Springwell Solar Farm

Environmental Statement

Volume 1
Chapter 12: Noise and Vibration

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

EN010149/APP/6.1
November 2024
Springwell Energyfarm Ltd

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12. Noise and vibration

12.1. Introduction

12.1.1. This chapter presents an assessment of likely significant effects arising from the construction, operation (including maintenance) and decommissioning of the Proposed Development upon noise and vibration. The full description of the Proposed Development is provided within **ES Volume 1, Chapter 3: Proposed Development Description [EN010149/APP/6.1]**.

12.1.2. This chapter is supported by the following figures presented in **ES Volume 2 [EN010149/APP/6.2]**:

- **Figure 12.1: Receptors Assessed**;
- **Figure 12.2: Baseline Survey Locations**;
- **Figure 12.3: Daytime Specific Noise Contours**; and
- **Figure 12.4: Night-time Specific Noise Contours**.

12.1.3. This chapter is supported by the following appendices presented in **ES Volume 3 [EN010149/APP/6.3]**:

- **Appendix 12.1: Baseline Noise Survey Results**;
- **Appendix 12.2: Construction Noise Plant Tables and Results**; and
- **Appendix 12.3: Operational Equipment Details**.

12.1.4. This chapter should be read in conjunction with the following environmental factor chapter(s) in **ES Volume 1 [EN010149/APP/6.1]**:

- **Chapter 10: Landscape and Visual Impacts**;
- **Chapter 14: Traffic and Transport**; and
- **Chapter 17: Cumulative Effects**.

12.2. Legislative framework, planning policy and guidance

12.2.1. This assessment has been undertaken with regard to the following legislation, planning policy and guidance.

It should be noted that this chapter does not assess the compliance of the Proposed Development against relevant planning policy. Such an assessment is presented in the **Planning Statement [EN010149/APP/7.2]**.

Legislation

- Environmental Protection Act 1990 – Part III of the Environmental Protection Act 1990 contains the mandatory powers available to local authorities within England and Wales in respect of any noise which either constitutes or is likely to cause a statutory nuisance **[Ref. 12-1]**.
- Control of Pollution Act 1974 – The Control of Pollution Act 1974 and the Environmental Protection Act 1990 give local authorities powers for controlling noise and vibration from construction sites and other similar works **[Ref. 12-2]**.

National planning policy

- Overarching National Policy Statement for Energy (NPS EN-1) (2023) – Discussion on the health effects including noise and other possible impacts, is presented within Section 4.4, with Section 5.12 outlining the planning policy for noise and vibration, including the adoption of relevant standards, the decision-making process and opportunities for mitigation for the assessment of noise **[Ref. 12-3]**.
- National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (2023) – Section 3.10 gives specific consideration to solar development including assessment of construction including traffic noise and vibration impacts **[Ref. 12-4]**.
- National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (2023) – Section 2.9 discusses the assessment of noise and vibration, and Section 2.10 discusses mitigation for network infrastructure. Paragraphs 2.9.40 to 2.9.42 discusses an assessment of overhead line noise – as no overhead lines are scheduled within the Proposed Development, no assessment of this aspect is assessed **[Ref. 12-5]**.
- National Planning Policy Framework (NPPF) (2023). This sets out the Government's planning policies for England and how these are expected to be applied. It includes statements relating to noise and the requirement to take it into account during the planning process. Consultation on the proposed reform to the NPPF ended on the 24 September 2024. The **Planning Statement [EN010149/APP/7.2]** considers both the current and consulted NPPF **[Ref. 12-6]**.
- Noise Policy Statement for England (NPSE) (Defra, 2010). NPSE sets out the long-term vision of Government noise policy: 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 **[Ref. 12-7]**.
- Planning Practice Guidance – Noise (2019). The Department for Communities and Local Government 'Planning Practice Guidance' was published in 2014 and updated in 2019. The Planning Practice Guidance

on Noise expands upon the NPPF and NPSE and sets out more detailed guidance on noise assessment. Like the NPPF and NPSE, the guidance does not include any specific noise levels but sets out further principles that should underpin an assessment **[Ref. 12-8]**.

Local planning policy

- Central Lincolnshire Local Plan (2018 - 2040) adopted 13 April 2023 **[Ref. 12-9]**.

Guidance

- BS 4142:2014+A1:2019 - Methods for Rating and Assessing Industrial and Commercial Sound **[Ref. 12-10]**.
- BS 5228-1:2009+A1:2014 - Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise **[Ref. 12-11]**.
- BS 5228-2:2009+A1:2014 - Code of Practice for Noise and Vibration Control on Construction and Open Sites – Vibration **[Ref. 12-12]**.
- BS 7445-1:2003 - Description and measurement of environmental noise - Guide to Quantities and Procedures **[Ref. 12-13]**.
- BS EN 60942:2018 - Electroacoustics – Sound Calibrators **[Ref. 12-14]**.
- BS EN 61672-1:2013 - Electroacoustics – Sound Level Meters **[Ref. 12-15]**.
- Calculation of Road Traffic Noise Memorandum, 1988 **[Ref. 12-16]**.
- Design Manual for Roads and Bridges, LA 111 Noise and Vibration (2019) **[Ref. 12-17]**.
- Institute of Environmental Management and Assessment (IEMA) (2014), Guidelines for Environmental Noise Impact Assessment, Version 1.2 **[Ref. 12-18]**.
- ISO 9613-2:2024 - Acoustics. Attenuation of Sound During Propagation Outdoors. Part 2: General Method of Calculation **[Ref. 12-19]**.
- World Health Organisation (1999), Guidelines for Community Noise **[Ref. 12-20]**.
- World Health Organisation (2009), Night Noise Guidelines for Europe **[Ref. 12-21]**.
- Association of Noise Consultants (2020), BS 4142:2014+A1:2019 Technical Note, Version 1.0 **[Ref. 12-22]**.
- BS 8233:2014 – Guidance on sound insulation and noise reduction for buildings **[Ref. 12-23]**.

12.3. Stakeholder engagement

12.3.1. **Table 12.1** provides a summary of the stakeholder engagement activities undertaken separately from the Environmental Impact Assessment (EIA) scoping, non-statutory consultation, statutory consultation and targeted consultation process in support of the preparation of this assessment, as well as detailing the matters raised, how such matters have been addressed, and where they have been addressed in the Environmental Statement (ES).

12.3.2. **ES Volume 3, Appendix 5.3: Scoping Opinion Response Matrix [EN010149/APP/6.3]** presents the responses received via the Scoping Opinion and the Applicant's response to each matter raised.

12.3.3. **Appendix A-4, J-1, J-2** and **K-3** of the **Consultation Report [EN010149/APP/5.1]**, which is submitted in support of the Development Consent Order (DCO) Application, sets out the feedback received during non-statutory, statutory and targeted consultation and how regard has been afforded by the Applicant to each matter raised.

Table 12.1 Summary of stakeholder engagement

Consultee	Date of Consultation	Summary of matters raised	How this matter has been addressed	Location of where this matter is addressed in the ES
North Kesteven District Council Environmental Health Officer	18 May 2023	Email issued which outlined the scope of the baseline noise monitoring, proposed monitoring locations and length of survey. Response received from North Kesteven District Council (dated 19 May 2023), stating acceptance of the survey monitoring approach with a request to ensure that the proposed baseline monitoring locations are considered in the context of potentially noisy ancillary equipment.	Matters raised by North Kesteven District Council taken into account during baseline noise survey. Locations either at or representative of those nearest sensitive receptors to the Proposed Development adopted for the survey.	**Section 12.4** of this chapter lists the agreed 24 noise monitoring locations.
North Kesteven District Council Environmental Health Officer	18 May 2023	Email which outlined the proposed scope of the noise and vibration assessment. Response received from North Kesteven District Council (dated 19 May 2023), stating acceptance of the assessment approach, but provided the following supplementary comments: • For operational noise, North Kesteven District Council would require rating noise levels to be a maximum 5 decibels (dB) above measured background levels;	Operational noise requirements taken into account for the initial assessment. The relevant BS 4142:2014+A1:2019 also adopts context, utilising the existing baseline environment and absolute noise limits into the assessment. This has also been accounted for in this case.	**Section 12.4** of this chapter describes the assessment approach.

Consultee	Date of Consultation	Summary of matters raised	How this matter has been addressed	Location of where this matter is addressed in the ES
		• The requirement for a Construction Environmental Management Plan, following the outcomes of the construction assessment, in order to outline the Site's approach to dealing with potential complaints and opportunities for mitigation.	An **Outline Construction Environmental Management Plan (oCEMP) [EN010149/APP/7.7]** is submitted in support of the DCO Application.	
North Kesteven District Council Environmental Health Officer	16 January 2024	Email outlining a summary of the baseline conditions, and refined proposed assessment criteria. Email response received on 16 January 2024 agreeing to approach.	Operational assessment undertaken in line with agreed approach.	**Sections 12.4** and **12.6** of this chapter describe the approach to, and details of, the assessment.
North Kesteven District Council Environmental Health Officer	18 September 2024	Email outlining the proposal to scope vibration during construction out of the assessment due to the distances between construction activities and receptors. Email response received from North Kesteven District Council Environmental Health Officer on 18 September 2024 agreeing to the proposed approach.	Vibration during construction and decommissioning has been scoped out of the assessment.	**Section 12.4** of this chapter describes the assessment approach.

12.4. Approach to the assessment

Study area

12.4.1. The study area extends to those sensitive receptors located in close proximity to the Order Limits (no sensitive receptors are located within the Order Limits).

