atmos CONSULTING

18th June 2025

Technical Report

Noise Impact Assessment

Stokes Lane Solar Farm

Stokes Lane Solar Farm Limited

your project our expertise

Contents

1. Introduction 1
   - 1.1 Description of Development 1
   - 1.2 Consultation 1
2. Assessment Methodology 2
   - 2.1 Assessment Criteria 2
3. Noise Impact Assessment 4
   - 3.1 Noise Sensitive Receptors 4
   - 3.2 Construction Noise 4
   - 3.3 Operational Noise Sources 4
   - 3.4 Noise Modelling 5
   - 3.5 Daytime and Night-time Assessment 6
   - 3.6 Contextual Considerations 7
4. Conclusion 8

Appendix A: Figure List 9

Tables

Table 1: Nearest Representative Noise Sensitive Receptors 4
Table 2: Noise Point Sources 5
Table 3: Octave Band Sound Power Levels used in Assessment, dB re 1pW 5
Table 4: Calculation of Rating Level at Receptors 6

Document Prepared For

Harry Whittaker
Stokes Lane Solar Farm Limited
22 Grosvenor Gardens,
London,
SW1W 0DH

Document Prepared By

Fraser Thomson
Principal Consultant, Acoustics & Noise
planning@atmosconsulting.com

Document Approved By

Malcolm Sangster
Technical Director EIA & Consenting
planning@atmosconsulting.com

Version	Date	Reason
1	10/06/2025	Initial Issue
2	18/06/2025	Re-Issue following client comments

URS is a member of Registrar of Standards (Holdings) Ltd.

1. Introduction

Atmos Consulting Limited ('Atmos') has undertaken a Noise Impact Assessment (NIA) on behalf of Stokes Lane Solar Farm Limited ('the Applicant') Ltd in support of a planning application for a proposed Solar Farm with an estimated export capacity of up to 28MW, plus associated infrastructure (the 'Proposed Development') at land north and south of Rookery Farm Lane approximately 500m south of Monk Sherborne; 700m northwest of Basingstoke and 400m west of Sherborne St John.

The Proposed Development lies wholly within the planning authority area of the Basingstoke & Deane Borough Council (BDBC).

The Proposed Development Site is illustrated in Figure 1.

1.1 Description of Development

The Proposed Development Site (the 'Site') is centred on National Grid Reference (NGR) SU 608 552, located at a site approximately 500m south of Monk Sherborne and 700m northwest of Basingstoke and 400m west of Sherborne St John.

The Proposed Development consists of the following:

- PV Solar Modules;
- String Inverters
- 4 Power Stations;
- DNO substation;
- Customer Substation
- Access tracks from the road and within the site;
- Cabling;
- Storage containers;
- Security fencing, CCTV cameras and lighting; and
- A temporary construction compound within the Site. This compound is only proposed for construction periods and will not be present during the operation of the solar farm.

Please refer to ES Figure 1-2: Site Layout Plan, for full details on the Proposed Development associated infrastructure.

1.2 Consultation

The Environmental Health Department at BDBC was contacted in March 2025 to confirm the assessment methodology, monitoring strategy and baseline conditions within this report.

As no response had been received at the time of writing, this assessment has been undertaken in accordance with BS4142:2014+A1:2019 as per recognised best practice.

No background sound monitoring has been undertaken, accordingly a conservative approach assuming a fixed background sound level of 35 dB L_{A90} has been used as a substitute for both day and night background sound levels.

2. Assessment Methodology

This NIA has been undertaken as follows:

- Generation of a 3D computer noise modelling using CadnaA software to predict noise levels at surrounding residential properties.
- Determination of potential impacts at the closest Noise Sensitive Receptors (NSRs) in accordance with BS4142:2014+A1:2019; and
- Where necessary, determination of potential mitigation measures to reduce predicted impacts.

2.1 Assessment Criteria

2.1.1 BS4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'

Atmos has conducted this NIA in accordance with the British Standard BS4142: 2014 'Methods for rating and assessing industrial and commercial sound'.

This standard describes methods for rating and assessing sound of an industrial or commercial nature which includes:

- Sound from industrial and manufacturing processes;
- Sound from fixed installations which comprise mechanical and electrical plant and equipment;
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from processes or premises, such as that from forklift trucks, or that from train or ship movements on or around an industrial or commercial Site.

