the properties identified above. The results of the surveys will enable a full BS 4142 assessment for the operational noise to be prepared.

The modelling results prepared within this assessment will be used to further develop the site layout to ensure any potential impacts are minimised. Measures to be taken will include:

- Selection of plant which generates low levels of noise;
- Minimising the amount of plant located close to the boundaries with neighbouring noise sensitive properties and locating the plant more centrally within the site, where it would be partially screened by the solar panels;
- Provision of acoustic fences around noisier items of plant, where necessary.

6. Summary

LF Acoustics Ltd have been appointed by Arise Renewable Energy UK Limited to undertake a noise assessment for the proposed Great Harmeston Solar Farm, to be located on land to the south of Upper Harmeston, Pembrokeshire.

The solar farm would be constructed across several fields, with a proposed substation to be located within the south-eastern area of the site.

This report has presented a preliminary assessment of the noise levels attributable to the operation of the solar farm at surrounding noise sensitive properties, to enable potential constraints to be identified.

This report has presented calculations and a preliminary assessment of the noise levels to be generated by the operation of the solar farm.

The calculated noise levels have been assessed against relevant standards and guidance, to identify any likelihood of adverse impacts.

The preliminary assessment concluded that the operation of the solar farm would generate a low potential for adverse impacts at neighbouring noise sensitive properties.

The assessment has identified areas where noise levels could be reduced to further reduce a potential for adverse impacts, which would be considered as the scheme is developed. Where possible, plant would be located well away from neighbouring properties, with acoustic fencing also to be considered around plant close to properties.

The preliminary results within this assessment will also be used to target baseline noise monitoring, which will be used to facilitate a full BS 4142 assessment, which will be prepared to accompany the main planning application.