12.4.2. For the purpose of this assessment, the receptor nearest and/or most potentially affected are considered to represent the worst-case scenario for a single or closely located group of receptors to the Order Limits.

12.4.3. This has been based on professional judgement, and which the Applicant considers could be subject to significant noise and/or vibration effects as a result of the construction, operation (including maintenance) and/or decommissioning of the Proposed Development.

12.4.4. Receptors assessed have been derived using the documents listed within **Section 12.2**, more specifically, BS 4142 **[Ref. 12-10]**, BS 5228-1 **[Ref. 12-11]**, BS 5228-2 **[Ref. 12-12]**, LA 111 **[Ref. 12-17]**, and Guidelines for Environmental Noise Impact Assessment **[Ref. 12-18]**. Sensitive receptors assessed are listed in **Table 12.2** below and their location is presented in **ES Volume 2, Figure 12.1: Receptors assessed [EN010149/APP/6.2]** and Fields IDs are presented in **ES Volume 2, Figure 3.1: Zonal Masterplan [EN010149/APP/6.2]**.

Table 12.2 Sensitive receptors assessed

Receptor	Grid Reference	Justification
Gorse Hill Farm	501142E 356220N	Proximity to Field Tb2
The Bungalow, Gorse Hill Road	501187E 356279N	Proximity to Field Tb2
14 Martin Court, Mallory Road, RAF Digby	504548E 356395N	Proximity to Field Bcd086
13 Howard Road, RAF Digby	504935E 356264N	Proximity to Field Rw12
Rowston Cottages, Digby	505134E 356539N	Proximity to Field Rw01
The Lodge, Digby	505230E	Proximity to Field Bk02

Receptor	Grid Reference	Justification
	356823N	
Scopwick Mill	505726E 357614N	Proximity to Field Bcd068
Mill Cottages, Scopwick	506022E 357800N	Proximity to Field Bcd066
52 Heath Road, Scopwick	506333E 357975N	Proximity to Field Bcd148
29 Heath Road, Scopwick	506536E 357992N	Proximity to Field Bcd148
1 Vicarage Lane, Scopwick	506762E 358170N	Proximity to Field B1
Scopwick House, Scopwick	506654E 358356N	Proximity to Field Md05
The Old Rectory, Blankney	506498E 359782N	Proximity to Field C7
The Hall Cottage, Blankney	506961E 359869N	Proximity to Field C6
Hall Farm, Blankney	507194E 359883N	Proximity to Field C6
Staging Post, Blankney	507085E 360293N	Proximity to Field By03
Brickyard Farm, Blankney	508565E 360433N	Proximity to Field By20
Scopwick Low Field Farm, Kirkby Green	508483E 359008N	Proximity to Field Lf02
The Mills, Kirkby Green	508935E 358036N	Proximity to Field Lf11

Receptor	Grid Reference	Justification
Harefield, Kirkby Green	508412E 357924N	Proximity to Field Lf08
Braemar Residential Park, Kirkby Green	508129E 358088N	Proximity to Field Lf08
Longfields, Scopwick	507524E 358118N	Proximity to Field Md01
4 Springfield Estate, Scopwick	507164E 358213N	Proximity to Field Md06
1 Glebe Close, Scopwick	506911E 358169N	Proximity to Field Md06
6 Farriers Court, Scopwick	506749E 358097N	Proximity to Field B1
35 Beckside, Scopwick	506505E 357912N	Proximity to Field Bcd148
4 Almonds Court, Scopwick	506799E 357910N	Proximity to Field B1
Sheffield House, Scopwick	506855E 356719N	Proximity to Field Bk10
The Hayloft, Rowston Top	505677E 356209N	Proximity to Field Rw02
Glebe Farm, Digby	504951E 355916N	Proximity to Field Bcd088
The Garden House, Digby	505312E 355565N	Proximity to Field Bcd088
The Lodge, Ashby de la Launde	504842E 355323N	Proximity to Field Bcd088
Slate House, Ashby de la Launde	503882E	Proximity to Field Bcd118

Receptor	Grid Reference	Justification
	354330N	
Mount Farm, Ashby de la Launde	504627E 353753N	Proximity to Field Bcd129
Peacock Lodge Cottages, Ashby de la Launde	503975E 353647N	Proximity to Field Bcd129
Hill Farm Cottages, Brauncewell	505570E 353213N	Proximity to Field E2
Manor House, Brauncewell	504643E 352461N	Proximity to Field E2
Church House, Brauncewell	504342E 352505N	Proximity to Field E2
School Row, Brauncewell	503629E 352118N	Proximity to Field W1
7 Thompson's Bottom, Ashby de la Launde	501857E 354947N	Proximity to Field Bcd098
1 Thompson's Bottom, Ashby de la Launde	501880E 355053N	Proximity to Field Bcd094
Ashby Lodge, Ashby de la Launde	502886E 355273N	Proximity to Field Bcd098
Toll Bar Cottages, Ashby de la Launde	502694E 355720N	Proximity to Field Bcd082

Scope of the assessment

12.4.5. The scope of this assessment has been established throughout the EIA process and design of the Proposed Development. Further information can be found in **ES Volume 1, Chapter 5: Approach to the EIA [EN010149/APP/6.1]**.

12.4.6. This section provides an update to the scope of the assessment from that presented in the EIA Scoping Report which is located in **ES Volume 3, Appendix 5.1: Scoping Report [EN010149/APP/6.3]** and re-

iterates/updates the evidence base for scoping matters in or out following further iterative assessment.

Receptors/matters scoped into the assessment

12.4.7. **Table 12.3** presents the receptors/matters that are scoped into the assessment reported within this ES, together with appropriate justification.

Table 12.3 Receptor/matters scoped into the assessment

Receptor/matter	Phase	Justification
Noise from construction and decommissioning activities	Construction and decommissioning	Construction and decommissioning activities are likely to involve large earthmoving/lifting plant items with the potential for significant noise effects to occur. Therefore, construction and decommissioning noise has been scoped into the assessment, as detailed within the EIA Scoping Report presented in **ES Volume 3, Appendix 5.1: Scoping Report [EN010149/APP/6.3]** and confirmed within the Scoping Opinion presented in **ES Volume 3, Appendix 5.2: Scoping Opinion [EN010149/APP/6.3]**.
Noise from the operational Proposed Development	Operation	Operational plant items are likely to have an impact on the existing noise environment and affect local amenity. Therefore, operational noise has been scoped into the assessment, as detailed within the EIA Scoping Report presented in **ES Volume 3, Appendix 5.1: Scoping Report [EN010149/APP/6.3]** and confirmed within the Scoping Opinion presented in **ES Volume 3, Appendix 5.2: Scoping Opinion [EN010149/APP/6.3]**.
Noise from construction and decommissioning traffic	Construction and decommissioning	During construction and decommissioning, there is potential for increase in Heavy Goods Vehicle (HGV) vehicle movements that may cause significant effects; therefore, road traffic for the construction and

Receptor/matter	Phase	Justification
		decommissioning phases has been scoped into the assessment, as detailed within the EIA Scoping Report presented in **ES Volume 3, Appendix 5.1: Scoping Report [EN010149/APP/6.3]** and confirmed within the Scoping Opinion presented in **ES Volume 3, Appendix 5.2: Scoping Opinion [EN010149/APP/6.3]**.

Receptors/matters scoped out of the assessment

12.4.8. **Table 12.4** presents the receptors/matters that are scoped out of the assessment that are therefore not considered as part of this ES, together with appropriate justification.

Table 12.4 Receptors/matters scoped out of the assessment

Matter	Phase	Justification
Vibration	Construction and decommissioning	Receptors are considered to be located far enough away from construction works that vibration levels are expected to cause low impact or less. This matter was proposed to be scoped out in the EIA Scoping Report, as presented in **ES Volume 3, Appendix 5.1: Scoping Report [EN010149/APP/6.3]**. However, the EIA Scoping Opinion (**ES Volume 3, Appendix 5.2: Scoping Opinion [EN010149/APP/6.3]**) requested it be scoped in. Following a further review of the proposed construction methods (as detailed in **ES Volume 3, Appendix 12.2: Construction Noise Plant Tables and Results [EN010149/APP/6.3]**) and the attenuation due to the distance of receptors from works, it is anticipated that there would be no significant vibration effects to surrounding receptors during either construction or decommissioning.

Matter	Phase	Justification
		The scoping out of vibration during construction has been agreed with the North Kesteven District Council Environmental Health Officer (refer to **Table 12.1** above).
Vibration	Operation (including maintenance)	Operational elements including fixed plant items/structures would not emit discernible levels of vibration, and are considered to be located at a sufficient distance away from sensitive receptors, shown in **ES Volume 2, Figure 3.1: Zonal Masterplan [EN010149/APP/6.2],** to not result in possible significant vibration impacts. Therefore, vibration during operation (including maintenance) has been scoped out of the assessment, as detailed within the EIA Scoping Report presented in **ES Volume 3, Appendix 5.1: Scoping Report [EN010149/APP/6.3]** and confirmed within the Scoping Opinion presented in **ES Volume 3, Appendix 5.2: Scoping Opinion [EN010149/APP/6.3]**.
Noise from operational traffic	Operation (including maintenance)	Once the Proposed Development is operational, the effect on the local road system is expected to be minimal for maintenance purposes and occasional equipment replacement. Therefore, assessment of all road users has been scoped out of the assessment, as detailed within the EIA Scoping Report presented in **ES Volume 3, Appendix 5.1: Scoping Report [EN010149/APP/6.3]** and confirmed within the Scoping Opinion presented in **ES Volume 3, Appendix 5.2: Scoping Opinion [EN010149/APP/6.3]**.
Ecological designated sites	Construction, operation (including maintenance) and decommissioning	Review of Natural England's online data mapping sources indicates that there are no Sites of Special Scientific Interest **[Ref. 12-24]**, Special Protection Areas **[Ref. 12-25]**, or Ramsar sites **[Ref. 12-26]** adjacent to or at closer distance than

Matter	Phase	Justification
		the residential locations assessed within this chapter (refer to **ES Volume 1, Chapter 7: Biodiversity [EN010149/APP/6.1]** for further detail.
Noise along Public Rights of Way (PRoW)	Construction, operation (including maintenance) and decommissioning	Due to the transient and temporary nature of users along PRoW through the Proposed Development, and the proposed distance between PRoW and equipment detailed in **Design Commitments [EN010149/APP/7.4],** noise impacts along these areas is not assessed.