The procedure detailed in the standard compares the measured or predicted noise level 'the specific noise level' from any of the above detailed noise sources with the background sound level at a residential dwelling. The measured background sound level at a receptor should be reliable and should not necessarily ascertain a lowest measured background sound level, but rather to quantify what is typical.

The specific noise level also acknowledges the following reference time intervals depending upon whether the noise source operates during daytime or night-time periods:

- Daytime (07:00 – 23:00): 1 hour; and
- Night-time (23:00 – 07:00): 15 minutes.

There are a number of 'penalties' which can be attributed to the specific sound level depending upon the 'acoustic features' of the sound level under investigation. These penalties vary in their weighting depending upon the severity of the acoustic feature, as follows:

Tonality

- +2 dB: where the tonality is just perceptible;
- +4 dB: where the tonality is clearly perceptible; and
- +6 dB: where the tonality is highly perceptible.

Impulsivity

- +3 dB: where the impulsivity is just perceptible;
- +6 dB: where the impulsivity is clearly perceptible; and

- +9 dB: where the impulsivity is highly perceptible.

Intermittency

- +3 dB: where the intermittency is readily distinctive against the acoustic environment.

In addition to the above acoustic features, there is a penalty for 'other sound characteristics' of +3 dB where a sound exhibits characteristics that are neither tonal nor impulsive, though are readily distinctive against the acoustic environment.

BS4142 goes on to state that the rating level is equal to the specific sound level if there are no such features present or expected to be present.

Assessment of the rating level relative to the background sound level can yield the following commentary:

- Typically, the greater this difference (between the rating level and the background sound level), the greater the magnitude of impact;
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and
- 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. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

2.1.2 Basingstoke and Deane Borough Council - Environmental Protection Guidance Note for Developers and Consultants, Noise Assessments and Reports for Planning Applications

Basingstoke and Deane Borough Council has their own guidance document in relation to noise assessments and lists the following in relation to Industrial and commercial noise sources:

> *"9.1 - British Standard 4142 is the governing guidance where noise of an industrial nature or commercial nature is under consideration. This method is to be used for assessing impact from noise sources within the scope of this methodology. Please refer to BS 4142:2019 (or as updated), for further information. Where BS 4142 assessments are carried out the council's advice is detailed below.*
>
> *9.2 - <u>New noise sources</u>*
>
> *While a noise source which is assessed to be at, or marginally above the existing background noise level is unlikely to lead direct adverse impacts (unless background sound levels are already high); where various mechanical plant and equipment is introduced over time, ambient and background noise levels are likely to progressively creep upwards. As such, to minimise this, as a starting point, noise from new mechanical sources should preferably be below, but certainly no greater than the existing background level at the most sensitive period when the plant will be operated (e.g. evenings, nights and weekends). If this cannot be achieved, then a view will be taken on the context and character of the noise as discussed in section 11 of BS 4142."*

Atmos has conducted this NIA in line with this Guidance Note.

3. Noise Impact Assessment

3.1 Noise Sensitive Receptors

The closest identified NSRs to the Proposed Development Site have been identified from aerial imagery and mapping are listed in Table 1 below and shown in Figure 2. A total of 21 NSRs have been identified within 1 km of the Proposed Development site boundary.

No properties have been identified that are financially involved with the project.

Table 1: Nearest Representative Noise Sensitive Receptors

Name	ID	Coordinates	
26 Queens Cottages	R1	460854.7	155470.5
25 Queens Cottages	R2	460833.3	155473.8
22 Queens Cottages	R3	460818	155491.5
Actual manor farm	R4	460792	155746.8
All Saints Church	R5	460852.7	155790.8
Rookery farm house	R6	460831	156017.4
Rook Hill	R7	460752.7	156253.2
Paddock View	R8	460880	156199.4
Eglesfield Cottage	R9	460932.6	156271
Queens House	R10	460941.1	156183.3
Iris Cottage	R11	461080.6	156072.4
Thames Dale	R12	461463.2	155841.5
Lavers Lea	R13	461776.7	155627.5
9 Aldermaston Road	R14	461753.6	155500.5
11 Aldermaston Road	R15	461675.7	155241
12 Aldermaston Road	R16	461617.3	155040
28 Mulligan Way	R17	461635.7	154350.9
Biddesden Farmhouse	R18	461441.7	154323
4 Balata Way	R19	461435.4	154187.2
2 Nightingale Gardens	R20	461097	153957.6
Field Barn Farm	R21	459709	155119.5

3.2 Construction Noise

A temporary construction compound would be formed within the site boundary to enable the secure storage of materials and equipment during the construction phase. The temporary compound will be used to allow HGVs to turn, and a new internal access track would be required for construction, maintenance, and decommissioning.