References

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Figures

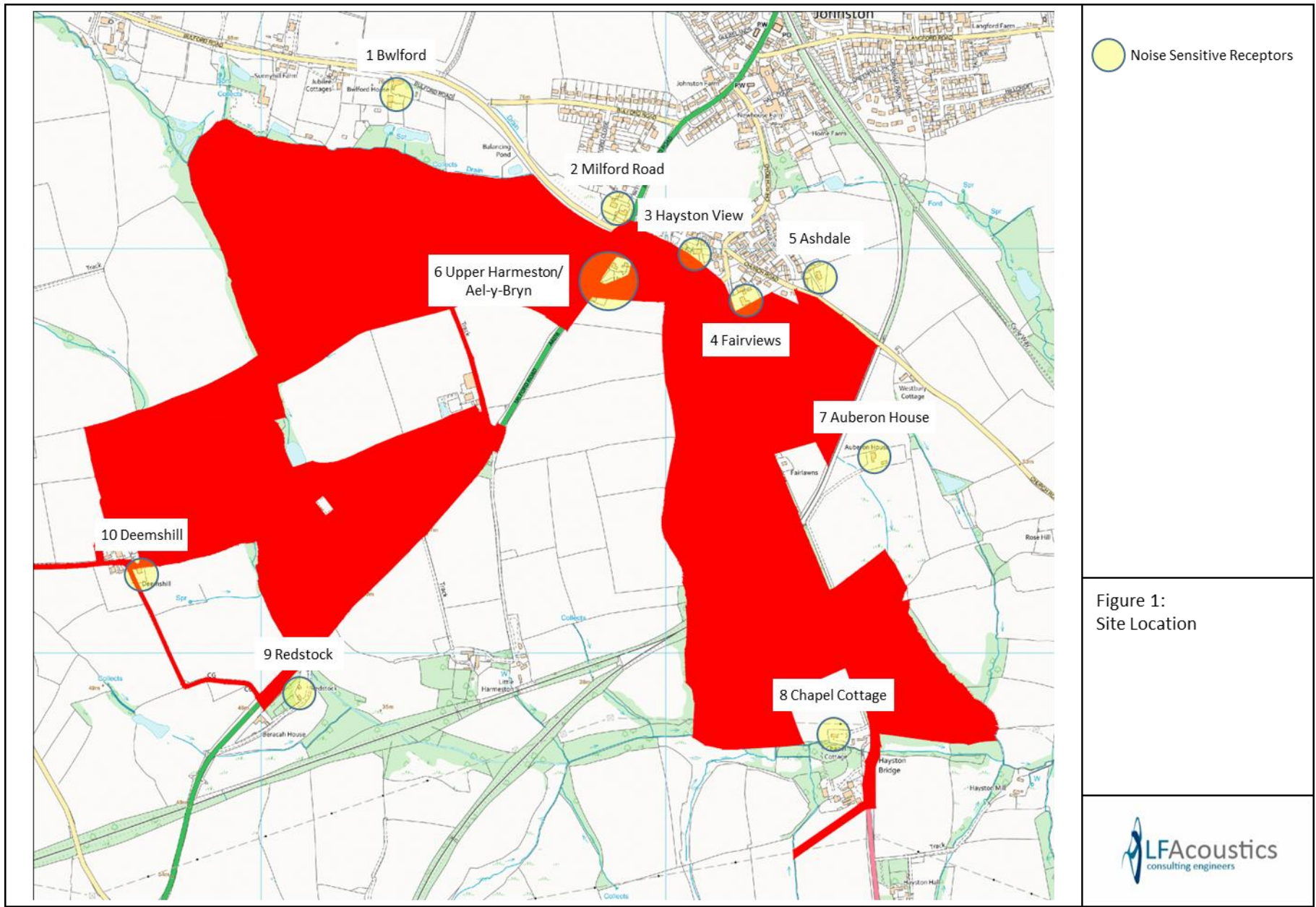
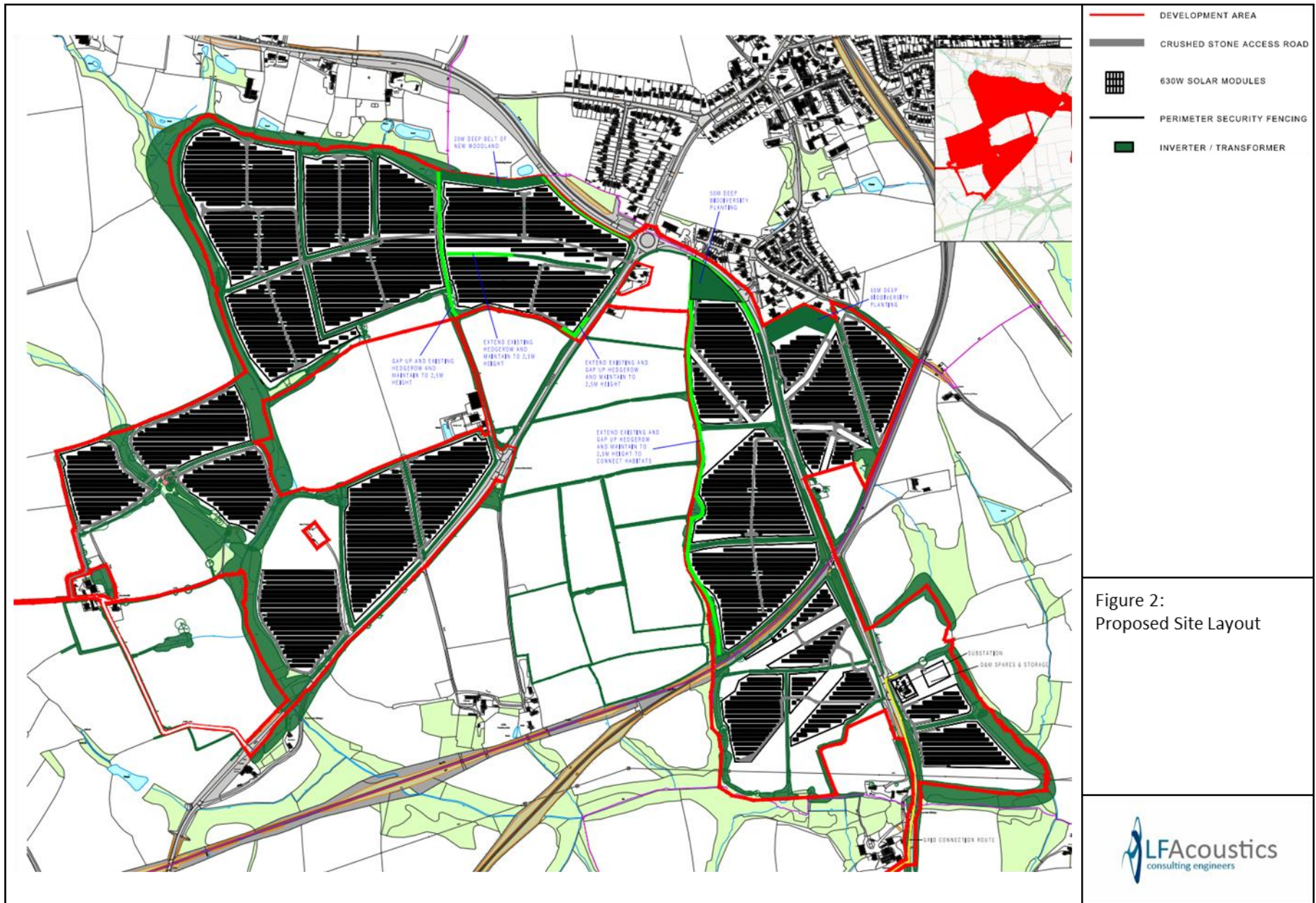