Establishing baseline conditions

Data sources to inform the EIA baseline characterisation

12.4.9. The choice of baseline survey locations was informed by the following sources:

- Aerial photography and mapping; and
- Address based data for residential properties.

Site surveys

12.4.10. A baseline noise survey has been undertaken to establish the prevailing acoustic environment at receptor locations, and at locations within the Order Limits deemed representative of receptors where a survey could not be undertaken at the receptor.

12.4.11. The baseline surveys comprised unattended noise monitoring at 24 locations, as listed in **Table 12.5** below and described in **ES Volume 3**, **Appendix 12.1: Baseline Noise Survey Results [EN010149/APP/6.3]** and presented in **ES Volume 2, Figure 12.2: Baseline Survey Locations [EN010149/APP/6.2]**. Monitoring locations were agreed with North Kesteven District Council Environmental Health Officer (refer to **Table 12.1** above). Monitoring was undertaken between 6 June 2023 and 19 July 2023.

12.4.12. The equipment used for the baseline surveys were Class 1 sound level meters conforming to the requirements of BS EN 61672 **[Ref. 12-15]**, and calibrators conforming to the requirements of BS EN 60942 **[Ref. 12-14]**. The meters were calibrated to traceable standards within the preceding two years and the calibrator within the previous 12 months of the survey

measurement. The sound level meters were field calibrated once set up in position and on completion of the survey. No significant calibration drift was observed, i.e. within a +/- 0.5 dB tolerance.

12.4.13. The noise monitoring equipment at all positions was located at least 3.5 metres (m) from any significant reflective surfaces, other than the ground, considered to be under free-field measurement conditions. All measurements were taken from the microphone situated approximately 1.5m above local ground level.

Table 12.5 Baseline survey measurement location details

Baseline Survey Location	Grid Reference	Description	Representative of Receptor
1	501375E 356226N	North-west of Field ID Tb1 - situated ~190m from Gorse Hill Farm, off Gorse Hill Lane	Gorse Hill Farm The Bungalow, Gorse Hill Road
2	502111E 355010N	West of Field ID Bcd098 - situated ~230m from No. 1 Thompson's Bottom	1 and 7 Thompson's Bottom, Ashby de la Launde
3	503616E 352045N	East of Field ID W2 - situated ~60m from School Row, Brauncewell	School Row, Brauncewell
4	504562E 352652N	East of Field ID E1a - situated ~190m from Manor House, Brauncewell	Hill Farm Cottages Manor House Church House, Brauncewell
5	504300E 353894N	East of Field ID Bcd120 – situated ~340m from Mount Farm, Ashby de la Launde	Mount Farm Peacock Lodge Cottages, Ashby de la Launde
6	503763E 354142N	East of Field ID Bcd118 – situated ~10m from Slate House Cottages, Ashby de la Launde	Slate House, Ashby de la Launde
7	502914E 355244N	North-east of Field ID Bcd099 – situated ~20m	Ashby Lodge Toll Bar Cottages, Ashby de la Launde

Baseline Survey Location	Grid Reference	Description	Representative of Receptor
		from Ashby Lodge Cottages, Ashby de la Launde	
8	504528E 356393N	South-east of Field ID Bcd076 – situated ~20m from No. 14 Martin Court, Ashby de la Launde	14 Martin Court, Mallory Road, RAF Digby
9	505027E 356240N	North-east of Field ID Bcd079 – situated ~10m from No. 13 Howard Road, RAF Digby	13 Howard Road, RAF Digby Rowston Cottages Glebe Farm, Digby
10	505276E 356809N	West of Field ID Bk01 – situated ~40m from The Lodge, Digby	The Lodge, Digby
11	505574E 356421N	North-east of Field ID Rw12 – situated ~230m from The Hayloft, Rowston Top	The Hayloft, Rowston Top
12	505199E 355578N	South of Field ID Rw10 – situated ~100m from The Garden House, Digby	The Garden House, Digby The Lodge, Ashby de la Launde
13	505779E 357404N	North-east of Field ID Bk03 – situated ~215m from Scopwick Mill, Scopwick	Scopwick Mill Mill Cottages, Scopwick
14	506701E 358119N	South of Field ID B1 – situated ~55m from No. 6 Farriers Court, Scopwick	52 Heath Road 29 Heath Road 1 Vicarage Lane Scopwick House 6 Farriers Court 35 Beckside 4 Almonds Court, Scopwick

Baseline Survey Location	Grid Reference	Description	Representative of Receptor
15	507084E 356951N	South-east of Field ID Bk10 – situated ~340m from Sheffield House, Scopwick	Sheffield House, Scopwick
16	506975E 358325N	South-east of Field ID Md05 – situated ~170m from 1 Glebe Close, Scopwick	4 Springfield Estate 1 Glebe Close, Scopwick
17	506955E 359792N	East of Field ID C1 – situated ~70m from The Hall Cottage, Blankney	The Old Rectory The Hall Cottage Hall Farm, Blankney
18	507242E 360414N	North-west of Field ID By01 - situated ~190m from Staging Post, Blankney	Staging Post, Blankney
19	508383E 360403N	South of Field ID By05 – situated ~180m from Brickyard Farm, Blankney	Brickyard Farm, Blankney
20	508497E 358982N	North of Field ID Lf09 - situated ~15m from Scopwick Low Field Farm, Kirkby Green	Scopwick Low Field Farm, Kirkby Green
21	509222E 358029N	South of Field ID Lf10 – situated ~290m from The Mills, Kirkby Green	The Mills, Kirkby Green
22	508392E 358139N	South of Field ID C10 – situated ~220m from Harefield, Kirkby Green	Harefield Braemar Residential Park, Kirkby Green Longfields, Scopwick

Approach to design flexibility

12.4.14. The design principles and parameters, as outlined in **ES Volume 1, Chapter 3: Proposed Development Description [EN010149/APP/6.1]** and the parameter plans presented in **ES Volume 2, Figure 3.1 – 3.4 [EN010149/APP/6.2]**, set out the reasonable 'worst-case' for the Proposed Development..

12.4.15. **ES Volume 1, Chapter 5: Approach to the EIA [EN010149/APP/6.1]** sets out those elements of the Proposed Development for which optionality is present within the design. The reasonable 'worst-case' scenario that has been assessed in this noise and vibration chapter for each element of the Proposed Development where optionality is present within the design is outlined within **Table 12.6**.

Table 12.6 Reasonable worst-case scenario assessed for noise and vibration

Project element	Reasonable worst-case scenario that has been assessed
Battery Energy Storage System (BESS) and Springwell Substation[1] and Main Collector Compound	Iterative modelling of the noise emitting plant in Field Tb2 (the BESS, Springwell Substation and Main Collector Compound) has been assessed during the design stages of the Proposed Development. Different capacities and positioning of plant items have been modelled in order to inform the parameters and reduce noise levels where practical. The capacity of the BESS and location of Springwell Substation has been balanced between multiple aspects such as noise, engineering design, safety, landscape and visual impacts, and commercial aspects of the Proposed Development to present an optimised Site layout. This assessment has considered the maximum parameters for the location of the BESS and Springwell Substation as outlined in **ES Volume 2, Figure 3.1: Zonal Masterplan [EN010149/APP/6.2]**, which mainly comprises the location of the BESS and Springwell Substation assessed at the closest parameters to closest receptors, to ensure a worst-case has been assessed. Embedded mitigation is proposed within Field Tb2 around each Springwell Substation transformer and the BESS Compound to assist reducing noise levels further, consisting of a 4m high barrier around the BESS Compound, and a 6m high absorbent barrier positioned around the west, north and east faces of each Springwell Substation transformer.
Balance of Solar System (BoSS) – Inverters	The inverters which form part of the BoSS would comprise either string inverters which are placed underneath the Solar photovoltaic (PV) modules or central inverters which

[1] Due to the relatively close location of the BESS and Springwell Substation to each other, these have been assessed together as a project element for noise purposes.