The scale, nature and short duration of the activity means that construction noise is unlikely to be a significant issue. Therefore, it has been excluded from noise impact assessment.

3.3 Operational Noise Sources

The Solar site includes the following identified noise generating equipment:

- Power Stations (as described in; “Stokes Lane Solar Farm Technical Drawing 2”);
- Solar String Inverters (generally located at the end of solar arrays towards the site boundary);

- DNO Substation; and
- Customer Substation.

The above equipment is illustrated on Figure 1

The modelling assumptions relevant to this equipment is presented in Table 2 below.

It is assumed that the plant will be operational 24 hours a day 365 days a Year.

Noise data for the site equipment was supplied to Atmos by the Applicant in the form of broadband data. Specific Octave or 1/3rd octave band data wasn't available for the proposed equipment. However, Atmos was informed that the noise frequency profile of other similar equipment on one of the Applicant's other sites was appropriate to use, that represented those to be installed for this site. This information was adjusted accordingly to match the overall sound power source data for the relevant units.

Table 2: Noise Point Sources

Equipment	Number of Units	Height (modelled)	Comments
String Inverter	94	1.25m	Modelled as point source
Power Station	4	2.9 m	Modelled as point source
Customer Substation	1	2.5 m	Modelled as point source
DNO Substation	1	2.0m	Modelled as point source

A summary of the sound power level data used in the assessment is shown in Table 3.

Table 3: Octave Band Sound Power Levels used in Assessment, dB re 1pW

Item	Qty	Overall dB (A)	Linear Octave Band Sound Power Level, dB								
			31.5	63	125	250	500	1k	2k	4k	8k
String Inverter	94	84	77.2	74.0	89.4	87.8	81.0	76.5	70.3	65.3	60.7
Power Station	4	94	87.6	84.4	99.8	98.2	91.4	86.9	80.7	75.7	71.1
Customer Substation	1	68	-	-	-	-	-	-	-	-	-
DNO Substation	1	67	-	-	-	-	-	-	-	-	-

BS4142:2014 specifies applicable penalties in relation to tonal, impulsive and intermittent characteristics. However, analysis of octave band data does not indicate the presence of significant tones. Atmos' experience with similar units is that the sound is continuous and give the continuous nature of the Proposed Development operation, no intermittency is expected.

Accordingly, no penalties have been applied for these characteristics.

3.4 Noise Modelling

In order to accurately assess the noise levels associated with the Proposed Development at the closest receptors, a 3D Noise Model has been constructed using the modelling software CadnaA 2025. The Following assumptions, inputs and considerations have been included in the model:

- Noise sources have been inputted as point sources using the sound pressure, sound power levels and height (where applicable) data provided;
- 1m Lidar data has been used for the surrounding area and 1m Lidar (existing elevations) within the site boundary to determine elevations;
- A reflection order of two has been used in all calculations with a ground absorption of 1.0 (where 1 is soft ground and 0 is hard ground), local areas of hard ground determined from imagery and site data have been input as 0;

- Where deemed relevant, intervening buildings between noise sources and receptors have been modelled; and
- Noise levels have been generated using ISO 9613-1 and ISO 9613-2 *"Acoustics-Attenuation of sound during propagation outdoors"* as included in the CadnaA software.

3.5 Daytime and Night-time Assessment

3.5.1 BS4142 Assessment

Since a conservative scenario using a fixed 35 dBA background sound has been assumed, both daytime and night-time assessment will be the same. The majority of the solar farm elements are not expected to operate at night; however, all equipment has been modelled as fully operational regardless of day or night-time operation. Therefore, it is assumed that the predicted levels in Table 4 would likely be substantially lower at night.

Figure 2 shows the unmitigated noise contour map.

Table 4 presents the calculated noise rating level (applicable for both daytime and night-time periods) at the NSRs. For the purposes of assessment, modelling results are rounded to the nearest dB.