Figure 1:
Site Location





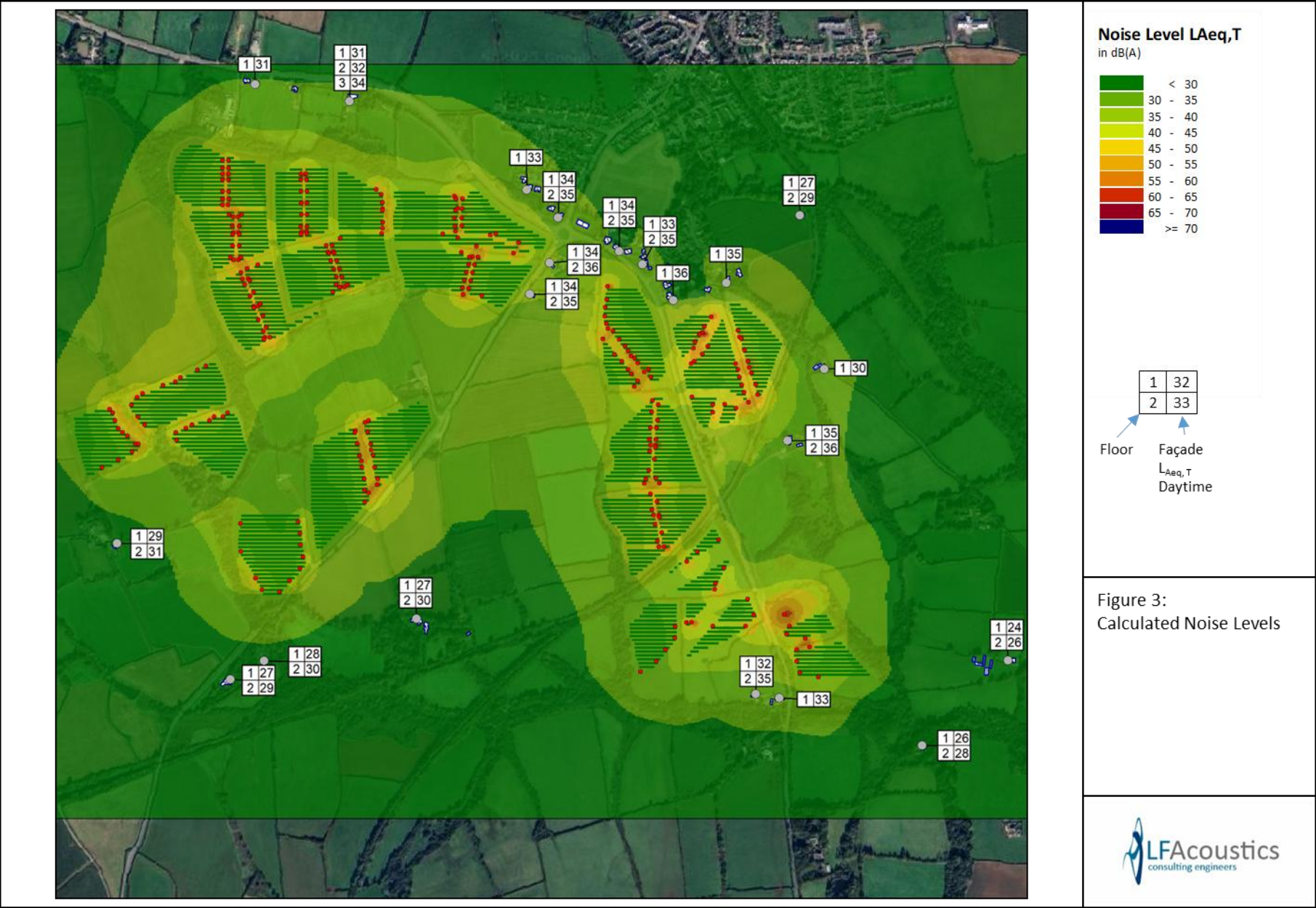


Figure 3:
Calculated Noise Levels



Appendix A Noise Units

Decibels (dB)

Noise can be defined as unwanted sound. Sound in air can be considered as the propagation of energy through the air in the form of oscillatory changes in pressure. The size of the pressure changes in acoustic waves is quantified on a logarithmic decibel (dB) scale firstly because the range of audible sound pressures is very great, and secondly because the loudness function of the human auditory system is approximately logarithmic.

The dynamic range of the auditory system is generally taken to be 0 dB to 140 dB. Generally, the addition of noise from two sources producing the same sound pressure level, will lead to an increase in sound pressure level of 3 dB. A 3 dB noise change is generally considered to be just noticeable and a 10 dB change is generally accepted as leading to the subjective impression of a doubling or halving of loudness. A 5 dB change is generally considered to be clearly discernible.

A-weighting

The bandwidth of the frequency response of the ear is usually taken to be from about 18 Hz to 18,000 Hz. The auditory system is not equally sensitive throughout this frequency range. This is taken into account when making acoustic measurements by the use of A-weighting, a filter circuit which has a frequency response similar to the human auditory system.

Units Used to Describe Noises Which Change Their Level with Time

The Equivalent Continuous A-Weighted Sound Pressure Level ($L_{Aeq,T}$) is the principal measurement index for environmental noise. The $L_{Aeq,T}$ is defined as the A-weighted sound pressure level of the steady sound which contains the same acoustic energy as the noise being assessed over a specific time period, T.

The L_{A90} is the noise level exceeded for 90% of the measurement period. It is generally used to quantify the background noise level, the underlying level of noise which is present even during the quieter parts of the measurement period.

The L_{Amax} is the single maximum value that the A-weighted sound pressure level reaches during a measurement period. $L_{Amax F}$, or Fast, is averaged over 0.125 of a second and $L_{Amax S}$, or Slow, is averaged over 1 second. The measured L_{Amax} noise levels in this assessment are Fast.