Project element	Reasonable worst-case scenario that has been assessed
	are sited at regular intervals amongst the Solar PV modules. Extensive modelling has been undertaken for the different types of inverters within solar generating fields in order to identify where either string or central inverters can be located to avoid unacceptable impacts at sensitive receptors. A hybrid of both options is embedded into the design and considered for the assessment. The detailed list of each field and inverter type is detailed in **ES Volume 3, Appendix 3.1: Project Parameters [EN010149/APP/6.3]** and will be secured by the **Schedule 1** of the **Draft DCO [EN10149/APP/3.1]**.
Construction Compounds	This assessment has considered the maximum parameters for the location of the construction compounds as identified in **ES Volume 2, Figure 3.10: Primary and Secondary Construction Compounds [EN010149/APP/6.2]** and detailed within **ES Volume 1, Chapter 3: Proposed Development Description [EN010149/APP/6.1]**. The maximum parameters will be secured in the **Works Plans [EN010149/APP/2.3]**.
Satellite Collector Compounds	This assessment has considered the maximum parameters for the location of the Satellite Collector Compounds as outlined in **ES Volume 2, Figure 3.1: Zonal Masterplan [EN010149/APP/6.2]**, and **ES Volume 1, Chapter 3: Proposed Development Description [EN010149/APP/6.1]**. The maximum parameters will be secured in the **Works Plans [EN010149/APP/2.3]**.
Cable routes	This assessment has considered an illustrative reasonable worst case cable route close to receptors as presented in **ES Volume 2, Figure 3.9: Indicative Cable Crossing [EN010149/APP/6.2]**.
Internal tracks	This assessment has considered illustrative reasonable worst case internal access tracks to receptors as presented in **ES Volume 2, Figure 3.14: Indicative location of internal access tracks [EN010149/APP/6.2]**, and **ES Volume 1, Chapter 3: Proposed Development Description [EN010149/APP/6.1]**.

Project element	Reasonable worst-case scenario that has been assessed
Horizontal Directional Drill	The assessment has considered illustrative reasonable worst case cable route crossings across all roads as presented in **ES Volume 2, Figure 3.9: Indicative Cable Crossing [EN010149/APP/6.2]**.

Assessment assumptions

Noise from Construction Activities

12.4.16. The typical emissions of construction plant items and activities identified by the Applicant and that have been assumed for this assessment are detailed in **ES Volume 3, Appendix 12.2: Construction Noise Plant Tables and Results [EN010149/APP/6.3]**.

12.4.17. The construction noise impacts within the Order Limits have been assessed for fields where development is proposed, as detailed in **ES Volume 2, Figure 3.1: Zonal Masterplan [EN010149/APP/6.2]** and secured by the **Works Plans [EN010149/APP/2.3]**. The assessment has accounted for the construction activities occurring concurrently across the area. This is likely an overestimation of likely impacts, assuming all plant items are operating at the closest distance of approach to receptors, at the same time, taking a worst-case approach. In reality, the movement of vehicles and plant would be transient across the area and time.

12.4.18. Working hours on site would be from 7 a.m. to 7 p.m. Monday through Friday; and 7 a.m. to 12 noon Saturday. No working on Sunday or Bank Holidays. Any construction tasks within 400m to dwellings would be between 8am to 6pm on weekdays, and 8am to 12pm noon on Saturdays.

12.4.19. **Table 12.7** provides the anticipated noise levels of each construction activity. Plant noise levels have been obtained from manufacturers data or information within BS 5228-1 **[Ref. 12-11]**. The assessment assumes all plant items are in operation simultaneously during that activity, at a position which is the shortest distance from source to receptor. This provides a worst-case scenario of likely construction impact.

Table 12.7 Construction activities noise levels

Activity	Sound Pressure Level at 10m, dBA
Site Clearance	91
Primary and Secondary Construction Compound Installation	84

Activity	Sound Pressure Level at 10m, dBA
Internal Track Installation	79
Solar Panel Frame Installation and Piling	79
Cut and Fill Earthworks in Field Tb2	84
BESS Installation	78
Satellite Collector Compound and Substation Installation	77
Cabling Trenching	80
Concreting in Field Tb2 and Satellite Collector Compounds	84
Jointing Works	84
Horizontal Directional Drilling	85

12.4.20. Further details of the construction activities are presented in **ES Volume 3, Appendix 12.2: Construction Noise Plant Tables and Results [EN010149/APP/6.3]**.

12.4.21. Internal tracks within the Order Limits are also assessed as a regular well-defined route, as detailed in BS 5228-1 **[Ref. 12-11]**. Internal track calculations are based on a sound power level of 109 dB(A), reference C.4.1 within BS 5228-1 **[Ref. 12-11]** articulated dump truck, ten vehicles per hour, and a speed of 15mph (21.1kmh).

12.4.22. In addition, construction traffic is proposed to enter Field Tb2 off Gorse Hill Lane (directed off the A15). Internal track calculations for this portion of internal track also adopts a sound power level of 109(A) dB, ten vehicles per hour, and a speed of 15mph (21.1kmh).

Noise from Construction Traffic

12.4.23. The noise impact assessment of the construction phase outside of the Order Limits is based on the assumptions relating to routing and future baseline traffic values set out in **ES Volume 1, Chapter 14: Traffic and Transport [EN010149/APP/6.1]**.

12.4.24. Annual average weekday traffic (AAWT – 18hour) and %HGV is provided in **Tables 12.8** for the 2028 construction year.

12.4.25. The scenarios adopted for the assessment of short-term construction traffic impacts is:

- 2028 Construction Year Baseline vs 2028 Baseline + Construction + Committed Development

Table 12.8 AAWT construction traffic year, 2028, flows

Road Name	Speed, kph	2028 Construction Year Baseline		2028 Baseline + Construction + Committed Development	
		Flow, AWWT 18 hour	HGV %	Flow, AWWT 18 hour	HGV %
A15 (north of B1191)	97	13989	9.6	14528	10.4
A15 (south of B1191)	97	15581	9.4	16083	10.1
B1191 (between RAF Digby and Ashby de la Launde)	64	2812	15.5	3052	16.8
B1191 (between Scopwick and RAF Digby)	64	2088	16.1	2328	17.8
B1188 (north of Scopwick)	81	5073	6.0	5344	7.2
B1188 (south of Digby)	81	4959	18.5	4998	18.4
A15 (south of Metheringham Heath Lane)	97	13887	7.0	14650	7.7
A15 (north of Leasingham)	97	14837	7.3	15306	8.1
B1188 (south of Scopwick)	81	4372	4.8	4411	4.7
B1202	97	3790	5.6	3866	5.5

Road Name	Speed, kph	2028 Construction Year Baseline		2028 Baseline + Construction + Committed Development	
		Flow, AWWT 18 hour	HGV %	Flow, AWWT 18 hour	HGV %
Navenby Lane	97	1454	1.1	1523	1.0
Temple Road	97	547	2.9	581	7.7

12.4.26. The construction traffic routing along Gorse Hill Lane illustrated in **ES Volume 2, Figure 14.4: Transport Routing and Existing Highway Network [EN010149/APP/6.2]** has been omitted from the assessment against baseline, given the traffic would be directed into Field Tb2 without passing properties along Gorse Hill Lane, as stated within the **oCEMP [EN010149/APP/7.7]**. The assessment of construction traffic effects on properties along Gorse Hill Lane has been accounted for within the internal track calculations, as outlined in **paragraph 12.7.4**.

Noise from the Operational Proposed Development

12.4.27. Details of noise emitting equipment associated with the operation phase are provided in **Table 12.9** below. It should be noted that the final equipment supplier may be subject to change prior to installation. The impact of operational noise has been assessed using currently available equipment.

12.4.28. Although it is anticipated that different equipment items have varying operational regimes, dependent on the level of daylight and energy demand, the operational assessment has conservatively assessed all equipment at 100% operation at all times as a reasonable worst-case.

12.4.29. Operational impacts have been predicted using a computer noise model of the Proposed Development layout in **ES Volume 1, Chapter 3: Proposed Development Description [EN010149/APP/6.1]** and discussed in **Table 12.6**, using SoundPLAN v9.0. Noise model details presented in **Table 12.8**.

Table 12.8 Noise modelling details

Modelling Parameter	Setting
Algorithm	ISO 9613-2:2024
Ground Absorption	0.8 (soft ground conditions)
Meteorological conditions	10 degrees Celsius, 70% humidity, Wind from source to receiver.
Receptor height	Daytime, 1.5m above ground Night-time, 4m above ground
Terrain	LiDAR DTM 1 metre resolution

12.4.30. Noise levels for the operational assessment are presented in **Table 12.9**.

Table 12.9 Operational plant noise levels

Plant	Location	Assumptions	Reference noise level per single plant item
Main Transformer	Springwell Substation, Satellite Collector Compound	7 in Springwell Substation 2 in each Satellite Collector Compound	75 dB(A) at 1m
BESS Container	BESS Compound	720 no. in total	65 dB(A) at 1m
BESS Transformer	BESS Compound	120 no. in total	71 dB(A) at 1m (loudest side)
Central Inverter	Within each Solar PV field	Up to 102 with all Solar PV fields using Central Inverters	57 dB(A) at 10m
String Inverter	Within each Solar PV field	Up to 600 with mixed central and string inverters	69 dB(A) at 1m

Plant	Location	Assumptions	Reference noise level per single plant item
Inverter and Transformer Station (ITS)	Within each string inverter PV field	Up to 28 in scenario with mixed central and string inverters	54 dB(A) at 10m

12.4.31. A 4m high barrier has been included around the BESS Compound, with a 6m high absorbent barrier positioned around the west, north and east faces of the Springwell Substation transformers as part of the embedded mitigation.

12.4.32. Further details on reference noise levels and plant are presented in **ES Volume 3, Appendix 12.3: Operational Equipment Details [EN010149/APP/6.3]**.

Noise from Decommissioning Traffic

12.4.33. The likely noise impacts during the decommissioning phase are considered to be similar to the construction phase, as it is envisaged that similar plant and works would be used.