Table 4: Calculation of Rating Level at Receptors

Receptors	Calculated 1hr Specific Noise Level $L_{Aeq,t}$ (dB)	Penalty Rating	Calculated Rating Level, $L_{A,r}$ (dB)	Background Sound Level $L_{A90,1hr}$ (dB)	Difference +/- (dB)
R1	34.5	0	34.5	35	0
R2	34.1	0	34.1	35	-1
R3	33.7	0	33.7	35	-1
R4	31.9	0	31.9	35	-3
R5	31.4	0	31.4	35	-4
R6	27.7	0	27.7	35	-7
R7	25.4	0	25.4	35	-10
R8	25.8	0	25.8	35	-9
R9	24.6	0	24.6	35	-10
R10	25.6	0	25.6	35	-9
R11	26.7	0	26.7	35	-8
R12	26.4	0	26.4	35	-9
R13	22.9	0	22.9	35	-12
R14	23.5	0	23.5	35	-12
R15	24.2	0	24.2	35	-11
R16	19.0	0	19.0	35	-16
R17	18.9	0	18.9	35	-16
R18	20.9	0	20.9	35	-14
R19	20.1	0	20.1	35	-15
R20	20.6	0	20.6	35	-15
R21	23.6	0	23.6	35	-11

This shows that the noise rating level is not predicted to exceed the assumed background level at any of the closest receptors. On this basis no mitigation is required.

Analysis of the dominant noise sources at receptor R1, where the predicted levels are highest, showed that the highest contributor to the received level was the Power Station immediately to the south. It is understood that the design of this power station has the main noise source as cooling

fans at the top of the structure. It is likely that these cooling fans would only be operational in the capacity modelled during the peak sunlight hours on the warmest days of the year. It is therefore anticipated that for the majority of the time noise levels will be below the assigned background sound of 35 dBA.

3.6 Contextual Considerations

Due to the fact that this is solely a solar farm application it is likely that noise generation will be substantially less during night-time periods than that predicted in this NIA.

Noise generation is anticipated to be generally correlated with power output/ operating capacity. As the solar farm will be in an effective standby operational mode at night and never at 100% operation, and as the noise levels are based upon a 100% capacity/output, real world night-time noise levels would be expected to be far less than these predicted.

Additionally, as this assessment is based upon data that is likely to represent a 100% power capacity, this is in turn is likely to only be the case a small minority of days throughout the year. Therefore, most days are likely to operate at less than 100% and therefore emit less noise than those predicted in this NIA.

4. Conclusion

A Noise Impact Assessment (NIA) has been undertaken in-line with BS4142 of noise emissions and associated impacts on nearby sensitive receptors for the Proposed Development at land north and south of Rookery Farm Lane, Monk Sherborne.

A noise model has been used to determine predicted noise levels resulting from the operation of the Site at the surrounding receptors.

The assessment shows that unmitigated noise levels do not exceed the assigned background noise level of 35 dBA at the 21 closest identified sensitive receptors.

BS4142:2014 states that 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. Where the rating level does not exceed the background, this is an indication of the specific sound source having a low impact, depending on the context.

In accordance with BS4142:2014+A1:2019, this assessment shows that the Proposed Development noise emissions are likely to have a low impact.

The Proposed Development complies with Basingstoke and Deane Borough Council's Noise Guidance Note, as the Proposed Development is not predicted to exceed background sound levels.

Appendix A: Figure List

Figure 1: Site Layout

Figure 2: Noise Contour Plot 1.5m

Stokes Lane Solar Farm

solar2

Figure 1
Site Layout Plan

Key

- Site boundary
- Noise sensitive receptor

Proposed infrastructure

- Access track
- Security fence
- Power station
- Solar panel
- Spare parts container
- Substation
- String inverters

atmos CONSULTING

0 100 200 400
Metres

N

Scale @ A3:
1:10,000

06/05/2025 58759/BP/003f

Drawn by: JT Checked by: TH Approved by: FT

Stokes Lane Solar Farm

solar2

Figure 2
Noise Contour Plot 1.5m

Key

- Site boundary
- Noise sensitive receptor
- Proposed infrastructure
- String inverters

Noise Contour Plot - 1.5m Height

Predicted Noise Level (dBA)

- < 25
- 25 - 30
- 30 - 35
- 35 - 40
- 40 - 45
- 45 - 50
- > 50

atmos CONSULTING

0 200 400
Metres

N

Scale @ A3:
1:9,000

13/06/2025 58759/NO/029a
Drawn by: JT Checked by: TH Approved by: FT