12.4.34. The noise impact assessment of decommissioning traffic outside of the Order Limits has been assessed, although it is understood that this has been scoped out from the traffic and transport assessment, **ES Volume 1, Chapter 14: Traffic and Transport [EN010149/APP/6.1]**.

12.4.35. The year of decommissioning the Proposed Development is 2070. However, due to the limitations of the traffic software being unable to accurately predict traffic flows of the proposed decommissioning year (refer to **ES Volume 1, Chapter 14: Traffic and Transport [EN010149/APP/6.1]** for further details), annual average weekday traffic (AAWT – 18hour) and % HGV for 2060 is provided in **Table 12.10**.

12.4.36. The scenarios adopted for the assessment of short-term decommissioning traffic impacts are therefore:

- 2060 Decommissioning Year Baseline vs 2060 Baseline + Decommissioning + Committed Development

Table 12.10 AAWT decommissioning traffic construction year (2060) flows

Road Name	Speed, kph	2060 Decommissioning Year Baseline		2060 Baseline + Decommissioning Traffic + Committed Development	
		Flow, AWWT 18 hour	HGV %	Flow, AWWT 18 hour	HGV %
A15 (north of B1191)	97	15750	9.6	16289	10.3
A15 (south of B1191)	97	17543	9.4	18044	10.0
B1191 (between RAF Digby and Ashby de la Launde)	64	3165	15.5	3406	16.7
B1191 (between Scopwick and RAF Digby)	64	2351	16.1	2591	17.6
B1188 (north of Scopwick)	81	5711	6.0	5983	7.1
B1188 (south of Digby)	81	5583	18.5	5622	18.4
A15 (south of Metheringham Heath Lane)	97	15636	7.0	16399	7.7
A15 (north of Leasingham)	97	16705	7.3	17174	8.1
B1188 (south of Scopwick)	81	4923	4.8	4962	4.7
B1202	97	4267	5.6	4343	5.5
Navenby Lane	97	1637	1.1	1706	1.1
Temple Road	97	15750	2.9	16289	7.2

12.4.37. Like the construction traffic, proposed decommissioning traffic would not go past the residential properties along Gorse Hill Lane as stated within the **Outline Decommissioning Environmental Management Plan (oDEMP) [EN010149/APP/7.13]**, and has been omitted from the assessment against baseline. The assessment of decommissioning traffic effects on properties along Gorse Hill Lane has been accounted for within the internal track calculations as part of the construction assessment, as outlined in **paragraph 12.7.4**.

Assessment methodology and criteria

Value/sensitivity/importance

12.4.38. Criteria for determining receptor sensitivity, presented in **Table 12.11**, have been informed from guidance within:

- Design Manual for Roads and Bridges **(**DMRB) LA 111 'Noise and Vibration' **[Ref. 12-17]**; and
- IEMA 'Guidelines for Environmental Noise Impact Assessment' **[Ref. 12-18]**.

Table 12.11 Receptor sensitivity

Receptor Sensitivity	Type of Receptor
High	Residential properties, educational establishments, hospitals, places of worship, hotels, children's nurseries, nursing homes.
Medium	Commercial premises including offices, halls, public municipal areas, bars and restaurants.
Low	Industrial premises.
Negligible	All other areas such as those used primarily for agricultural purposes.

Magnitude of impact

12.4.39. Criteria for determining the magnitude of impact, presented in **Table 12.12**, has been informed by a variety of guidance documents as listed in **Section 12.2**, depending on the phase of the Proposed Development.

12.4.40. Although the lowest measure of magnitude of impact is defined as 'negligible', it should be noted that noise levels may still be audible/perceptible during construction, operation (including maintenance) and decommissioning, but does not cause any change in behaviour, attitude or other physiological response.

Table 12.12 Magnitude of impact criteria

Impact	Magnitude of impact			
	Negligible	Low	Medium	High
Construction and decommissioning phases – daytime noise (BS 5228-1:2009+A1: 2014)	Less than 55 dB $L_{Aeq,T}$	Between 55 and 65 dB $L_{Aeq,T}$	Between 66 and 75 dB $L_{Aeq,T}$	Greater than 75 dB $L_{Aeq,T}$
Construction phase and decommissioning - road traffic noise (DMRB LA 111 'Noise and Vibration')	Less than 1 dB increase in road traffic noise	1.0 to 2.9 dB increase in road traffic noise	3.0 to 4.9 dB increase in road traffic noise	Greater than or equal to 5 dB increase
Operational phase – daytime noise (BS 4142: 2014 + A1: 2019 / World Health Organisation, 1999 / BS 8233: 2014)	Rated noise level equal to or less than 35 dB $L_{Ar,T}$	Rated noise level between 36 and 40 dB $L_{Ar,T}$	Rated noise level between 41 and 50 dB $L_{Ar,T}$	Rated noise level greater than 50 dB $L_{Ar,T}$
Operational phase – night-time noise (BS 4142: 2014 + A1: 2019 / World Health Organisation, 1999 / BS 8233: 2014)	Rated noise level equal to or less than 30 dB $L_{Ar,T}$	Rated noise level between 31 and 35 dB $L_{Ar,T}$	Rated noise level between 36 and 45 dB $L_{Ar,T}$	Rated noise level greater than 45 dB $L_{Ar,T}$

12.4.41. For the operation (including maintenance) phase, BS 4142 **[Ref. 12-10]** advises that where rating levels and background levels are low, which is typically the case in rural areas, the assessment of operational noise should take the absolute noise level into context. The Association of Noise Consultants Guide to BS 4142 **[Ref. 12-22]** provides some clarity to this by stating:

"BS 4142 does not define 'low' in the context of background sound levels nor rating levels. The note to the Scope of the 1997 version of BS 4142 defined very low background sound levels as being less than about 30 dB L_{A90}, and low rating levels as being less than about 35dB $L_{Ar,Tr}$".

12.4.42. The Association of Noise Consultants Guide **[Ref. 12-22]** suggests that: *"…similar values would not be unreasonable in the context of BS 4142, but that the assessor should make a judgement and justify it where appropriate"*.

12.4.43. In this case, it is considered that a minimum rating level of 40 dB $L_{Ar,Tr}$ during the daytime, and 35 dB $L_{Ar,Tr}$ for the low magnitude impact criteria, would align with guidance in Planning Practice Guidance **[Ref. 12-8]**, which defines noise below the lowest observed adverse effect level (LOAEL) as follows:

"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".

12.4.44. Review of the measured baseline noise levels, presented in **Table 12.14** and **ES Volume 3**, **Appendix 12.1: Baseline Noise Survey Results [EN010149/APP/6.3]**, indicates that residual noise levels ($L_{Aeq,T}$) are equal to or less than the applied rating level design targets applied to the low magnitude criteria. This is considered to successfully apply the concepts of a LOAEL within Planning Practice Guidance **[Ref. 12-8]** and 'context' within BS 4142 **[Ref. 12-10]**.

12.4.45. BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings' **[Ref. 12-23]** and the World Health Organisation 'Guidelines for Community Noise' (1999) **[Ref. 12-20]** provide guidance levels for internal noise within dwellings of 30dB $L_{Aeq,T}$ for good sleeping conditions at night. However, as residents are likely to be inside their properties at night, BS 8233:2014 **[Ref. 12-23]** states that building envelope attenuation reduces external noise by approximately 15 dB for a partially open window. Consequently, an external high magnitude criteria, indicating a significantly adverse effect level (SOAEL) of 45dB $L_{Ar,Tr}$ has been adopted for the night-time.

12.4.46. Based on the adaptation of absolute limits, World Health Organisation 1999 **[Ref. 12-20]** provides guidance on permissible levels above which adverse effects are likely to occur. Therefore, the criteria for LOAEL and SOAEL adopted within this assessment are considered as a design limit, above which the onset of LOAEL and SOAEL would occur.

12.4.47. Additionally, the operation of the Proposed Development may emit audible tonal components at receptors. As a conservative approach, tonal corrections have been applied based on the audibility of the noise source against the residual noise levels:

- +0dB applied where the specific noise level does not increase the residual noise level;
- +2dB applied where the specific noise source increases the residual noise level by up to and including 2dB (classed as 'just perceptible');
- +4dB applied where the specific noise source increases the residual noise level by 3 to 4dB (classed as 'clearly perceptible');

- +6dB applied where the specific noise source increases the residual noise level by 5dB or more (classed as 'highly perceptible').

12.4.48. Based on the indicative equipment, the operational plant items would not emit impulsive, intermittent, or other sound characteristic components which are discussed within BS 4142 **[Ref. 12-10]**.

Significance of effect

12.4.49. The significance of effect is determined by combining the sensitivity of the receptor and the magnitude of impact, as presented in **Table 12.13**. The assessment of significance relies on best practice, the relevant published standards and guidance documents, and professional judgement.

12.4.50. The significance of an effect is reported as either 'significant' or 'not significant'. Where an effect is assessed as 'negligible' or 'minor', this is considered to achieve the LOAEL within NPSE **[Ref. 12-7]** and is considered **not significant**. Where the effect is classed as 'moderate' or 'major', this is considered to achieve the SOAEL and is classed as **significant**. NPSE **[Ref. 12-7]** discusses that the SOAEL, which also implies the LOAEL, cannot be defined by a single objective noise-based measure to all sources of noise in all situations, and is likely different for varying noise sources, receptors, and times.

Table 12.13 Significance of effect

Magnitude of impact	Sensitivity of receptor/receiving environment to change			
	High	Medium	Low	Negligible
High	Major	Moderate	Minor	Negligible
Medium	Moderate	Minor	Negligible	Negligible
Low	Minor	Negligible	Negligible	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

12.5. Environmental baseline

12.5.1. The following section presents a summary of the baseline conditions for the receptors scoped into the assessment, as detailed within **Table 12.2** above. The full details of the baseline conditions are presented in **ES Volume 3, Appendix 12.1: Baseline Noise Survey Results [EN010149/APP/6.3]**.

Existing baseline

12.5.2. **Table 12.14** presents the results of the baseline surveys, and the derived representative background sound levels for daytime and night-time periods using statistical analysis undertaken in accordance with BS 4142 **[Ref. 12-10]**; survey data and derivations are presented in **ES Volume 3, Appendix 12.1: Baseline Noise Survey Results [EN010149/APP/6.3]**. Ambient noise levels ($L_{Aeq, T}$) are presented for both daytime 16-hour (07:00 – 23:00) and night-time 8-hour (23:00 – 07:00) periods. Representative background sound levels ($L_{A90, T}$) are presented for both daytime 1-hour and night-time 15-minutes.

12.5.3. Weather conditions for the monitoring period have been analysed for the nearest weather station to the Proposed Development, located 1.6km to the south-west of Ashby de la Launde (Wunderground ID – ILINCO209). Where the weather conditions were considered unsuitable for environmental noise monitoring (in accordance with the requirements of BS 7445-1:2003 **[Ref. 12-13]**), the corresponding noise data has been discounted.

12.5.4. Baseline monitoring locations are presented in **ES Volume 2, Figure 12.2: Baseline Survey Locations [EN010149/APP/6.2]**.

Table 12.14 Baseline survey results

Measurement Location	Daytime, 07:00 – 23:00		Night-time, 23:00 – 07:00	
	Ambient Noise Level, $L_{Aeq,T}$	Representative Background Sound Level, $L_{A90,1hour}$	Ambient Noise Level, $L_{Aeq,T}$	Representative Background Sound Level, $L_{A90,15minute}$
1	46	34	43	29
2	49	40	45	30
3	49	35	48	26
4	53	43	50	26
5	44	31	35	22
6	45	35	41	24
7	44	30	43	22
8	52	37	53	27
9	43	31	38	20

Measurement Location	Daytime, 07:00 – 23:00		Night-time, 23:00 – 07:00	
	Ambient Noise Level, $L_{Aeq,T}$	Representative Background Sound Level, $L_{A90,1hour}$	Ambient Noise Level, $L_{Aeq,T}$	Representative Background Sound Level, $L_{A90,15minute}$
10	50	30	43	21
11	51	36	48	26
12	48	32	40	22
13	46	33	41	23
14	44	28	36	22
15	60	38	53	25
16	50	36	42	24
17	47	33	41	22
18	50	35	48	22
19	51	36	42	23
20	52	37	45	24
21	49	33	39	20
22	47	31	45	20
23	53	33	47	19
24	44	31	35	19

Future baseline in the absence of the Proposed Development

12.5.5. On the basis that the majority of the Proposed Development is located within a rural setting, typically comprising agricultural land use and not located close to major transport infrastructure, there is generally not expected to be significant changes to the baseline conditions in the future.

12.5.6. Regarding transport infrastructure, such as roads, there is potential for growth in the traffic flows in the future baseline scenario. In the absence of significant alterations to the wider road network, the variation in traffic flows would be expected to be incremental and therefore unlikely to give rise to perceptible changes in the acoustic environment.

12.6. Mitigation embedded into the design

12.6.1. This assessment has been based on the principle that measures have been 'embedded' into the design of the Proposed Development to remove potential significant effects as far as practicable, for example by the considered placement of infrastructure. **ES Volume 1**, **Chapter 3: Proposed Development Description [EN010149/APP/6.1]** and **ES Volume 3**, **Appendix 3.1: Project Parameters [EN010149/APP/6.3]** and the Design Commitments which form part of the **Design Approach Document [EN010149/APP/7.3]** identify measures that have been embedded into the design of the Proposed Development. The embedded mitigation relevant to this assessment is detailed below and secured in the **Design Commitments [EN010149/APP/7.4].**

- A 4m high barrier has been included around the BESS Compound, with a 6m high absorbent barrier positioned around the west, north and east faces of the Springwell Substation transformers.
- Springwell Substation, BESS, Collector Compounds, Standalone Inverter, Transformer and Switchgear and ITS (part of the balance of solar system plant comprised in Work No. 1) will be offset at least 250m from residential properties.
- Perimeter fencing surrounding the Solar PV development will be offset at least 15m from existing woodlands.
- Perimeter fencing surrounding the Solar PV development will be offset at least 10m either side from all existing hedgerows.
- Built development above ground will be offset at least 20m from Local Wildlife Sites except for highways improvement works.
- Perimeter fencing surrounding the Solar PV development will be offset at least 30m from main badger setts.
- Independent Outdoor Equipment (transformer, switchgear and central inverters) and ITS will be offset at least 50m from all existing and proposed statutory PRoW.
- Perimeter fencing surrounding the Solar PV development will be offset at least 15m from either side of existing and proposed statutory PRoW.

12.7. Assessment of likely effects (without additional mitigation)

Noise from Construction Activities

12.7.1. **ES Volume 3, Appendix 12.2: Construction Noise Plant Tables and Results [EN010149/APP/6.3]** details the potential impacts of noise from construction activities in the absence of additional mitigation.

12.7.2. Highest noise levels calculated during the construction phase (in the absence of additional mitigation) is from the cable trenching phase. The highest predicted noise level from cable trenching activity is 66dB $L_{Aeq,T}$ at Scopwick Mill, which is located approximately 45m from cable trenching activity. However, it should be noted that such a noise level is likely to occur for a short period of time, potentially 10 weeks.

12.7.3. All other construction activities are predicted to generate noise levels less than 65dB $L_{Aeq,T}$ (in the absence of additional mitigation) at all sensitive receptors.

12.7.4. Additionally, calculations of noise generated by construction traffic on internal access tracks within the Order Limits predict levels of less than 55 dB $L_{Aeq,T}$ at all sensitive receptors (in the absence of additional mitigation).

Construction Traffic Noise

12.7.5. **Table 12.15** below summaries the predicted noise level changes as a result of construction phase traffic for the assumed peak construction year of 2028, in the absence of additional mitigation.

Table 12.15 Construction traffic road noise level change - 2028

Road Name	Short Term Noise Level Change, dB $L_{A10,18hour}$
A15 (north of B1191)	0.3
A15 (south of B1191)	0.2
B1191 (between RAF Digby and Ashby de la Launde)	0.6
B1191 (between Scopwick and RAF Digby)	0.7
B1188 (north of Scopwick)	0.5
B1188 (south of Digby)	0.0
A15 (south of Metheringham Heath Lane)	0.3
A15 (north of Leasingham)	0.3
B1188 (south of Scopwick)	0.0
B1202	0.1

Road Name	Short Term Noise Level Change, dB $L_{A10,18hour}$
Navenby Lane	0.2
Temple Road	1.1

Noise from the Operational Proposed Development

12.7.6. **Table 12.16** below summarises the daytime noise rating levels for the operational Proposed Development in the absence of additional mitigation.

Table 12.16 Daytime operational noise assessment

Receptor	Rated noise level, dB $L_{Ar,1hour}$	Exceedance above representative background sound level, dB	Exceedance above low impact magnitude (40 dB $L_{Ar,1hour}$), dB
Gorse Hill Farm	34	0	-6
The Bungalow, Gorse Hill Road	34	0	-6
14 Martin Court, Mallory Road, RAF Digby	24	-7	-16
13 Howard Road, RAF Digby	27	-3	-13
Rowston Cottages, Digby	31	1	-9
The Lodge, Digby	31	-5	-9
Scopwick Mill	30	2	-10
Mill Cottages, Scopwick	28	0	-12
52 Heath Road, Scopwick	27	-11	-13
52 Heath Road, Scopwick	27	-11	-13

Receptor	Rated noise level, dB $L_{Ar,1hour}$	Exceedance above representative background sound level, dB	Exceedance above low impact magnitude (40 dB $L_{Ar,1hour}$), dB
1 Vicarage Lane, Scopwick	27	-11	-13
Scopwick House, Scopwick	27	-11	-13
The Old Rectory, Blankney	26	-10	-14
The Hall Cottage, Blankney	29	-7	-11
Hall Farm, Blankney	31	-5	-9
Staging Post, Blankney	29	-8	-11
Brickyard Farm, Blankney	30	-3	-10
Scopwick Low Field Farm, Kirkby Green	34	3	-6
The Mills, Kirkby Green	26	-7	-14
Harefield, Kirkby Green	26	-5	-14
Braemar Residential Park, Kirkby Green	29	-2	-11
Longfields, Scopwick	29	-2	-11
4 Springfield Estate, Scopwick	29	-6	-11

Receptor	Rated noise level, dB $L_{Ar,1hour}$	Exceedance above representative background sound level, dB	Exceedance above low impact magnitude (40 dB $L_{Ar,1hour}$), dB
1 Glebe Close, Scopwick	27	-8	-13
6 Farriers Court, Scopwick	27	-11	-13
35 Beckside, Scopwick	28	-10	-12
4 Almonds Court, Scopwick	28	-10	-12
Sheffield House, Scopwick	31	-2	-9
The Hayloft, Rowston Top	32	0	-8
Glebe Farm, Digby	25	-5	-15
The Garden House, Digby	24	-9	-16
The Lodge, Ashby de la Launde	21	-12	-19
Slate House, Ashby de la Launde	30	0	-10
Mount Farm, Ashby de la Launde	25	-10	-15
Peacock Lodge Cottages, Ashby de la Launde	31	-4	-9
Hill Farm Cottages, Brauncewell	11	-20	-29

Receptor	Rated noise level, dB $L_{Ar,1hour}$	Exceedance above representative background sound level, dB	Exceedance above low impact magnitude (40 dB $L_{Ar,1hour}$), dB
Manor House, Brauncewell	25	-6	-15
Church House, Brauncewell	27	-4	-13
School Row, Brauncewell	33	-10	-7
7 Thompson's Bottom, Ashby de la Launde	33	-7	-7
1 Thompson's Bottom, Ashby de la Launde	33	-7	-7
Ashby Lodge, Ashby de la Launde	32	-5	-8
Toll Bar Cottages, Ashby de la Launde	34	-3	-6

12.7.7. Predicted daytime noise levels, considering the plant source noise levels, positioning and numbers within each field, are below 40 dB $L_{Ar,1hour}$ at all receptors considered. This complies with the adopted criteria outlined in **Table 12.12** and agreed with North Kesteven District Council (refer to **Table 12.1**) and secured in **Requirement 15** of the **Draft DCO [EN010149/APP/3.1]**.

12.7.8. **Table 12.17** below summarises the night-time noise rating levels for the operational Proposed Development in the absence of additional mitigation.

Table 12.17 Night-time operational noise assessment

Receptor	Rated noise level, dB $L_{Ar,15minute}$	Exceedance above representative background sound level, dB	Exceedance above low impact magnitude (35 dB $L_{Ar,15minute}$), dB
Gorse Hill Farm	34	5	-1
The Bungalow, Gorse Hill Road	34	5	-1
14 Martin Court, Mallory Road, RAF Digby	26	6	-9
13 Howard Road, RAF Digby	28	7	-7
Rowston Cottages, Digby	32	11	-3
The Lodge, Digby	33	7	-2
Scopwick Mill	31	9	-4
Mill Cottages, Scopwick	30	8	-5
52 Heath Road, Scopwick	29	4	-6
52 Heath Road, Scopwick	29	4	-6
1 Vicarage Lane, Scopwick	29	4	-6
Scopwick House, Scopwick	29	4	-6
The Old Rectory, Blankney	28	5	-7
The Hall Cottage, Blankney	31	8	-4
Hall Farm, Blankney	35	12	0

Receptor	Rated noise level, dB $L_{Ar,15minute}$	Exceedance above representative background sound level, dB	Exceedance above low impact magnitude (35 dB $L_{Ar,15minute}$), dB
Staging Post, Blankney	30	6	-5
Brickyard Farm, Blankney	34	14	-1
Scopwick Low Field Farm, Kirkby Green	35	15	0
The Mills, Kirkby Green	28	9	-7
Harefield, Kirkby Green	30	11	-5
Braemar Residential Park, Kirkby Green	32	13	-3
Longfields, Scopwick	33	14	-2
4 Springfield Estate, Scopwick	30	8	-5
1 Glebe Close, Scopwick	29	7	-6
6 Farriers Court, Scopwick	29	4	-6
35 Beckside, Scopwick	30	5	-5
4 Almonds Court, Scopwick	29	4	-6
Sheffield House, Scopwick	35	13	0
The Hayloft, Rowston Top	35	13	0
Glebe Farm, Digby	27	6	-8

Receptor	Rated noise level, dB $L_{Ar,15minute}$	Exceedance above representative background sound level, dB	Exceedance above low impact magnitude (35 dB $L_{Ar,15minute}$), dB
The Garden House, Digby	25	2	-10
The Lodge, Ashby de la Launde	23	0	-12
Slate House, Ashby de la Launde	32	10	-3
Mount Farm, Ashby de la Launde	27	3	-8
Peacock Lodge Cottages, Ashby de la Launde	35	11	0
Hill Farm Cottages, Brauncewell	14	-8	-21
Manor House, Brauncewell	29	7	-6
Church House, Brauncewell	31	9	-4
School Row, Brauncewell	35	9	0
7 Thompson's Bottom, Ashby de la Launde	34	4	-1
1 Thompson's Bottom, Ashby de la Launde	34	4	-1
Ashby Lodge, Ashby de la Launde	34	7	-1
Toll Bar Cottages, Ashby de la Launde	35	8	0

12.7.9. In the absence of additional mitigation, predicted night-time noise levels, considering the plant source noise levels, positioning and numbers within each field, would comply with the adopted 35dB $L_{Ar,15minute}$ criteria at all the sensitive receptors considered (refer to **Table 12.12** above). This adopted criteria is agreed with North Kesteven District Council (refer to **Table 12.1**).

Noise from Decommissioning Activities

12.7.10. The likely noise impacts from decommissioning activities are considered to be similar to the noise impacts predicted from construction activities (refer to **ES Volume 3, Appendix 12.2: Construction Noise Plant Tables and Results [EN010149/APP/6.3]**), as it is envisaged that similar plant and works would be used.

Decommissioning Traffic Noise

12.7.11. Traffic data have been provided for the assessed decommissioning year of 2060, due to the limitations discussed in **Paragraph 12.4.25**. **Table 12.18** below summaries the predicted short term noise level changes as a result of decommissioning phase traffic, in the absence of additional mitigation.

Table 12.18 Decommissioning traffic road noise level change - 2060

Road Name	Short term noise level change, dB $L_{A10,18hour}$
A15 (north of B1191)	0.3
A15 (south of B1191)	0.2
B1191 (between RAF Digby and Ashby de la Launde)	0.5
B1191 (between Scopwick and RAF Digby)	0.7
B1188 (north of Scopwick)	0.5
B1188 (south of Digby)	0.0
A15 (south of Metheringham Heath Lane)	0.4
A15 (north of Leasingham)	0.3
B1188 (south of Scopwick)	0.0
B1202	0.1

Road Name	Short term noise level change, dB $L_{A10,18hour}$
Navenby Lane	0.2
Temple Road	1.3

12.7.12. The highest short-term noise level change of 1.3dB is predicted along Temple Road; such a level is considered to be a low magnitude impact. All of the remaining road links considered are predicted to experience an increase in noise level of less than 1 dB.

12.8. Additional mitigation

Construction and Decommissioning Noise

12.8.1. Through the implementation of the **oCEMP [EN010149/APP/7.7]**, **oCTMP [EN010149/APP/7.8]**, **Outline Decommissioning Environmental Management Plan (oDEMP) [EN010149/APP/7.13]**, and Best Practicable Means (BPM) as defined by the Control of Pollution Act 1974 **[Ref. 12-2]**, the noise impacts at receptors in the vicinity of the construction and decommissioning phase activities would be minimised. Such measures are as follows:

- Ensure that each item of equipment complies with the noise limits quoted in The Noise Emission in the Environment by Equipment for use Outdoors Regulations 2001 **[Ref. 12-27]**;
- Maintain all vehicles, equipment and noise control measures in good and efficient working order and operated to minimise noise emissions, as prescribed by the manufacturer;
- Plant and equipment which can be supplied with fitted noise reduction modifications, such as exhaust silencer systems and pile driver shrouds, shall be preferentially selected where available;
- Screw piling to be utilised in fields of Solar PV development which are adjacent to receptors, where possible and feasible i.e. subject to ground conditions and archaeology;
- All plant and equipment in intermittent use shall be shut down during periods between work;
- No operation of any defective equipment or items fitted with noise control equipment until repaired;
- All engine compartments or acoustic enclosures are closed whilst engines are running;

- Erection of temporary hoardings to screen construction activities close to receptors;
- A quiet working ethic will be employed to ensure that all members of the workforce have consideration for the nearby residents;
- Shouting and use of radios when entering to and from Site, and when working on Site, will be controlled;
- Operatives will be briefed not to sound car horns to gain access to the Primary and Secondary Construction Compounds. To assist, security will arrange for the Site to be unlocked up to one hour prior to the start of the core working hours;
- The delivery routes set out in the **oCTMP [EN010149/APP/7.8]** will be communicated to and adhered to by all suppliers;
- No deliveries shall be accepted after 18:00 hours;
- Efforts will be taken to reduce number of staff/operative cars arriving at Site, through the use of crew buses and car share arrangements;
- Control and limit noise from reversing alarms and shall use the following hierarchy:
- Design the Primary and Secondary Construction Compound layouts to limit and avoid the need for the reversing of vehicles and ensure that drivers are familiar with the worksite layout;
- Utilise banksmen to avoid the use of reversing alarms;
- Use reversing alarms incorporating one or more of the features listed in hierarchical order below or any other comparable system:
  - Highly directional sounders;
  - Use of broadband signals;
  - Self-adjusting output sounders;
  - Flashing warning lights; and
  - Set reversing alarms to the minimum output noise level required for health and safety compliance.
- Toolbox talks will be carried out by the principal contractor to ensure that all members of the workforce are aware of their possible noise impact and of the sensitivities of the vicinity. These will also ensure that Best Practicable Means of control are delivered on the site.

Operation (including maintenance) Noise

12.8.2. Through the implementation of best practice measures as outlined in the **Outline Operational Environmental Management Plan (oOEMP) [EN010149/APP/7.10]** and the adopted criteria of 40dB $L_{Ar,1hour}$ daytime

and 35dB $L_{Ar,15minute}$ night-time which is secured in **Requirement 15** of the **Draft DCO [EN010149/APP/3.1],** the noise impacts at receptors in the vicinity of the operation (including maintenance) phase activities would be minimised.

12.9. Assessment of residual effects (with additional mitigation)

Noise from Construction Activities

12.9.1. By adopting the additional control measures outlined above, it is considered that noise levels from all construction activities would not exceed 65dB $L_{Aeq,T}$ at any of the receptors considered.

12.9.2. Based on the application of suitable control measures and the high sensitivity of receptors, the magnitude of impact of noise from construction activities during the construction phase at receptors is considered low, resulting in a temporary **minor adverse** effect, which is considered **not significant**.

Construction Traffic Noise

12.9.3. Construction traffic is predicted to increase baseline traffic noise levels by less than 3dB in the short term.

12.9.4. Based on the assessment and the high sensitivity of receptors, the magnitude of impact from construction traffic noise during the construction phase at receptors is considered low, resulting in a temporary **minor adverse** effect, which is considered **not significant**.

Noise from the Operational Proposed Development

12.9.5. Through inclusion of the embedded mitigation and optimisation of proposed operational plant items, predicted noise levels throughout daytime and night-time periods from the operational Proposed Development would not exceed 35dB $L_{Ar,T}$ at any receptors. Noise levels of this magnitude are considered to successfully apply the concept of LOAEL within Planning Practice Guidance – Noise **[Ref. 12-8]**.

12.9.6. Based on the application of embedded mitigation measures, the high sensitivity of receptors, and assuming the design and plant noise emissions are consistent with those incorporated within this assessment, the magnitude of impact during the operational phase at receptors is considered low, resulting in a permanent **minor adverse** effect, which is considered **not significant**.

Noise from Decommissioning Activities

12.9.7. Based on the application of suitable control measures and the high sensitivity of receptors, the magnitude of impact during the decommissioning phase at receptors is considered low, resulting in a temporary **minor adverse** effect, which is considered **not significant**.

Decommissioning Traffic Noise

12.9.8. Decommissioning traffic is predicted to increase baseline traffic noise levels by less than 3dB in the short term.

12.9.9. Based on the assessment and the **high** sensitivity of receptors, the magnitude of impact during the decommissioning phase at receptors is considered **low**, resulting in a temporary **minor adverse** effect, which is considered **not significant**.

Opportunities for enhancement

12.9.10. Opportunities for environmental enhancement are not considered relevant to noise and vibration.

12.10. Monitoring requirements

12.10.1. The **oCEMP [EN010149/APP/7.7]**, **oOEMP [EN010149/APP/7.10]** and **oDEMP [EN010149/APP/7.13]** set out procedures for setting up and publicising a contact point with the principal contractor to log, monitor and address any complaints associated with noise during the construction, operation and decommissioning phases. A scheme to this effect has been included in the aforementioned management plans. Provision of monthly reporting of information to local residents (including public rights of way users) to advise of potential noisy works that are due to take place has been included.

12.10.2. Following implementation of the **oCEMP [EN010149/APP/7.7]** and **oDEMP [EN010149/APP/7.13]**, appropriate targeted monitoring will be undertaken at receptors during the construction and decommissioning phases. This will be based on the outcomes of further additional detailed construction and decommissioning assessments to be undertaken by the principal contractor, with short-term monitoring proposed as a measure to ensure noise levels remain within relevant criteria.

12.10.3. Noise measurements of the installed operational equipment is recommended to verify predicted levels at source which have been accounted for within this assessment.

12.11. Difficulties and uncertainties

12.11.1. Construction plant lists have been generated for the various activities using the best available information at the time of writing. Information has been provided by the Applicant, using prior experience on similar sites. It is expected that these would be refined nearer the time of construction, and suitably controlled within the detailed Construction Environmental Management Plan (CEMP) and completed in accordance with the **oCEMP [EN010149/APP/7.7]**.

12.12. Summary

12.12.1. A summary of this assessment is presented in **Table 12.19**. The sensitivity of each receptor is identified alongside any relevant embedded mitigation and the potential effects that could arise on those receptors. Any proposed additional mitigation measures are stated, and the magnitude of impact and residual effects then assessed. Finally, any monitoring requirements are stated where applicable.

Table 12.19 Assessment Summary

Receptor/matter	Value / Sensitivity / importance of the receptor	Embedded Mitigation	Potential effects	Additional Mitigation	Magnitude of impact	Residual Effect (with additional mitigation)	Monitoring Requirement
Key: + = positive, - = negative, D = direct, I = indirect, ST = short-term, MT = medium-term, LT = long-term, P = Permanent, T = temporary							
Noise from construction activities	High	N/A	Impact on amenity	BPM measures and **oCEMP [EN010149/APP/7.7]**	Low	**Minor adverse (-) (D) (ST) (T) Not significant**	Targeted noise monitoring at receptors
Construction traffic noise	High	N/A	Impact on amenity	**oCTMP [EN010149/APP/7.8]**	Low	**Minor adverse (-) (D) (ST) (T) Not significant**	N/A

Receptor/matter	Value / Sensitivity / importance of the receptor	Embedded Mitigation	Potential effects	Additional Mitigation	Magnitude of impact	Residual Effect (with additional mitigation)	Monitoring Requirement
Key: + = positive, - = negative, D = direct, I = indirect, ST = short-term, MT = medium-term, LT = long-term, P = Permanent, T = temporary							
Noise from the operational Proposed Development	High	Appropriate distances retained between source and receiver	Impact on amenity	Optimised selection of plant and equipment, use of acoustic barriers	Low	**Minor adverse** **(-) (D) (LT) (P)** **Not significant**	Verification of plant noise measurements of installed equipment
Noise from decommissioning activities	High	Adopted mitigation and Best Practicable Means measures	Impact on amenity	**oDEMP [EN010149/APP/7.13**	Low	**Minor adverse** **(-) (D) (ST) (T)** **Not significant**	Targeted noise monitoring at receptors

Receptor/matter	Value / Sensitivity / importance of the receptor	Embedded Mitigation	Potential effects	Additional Mitigation	Magnitude of impact	Residual Effect (with additional mitigation)	Monitoring Requirement
Key: + = positive, - = negative, D = direct, I = indirect, ST = short-term, MT = medium-term, LT = long-term, P = Permanent, T = temporary							
Decommissioning traffic noise	High	N/A	Impact on amenity	**oDEMP [EN010149/APP/7.13**	Low	**Minor** **(-) (D) (ST) (T)** **Not significant**	N/A

12.13. References

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- **Ref. 12-2**: Control of Pollution Act 1974. Available online: https://www.legislation.gov.uk/ukpga/1974/40
- **Ref. 12-3**: Overarching National Policy Statement for Energy (EN-1) (2023). Available online: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1
- **Ref. 12-4**: National Policy Statement for Renewable Energy (EN-3) (2023). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-renewable-energy-infrastructure-en-3
- **Ref. 12-5**: National Policy Statement for Electrical Networks Infrastructure (EN-5) (2023). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5
- **Ref. 12-6**: National Planning Policy Framework (2023). Available online: https://www.gov.uk/government/publications/national-planning-policy-framework--2
- **Ref. 12-7**: Noise Policy Statement for England (Defra, 2010). Available online: https://www.gov.uk/government/publications/noise-policy-statement-for-england
- **Ref. 12-8**: Planning Practice Guidance – Noise (2019). Available online: https://www.gov.uk/government/collections/planning-practice-guidance
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- **Ref. 12-11**: British Standards Institute (2009 + 2014). BS 5228-1 + A1, Code of Practice for Noise and Vibration Control on Construction and Open Sites - Noise. BSI.
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- **Ref. 12-15**: British Standards Institute (2013). BS EN 61672-1, Electroacoustics. Sound level meters - Specifications. BSI.
- **Ref. 12-16**: Department of Transport Welsh Office (1988), Calculation of Road Traffic Noise.
- **Ref. 12-17**: Design Manual for Roads and Bridges (2020), LA 111 - Noise and vibration. Available online: [redacted]
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- **Ref. 12-19**: International Organization for Standardization (2024). ISO 9613-2:2024, Acoustics — Attenuation of sound during propagation outdoors Part 2: Engineering method for the prediction of sound pressure levels outdoors.
- **Ref. 12-20**: Berglund, Birgitta, Lindvall, Thomas, Schwela, Dietrich H & World Health Organization. Occupational and Environmental Health Team. (1999). Guidelines for community noise. World Health Organization. Available online: [redacted]
- **Ref. 12-21**: World Health Organization. Regional Office for Europe. (2009). Night noise guidelines for Europe. World Health Organization. Regional Office for Europe. Available online: [redacted]
- **Ref. 12-22**: The Association of Noise Consultants, BS4142:2014+A1:2019 Technical Note. Available online: [redacted]
- **Ref. 12-23**: British Standards Institute (2014). BS 8233, Guidance on sound insulation and noise reduction for buildings. BSI.
- **Ref. 12-24**: Natural England, Sites of Special Scientific Interest (England). Available online: [redacted]
- **Ref. 12-25**: Natural England, Special Protection Areas (England). Available online: [redacted]
- **Ref. 12-26**: Natural England, Ramsar (England). Available online: [redacted]

- **Ref. 12-27**: UK Statutory Instruments (2001) (SI 2001/1701), The Noise Emission in the Environment by Equipment for use Outdoors Regulations 2001. Available online: https://www.legislation.gov.uk/uksi/2001/1701/contents

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